Abstracts

Preconference Session 1

PC1: BEYOND THE BADGE: HOW TO COLLECT EXPERIENCES, NOT JUST CEUS

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The Southeast ACSM Annual Meeting provides students and young professionals with access to cutting-edge research, continuing education credits, and professional development opportunities. Yet, the true value of the SE experience extends beyond attending sessions, it lies in the relationships, collaborations, and personal growth that develop outside the lecture hall. This interactive session, *Beyond the Badge: How to Collect Experiences, Not Just CEUs*, is designed to help students and young faculty maximize their time at SEACSM by focusing on connection, engagement, and long-term career impact. The presenters bring complementary perspectives: Dr. O, a long-time SE contributor and mentor; Alyssa, a former SE board member; and Antonella, a recent mentee whose career trajectory has been shaped by SE mentorship and collaboration. Together, they will share their personal journeys and illustrate how mentorship, networking, and involvement transformed their SE experiences into lasting professional opportunities and friendships. The session will include a practical activity, the *Beyond the Badge Challenge,* where attendees commit to specific, achievable networking and engagement goals during the conference. Mini-tutorials on crafting a 15-second elevator pitch, following up with new connections, and effectively engaging with different presentation formats will give participants actionable skills to implement immediately. Attendees will leave this session with not only strategies to absorb conference content but also the tools to build meaningful connections that extend far beyond their CEUs.

Preconference Session 2

PC2: LEAD THE WAY: LEADERSHIP THROUGH PEER REVIEW AND OPEN SCIENCE WITH ACSM'S ESM JOURNAL

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Becoming a skilled and effective manuscript reviewer is a crucial step towards joining a journal's editorial board, attaining the role of Associate Editor, or advancing to the position of Editor-in-Chief. This tutorial aims to equip graduate students, post-doctoral scholars, and early career assistant professors with the essential skills and knowledge to conduct effective peer reviews of journal articles, thereby paving the way for future career opportunities. The session Dr. DuBose will include practical activities focused on the peer review process within the specific context of ACSM's journal, Exercise, Sport, and Movement (ESM). Additionally, the tutorial will explore ESM's commitment to open science principles and their influence on contemporary publishing practices. After attending this tutorial the attendee will be able to: 1. Describe the peer review process for journal articles 2. Discuss the importance and principles of open science 3. Incorporate best practices into their manuscript review process 4. Evaluate how open science principles could fit within their research agenda.

Preconference Session 3

PC301: VISION TESTS AND LIKERT SCALES TO INFORM DIFFERENT STAIRWAY CONTRAST MARKINGS: PRELIMINARY DATA

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BACKGROUND: Slips, trips, and falls on stairways pose significant safety concerns. Previous foot clearance measures suggest that tread edge contrast markings on stairs may reduce unintentional foot contact by altering the visual perception of step dimensions. The purpose of this analysis was to assess the association between visual acuity and contrast sensitivity and Likert Scale ratings of four different stairway contrast markings in two lighting conditions, providing insight for future stairway contrast marking implementation across a spectrum of vision performance. METHODS: Twenty-four participants performed visual acuity and contrast sensitivity tests and then navigated a stairway under four, randomized markings (dark 190033; yellow FFFF00; grey C8C8C8; opaque RBG0000) via a custom Unity application built for augmented reality, in two lighting settings (low <10 lx; standard 300 lx). After each condition, participants were asked to rate their experience. To investigate the relationship between vision (e.g., visual acuity and contrast sensitivity) and Likert scale ratings, Spearman correlations were performed to calculate the coefficient of determination, and Chi-square goodness-of-fit tests assessed the proportions of Likert Scale responses. RESULTS: Contrast sensitivity compared to visual acuity accounted for a greater variance (r2) for grey markers in low light (7% vs. 3%), opaque markers in standard light (14% vs. 1%), and dark markers in standard light (19% vs. 3%). Chi-square goodness-of-fit tests with weighted, observed frequencies indicated significant proportional differences of Likert scale responses for opaque markers in standard light ($x2$ (4) = 14.750, p = .005), a preference towards dislike, and dark markers in low light ($x2$ (4) = 11.000, p = .027), a preference towards likeness, but no proportional difference for opaque markers in low light ($x2$ (4) = 9.333, p = .053). CONCLUSIONS: Our preliminary data suggest that contrast sensitivity vision performance may inform stairway markings. Research is currently ongoing assessing how biomechanics is related to visual acuity and contrast sensitivity across varying stairway marking conditions.

PC302: THIGH ADIPOSITY, BUT NOT MUSCLE QUALITY, DIFFERS BY URINARY ESTROGEN-TO-PROGESTERONE RATIO IN PERIMENOPAUSAL FEMALES

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BACKGROUND: Perimenopause (PERI) is characterized by fluctuations in female sex hormones and is often accompanied by increased adipose tissue (AT) and reduced skeletal muscle quality and size. Hormonal influence on thigh composition assessed by MRI remains unclear. The objective of this study was to compare MRI-derived measures of thigh muscle composition between PERI females with high versus low urinary estrogen-to-progesterone (E:P) ratios. **METHODS:** Twenty-seven PERI females (irregular menstrual cycles or ≥3-month amenorrhea with bleeding within the prior 12 months; age: 48.8±4.5 years; BMI: 31.5±3.3 kg/m²) underwent whole-body MRI (3T) and images were processed and segmented in 3D Slicer using semi-automated thresholding to delineate total thigh AT (subcutaneous + intramuscular fat), subcutaneous AT, muscle volume (cm^3), and muscle quality (muscle/intramuscular fat ratio). Urinary hormones (E and P) were measured and used to stratify into HIGH (>83.9 ng/mL; n=13; early PERI) and LOW (<83.9 ng/mL; n=15; late PERI) groups. MRI-derived thigh composition outcomes were compared between HIGH and LOW hormone groups using an unpaired samples *t*-test. **RESULTS:** Total thigh AT (subcutaneous + intramuscular fat) was lower in the HIGH E:P ratio group (4213±937 cm^3) compared to the LOW E:P ratio group (5188±1355 cm^3; p=0.04). Intramuscular fat (HIGH: 614± 296 cm^3, LOW: 816±337 cm^3; p=0.10), muscle volume (HIGH: 2906±549 cm^3, LOW: 3001±667 cm^3; p=0.68), and muscle quality (HIGH: 5.68±2.69, LOW: 4.26±1.91; p=0.13) did not differ between groups. **CONCLUSION:** PERI females with a HIGH urinary E:P ratio exhibited lower thigh AT, with non-significant but consistent trends toward lower intramuscular fat and higher muscle quality. These findings highlight the value of monitoring urinary hormones during PERI to better understand links with cardiometabolic outcomes and responsiveness to interventions such as exercise or hormone therapy. **Grant or Funding Information:** These data were collected as part of a study funded by the American Diabetes Association, grant 7-23-ICTSWH-04.

PC303: INTERRUPTIONS WITHOUT IMPACT: INTERCONNECTED CARDIORENAL-METABOLIC BARRIERS TO THE PRACTICAL OPTIMIZATION OF PERIPHERAL VASCULAR HEALTH

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BACKGROUND: Excess sedentary time (ST) increases peripheral arterial disease risk by reducing muscle pump activity, resulting in blood pooling, metabolic dysfunction, and increased arterial stiffness (AS). Evidence suggests ST interruptions (STI) attenuate AS; however, guidance on practical STI strategies remain ambiguous. **PURPOSE**: To elucidate the STI-induced metabolic (triglyceride, TRG; HDL-to-LDL ratio, HLR) and renal (aldosterone-to-renin ratio, ARR) regulation of AS alleviation. **METHODS**: 20 adults (80% F, age: 45 ± 7 y, BMI: 27.6 ± 5.2 kg•m-2) completed 4h visits of uninterrupted sitting (CON) or STI conditions: standing (STAND), walking (WALK), or combined (MIXED). After semi-recumbent rest, femoral-ankle pulse wave velocity (faPWV) was assessed, followed by calf circumference (CC) and blood sample collection at pre- and post-condition. Outcomes were analyzed using a combined linear mixed model and mediation analysis approach ($p \leq 0.05$). **RESULTS**: STI did not alter faPWV ($p = 0.757$; R2m: 0.061), CC ($p = 0.952$; R2m: 0.026), ARR ($p = 0.535$; R2m: 0.020), TRG ($p = 0.730$; R2m: 0.036), or HLR ($p = 0.857$; R2m: 0.013) vs. CON. Mediations showed no STI-faPWV ($p \geq 0.603$) or STI-CC ($p \geq 0.510$) indirect effects, with peak total effect contributions from TRG (10%) and ARR (77%), respectively. faPWV was positively predicted by TRG (β= 0.004 ± 0.002 mg•dL-1, 95%CI [4.50e-4 - 0.007], $p = 0.026$), and unrelated to HLR (β= -0.882 ± 0.523 mg•dL-1, $p = 0.092$) and ARR (β= 0.001 ± 0.008 ng•dL-1 per ng•mL-1•h-1, $p = 0.873$). CC was positively predicted by ARR (β= 0.077 ± 0.031 ng•dL-1 per ng•mL-1•h-1, 95%CI [0.016 - 0.139], $p = 0.014$), inversely by HLR (β= -4.064 ± 1.999 mg•dL-1, 95%CI [-7.984 - -0.145], $p = 0.042$) and unrelated to TRG (β= 0.004 ± 0.007 mg•dL-1, $p = 0.558$). **CONCLUSIONS**: Biological plausibility was suggested with peripheral volume-stiffness burden corresponding to increased TRG (faPWV: +0.004 m•s-1) and ARR (CC: +0.08 cm) as well as decreased HLR (CC: +4.06 cm). These results indicate increases in lower limb AS and peripheral fluid retention may be mediated by lipid dysfunction and renal hemodynamics, respectively. However, STI did not mitigate AS, implying STI-induced vascular benefits, and their biological regulation, may be dose-dependent. Future studies should optimize the balance between STI practicality and efficacy.

PC304: MODERATING EFFECTS OF INDIVIDUAL DIFFERENCES IN BASELINE EPISODIC MEMORY ON ACUTE EXERCISE BENEFITS IN MEMORY

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BACKGROUND: Acute vigorous-intensity exercise has been shown to positively impact cognitive function, including long-term episodic memory performance. However, few studies have investigated whether individual differences in baseline memory influence the relationship between acute exercise and memory performance. Thus, the purpose of this experiment was to evaluate baseline episodic memory as a potential moderator of the relationship between acute exercise and memory. **METHODS:** Two-hundred and thirteen young adults completed a within-subjects, counterbalanced design. Participants completed two conditions: a vigorous intensity exercise condition and a non-exercise control condition. For each condition, two list-learning memory assessments were employed, one conducted after a 20-minute delay and another after a 24-hr delay. Baseline long-term episodic memory was evaluated from the control condition using participants' episodic memory performance at the 24-hour delay. Mixed-measures analyses of variance (ANOVA) were performed to assess these aims. **RESULTS:** With the number of correct words recalled at the 24-hr delay as the primary outcome, consistent with prior literature and our hypothesis, a 2 (*Condition*) × 3 (*Baseline Individual Memory Difference*) mixed-measures ANOVA yielded a main effect for Condition, $F(1,208) = 16.420$, $p < 0.001$, a main effect for Baseline Individual Memory Difference, $F(2,208) = 152.284$, $p < 0.001$, and an interaction between these factors, $F(2,208) = 32.873$, $p < 0.001$. Post-hoc testing revealed that participants with lower baseline episodic memory ability demonstrated the greatest increases in long-term episodic memory performance after exercise (compared to control), mean difference = 2.254, $t = 7.858$, $p < 0.001$. **CONCLUSIONS:** These results suggest that individual differences in memory performance should be considered as an important moderator when evaluating the relationship between acute exercise and long-term episodic memory function.

PC305: PROGESTERONE FLUCTUATIONS ARE ASSOCIATED WITH EXTRACELLULAR FLUID VOLUME IN HEALTHY, EUMENORRHEIC WOMEN

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BACKGROUND: Accurate investigation of menstrual cycle (MC) effects on performance demands that researchers measure reproductive hormones to confirm participants' phase at the time of data collection. Unfortunately, this step is often skipped due to challenges with acquiring and analyzing blood samples. Previous research using bioimpedance spectroscopy (BIS) has demonstrated that changes in body water distribution may occur between MC phases; if these changes are related to hormone fluctuations, then BIS may be a viable option for non-invasively confirming MC phase. The purpose of this study was to examine relationships between body water and serum hormone concentrations across MC phases. METHODS: Eighteen women (age 22 ± 4 y) with a history of normal menstruation completed the study procedures on three separate occasions. Study visits were scheduled to coincide with the early follicular (EF), late follicular (LF), and mid-luteal (ML) phases of participants' MC based on self-reported onset of menstruation and at-home urinary ovulation testing. Serum estrogen and progesterone concentrations were quantified via ELISA and used to confirm MC phase. Fluid distribution (extracellular [ECF] and intracellular [ICF] fluid volumes) and bioimpedance (resistance at zero [R_0] and infinite [R_{inf}] frequencies) metrics were obtained using whole-body BIS. Differences in outcome variables across MC phase were assessed using within-subjects ANOVA. Associations between hormone concentrations and BIS metrics were determined using repeated measures correlation (R_{rm}). RESULTS: Hormones fluctuated as expected, with LF estrogen (440.2 ± 358.7 pmol/L) and ML progesterone (96.0 ± 53.9 nmol/L) concentrations 71% ($p < 0.05$) and 244% ($p < 0.001$) greater than EF values, respectively. Progesterone was strongly associated (all $p < 0.001$) with ECF ($R_{rm} = -0.60$) and R_0 ($R_{rm} = 0.56$). Associations between estrogen and BIS variables were small (R_{rm} values -0.16 to 0.14) and non-significant (all $p > 0.10$). CONCLUSIONS: Serum progesterone increases were associated with reduced ECF volume and increased R_0. These findings suggest that BIS may have utility in detecting progesterone fluctuations and could be used as a non-invasive method for confirming the latter phase of the MC.

PC306: ASSOCIATIONS BETWEEN STRUCTURAL AND FUNCTIONAL ASYMMETRIES IN ROTC CADETS

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BACKGROUND: Interlimb asymmetry describes differences between the right and left limbs in composition, function, and performance. In military populations, musculoskeletal injuries (MSKI) reduce readiness and increase healthcare costs, yet few studies have examined the role of asymmetries in this context. This study aimed to investigate the relationships between body composition and anthropometric asymmetries and functional asymmetries in power and dynamic balance among ROTC cadets. METHODS: Seventy-nine healthy ROTC cadets (20.1 ± 2.3 yrs; 84.8% male) completed one laboratory visit for anthropometrics, Dual-Energy X-Ray Absorptiometry (DEXA), and baseline countermovement jumps (CMJ) and Y-Balance Test (YBT). Interlimb asymmetry scores were calculated as right-left differences. Pearson product-moment correlations were used to examine associations between anthropometric/body composition asymmetries and jump/balance asymmetries ($\alpha = 0.05$). RESULTS: Leg lean mass asymmetry was significantly correlated with CMJ peak propulsive force ($r = 0.517$, $R^2 = 0.27$, $p < 0.001$), average propulsive force ($r = 0.560$, $R^2 = 0.31$, $p < 0.001$), peak braking force ($r = 0.447$, $R^2 = 0.20$, $p < 0.001$), and average braking force ($r = 0.355$, $R^2 = 0.13$, $p = 0.001$). Mid-thigh girth asymmetry correlated with leg lean mass asymmetry ($r = 0.413$, $R^2 = 0.17$, $p < 0.001$), peak propulsive force asymmetry ($r = 0.481$, $R^2 = 0.23$, $p < 0.001$), average propulsive force asymmetry ($r = 0.394$, $R^2 = 0.15$, $p < 0.001$), peak braking force asymmetry ($r = 0.430$, $R^2 = 0.18$, $p < 0.001$), average braking force asymmetry ($r = 0.362$, $R^2 = 0.13$, $p = 0.001$). YBT composite asymmetry was strongly correlated with reach direction asymmetries ($r = 0.681$-0.696, $p < 0.001$). CONCLUSIONS: Leg lean mass and mid-thigh girth asymmetries were moderately associated with functional jumping asymmetries in propulsive and braking forces. These results suggest structural asymmetries may contribute to performance imbalances. Monitoring composition and anthropometric asymmetries may provide insight into physical readiness and potential risk factors for MSKI in ROTC cadets.

PC307: STEROID KNEE INJECTIONS FOR OBESE PATIENTS WITH KNEE ARTHRITIS: STANDARD VS. LOW DOSE TREATMENTS

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BACKGROUND: Steroid injections are commonly used to treat knee joint pain in patients with knee osteoarthritis. Standard treatment is 40 mg triamcinolone acetonide (40mg/ml) as described by the American College of Rheumatologists. Recent studies have suggested that lower doses may be sufficient. However, it is unclear if lower doses have good efficacy for obese patients. PURPOSE: Assess obese patients with knee arthritis and compare a low dose group (20mg) to a standard dose group (40mg) to determine if there are significant differences in outcomes (KOOS score and pain). We hypothesized there would be no differences in KOOS scores and VAS pain scores for the two groups. METHODS: Patients included had diagnosed primary knee arthritis and a BMI ≥ 30. Steroid treatments were administered using an ultrasound-guided approach. The standard treatment group (9 male, 10 female; 67.16±7.34 yrs) received 40-mg of triamcinolone acetonide (40mg/ml) + 4ml of lidocaine (10 mg/ml - 1%). The low-dose group (2 male, 9 female; 66.55±8.41 yrs) received 20-mg of triamcinolone acetonide (40mg/ml) + 4ml of lidocaine (10mg/ml - 1%). Knee function was assessed at baseline and 4 weeks using the KOOS questionnaire and the VAS pain scale. A two-way ANOVA (dose x time) and post-hoc comparisons (with Bonferroni corrections) were used to test for significant differences (overall α;=0.05). RESULTS: For the KOOS scores, there were significant 4-week improvements ($p<0.01$) for both the standard dose group (37.6±14.2 to 70.2±15.3) and low dose group (49.5±17.4 to 78.1±10.7). At four weeks, there was no significant difference ($p=0.13$) in KOOS scores between the two groups. For the 4-week pain score, there was also no significant difference ($p<0.84$) between the standard dose group (2.6±1.4) and low dose group (2.7±1.6). CONCLUSION: Both groups had dramatic improvement in knee function by week 4. The low dose appeared to have good efficacy as there were no significant group differences at week 4 (for both KOOS scores and VAS pain scores). Larger randomized control trials are warranted.

PC308: EVALUATION OF POTENTIAL FACTORS ASSOCIATED WITH VALIDITY INDICES FOR WEARABLE TECHNOLOGIES DURING TREADMILL LOCOMOTION

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BACKGROUND: The increasing use of steps and cadence for physical activity monitoring reinforces the need for valid wearable technologies. Validity indices are important to objectively compare the performance of wearable technologies. **PURPOSE:** To examine factors associated with validity indices for wearable technologies: treadmill speeds (slow [0.8-3.2 km/h], normal [4.0-6.4 km/h], fast [7.2-8.0 km/h]); wear location (waist, wrist, thigh, ankle); and body mass index (BMI). **METHODS:** Participants completed 5-min treadmill bouts while wearing 10 devices (Waist: ActiGraph GT3X+, Fitbit Inspire, NewLifestyles; Wrist: Apple Watch, Polar, GeneActive, Fitbit Versa, Garmin; Thigh: activPAL; Ankle: StepWatch). The criterion step was measured by direct observation via a hand-tally device. Validity indices included accuracy (mean absolute percentage error, MAPE) and bias (mean percentage error). Zero-inflated gamma mixed effects and gamma mixed effects regression models were used to test the factors' associations with accuracy and bias, respectively. **RESULTS:** Seventy-two adults (19.0±0.8 years, 50.0% female) completed 670 treadmill bouts. For normal speeds, 8 wearable devices performed at <6.4% MAPE with NewLifestyles and Polar at <11.7% MAPE. At normal speeds, the thigh location showed higher accuracy (MAPE: 1.1±1.9%) than the ankle (3.2±10.3%), waist (4.8±12.5%), and wrist (4.8±7.4%). All wearable technologies displayed the lowest accuracy at slow speeds (27.0±33.7%) and highest accuracy at normal speeds (4.5±9.7%). Normal speeds, thigh and wrist locations, and BMI were negatively associated with inaccuracy ($p<0.01$), while slow speeds were positively associated with inaccuracy ($p<0.001$). Normal speeds and BMI were positively associated with bias ($p<0.01$), while slow speeds and thigh, waist, and wrist locations were negatively associated with bias ($p<0.01$). **CONCLUSIONS:** Validity indices were associated with speed, wear location, and BMI. Thus, to objectively compare wearable device performance, standardized internal validity indices and their associated factors (i.e., speed, wear location, BMI) should be considered in study designs. **FUNDING:** NIH NICHD-R01HD105768. This content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

Preconference Session 4

PC4: FROM THE ISLAND TO THE COLLEGE: PUERTO RICO'S ENDURING INFLUENCE ON SPORTS MEDICINE

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Puerto Rico's recent inclusion within the geographic boundaries of the Southeast ACSM Regional Chapter (SEACSM) marks a significant milestone in acknowledging decades of contributions to sports medicine and exercise science. For over 40 years, ACSM members from Puerto Rico have actively participated in annual and regional meetings through consistent attendance and scientific presentations. Following 15 years of evaluating regional chapter alignment, members and fellows from Puerto Rico identified SEACSM as the most geographically and professionally appropriate fit. This presentation aims to both honor Puerto Rico's longstanding involvement in ACSM and propose actionable strategies to deepen integration, foster collaboration, and strengthen leadership within SEACSM. The learning objectives are to: 1) highlight Puerto Rico's historical contributions to ACSM and the field of exercise sciences, 2) explore strategies to strengthen collaboration and engagement between Puerto Rico and SEACSM, and 3) identify opportunities for professional development, networking, and leadership within the regional chapter framework. This tutorial is designed for SEACSM-affiliated faculty and professionals who value regional collaboration and scientific exchange, as well as students and early-career professionals seeking mentorship, networking, and professional development opportunities.

Student Award Posters—Doctoral

D1: RESISTANCE EXERCISE IMPROVES PHYSICAL FUNCTION BUT NOT PSYCHOLOGICAL PREDICTORS OF LONG-TERM MAINTENANCE IN CANCER SURVIVORS

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BACKGROUND: Resistance exercise (RE) is recommended for cancer survivors to improve muscle strength and physical function. However, many survivors discontinue RE once supervised programs end. Understanding how psychological factors related to physical activity maintenance change during these interventions can inform strategies to support longer-term participation. **METHODS:** Participants were cancer survivors enrolled in an 8-week supervised RE program in Columbia, South Carolina. Eligibility included adults ≥18 years of age having completed primary cancer treatment. The program consisted of 2 supervised RE sessions per week, each including 6-8 exercises targeting the major muscle groups of the upper- and lower-body. Program effectiveness was evaluated using the Short Physical Performance Battery (SPPB), Bellarmine Norton Assessment Tool (BNAT), and Sit-to-Stand Power (STSP). Psychological factors related to physical activity maintenance included RE task self-efficacy (RESE), barrier self-efficacy (BSE), outcome expectations for exercise (OEE), exercise self-identity (ESI), and fear of physical activity (FPA). Paired-samples t-tests were used to assess changes from pre- to post-intervention, and Hedges' g effect sizes (ES) were used to quantify the magnitude of change. At 3 months post-program, participants were contacted to assess continued RE participation. **RESULTS:** Twenty-five cancer survivors (4 men, 21 women; mean age 60 ± 9 years) primarily treated for breast cancer (60%) completed the intervention. Significant improvements were observed in physical function, SPPB ($ES = 0.66$, $p < 0.05$), BNAT ($ES = 1.14$, $p < 0.05$), and STSP ($ES = 0.44$, $p < 0.05$). There were no significant changes in RESE, BSE, OEE, ESI or FPA. Thirteen participants have completed the 3-month follow-up to date, of whom 5 (38%) reported continuing RE ≥2 days/week. **CONCLUSION:** Supervised RE improved physical function but did not influence psychological factors linked to long-term maintenance. Additional follow-up is ongoing to assess longer-term changes in physical function and psychological factors. Although the null findings for psychological outcomes may be explained by the small sample size, the modest participation in RE at 3 months highlights the need for strategies to promote continued participation.

D2: THE ASSOCIATION OF STRENGTH AND BODY COMPOSITION IN CHIDLREN AGES 5 TO 11 YEARS

Trey R. Naylor, Abigayle R. Spong, Scott M. Sigrist, Kelsie P. Kohlman, Jody L. Clasey, FACSM. *University of Kentucky, Lexington, KY.*

BACKGROUND: Prior reports have determined that fat-free mass (FFM) is positively associated with muscle strength. Furthermore, DXA scanning can provide total body and regional soft tissue analyses and the ability to create and analyze uniquely created regions of interest (ROI) including the quadriceps (QUADS) and hamstrings (HAMS). While this association has been demonstrated in adults, the association between mineral-free lean (MFL) mass measures and muscle strength in young children has not been fully elucidated. The purpose of this study was to determine the association between strength and total body and regional soft tissue measures in young children. **METHODS:** Total body DXA scans from 32 children 5-11 years (8.0 ± 1.6) of age were acquired with the subjects lying on their left and right sides with the leg of interest extended and the contralateral leg bent removing it from the analyses field of view. Unique regions of interest were created for analyses of MFL masses using custom analyses software. Muscle strength testing was performed using a RAMPing protocol at 90° knee flexion consisting of two warm-up contractions at 50% and 75% perceived effort followed by three maximal voluntary isometric contractions (MVIC) of knee flexion and extension using an isokinetic dynamometer (Biodex System 4). Correlational analyses and explained variance were used to determine the associations between strength and body composition. **RESULTS:** Peak knee extension torque (72.6 ± 35.9 N·m) explained 70.6% of the variance in total body MFL mass (20.3 ± 6.1 kg), 77.5% of the variance in total thigh MFL mass (2.2 ± 0.9 kg), and 66.3% of the variance in QUADS MFL mass (0.8 ± 0.3 kg) while peak knee flexion torque (27.4 ± 14.0 N·m) explained 59.8% of the variance in total body MFL mass, 62.7% of the variance in total thigh MFL mass, and 65.4% of the variance in HAMS MFL mass (0.8 ± 0.3 kg). **CONCLUSIONS:** Total body and total thigh MFL mass, including QUADS and HAMS MFL mass measures demonstrated a strong association to peak knee extension and flexion torque, confirmed by the significant explained variance. This study was supported in part by the University of Kentucky Pediatric Exercise Physiology Laboratory Endowment.

D3: QUANTIFYING MENSTRUAL CYCLE CHARACTERISTICS IN PROFESSIONAL ATHLETES ACROSS A COMPETITIVE SOCCER SEASON

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BACKGROUND: The menstrual cycle (MC) is highly sensitive to internal and external stimuli, and as such, it is likely that MC characteristics (e.g. cycle length) and symptomology might vary in elite female athletes. Little research has been done to longitudinally quantify MC characteristics and symptoms in elite female athletes throughout a sporting season. Therefore, the aim of this study was to establish variability in MC characteristics and symptoms between different hormonal profiles (HP), including naturally menstruating, intrauterine devices (IUD), and oral contraceptive pill (OCP), and estimated MC phases throughout the course of a National Women's Soccer League (NWSL) season. METHODS: 22 players (age: 26 ± 5 years; 9 naturally menstruating, 7 IUD users, 6 OCP users) participated in the study. Subjective and objective MC data were collected daily throughout the entire pre- and regular 2024 NWSL season. MC phases were estimated based upon a previously validated tracking method. MC length, variability, symptom type, frequency, and severity were analyzed. RESULTS: Across all participants, the most common symptoms reported were lower back pain (16%), tender breasts (14%), and disturbed sleep (13%). Irrespective of HP, there were significantly fewer symptoms reported in phase 2 (β = -1.7, SE = 0.55, p = 0.002) and 3 (β = -1.5, SE = 0.57, p = 0.007), when compared to phase 1, and there were no significant differences when comparing phase 1 to 4 (β = -0.7, SE = 0.47, p = 0.13). IUD users experienced significantly more symptoms (β = 2.17, SE = 0.88, p = 0.014) when compared with natural or OCP. In the second half of the competitive season, all players experienced a significant increase in symptom severity (β = 0.045, SE = 0.032, t = 1.43, p = 0.049). There were no significant differences in cycle length variability between HP or across the season (p>0.05). CONCLUSIONS: This study highlights the importance of longitudinal MC tracking, as symptom frequency changed across phases and differed between HP, while symptom severity changed throughout the season. This study helps to provide a framework for MC monitoring and symptom mapping to allow athletes and practitioners to be proactive in symptom management to help improve athlete wellbeing.

D4: USING MACHINE LEARNING TO IDENTIFY CRITICAL BIOMECHANICAL FACTORS FOR FASTBALL VELOCVITY IN LIVE GAMES

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BACKGROUND: Fastball velocity is a key determinant of pitching performance in baseball. While prior research has examined the influence of pitching mechanics, traditional statistical models struggle with feature selection and instability under multicollinearity. Machine learning (ML) techniques offer the ability to capture higher-order interactions and may enhance predictive accuracy. This study aimed to develop ML-based models to predict in-game fastball velocity and identify the most influential biomechanical contributors. **METHODS:** Data from 236 Division I baseball pitchers (1.89±0.06 m, 92.4±10.15 kg; b92.11±2.72 mph) were collected during the period from 2023-2025. For each pitcher, the ten fastest fastballs were analyzed. Kinematic and kinetic variables were obtained using markerless motion capture (300Hz), and pitch velocity was tracked by a ball tracking device. Sixty-six biomechanical variables were initially considered as predictors. Three predictive models were evaluated: 3 linear models (LMM, LASSO, and Elastic Net) and 3 non-linear models (Random Forest, Boost Gradient Regression, and Neural Network). Model performance was evaluated via R^2 and MAE. **RESULTS:** Linear models demonstrated strong predictive accuracy ($R^2 \approx .963$-$.964$; MAE ≈ 0.38). Nonlinear approaches yielded comparable or superior results (Random Forest: $R^2 = .970$, MAE = .36; Gradient Boosting: $R^2 = .998$, MAE = .01; Neural Network: $R^2 = .972$, MAE = .59). Across all models, elbow and shoulder kinetics consistently explained fastball velocity, while maximum trunk rotational velocity emerged as a strong kinematic predictor. **CONCLUSIONS:** ML-based models reliably predicted in-game fastball velocity ($R^2 \approx .96$-$.97$). Based on the ML-based models, although non-linear models achieved marginally higher accuracy, linear models required fewer computational resources while maintaining comparable performance. Collectively, these finding highlight the pivotal role of upper-extremity kinetics and trunk rotational velocity in generating ball velocity among Division I collegiate pitchers in all ML-based models.

D5: NEAR-INFRARED SPECTROSCOPY MUSCLE OXYGENATION KINETICS REFLECTS FUNCTIONAL FITNESS IN MEN WITH PROSTATE CANCER

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BACKGROUND: Patients with prostate cancer undergoing androgen deprivation therapy (ADT) have a heightened risk of cardiovascular disease (CVD). Exercise intolerance, marked by substantial decreases in cardiorespiratory fitness, is a hallmark contributor to exacerbated CVD risk. Understanding physiological factors related to exercise intolerance is paramount to the development of targeted interventions to reduce CVD burden and enhance quality of life (QoL). The purpose of this study was to investigate the role of peripheral skeletal muscle contributors to functional exercise capacity in older men with prostate cancer undergoing ADT. METHODS: Eight patients (67 ± 6.5 years) completed a dual-energy X-ray absorptiometry scan to characterize lean mass, a six-minute walk test (6MWT) to assess functional aerobic capacity representative of daily living activities, and a cardiopulmonary exercise test to confirm exercise intolerance. During the 6MWT, a near-infrared spectroscopy (NIRS) device was placed on the gastrocnemius to determine skeletal muscle oxygen saturation (StO2), a measure of the balance between local oxygen delivery and utilization. Time to steady-state StO2 (tSS-StO2), an indication of the efficiency to meet local oxygen demand, was calculated as the time required to reach steady-state oxygen saturation from the onset of the 6MWT. RESULTS: Cardiorespiratory fitness (14.2 ± 2.7 mL·kg-1·min-1; 10th percentile) and functional aerobic capacity (469.6 ± 51.5 m; 10th percentile) were severely impaired. There was a significant negative correlation between tSS-StO2 and 6MWT distance (r = -0.74, P = 0.037). In addition, patients with lesser leg muscle mass indexed to body surface area took longer to reach SS-StO2 (r = -0.92, P = 0.001). CONCLUSIONS: A delayed local oxygenation response was associated with worsened functional fitness in older men with prostate cancer undergoing ADT. In these patients, muscle wasting may play a role in impaired oxygen kinetics. The findings demonstrate that peripheral limitations to exercise capacity may be an important therapeutic target to improve cardiorespiratory fitness, CVD risk, and QoL in those with prostate cancer.

D6: WHAT IS THE ACUTE TEMPORAL DOSE-RESPONSE RELATIONSHIP OF HIGH-CADENCE CYCLING AND GAIT VELOCITY?

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BACKGROUND: Gait velocity is strongly correlated with physical function, fall risk, and adverse health outcomes. High-cadence cycling (HCC) for 15 minutes has been found to significantly improve self-selected gait velocity, though the minimum dose for gait improvements has yet to be identified. This study aimed to determine the minimum dose of HCC that elicits clinically meaningful and statistically significant improvement of self-selected gait velocity. METHODS: Fifteen recreationally active healthy adults (Age: 21.6yrs ± 4.27, Mass: 72.41kg ± 15.77, Height: 1.73m ± .09) completed 1-, 5-, and 10-minute bouts of HCC on separate days. Self-selected gait velocity (10-meter walk test) and exertion (rating of perceived exertion (RPE), heart rate reserve (%HRR)) were measured prior to and following HCC. A two-way repeated measures ANOVA was utilized to assess differences in pre- and post-cycling gait metrics, while a one-way repeated measures ANOVA was used to compare exertion across the three cycling groups. Pairwise independent samples t-tests with post-hoc Bonferroni corrections were performed to determine the location of statistical significance. All statistical tests α = 0.05. RESULTS: Improvements in self-selected gait velocity were observed for each cycling duration, with participants improving 73%, 87%, and 91% at 1, 5, and 10 minutes, respectively (all p<.001)). RPE was lower in the 1-minute bouts compared to 5- and 10-minute bouts with no significant difference in %HRR. CONCLUSIONS: HCC at any duration elicited a significant improvement in gait velocity, with 10 minutes demonstrating the greatest increase in gait velocity, although no more clinically meaningful than 1 minute. Acute bouts of cycling (e.g., 1 minute) elicited meaningful improvements in gait velocity, with significantly lower exertion. These findings suggest HCC duration may be a tunable cycling parameter to improve gait ability when considerations such as aerobic capability, muscular strength, pain, or fatigue limit longer durations.

D7: CHANGES IN IGG AND PLASMA GLYCOMES IN RESPONSE TO ENDURANCE EXERCISE TRAINING: HERITAGE FAMILY STUDY

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BACKGROUND: The immunoglobulin G (IgG) and plasma N-glycomes represent biomarkers of cardiovascular and age-related diseases. However, it is unknown whether exercise training alters glycomic profiles. Therefore, we examined the effects of endurance training on the IgG and plasma glycomes in the HERITAGE Family Study. METHODS: Baseline and post-intervention plasma samples from 652 HERITAGE participants (57% female, 44% Black, 17-65 years old) that completed 20 weeks of progressive endurance exercise training were analyzed. Glycomic profiles (25 IgG glycans, 9 derived IgG traits, 39 plasma glycans, 16 derived plasma traits) were measured using HILIC-UPLC and MALDI-TOF-MS. Paired t-tests were performed to examine training effects. Bonferroni corrected p-values were used to determine statistical significance. RESULTS: Four plasma glycans significantly decreased in abundance with training (-2.5 to -0.7%, p≤0.001). Of these, one plasma glycan was characterized by high mannose, while the other three had antennary fucosylated, tri- or tetra-galactosylated, and di-, tri-, or tetra-sialylated tri- or tetra-antennary structures. One derived plasma trait, which represents the proportion of digalactosylated structures in the plasma glycome, significantly increased with training (0.3%, p=0.001). One IgG glycan (0.9%, p=0.0001) and one derived IgG trait (0.6%, p=0.004) increased in abundance with training. The IgG glycan had core fucosylated, monogalactosylated with bisecting GlcNAc, digalactosylated, and biantennary structures. The derived IgG trait was characterized by the proportion of bisecting GlcNAc in the IgG glycome. CONCLUSION: Endurance exercise training only modestly altered the IgG and plasma N-glycomic profiles. The training responses of the glycomes differed by glycan structure. Future studies should investigate how changes in glycans with exercise training are related to changes in cardiometabolic health.

D8: ASSESSMENT OF BRAIN HEALTH DURING PROLONGED SITTING USING CEREBROVASCULAR OUTCOMES FROM THE SWITCH TRIAL

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BACKGROUND: Modification of lifestyle factors can delay or prevent up to 40% of dementia cases. Robust evidence suggests sedentary behavior (SB), most commonly as prolonged sitting, is one such factor. However, optimal modification of SB remains elusive due to heterogeneity of previously trialed SB interruptions and cerebrovascular endpoints used. This study compared multiple SB interruption strategies using cerebrovascular health measures over 4 hours of sitting. **METHODS:** Healthy, middle-aged adults (n=22, 43.8 ± 4.2 years old, 68% female) in an ongoing randomized cross-over trial (SWITCH) were used. Participants underwent 4 sitting conditions separated by at least 48 hours: 1) 4 h of uninterrupted sitting, 2) 4 h of sitting with once/hour 15 min standing breaks, 3) 4 h of sitting with once/hour 5-min walking breaks, and 4) 4 h of sitting with both once/hour walking breaks (5 min) and once/hour standing breaks (15 min). Cerebrovascular measures were collected using transcranial doppler ultrasound pre/post each sitting condition, including middle cerebral artery velocity (MCAv, cm/s), heart-to-middle cerebral pulse wave velocity (hmPWV, m/s), and cerebrovascular conductance index (CVCi, cm/s/mmHg), calculated as MCAv divided by mean arterial pressure (MAP). Results were analyzed using linear mixed models with random effects. **RESULTS:** No time x condition interaction effects were detected (all p > 0.05). There was a moderate decrease over time in MCAv (-4.3%, b = -2.29 ± 1.2 cm/s, d = 0.66, p = 0.025) and no effect of condition (p = 0.918). There was a large increase over time in hmPWV (83.1%, b = 0.979 ± 0.26 m/s, d = 2.56, p < 0.001) and no effect of condition (p = 0.993). Lastly, there was a moderate decrease over time in CVCi (7.8%, b = -0.05 ± 0.01 cm/s/mmHg, d = 0.46, p < 0.001) and no effect of condition (p = 0.262). **CONCLUSIONS:** There are robust increases in hmPWV with SB, indicating impaired cerebrovascular health. Walking and standing breaks used in this study may not be intense or frequent enough to significantly change brain health during sitting.

Student Award Posters—Masters

M1: A NOVEL EXTERNAL ANKLE SUPPORT EFFECTIVELY ATTENUATES HIGH VELOCITY INVERSION

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BACKGROUND: Approximately 2 million ankle sprains occur annually in the United States. External ankle supports are the gold standard for ankle sprain prevention. The BetterGuards™ ankle brace is the first adaptive ankle brace to be available for athlete use. Currently, no external validation studies have been published on the efficacy of the brace. The purpose of this study was to examine isokinetic performance metrics with and without the BetterGuards across populations with varying levels of ankle stability. **METHODS**: Thirty participants (male = 15; female = 15), were distributed across three stability classifications: Healthy, Copers, and those with chronic ankle instability. All participants performed voluntary full range of motion (ROM) inversion on both the dominant (DL) and non-dominant (NDL) legs, with the BetterGuards (BG) and without the BetterGuards™ (NB), on the isokinetic dynamometer at an angular velocity of 180 deg/s. Variables analyzed were peak torque in Nm, work in J, average power in W, and ROM in degrees. Four 3 (group) x 2 (condition) x 2 (leg) ANOVAs with repeated measures were run to assess differences in performance. **RESULTS**: Peak torque results showed an interaction between condition and leg ($F = 4.875$; $p = .036$; $\eta_p^2 = .153$) with the greatest amount of peak torque produced in the BG on the DL, followed by the NB on the DL, the NB on the NDL, and, lastly, the BG on the NDL. There was a significant main effect for leg ($F = 12.147$; $p = .002$; $\eta_p^2 = .310$) with the DL producing more torque. Work results showed a significant difference between conditions ($F = 9.094$; $p = .006$; $\eta_p^2 = .252$) with the NB condition resulting in significantly higher work. There was a significant difference in leg ($F = 7.633$; $p = .100$; $\eta_p^2 = 0.22$) with the DL performing greater work. There was a

significant difference for power related to leg (F = 6.461; p = .017; η_p^2 = .193) showing greater power output on the NDL. Lastly, results showed significantly higher inversion ROM in the NB condition (F = 13.347; p = .001; η_p^2 = .331). **CONCLUSIONS**: The observed reductions in power, work, and ROM indicate that the adaptive mechanism of the BetterGuards ankle brace effectively attenuates high-velocity inversion. By limiting the extent of inversion, these mechanical constraints may play a protective role in reducing the risk of lateral ankle sprains.

M2: EFFECTS OF CADENCE-CONTROLLED WALKING INTENSITY ON BRACHIAL BLOOD PRESSURE AND ARTERIAL STIFFNESS INDICES

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BACKGROUND: Post-exercise hypotension (PEH) is a blood pressure (BP) reduction following a single bout of exercise. Evidence for intensity effects is mixed, likely due to inconsistent definitions and lack of control for exercise volume (e.g., MET-min). This study examined the effects of cadence-controlled walking intensity on brachial BP and arterial stiffness. **METHODS:** Twenty-two adults (27.7±6.8 y; 50% men; SBP/DBP: 123.9±10.4 / 77.1±7.6 mmHg) completed two volume-matched (~90 MET-min) walking bouts in a randomized crossover design: moderate (100 steps/min, 30 min, ~3 METs) and vigorous (130 steps/min, 15 min, ~6 METs). Cadence was regulated with smartwatch feedback. Brachial BP (systolic [SBP], diastolic [DBP], mean arterial pressure [MAP]) and augmentation index standardized at a heart rate of 75 bpm (AIx75) were assessed pre- and 30 min post-exercise using an automated cuff-based device. Repeated-measures ANOVAs with Bonferroni correction tested condition and condition*time effects. Change scores (Δ) are reported as mean ± SD and **r**aw values as estimated marginal means ± SE. **RESULTS:** A small, non-significant PEH response was observed for SBP following the vigorous condition (Δ = -0.5±7.6 mmHg, *p*=.76), while the moderate condition increased SBP 30 min post exercise (Δ = 3.2±6.1 mmHg, *p*<.05). No PEH effects occurred for DBP or MAP. While no significant main effects of condition or interactions were observed for SBP, DBP, or MAP, contrasts demonstrated higher (non-significant) BP values 30-min post-exercise following moderate- vs. vigorous-intensity walking: SBP (125.1±2.6 vs. 122.4±2.5 mmHg), DBP (82.2±1.7 vs. 80.0±2.3 mmHg), and MAP (95.4±1.9 vs. 93.1±2.4 mmHg). For arterial stiffness, a significant condition*time interaction for AIx75 was observed, with reductions following vigorous walking only (Δ = -8.4%±8.2, p<.001), and with no comparable changes after moderate (Δ = -2.5±13.0%, p>.05). **CONCLUSION:** Cadence-controlled walking at vigorous intensity elicited different patterns in BP and arterial stiffness responses compared to moderate. Findings suggest PEH is intensity-dependent, but that full effects may not be evident within a 30 min post-exercise window. Future studies should evaluate intensity-specific PEH across extended recovery periods and daily time courses.

M3: METABOLIC IMPACT OF PRE-EXERCISE PROTEIN INTAKE VS. FASTING IN PERIMENOPAUSAL WOMEN

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BACKGROUND: Physiologic changes associated with perimenopause (PERI) drive impairments in cardiometabolic health and body composition. High intensity interval training (HIIT) improves energy expenditure and substrate utilization, but the role of nutrient timing on metabolic outcomes in PERI is unclear. The purpose was to evaluate pre-exercise protein vs fasting prior to HIIT on energy expenditure (REE; kcals) and fuel use (respiratory exchange ratio; RER; a.u.) in PERI. **METHODS:** 28 PERI women (mean ± standard deviation: age: 48.7±4.5 yrs; body fat: 40.2%±3.2%) participated in a randomized cross-over design with two visits. In a randomized visit order, participants consumed either 25g of whey mixed in 8oz of water (PRO) or water alone (8oz) (FAST) within 10 minutes (min) prior to HIIT, which included 10×1 min of cycling at 75% of heart rate reserve, with 1 min of rest. REE and RER were obtained via indirect calorimetry before, during (work and rest bouts), 0-20 min post, and 40-60 min post HIIT. Repeated measures analyses of variance were used to examine differences in REE and RER. **RESULTS:** No time×nutrition effect was observed for REE (*p*=0.899). REE was higher in PRO than FAST at 0-20 minutes (144.3±56.3kcals, p=0.017) and 40-60 minutes (137.7±49.0 kcals, *p*=0.010). No time×nutrition effect was observed for RER (*p*=0.213). RER was significantly higher in PRO than FAST at 0-20 min (0.079±0.015 a.u., *p*<0.001) and 40-60 min (0.086±0.015 a.u., *p*<0.001). There was no effect of nutrition on RER during work (0.008±0.016 a.u., *p*=0.596) or rest bouts (0.001±0.017 a.u., *p*=0.940). **CONCLUSIONS:** Protein supplementation prior to HIIT increased REE by approximately 145 kcals, which may support body composition goals. No differences were seen in RER during work and rest bouts of HIIT, indicating pre-exercise nutrition may not influence substrate use during exercise. RER was reduced in FAST conditions following HIIT, potentially due to greater intensities during PRO conditions.

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M4: PLANTAR CUTANEOUS SENSITIVITY AND WALKING GAIT PARAMETERS IN CHRONIC ANKLE INSTABILITY

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BACKGROUND: Increased lateral plantar loading and greater ankle inversion angles during the stance phase of walking are often associated with recurrent lateral ankle sprains (LAS) in individuals with chronic ankle instability (CAI). Diminished plantar cutaneous sensitivity (PCS) is a sensory-perceptual impairment that has been reported in individuals with CAI, which may explain the aberrant gait biomechanics associated with CAI. However, the relationship between PCS and plantar loading during walking gait has not been evaluated. This study assessed the relationship between PCS and plantar loading during walking gait in individuals with CAI. **METHODS:** Healthy adults with self-reported CAI (n=23; age: 21±2 y; height: 173.4±14.0 cm; mass: 79.2±17.3) had PCS tested at the heel, first metatarsal, third metatarsal, fifth metatarsal and hallux using descending Semmes-Weinstein monofilaments. Next, participants completed 3 overground walking trials consisting of 10 strides at preferred walking speed. Normal plantar force was measured from the heel (H), lateral forefoot (LFF) and medial forefoot (MFF) using novel loadsol-mlp® insoles at 200 Hz. The middle 6 strides from each trial were identified (e.g., 18 total strides analyzed) and vertical plantar force and vertical plantar impulse were then calculated and averaged from the H, LFF, and MFF. Pearson's correlation coefficients assessed the linear relationship between PCS and gait parameters in CAI ($p < 0.05$). **RESULTS:** A moderate correlation ($p = 0.012$; $r = 0.530$) was observed between PCS at the fifth metatarsal (3.53 ± 0.53) and vertical plantar impulse of the LFF (126.43 ± 45.71 Ns). In addition, a moderate correlation ($p = 0.042$; $r = 0.440$) was identified between PCS at the hallux (3.36 ± 0.67) and the vertical plantar force in MFF (381.57 ± 61.01 N). No other significant relationships were observed ($p > 0.05$). **CONCLUSION:** We identified that reduced PCS of the fifth metatarsal is associated with increased vertical plantar impulse in the LFF. The inability to adequately regulate LFF plantar loading during walking gait appears to be linked to diminished PCS and is likely to increase the risk of recurrent LAS in individuals with CAI.

M5: ESTROGEN AND PROGESTERONE EFFECTS ON MUSCLE SIZE AND QUALITY IN THE VASTUS LATERALIS IN FEMALES

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Introduction: Muscle size and quality are good indicators of overall health and physical function. Ultrasound is a non-invasive method for quantifying muscle characteristics such as size and quality. Fluctuations in female sex hormones across the menstrual cycle may acutely influence intramuscular water content, potentially altering these ultrasound-derived measures. Therefore, the purpose of this study was to evaluate differences in ultrasound-derived measurements of muscle size and quality between hormone phases in healthy eumenorrheic females. **Methods:** In a repeated-measures design, 34 eumenorrheic women (Age: 22.6 ± 5.0 years; BMI: 23.5 ± 2.6 $kg \cdot m^{-2}$; % body fat: 27.1 ± 6.0 %) completed ultrasound-derived measures of muscle size (cross-sectional area [mCSA]) and quality (echo intensity [EI]) in the low (1-7 days post-menstruation) and high- (5-9 days post-ovulation) hormone phases. Muscle cross-sectional area and EI of the vastus lateralis were assessed from panoramic ultrasound images. Paired-samples t-tests were used to evaluate differences in mCSA and EI between phases. **Results:** Hormonal analysis confirmed phase distinctions, with estrogen (82.3 ± 60.5 $ng \cdot mL^{-1}$ vs. 151.4 ± 99.7 $ng \cdot mL^{-1}$; $p < 0.001$) and progesterone (2.5 ± 1.4 $ug \cdot mL^{-1}$ vs. 6.7 ± 5.7 $ug \cdot mL^{-1}$; $p < 0.001$) significantly higher in the high-hormone phase. There were no significant differences in mCSA (19.2 ± 4.1 cm^2 vs. 18.6 ± 4.2 cm^2; $p = 0.176$) or EI (178.1 ± 45.9 vs. 178.4 ± 42.4 AU; $p = 0.951$) between phases.

Conclusion: Ultrasound-derived measures of muscle size and quality did not significantly differ between the low and high hormone phase in healthy eumenorrheic women. These findings suggest that fluctuations in sex hormones associated with the menstrual cycle may not meaningfully influence ultrasound-derived measures of vastus lateralis size and quality. Controlling for hormone phase may not be necessary in studies using ultrasound-derived muscle outcomes which could simplify future study design and support greater inclusion of women in research.

M6: HEART RATE ACCURACY ACROSS WEARABLE DEVICES AND EXERCISE INTENSITY SPECTRUM: A PILOT STUDY

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BACKGROUND: Photoplethysmography (PPG) is a low-cost, minimally invasive method for heart rate (HR) measurement in wearable monitors. Light is emitted to the skin and fluctuations in reflected light, due to blood perfusion, are converted to HR via proprietary algorithms. Given wearables widespread use for ambulatory monitoring, HR accuracy must be validated. The purpose of this study is to assess HR error in several wearable activity monitors from rest to moderate-to-vigorous activity, across various upper and lower body activities. METHODS: Healthy participants (N=26, 22±4 yrs, 25.52±6.04 BMI) wore four wearable activity monitors (Empatica Embrace Plus, Garmin Vivosmart 4, Apple Watch Series 5, and Fitbit Inspire HR) and Polar H9 chest strap (criterion) during rest (3 min), treadmill walking (1.1 - 1.7 m/s, 3 min), treadmill jogging (1.8 - 2.2 m/s, 3 min), treadmill running (> 2.2 m/s, 3 min), arm ergometry (25 W, 3 min), stair stepping (1 min), and exercise gaming (Ring Fit Adventure, Nintendo Switch, 8 min). HR from the screen of each monitor were recorded and converted to mean bias (monitor - criterion). Linear mixed models (LMM) were used to compare mean bias across each monitor, with all activities combined (SPSS v31). Bland Altman (BA) plots were used to visually assess bias for each monitor. RESULTS: Fixed effect LMM showed that HR error was not different by monitor type, $F(3, 48) = 2.67$, $p = 0.058$. However, accuracy varied (mean bias, 95% limits of agreement [LOA], mean absolute percent error [MAPE]) and MAPE was not acceptable across all devices (acceptable: <10%). Garmin and Apple had the least error (mean bias 0.82±16.03, MAPE 6.55±12.91% and mean bias -2.41±11.31, MAPE 2.89±6.77%, respectively), while Fitbit (mean bias -5.55±18.86, MAPE 7.88±12.15%) and Empatica (mean bias -9.64±26.41, MAPE 10.93±15.36%) exceeded the 10% MAPE threshold. Corresponding 95% LOA were Garmin: -30.59 to 32.23, Apple: -24.59 to 19.76, Empatica: -42.52 to 31.42, Fitbit: -61.41 to 42.13. CONCLUSION: During a variety of activities, HR accuracy was greater for Apple and Garmin devices (narrower LOA and MAPE <10%) compared to the Fitbit and Empatica devices (wider LOA and MAPE >10%). Further research is warranted to investigate the sources of error in HR measurement accuracy assessed by different PPG devices.

M7: THE EFFECT OF AN ACUTE BOUT OF RESISTANCE EXERCISE ON ARTERIAL WAVE REFLECTIONS

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BACKGROUND: ACSM recommends aerobic and resistance exercise to improve cardiovascular and musculoskeletal health. While acute aerobic exercise has been shown to decrease central pressure and arterial wave reflections, the effects of acute resistance training on arterial wave reflections are not well understood. Therefore, we aimed to determine the acute effect of a single bout of resistance exercise on arterial wave reflection magnitude, timing, and wasted pressure effort. METHODS: Twelve apparently healthy young adults (n = 4 females) participated in this study. Radial artery applanation tonometry and echocardiography was performed to estimate aortic pressure wave morphology and left ventricular outflow, respectively, for subsequent pressure-flow analyses. Participants completed 8 (4 upper and 4 lower body) machine-based exercises (8-12 reps, 2 sets each, at 60-70% of 1-RM) then had measurements repeated at 30-, 60-, 90-, and 120-minutes post exercise. Data was analyzed using repeated measures with Dunnet adjustment when appropriate for post-hoc comparisons. RESULTS: Compared to baseline, reflection magnitude decreased at 30- and 60-min post exercise (baseline 40 ± 6% vs. 30-min post 31 ± 8%, $p = 0.03$; vs. 60-min post 36 ± 8%, $p = 0.03$). Compared to baseline, reflection wave transit time decreased at 90-min post exercise (baseline 355 ± 60.8 ms vs. 90-min post 380 ± 62.9 ms, $p = 0.01$). Compared to baseline, wasted pressure effort tended to decrease at 30-, 60-, and 90-min post exercise (baseline 2189 ± 639 mmHg • ms; vs. 30-min post 2042 ± 883 mmHg • ms, $p = 0.08$, 60-min post 1702 ± 728 mmHg • ms, $p = 0.0$; 90-min post 1637 ± 1026 mmHg • ms, $p = 0.08$). CONCLUSION: An acute bout of resistance exercise improves indices of arterial wave reflection up to 2 hours post-exercise in healthy young adults.

M8: HIGH-CADENCE INTERVAL CYCLING IMPROVES GAIT VELOCITY WITH REDUCED AEROBIC DEMAND COMPARED TO CONTINUOUS CYCLING

Matthew Ott, Jason Simpson, Andrew Killgore, Tanner Thorsen. *The University of Southern Mississippi, Hattiesburg, MS.*

Background: Prior research has demonstrated high-cadence cycling, but not high work rate cycling, increases gait velocity. However, much of this previous work has utilized continuous bouts of cycling. High-cadence interval cycling may offer a pragmatic alternative to continuous high-cadence cycling protocols. This study compared high-cadence interval cycling (HCI) and high-cadence continuous cycling (HCC) under matched cadence, work rate, and duration to test whether high-cadence interval cycling achieves comparable improvement in gait velocity while reducing aerobic demand. **Methods**: Seventeen recreationally active adults completed three baseline 10 m walk tests (10MWT) to obtain gait velocity and cadence (steps per minute). Participants were randomized to either HCC for 15 minutes (n = 10), or HCI for 15×1-min with 1 minute rest intervals (n = 7). Cycling cadence was set at 160% self-selected gait cadence and work rate was set at 1 W/kg for all participants. Final heart rate (beats per minute), heart rate reserve (%HRR), and rating of perceived exertion (RPE) were recorded during the final minute of each cycling protocol. Three post-cycling 10MWT were repeated to obtain post-cycling gait velocity and cadence. A two-way ANOVA with repeated measures was used to compare gait metrics across groups and time, while independent samples t-test compared heart rate, %HRR and RPE between groups. **Results**: Both HCC (1.27 m/s pre, 1.33 m/s post, $p < .001$) and HCI increased post-cycling gait velocity (1.18 m/s pre, 1.30 m/s post, $p < .001$). There was no difference in post-cycling gait velocity between HCC and HCI. Gait cadence increased in both HCC (111.0 pre, 113.5 post, $p < .001$) and HCI (108.0 pre, 112.9 post, $p < .001$). No difference in post-cycling walking cadence was shown between groups. Heart rate (160.4 vs 134.5, $p = .040$), %HRR (.403 vs .270, $p = .013$), and RPE (13.3 vs 11.1, $p = .049$) were lower in HCI versus HCC. **Conclusion**: Both HCC and HCI cycling protocols resulted in acute increases in gait velocity; however, HCI was able to produce outcomes similar to the HCC with less aerobic demand. Thus, HCI training approach may be an advantage for individuals who are seeking to improve gait velocity who cannot tolerate prolonged continuous cycling.

Student Award Posters—Undergraduate

U1: THE EFFECTS OF ACUTE CAPSAICIN SUPPLEMENTATION ON UPPER BODY MUSCULAR ENDURANCE DURING EXERCISE

Milosz Gargol, Cameron Rice, Jarrett Walbolt. *Montreat College, Montreat, NC.*

BACKGROUND: Resistance training (RT) is crucial for developing an athlete and optimizing sports performance. Incorporating Capsaicin into an athlete's nutrition may help maintain or improve performance, especially related to RT. METHODS: 12 resistance trained collegiate athletes were recruited for this randomized, crossover study. At study entry, participants completed medical history and perceived 1 repetition max (1RM) forms. Two testing sessions spaced four days apart were scheduled. Sessions consisted of 4 sets at 70% 1RM of the bench press with 120s of rest between sets with performance of a countermovement jump (CMJ) on uniaxial force plates after the first and last set. Control (CONT) measurements were obtained without supplementation. For the capsaicin trial (CAPS), each participant ingested a 30mg capsaicin supplement 45 min before exercise. The number of repetitions performed by participants was measured at CONT and CAPS. RESULTS: No significant improvements were found for CMJ jump height (0.354±0.079 to 0.370±0.0531m; p=0.652), reactive strength index (0.817±0.190 vs. 0.685±0.090; p=0.062), or total reps on bench press (31.5±9.97 to 32.8±11.9; p=0.794). CONCLUSION: No effect of capsaicin supplementation on CMJ or bench press performance were found. Capsaicin dosage and formulation likely affected the results. Our study used a commonly available formulation, but a phenylcapsaicin supplement may provide benefit. Further research should also consider utilizing a fixed range of motion exercise in order to better elucidate any potential benefits of capsaicin supplementation in athletic populations.

U2: THE IMPACT OF SOCIAL FEEDBACK AND CUEING ON JUMP PERFORMANCE

Rebeca Cruz, Natalie Hall, Elena Fibraio, Marley Smith, Sarah Mcallister, Savannah Adkins, Jarrett Walbolt. *montreat college, Montreat, NC.*

BACKGROUND: Countermovement jumps (CMJ) are widely used to evaluate athletic power and performance. Research suggests that both verbal cueing and social feedback can shape movement strategies, influencing jump height, velocity, and motor control. This study investigates whether targeted cues and competitive feedback through leaderboards can enhance specific phases of CMJ performance. METHODS: Thirty-one trained collegiate athletes participated in this study with three trials: control (CONT), velocity-based feedback (VELO), and force-based feedback. During CONT, participants were instructed to jump as high as possible without additional cues or feedback. In VELO, athletes were encouraged to focus on jumping as quickly as possible while also being exposed to a competitive leaderboard to observe the influence of social comparison on performance. FORC involved instructing participants to emphasize generating maximum force from the initial phase of the jump, again with the presence of the leaderboard. All jumps were performed on a Uniaxial force plate to capture detailed kinetic and kinematic data. RESULTS: Jump Height was not significantly different between CONT, VELO, and FORC (0.281±0.17 vs 0.278±0.17 vs 0.287±0.018, p=0.130). Significant differences were found in modified reactive strength index (mRSI) (0.345±0.023 vs 0.473±0.034 vs 0.393±0.026, p=0.001), average propulsive force (1402.4±60.7 vs 1598.0±74.6 vs 1449.8±62.5, p=0.004), and average propulsive velocity (1.410±0.039 vs 1.503±0.040 vs 1.482±0.040, p=0.001). CONCLUSION: The results suggest that verbal cues and social feedback using a leaderboard can improve certain aspects of jump performance, like force, velocity and jump quality, but not jump height. While both forms of feedback outperformed control, Velocity-based feedback appeared to lead to better velocity, force, and mRSI.

U3: BATTLE OF THE HITTS: COMPARING CARDIOVASCULAR RESPONSES FROM AEROBIC- AND RESISTANCE-BASED MICRO-BOUT HIIT PROTOCOLS

Brighten M. Winslow, Andrew Shanely, FACSM, Robert J. Kowalsky, FACSM. *Appalachian State University, Boone, NC.*

BACKGROUND: Post-exercise cardiovascular (CV) benefit occurs from one bout of high-intensity interval training (HIIT). However, limitations of the previous literature include i) mostly running-based HIIT protocols with sparse direct comparison to resistance-based HIIT protocols, ii) longer duration sessions (e.g., 30 mins), and iii) using only traditional CV risk factors like blood pressure (BP) and heart rate (HR). Therefore, the purpose of this study is to compare a single, micro-bout (10 min) HIIT protocol that is running-based to resistance-based for similar post-exercise CV responses using both traditional and novel CV risk factor outcomes. METHODS: A randomized crossover trial with individuals aged 18 to 45 yrs, was conducted on separate days using running-based (RUN) and resistance-based (REX) HIIT micro-bout (10-minute) conditions. Each condition utilized a 30:30 sec exercise:rest ratio. Exercise intensity was set at 75-90% HR reserve of age-predicted HRmax. REX utilized a different body weight-based exercise for each 30-sec bout of exercise, for 10 total exercises set to a pace of 120 bpm on a metronome. CV outcomes were measured pre-exercise, as well as immediately, 30 mins, and 60 mins post-exercise using standard assessment procedures. CV outcomes included traditional (HR, BP) and novel pulse wave velocity (PWV) measures. Repeated measures ANOVAs (condition and time) were utilized for the evaluation of all data for an interaction effect. A paired t-test evaluated the averaged exercising HR response of each condition. RESULTS: 8 participants (22.7±5.4 years old, 78% female) completed both arms of the study. Exercise intensity was higher during RUN (RUN HR: 167±11 vs. REX HR: 158±12 bpm, p=.001). Systolic BP (F=1.21, p=.328), HR (F=1.59, p=.246), carotid-femoral PWV (F=1.26, p=.312), brachial-femoral (F=1.32, p=.298), and brachial-ankle PWV (F=0.10, p=.843) were nonsignificant for a condition-by-time interaction effect. The largest post-exercise reductions were observed in PWV measures. CONCLUSION: One micro-bout of resistance-based HIIT elicits a similar post-exercise CV response as running-based HIIT for both traditional and novel risk factors. This allows individuals to choose a HIIT protocol based on their preference for post-exercise CV benefit.

U4: ASSOCIATIONS BETWEEN GAIT SPEED AND CEREBROVASCULAR HEMODYNAMICS IN MIDDLE-AGED ADULTS

Mia Fauceglia[1], Alexander Pomeroy[1,2], Jeb F. Struder[1], Kristen M. Paternoster[1], Andrew M. Koessler[1], Taylor Shorter[1], Craig Paterson[1,3], Keeron Stone[4,5], Gaurav Dave[1], Bethany B. Gibbs[6], Feng-Chang Lin[7], Michelle L. Meyer[1,2], Maihan Vu[7], Erik D. Hanson, FACSM[1,2]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]Human Movement Science Curriculum, University of North Carolina at Chapel Hill, Chapel Hill, NC. [3]University of Bristol, Bristol, UK. [4]Cardiff Metropolitan University, UK. [5]National Cardiovascular Research Network, Wales, UK. [6]School of Public Health, West Virginia University, Morgantown, WV. [7]Center for Health Promotion and Disease Prevention, University of North Carolina at Chapel Hill, Chapel Hill, NC.*

BACKGROUND: Reduced gait speed is associated with higher dementia occurrence in older adults and may be partially attributed to changes in cerebral hemodynamics with age. However, the relationship between gait speed in midlife and cerebral hemodynamics is not well understood, making it an important focus in brain health. This study aims to investigate whether self-selected gait speed is associated with measures of age or cerebrovascular health. **METHODS:** Data came from the Sitting with Interruption and Whole-Body Cardiovascular Health (SWITCH) trial, including middle age (30-60 y), healthy adults (n=33, 46.6 ± 5.9 y) who were physically inactive (<90 min/week moderate to vigorous activity) and sedentary (≥8 h sitting). Self-selected gait speed was measured on a standardized treadmill. Cerebral blood velocity was assessed in the middle cerebral artery (MCAv) using a transcranial doppler ultrasound (TCD). Mean arterial pressure (MAP) was measured with blood pressure (BP+). Cerebrovascular conductance (CVCi) was calculated with MCAv divided by MAP, and heart-to-middle cerebral pulse wave velocity (hmPWV) measured with both TCD and an electrocardiogram (ECG). Participants arrived between 0700-0900, consumed a standardized meal, and rested in a semi-recumbent position for 20 minutes before measurements. Associations between gait speed and measures of cerebrovascular health were analyzed with two linear regression models: (1) age with walk speed and (2) walk speed with cerebrovascular measures. **RESULTS:** Walk speed (mean 2.1 ± 0.4 mph) was not associated with age (R2 = 0.06, b= -0.02 ± 0.01 y, p=0.159). In the second regression model (R2 = 0.117), walk speed was unrelated to MCAv (b= -0.01 ± 0.01 cm/s, p=0.370), hmPWV (b= 0.178 ± 0.139 cm/s, p=0.217), or CVCi (b= 0.46 ± 0.76 cm/s/mmHg, p=0.548). **CONCLUSIONS:** Age was not associated with walking speed, or cerebrovascular hemodynamic measures (MCAv, hmPWV, CVCi). Unlike findings in older adults linking slower gait speed to cerebrovascular decline, these results in midlife may not reflect brain hemodynamics. Future SWITCH trial analyses will test walking speed alongside other variables to deepen insight into brain health.
FUNDING SOURCE: National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number R01HL157187.

U5: ASSESSMENT OF BRAIN FUNCTION AND PERSONALITY TYPES ON A PENALTY KICK IN WOMEN COLLEGIATE SOCCER PLAYERS.

Emily M. Cabral. *Nova Southeastern University, Davie, FL.*

BACKGROUND: The relationship between personality traits, emotional regulation, and athletic performance has been widely studied in sports psychology. Personality traits influence how athletes perceive, process, and express emotions in high-pressure situations, such as penalty kicks in soccer. The Big Five personality traits—agreeableness, conscientiousness, neuroticism, extroversion, and openness—provide a framework for understanding these differences. Furthermore, advances in neurophysiological measurement tools such as electroencephalography (EEG) allow researchers to examine brain activity during sport specific tasks. The purpose of this research study is to assess National Collegiate Athletic Association (NCAA) woman's soccer players brain function with regards to their personality types while taking a soccer penalty kick wearing an electroencephalogram (EEG) band. **METHODS:** Fourteen NCAA women's soccer players (ages 17-25) completed two baseline tests: (1) the Big Five personality assessment and (2) a Stability/Variability EEG brain function test (alpha, beta, theta, delta waves) in a resting state. During field testing, players wore an EEG device while taking 20 randomized penalty kicks (five per target: upper left, lower left, upper right, lower right). EEG data weas recorded and stored using the Neurogoal app. RESULTS: Emotional stability showed a strong positive correlation with low beta wave activity (r = 0.81), reflecting optimal attentional control and composure under stress. Similarly, a fun-seeking personality trait was positively correlated with gamma waves (r = 0.79), reflecting extraversion, heightened energy, and enjoyment of the activity. Conversely, conscientiousness was negatively correlated with gamma wave activity (r = -0.66), suggesting reliance on structured, deliberate processing rather than rapid, high-frequency neural activity. **CONCLUSION:** Emotional stability with low beta activity supports focus and composure during penalty kicks, while conscientiousness is linked to reduced gamma activity, indicating more structured cognitive processing. Personality traits therefore play a key role in shaping brain function and athletic performance.

U6: POST EXERCISE OXYGEN CONSUMPTION IN FOREARM MUSCLES IN INDIVIDUALS WITH A FAMILY HISTORY OF DIABETES

Olivia Kachappilly, Charlotte Flame, Kevin McCully. *University of Georgia, Athens, GA.*

Background: Post-exercise oxygen consumption (EPOC) contributes to exercise benefits, and impaired muscle metabolism may influence diabetes risk. Near-infrared spectroscopy (NIRS) is a tool commonly used to evaluate muscle metabolism. This study compared EPOC in the forearm muscles of young adults with and without a family history of diabetes. Methods: Seven young female adults with and without an immediate family history of diabetes were tested. The study was approved, and informed consent was obtained. A two-group, one-day design was used with three protocols: ischemic reperfusion, EPOC, and mitochondrial capacity. Muscle oxygen levels were measured with NIRS (Train.Red) in the dominant and non-dominant forearm. Blood flow was assessed as the initial reperfusion rate following 5 minutes of ischemia. EPOC was measured after 60 seconds of rapid wrist curls with a 2.3 kg weight, followed by measurements every minute for 10 minutes. Muscle mitochondrial capacity (mVO_2max) was determined from the recovery rate of muscle metabolism after 30 seconds of electrical stimulation. EPOC was calculated as the area under the curve of oxygen consumption, subtracting the phosphocreatine contribution calculated from mVO_2max. Group comparisons were made using t-tests with significance at $p<0.05$. Results: mVO_2max was higher in the right arm (1.62+0.06 min^{-1}) than the left arm (1.44+0.02 min^{-1}; $p=0.045$). Net EPOC was 23.2+10 O_2·s in the right arm and 15.1+6 O_2·s in the left arm, $p=0.15$. No statistically significant differences were observed between participants with and without a family history of diabetes. Conclusions: Short, intense exercise resulted in significant EPOC. A small difference in mVO2max was found between the left and right arm. However, no differences were found in the mitochondrial capacity or EPOC between individuals with and without a family history of diabetes. Larger studies are needed to further explore EPOC in populations at risk for diabetes.

U7: VALIDITY AND RELIABILITY OF STANDING PULSE WAVE VELOCITY ASSESSMENT

Millie Monahan[1], Tyler D. Quinn[2], Joseph M. Stock[3], Bethany Barone Gibbs[2], Robert J. Kowalsky, FACSM[1]. *[1]Appalachian State University, Boone, NC. [2]West Virginia University, Morgantown, WV. [3]East Carolina University, Greenville, NC.*

BACKGROUND: Prolonged passive standing may negatively influence vascular health. Pulse wave velocity (PWV) is a non-invasive, gold-standard measurement of vascular stiffness that could offer insights into the vascular impacts of standing. To accurately quantify the effects of standing behavior, PWV assessment should be performed while standing instead of the typical supine posture. Determining the accuracy and repeatability of standing PWV assessment is needed before being widely deployed in research. METHODS: This crossover design study (N=14, 71% female, 26.6±10.7 years old) consisted of two visits conducted ≥2, but ≤21 days apart. PWV outcomes measured included carotid-femoral (cfPWV; supine position only), brachial-femoral (bfPWV), femoral-ankle (faPWV), and brachial-ankle (baPWV). Baseline measurements were completed in both the standing and supine postures (counterbalanced) after a 10-minute rest in each respective posture. Next, a standardized perturbation was provided (caffeine pill), and then PWV was reassessed every 10 minutes for 30 minutes while participants remained in a supine or standing posture. Intra-class correlations (ICCs) assessed day-to-day reliability. Validity was determined by comparing all peripheral PWV measures in the standing posture to the supine posture, as well as to central PWV measures (supine cfPWV) using Pearson's correlations. Generalized linear mixed models were used to evaluate differences in PWV response across time points, while adjusting for age and sex. RESULTS: Moderate ICCs were observed for day-to-day reliability of standing bfPWV (ICC: .538, p=.013), faPWV (ICC: .649, p=.002), and baPWV (ICC: .608, p=.010). Moderate correlations were observed for bfPWV (r=.418) and baPWV(r=.419) with supine measures. bfPWV was moderately correlated and baPWV was highly correlated with supine cfPWV (r=.461 and r=.838, respectively). No time x condition interactions were observed for any measurements (p>0.05), suggesting similar responses over time between postures to the perturbation. CONCLUSIONS: All standing PWV measures were moderately reliable, yet only bfPWV and baPWV were moderately-to-highly correlated with related central and peripheral measures. Studies evaluating standing on vascular health could consider measuring standing PWV.

U8: OVERLAYERING ON SPORT-SPECIFIC ACCURACY SKILLS IN BASKETBALL PLAYERS

Christian Griffin, Karly Horn, Jarrett Walbolt. *Montreat College, Montreat, NC.*

BACKGROUND: Exercise leads to an increase in core body temperature, which can lead to injury, heat exhaustion, and decrease in performance. Overlaying is a technique often used to trigger heat adaptations, but the acute effects are unknown. The purpose of our study was to test the changes in sport specific skills in collegiate basketball athletes. **METHODS**: A total of 16 male collegiate basketball athletes were recruited for this crossover design study. Participants engaged in standard practice on two days, one being overlayered attire consisting of sweatpants and long sleeve shirts (OVER) and the other day was normal practice attire consisting of short sleeves and shorts (NORM). Their forehead skin temperatures were recorded before and after practice using an infrared thermometer. At the beginning and end of practice, they were asked to perform a standardized series of free-throws, mid-range, and 3-pointers basketball shots. A repeated measures ANOVA was used to detect differences between times and trials. **RESULTS**: For NORM, participants increased total shots made (20.4 ± 0.74 to 22.3 ± 0.74, $p = 0.022$), while OVER did not significantly change (22.4 ± 0.74 to 21.1 ± 0.74, $p = 0.100$). For NORM, participants increased mid-range shots made (6.37 ± 0.35 to 7.25 ± 0.26, $p = 0.045$), while OVER did not significantly change (6.94 ± 0.25 to 6.75 ± 0.26, $p = 0.658$). While other measures of shot accuracy approached significance favoring the normal trial, no other significant changes were found ($p > 0.05$). No significant changes in skin temperature were found ($p > 0.05$). **CONCLUSIONS**: While there was no significant change in skin temperature, there was change in shot accuracy, favoring the normal trial. Future research should address our limitation of using skin temperature instead of core body temperature.

Symposia

S1: PRACTICAL APPLICATIONS OF AI IN RESEARCH, TEACHING, AND LEARNING

Katie R. Hirsch[1], Jonathan S. Howard[2], Callie L. Unrein[1], B. Sue Graves, FACSM[3]. *[1]University of South Carolina, Columbia, SC. [2]Georgia Highlands College, Rome, GA. [3]Florida Atlantic University, Boca Raton, FL.*

Artificial Intelligence (AI) has rapidly evolved from a futuristic concept to a transformative tool that is reshaping how we think, teach, and learn. AI can enhance creativity, streamline workflows, and support the instructional and learning process, but its integration also raises concerns related to academic integrity, intellectual property, misinformation, and the loss of critical thinking skills. As a result, simultaneous enthusiasm and uncertainty exists among the Exercise Science field about integrating AI into academic settings. The goal of this session is to provide practical strategies for integrating AI across research, teaching, and learning. **Dr. Sue Graves** will introduce the importance of AI literacy and interdisciplinary collaboration to prepare faculty and students for a workforce increasingly shaped by digital tools. **Dr. Katie Hirsch** will discuss ethical applications of AI in research, including conceptual development, data analysis, writing, and translation to practice. **Dr. Jonathan Howard** will highlight instructional strategies to enhance instruction, including the use of AI for grading, rubric design, and assignments. Finally, doctoral student **Callie Unrein** will share perspectives on how students can leverage AI by prompting it to reduce confirmation bias, streamline workflows, and facilitate personalized learning, while still maintaining the critical thinking skills needed for future success. Current guidelines from higher education emphasize the importance of AI literacy for both students and faculty. From this session, we hope to empower those in the Exercise Science field to become not only competent but innovative users of AI, ensuring students graduate with relevant digital literacy skills for today's job market.
Learning Objectives: 1) Identify common AI tools and their applications in Exercise Science. 2) Implement AI-enhanced strategies in research, teaching, and learning. 3) Address ethical concerns and guide faculty and students in the responsible use of AI. 4)Explore opportunities for interdisciplinary collaboration to expand AI integration. **Generative AI statement:** In alignment with the theme of this presentation, AI tools were used in the writing and drafting of this abstract; all content was edited and approved by the authors.

S2: TARGETED NUTRITION FOR CONCUSSION RECOVERY: EVIDENCE-BASED STRATEGIES FOR BRAIN RESILIENCE
Hunter S. Waldman. *University of North Alabama, Florence, AL.*

Concussions and traumatic brain injuries (TBI) require more than passive rest—emerging evidence suggests targeted nutrition may play a critical role in prevention, acute management, and long-term recovery. This presentation explores the neuroprotective potential of evidence-based supplements such as omega-3 fatty acids, creatine, and antioxidants. These compounds may reduce injury risk, mitigate damage during impact, and accelerate cognitive recovery. Timing of supplementation—pre-, during, and post-injury—is crucial, and protocols must consider dosing, safety, and contraindications. As interest grows in applying these strategies to athletes, tactical populations, and rehabilitation settings, literature has begun to clarify mechanisms of action and practical applications. Dr. Waldman will present current research on the physiological mechanisms behind these compounds, discuss optimal dosing strategies across the injury timeline, and provide real-world applications for integrating nutrition into concussion care. His expertise will help bridge the gap between emerging science and practical implementation in sport, tactical, and clinical environments. Attendees will gain actionable insights into how nutrition can support brain resilience and recovery, redefining concussion management beyond traditional rest-based models.

S3: MAXIMAL OXYGEN UPTAKE: HOW DID WE GET HERE?
L. Bruce Gladden, FACSM[1], Alexander C. Berry[1], Scott K. Powers, FACSM[2]. *[1]Auburn Univeristy, Auburn, AL. [2]University of Florida, Gainesville, FL.*

Maximal oxygen uptake has been a topic of experimental study for over 100 years, and it remains the best single measure of aerobic/endurance fitness. From the seminal work of Nobel Prize winner A.V. Hill through the foundational studies of Taylor, Buskirk, and Henschel, and Mitchell and Chapman, and finally to contemporary practices, maximal oxygen uptake remains central to the field of exercise physiology. A high maximal oxygen uptake is dependent on healthy integrated function of the body's organ systems and metabolic machinery and is a commonly used predictor of both aerobic performance and metabolic health. The topic remains relevant as there is ongoing discussion about a verification phase for establishing valid quantification of maximal oxygen uptake. In this symposium, 1) L. Bruce Gladden will discuss early measures of metabolic rate that underpin the maximal oxygen uptake concept, 2) Alexander C. Berry will present some classic foundational studies for the essential principles, and 3) Scott K. Powers will summarize current best practices for maximal oxygen uptake measurement. This symposium will appeal to a broad audience from basic scientists to practitioners who apply the maximal oxygen uptake concept in training, prevention, and rehabilitation.

S4: HOLD YOUR HORSES! RETHINKING YOUTH FITNESS TESTING
Dawn P. Coe, FACSM[1], Rebecca A. Battista, FACSM[2]. *[1]University of Tennessee, Knoxville, TN. [2]Appalachian State University, Boone, NC.*

Fitness testing in youth is widely implemented across multiple fields, especially in physical education. Yet fitness testing remains highly contested between supporters and those who question its application. In 1995, Dr. Tom Rowland penned an editorial "The horse is dead; Let's dismount", questioning the appropriateness and utility of fitness testing (the 'horse') and starting a 30-year series of friendly debate articles and commentaries. The purpose of this presentation is to reimagine youth fitness testing through an equestrian metaphor, examining the roles of the "horse" (assessment), the "trainer" (administrator or teacher), and the "jockey" (youth participant) to highlight how current practices impact not only physical health, but also confidence, motivation, and physical literacy. Presenters will introduce an evidence-based approach for selecting assessments that evaluate the standards being taught in physical education. Pedagogical challenges include teaching youth how to move appropriately and confidently, training test administrators, and choosing assessments that are valid and reliable for diverse populations. Recent federal actions, such as the reinstatement of the Presidential Physical Fitness Test, spotlight these concerns and the importance of fitness. However, to address the challenges of obesity and inactivity, a shift toward assessments that are age-appropriate and inclusive is critical. Utilizing a flexible framework, the Fitness Assessment Team Tack Box, "trainers" select from a variety of diverse, age- and context-appropriate assessments, including health, motor, and psychosocial domains, to develop best practices to better support youth development. By advocating for process-focused recognition aligned with curricular goals, a flexible fitness assessment that balances accountability with evidence-based practice can function as both a health benchmark and a catalyst for lifelong wellness. Reframing fitness testing to attend simultaneously to the horse, trainer, and jockey invites educators to cultivate environments where all students can develop the skills, confidence, and enjoyment for sustained physical activity and well-being.
Artificial intelligence (AI) tools were used in the writing of the abstract/presentation.

S5: TAKING A STAND: HARMFUL OR HELPFUL TO CARDIOVASCULAR HEALTH?
Robert J. Kowalsky, FACSM. *Appalachian State University, Boone, NC.*

Emerging evidence suggests that the accumulation of standing behavior contributes to both helpful and harmful influences on health outcomes, depending on the context and pattern, particularly for cardiovascular disease. Such a paradox has significant implications for physical activity guidelines and research. This symposium will unpack the nuances of the standing behavior paradox. First epidemiological findings will be presented linking standing to health risks or benefits. Then, acute experimental data will be explored that illuminates the potential physiological mechanisms of standing and cardiovascular health. Lastly, a proposed paradigm shift will be discussed that further classifies standing behavior as passive or active, highlighting knowledge gaps and identifying priorities for future investigation and policy. Attendees will gain a deeper understanding of how context and patterns of standing influence health outcomes, how this complexity can inform guidelines and public health messaging, and future directions for research on standing and health.

S6: THE NEXT GENERATION OF EXERCISE ONCOLOGY: BIGGER, BOLDER AND BETTER
Erik D. Hanson, FACSM, Claudio L. Battaglini, FACSM. *University of North Carolina, Chapel Hill, NC.*

In the late 1980s, exercise training was first introduced as a supportive care for individuals affected by cancer. These pioneering works demonstrated that physical exercise was safe, feasible, and acceptable, with current evidence rated as strong by ACSM for improving anxiety, depression, fatigue, quality of life, lymphedema and physical function. Exercise oncology has since evolved beyond mitigating side effects, now encompassing cancer prevention, treatment support, and recurrence risk reduction—with recent data even showing direct survival benefits. Ongoing work now includes rare cancers, pediatric populations, and individuals with metastatic disease. Despite this progress, key challenges remain, including understanding biological mechanisms, determining minimum effective doses, developing tailored interventions, reaching rural and underserved populations, and improving implementation and uptake. These are vital benchmarks toward the strategic goal of making exercise a standard of care in oncology by 2030. The aim of this symposium is to equip researchers with the knowledge and tools needed to meet these challenges and advance the next generation of exercise oncology studies. Dr. Claudio Battaglini will provide historical context based on his 25 years of experience. He will also discuss barriers and facilitators to both home- and hospital-based interventions, highlighting recent work in pediatric populations, where current evidence quality remains low. Dr. Erik Hanson will present alternative methods and study designs to improve efficiency and efficacy when working with smaller or rarer populations. He will also propose strategies for optimizing data collection and assessing patients' readiness to engage in exercise. Recognition that individuals affected by cancer can safely engage in exercise which experiencing reductions in a wide range of side effects was a critical breakthrough, especially considering that physical activity during and after treatment was once considered a "radical departure" from standard care. To better serve patients, the future of exercise oncology needs to be built on innovative methodologies, new approaches, and bold ideas—laying the foundation for initiatives to optimize patient outcomes across the cancer care continuum.

S7: YOU WALKED HOW FAR? SELF-EFFICACY, STRESS AND TYPE TWO FUN DURING STUDY ABROAD
Karissa L. Peyer, FACSM. *University of Tennessee at Chattanooga, Chattanooga, TN.*

The Camino de Santiago is a network of ancient Catholic pilgrimage trails in northern Spain that attracts over 400,000 individuals each year. While originally a religious undertaking, people now complete the Camino for many reasons including as a personal and physical challenge. People on the Camino are referred to as "pilgrims" and must walk at least 100km in order to register as having completed the trek. Such long-distance hikes provide high levels of physical activity and have been linked to increased self-reliance and empathy and

reduced stress, but nearly all studies of these endeavors have been conducted retrospectively, reducing scientific rigor. Long-distance hikes may represent "type two fun," a popular term for an experience that is not actually fun while it is happening but that is looked at fondly in retrospect, highlighting the need for in-the-moment assessment of experiences. This tutorial will present the results of a small prospective study of university students (n=7) who completed 400 miles of the Camino de Santiago as part of a study abroad program in the Summer of 2025. Participants reported daily enjoyment, pain, connection with nature and connection other pilgrims. They also completed pre-post surveys of altruism, basic psychological needs, resilience, self-efficacy, and perceived stress. Attendees will learn 1) about the concept of Type Two Fun as it pertains to long-distance hikes and other physical activity pursuits, 2) changes in physical activity-related psychological measures over the course of the 25-day pilgrimage, and 3) suggestions for conducting research as part of university study abroad programs to document impact.

S8: ADJUSTING TO NATURE: STRATEGIES TO NAVIGATE TEACHING, LEARNING AND MENTAL HEALTH FOLLOWING NATURAL DISASTERS

Tamerah Hunt, FACSM, Justine Coleman, Amy Jo Riggs. *Georgia Southern University, Statesboro, GA.*

The most common natural disasters include severe thunderstorms, wildfires, floods, heat waves, floods, heat waves, droughts, winter storms, cold waves, and tropical storms. The American Red Cross responds to an average of about 65,000 disasters every year. However, the southeastern portion of the US experiences significant numbers of hurricanes, tropical storms, flash floods, winter storms, and droughts. Many of these natural disasters occur during the academic year and cause significant interruptions in academic studies, professional development, and overall well-being. In many cases, faculty are ill-equipped to help students and other faculty navigate the physical, psychological, and emotional loss that can occur following a natural disaster. Recently, increased attention has focused on mental health and emotional well-being as the number and severity of natural disasters has disrupted lives. The purpose of this presentation is to discuss strategies to support students, faculty, and staff after the disruption, stress and guilt caused by the need to pivot from an original plan following a natural disaster. The increased amount of stress that results from emergency pivoting of class delivery and assignments, changes in daycare availability, disruption of communication, the potential cost of home repair, and potential loss of life creates undue stress. Mrs. Justine Coleman, Dr. Amy Jo Riggs and Dr. Tamerah Hunt will lead a panel discussion about strategies to effectively pivot educational objectives, clinical rotations, and support wellness techniques to decrease stress. Learning objectives: After completing this session, attendees will: a) understand stress factors associated with natural disasters b) apply stress reducing techniques and c) develop an effective educational plan to pivot following a natural disaster.

S9: BEYOND BODY COMPOSITION: ADVANCED APPLICATIONS OF BIOIMPEDANCE FOR RESEARCH AND CLINICAL PRACTICE

Kworweinski Lafontant, David H. Fukuda, FACSM. *University of Central Florida, Orlando, FL.*

Through bioelectrical impedance analysis (BIA) and spectroscopy (BIS), bioimpedance has historically been a popular technique for assessing body composition throughout a wide range of populations. However, bioimpedance has rapidly increased in clinical utility over the years for reasons beyond body composition. Recent advances in assessing cellular health and hydration status, as well as screening for various cardiometabolic diseases, all stem from bioimpedance. Despite these advances, many clinicians and researchers remain unaware of the valuable information that their BIA and BIS devices provide outside of body fat percentages. Therefore, the purpose of this symposium is to review the foundational and latest research on bioimpedance as well as its applications. This session will provide participants with background information on how bioimpedance works mechanistically (Lafontant), detail the latest research on disease/disorder markers from bioimpedance (Lafontant), demonstrate advanced techniques such as characteristic frequency modeling and vector analysis (Fukuda), and examine best practice guidelines for clinical assessment and research with bioimpedance (Fukuda). Session participants will become familiar with available software and methods to complete advanced analyses with their bioimpedance data. This will empower session participants to get the most out of their BIA and BIS devices and improve the quality of their research and/or patient interactions.

S10: MARCHING MOVEMENT MATTERS: COLLABORATION BETWEEN KINESIOLOGY RESEARCHERS AND THE MARCHING BAND

Megan E. Holmes, Craig Aarhus, JohnEric W. Smith. *Mississippi State University, Mississippi State, MS.*

This symposium explores the innovative collaboration between the Department of Kinesiology and the Famous Maroon Band (FMB) at Mississippi State University, highlighting the intersection of exercise physiology and musical performance. The session will provide attendees with a foundational understanding of the physiological demands of marching performance, a review of relevant research findings, and a candid discussion of the collaborative process from both scientific and artistic perspectives. The session will begin with an overview of the collaboration's origins and goals, presented by Dr. JohnEric Smith (Kinesiology) and Dr. Craig Aarhus, who will outline the physiological demands of marching band performance and the rationale for applying exercise science principles to this unique population. Dr. Megan Holmes and Dr. JohnEric Smith (Kinesiology) will follow with a review of current research findings, including data on heat acclimation and physical activity levels observed in marching band members during training and performance. Some preliminary associations between physical activity indices and various health metrics will be presented. Dr. Craig Aarhus (FMB) will then provide insight into the logistical and cultural challenges of integrating scientific protocols into a traditionally artistic domain, while also highlighting the benefits observed in student performance and injury prevention. Finally, Drs. Smith, Holmes, and Aarhus will jointly discuss future directions for research and program development, including wearable technology, individualized training plans, and broader applications of this model to other performing arts. Attendees will leave with a deeper understanding of how exercise physiology can enhance performance, safety, and sustainability in marching band programs, as well as practical strategies for initiating similar collaborations in their own institutions. This effort was funded by the Department of Kinesiology and Department of Music, Mississippi State University. Artificial intelligence (AI) tools were used in the writing of the abstract for grammatical review.

S11: ACSM FITNESS INDEX: WHAT KEEPS THE SOUTH FROM THE TOP OF THE RANKINGS?

Rebecca A. Battista, FACSM[1], Stella Lucia Volpe, FACSM[2], Janet R. Wojcik, FACSM[3]. *[1]Appalachian State University, Boone, NC. [2]Virginia Polytechnic Institute and State University (Virginia Tech), Blacksburg, VA. [3]Winthrop University, Rock Hill, SC.*

In 2008, the American College of Sports Medicine (ACSM) launched the ACSM American Fitness Index (Fitness Index), in partnership with the Elevance Health Foundation. This annual report ranks 100 largest cities in the United States on a composite of health behaviors, health outcomes, built environment, and local policies that support physically active lifestyles. The Fitness Index can be a strong advocacy tool, allowing residents, local officials, community groups, and health organizations to assess and address factors contributing to their city's fitness, health, and quality of life (https://acsm.org/about/community-impact-programs/american-fitness-index/). The ACSM American Fitness Index aligns with the mission and vision of ACSM by providing cities with data to help them change their environments to support and promote physical activity. However, many ACSM members may be unfamiliar with the details of the ACSM American Fitness Index. Therefore, this session led by ACSM Fitness Index Committee Members will highlight the accomplishments of the ACSM American Fitness Index over the last 18 years and discuss why some cities have done much better with the indicators than others. Finally, this session will help to shed light on all the indicators that are measured, and how they might help to improve a city's overall fitness and health.Learning objectives include the following: 1) assess the reason why some cities have had better indicators than others, focusing on cities in the SEACSM region and 2) discuss the indicators, how they are selected, and how they can help cities improve overall fitness and health. Generative AI statement: Artificial intelligence (AI) tools were used in the writing (revising) of the abstract/presentation.

S12: CLINICAL BIOMECHANICS AND DISABILITY: TRANSLATING CONSIDERATIONS INTO PRACTICE

Lauren A. Luginsland[1], Alana Turner[2]. *[1]University of South Florida, Tampa, FL. [2]University of Southern Mississippi, Hattisburg, MS.*

Since the early 1990s, clinical biomechanics has played an important role in surgical decision making, particularly using clinical gait analysis. This assessment method has become standard practice for physicians managing pathological conditions such as cerebral palsy and stroke survivors. Currently, only 19 motion capture laboratories in America

meet the strict quality standards required for certification in this field. These motion capture laboratories mainly help physicians determine the best rehabilitation programs and surgical procedures for pediatrics and older adult patients who experience challenges with daily activities and quality of life. However, laboratories do not require clinical accreditation or a formal certification to start implementing fundamental considerations into practice. The purpose of this symposium is to discuss the practical applications and key considerations for conducting clinical biomechanics research alongside people with disabilities. Dr. Luginsland will share important considerations and best practices of clinical gait analysis and Dr. Turner will discuss the implementation and application related to individuals with disabilities. Together they will highlight important biomechanical research recommendations applicable throughout the lifespan, with a focus on children with disabilities. Researchers and practitioners will gain an understanding of the latest recommendations for standardized clinical biomechanics application, strategies for conducting research with children with disabilities, approaches for community outreach and engagement, and interdisciplinary collaborations. Researchers and practitioners may adapt these considerations and update their own laboratory workflows to better serve various clinical populations and individuals with disabilities.

S13: SODIUM BICARBONATE SUPPLEMENTATION: EFFECTS OF NEW DELIVERY METHODS ON EXERCISE PERFORMANCE AND GASTROINTESTINAL TOLERANCE

Michael J. Saunders, FACSM. *James Madison University, Harrisonburg, VA.*

Sodium bicarbonate ($NaHCO_3$) ingestion has been investigated for decades as a potential ergogenic aid for athletes. Studies have reported that sodium bicarbonate increases the buffering capacity of the blood, contributing to enhanced acid-base balance during high-intensity physical activity. As such, pre-exercise ingestion of sodium bicarbonate has been shown to enhance performance in maximal exercise tasks lasting approximately 30 s to 12 min, or other tasks that elicit metabolic acidosis. Despite its potential benefits, bicarbonate intake is also associated with increased incidence of gastrointestinal (GI) symptoms, such as nausea, bloating, cramping and diarrhea, which can undermine the ergogenic effects of supplementation. Some researchers have reported that bicarbonate ingestion produced significant ergogenic effects only after removing participants who experienced GI discomfort following supplementation. As such, investigators have examined ways to potentially reduce GI discomfort, such as modifying supplement dosage, timing, and delivery methods. Recently, a commercially available supplement was developed (Bicarb System™, Maurten AB, Gothenburg, Sweden) which incorporates NaHCO3 mini-tablets embedded in a carbohydrate hydrogel, which could reduce GI symptoms by minimizing interactions with stomach acid during digestion. The supplement has received considerable media attention due to its reported utilization by numerous top-level athletes. However, peer-reviewed studies investigating the efficacy of this product are minimal to date. The purpose of this symposium is to review the effects of sodium bicarbonate ingestion on buffering capacity, exercise performance, and GI symptoms during exercise, and examine existing evidence regarding the effects of new delivery methods on these outcomes.

S14: PREPARING AND COACHING THE ELITE WARFIGHTER AND COMPETITIVE MILITARY ATHLETE

Parker N. Hyde. *University of North Georgia, Dahlonega, GA.*

Elite warfighters, or members of Special Operations Forces (SOF), are classically compared to traditional Olympic and team sports athletes. While this comparison may be accurate at the basement level, elite warfighters and competitive military athletes have unique demands beyond the scope of normal sport. Many competitive military competitions, such as Best Ranger Competition/Ranger Challenge, span durations of greater than 60 hours with over 30+ miles of loaded movements. Additionally, many SOF selection events may last weeks or months with high volumes of physical and mental fatigue. Currently, there exists a chasm of published literature between the traditional elite athlete and the current defined general tactical athlete. Therefore, the purpose of this symposium is to provide a deeper understanding of the unique physical and cognitive demands of the elite warfighter prior to selection based events and competitive military athlete competitions such as Best Ranger Competition and Ranger Challenge. Dr. Parker Hyde will share important considerations and lessons learned from working with special operations soldiers across multiple armed forces branches and physical preparation of a competitive Ranger Challenge team. Dr. Gaven Barker will discuss the unique cognitive and nutritional demands of the competitive military athlete and strategies to improve performance in these domains. Researchers and practitioners will have a greater understanding of the current state of published literature in relation to the demands of the competitive military athlete. Additionally, researchers and practitioners will learn real-world strategies and have discussions on current approaches to novel scientific discoveries and coaching this unique athletic population. The overarching goal of this symposium is to bridge the gap that currently exists and facilitate dialogue around strategies to facilitate a greater scientific understanding of this unique population.

S15: GOT GROWTH? THE RELATIONSHIP BETWEEN CAM MORPHOLOGY, PEAK HEIGHT VELOCITY AND TRAINING LOAD DURING ADOLESCENCE

Sara Lynn Terrell[1], James M. Lynch[2]. [1]*Florida Southern College, Lakeland, FL.* [2]*Southern Illinois University, Carbondale, IL.*

Primary cam morphology (PCM) is a bony or cartilage prominence of varying size at any location around the femoral head-neck junction, changing the femoral head shape to aspherical. PCM develops during skeletal maturation as an adaptive physiologic response to load and is prevalent in athletes with open growth plates reporting high training volumes just prior to peak height velocity (PHV). Surgery has risen substantially with little emphasis on prevention and education. Literature suggests a broader exploration into forces impacting adolescent skeletal systems to support holistic prevention, such as conducting peak PHV calculations in adolescent athletes, targeted periodization and physical literacy prioritization. These strategies, grounded in bone remodeling foundations, may be viable approaches to reduce PCM incidence. Therefore, the purpose of this symposium is to explore PCM etiology with attention to PHV timing and training load monitoring strategies in adolescent athletes. Dr. Terrell will review scientific literature demonstrating the relationship of PCM etiology to femoral growth plate closure and athlete training load. Dr. Lynch will discuss bone remodeling principles and methods to calculate peak height velocity (PHV) time periods. Dr. Terrell will explore how PHV calculations coupled with periodization strategies may distribute epiphyseal loads at the hip. Both researchers and practitioners will learn PHV calculation strategies, training load considerations, and periodization concepts for adolescent athletes. Researchers and practitioners may change how training concepts are applied within critical skeletal growth periods which may better support health and longevity of adolescent athletes.

Tutorials

T1: WHAT IS THE LIMITING FACTOR FOR MAXIMAL OXYGEN UPTAKE? IT DEPENDS.

David R. Bassett, FACSM. *The University of Tennessee, Knoxville, TN.*

Ever since Hill and Lupton (1923) introduced the concept of maximal oxygen uptake over a century ago, exercise physiologists have pondered the limiting factors for VO_{2max}. The pathway for O_2 from ambient air to mitochondria includes a series of steps: (1) pulmonary ventilation, (2) diffusion of O_2 out of the lung and into the blood, (3) the O_2 carrying capacity of the blood, (4) the rate of blood flow, (5) diffusion of O_2 out of the blood and into the muscle, and (6) O_2 consumption by the mitochondria. In theory, any of these factors could be the "rate-limiting step" in VO_{2max}. We will start by considering VO_{2max} in clinical populations (those with COPD, mitral stenosis, atrial fibrillation, anemia, and inborn errors of metabolism). We will then consider the limiting factor(s) for VO_{2max} in a champion middle distance runner, and a high-altitude mountaineer atop Mount Everest. As will be seen, the rate-limiting step in VO_{2max} depends on several factors, including atmospheric conditions, aerobic fitness, and the medical status of the individual being studied. In summary, just as Wagner, Hoppeler, and Saltin (1991) noted, there is no single limiting factor for VO_{2max}. Rather, as they concluded, the transfer of oxygen from ambient air to mitochondria is dependent upon a series of integrated steps and a decrease in the transfer capacity of <u>any</u> of these steps will result in a predictable decrease in VO_{2max}. However, Saltin's classic 1985 experiment found that when subjects perform strenuous exercise with a small muscle group, the skeletal muscle's peak blood flow and peak VO_2 are about 2x greater than during whole-body exercise. Thus, during strenuous whole-body exercise in healthy humans, the capacity of skeletal muscle to accept blood flow (and consume O_2) exceeds the heart's ability to deliver it.

T2: DEVELOPING EXPERIENTIAL LEARNING AND CRITICAL THINKING ACTIVITIES IN AN UNDERGRADUATE EXERCISE SCIENCE COURSE

Josh Wludyga. *Georgia Gwinnett College, Lawrenceville, GA.*

This presentation explores the integration of experiential learning and critical thinking activities within an undergraduate exercise science course to enhance student engagement, comprehension, and application of course concepts. By incorporating hands-on experiences that introduce them to career opportunities in the field, students are encouraged to actively participate in the learning process. These strategies promote deeper understanding of the applicability of their curriculum while fostering critical thinking and decision-making skills essential for future professionals in health and fitness fields. The session will highlight specific activities being implemented as part of a larger-scale initiative across a four-year institution in the southeast region. Additionally, the presentation will share student feedback and proposed data analysis, offering practical insights for educators seeking to enrich their curriculum through experiential, self-reflection, and critical thinking approaches.

T3: HOLY BASIL SEEDS! CREATIVE NUTRITION AND PHYSICAL ACTIVITY STRATEGIES FOR OPTIMAL HEALTH ACROSS THE LIFESPAN.

Amy Jo Riggs, Mary Beth Yarbrough, Tamerah Hunt, FACSM. *Georgia Southern University, Statesboro, GA.*

In the past decade there has been a growing public interest in health and wellness, much of it fueled by social media. This surge of attention has led to some conflicting advice about nutrition and physical activity creating confusion across all age groups. With the overwhelming amount of health information available today, many Americans struggle to identify their nutritional and physical activity needs and how to integrate healthy habits into their busy lives. Yet proper nutrition and regular physical activity are essential for building and preserving muscle and bone throughout life. Age-related muscle loss with approximately 10% muscle loss beginning to occur around 25 years and an additional 40% loss between the ages of 50-80. This session will 1) discuss the new trends in physical activity and nutrition requirements for an active lifestyle and 2) examine the relationship between nutrition, physical activity and mental health. Dr. Amy Jo Riggs will discuss creative ways to obtain nutritional requirements based on physical activity and aging throughout the lifespan. MaryBeth Yarbrough will discuss considerations for physical activity based on the health-related physical components to optimize overall health and mental wellness. Dr. Tamerah Hunt will discuss the relationship between nutrition, physical activity and mental health. Learning objectives: After completing this session, attendees will: a) understand the relationship between nutrition, physical activity and mental health b) dispel common myths associated with nutrition and physical activity and c) develop an age-appropriate wellness (physical activity, nutrition and mental health strategies) plan. The target audience for this tutorial is students, faculty, researchers, clinicians and anyone that wants to exhibit healthy behaviors throughout the lifespan.

T4: WE BUILT IT, THEY CAME: EXPANSION AND ASSESSMENT OF RURAL PHASE THREE CARDIAC REHAB PROGRAM

Rebecca Collins, Lily Cohran, Victoria Floyd, Shelby Kitchings, Adelaide Morrissey. *Georgia Southern University, Statesboro, GA.*

Bulloch County is ranked 1st out of 119 counties in the number of cardiovascular deaths in RURAL counties in 2023 according to OASIS creating a clear disparity in cardiovascular health. To meet this critical need, Georgia Southern University partnered with the Statesboro YMCA and East Georgia Regional Medical Center to create a free Phase Three Cardiac Rehabilitation Program nearly 4 years ago. After initial grant funding and the development of strong partnerships with various community organizations, the program has reached full capacity. This program has started to bridge the gap between graduating from Phase 2 Cardiac Rehab and returning to regular physical activity for patients., The critical components for success have included: the ability to run free of charge for all patients due to community donations; active participation through service learning opportunities for students; and community fundraising. Assessment of quality of life questionnaires and motivational interviewing have identified common barriers to returning to physical activity after health-related adverse events. Further, identification of the importance of socialization and mental well-being the patients experience through participation in the program was evident. The purpose of the presentation is to discuss program effectiveness through reporting of pre-post data from the Fullerton Functional Fitness Test, patient satisfaction, quality of life metrics, successful program, and growth strategies. Finally we will discuss future expansion of the model for this phase three program to other facilities in the state of Georgia. Rebecca Collins will discuss the program background and rapid growth strategies. Lily Cohran and Adelaide Morrissey will discuss pre- and post-data from the Fullerton fitness assessments. Victoria Floyd will discuss the psycho-social effectiveness of the program, and Shelby Kitchings will discuss patient satisfaction reports from current patients. Rebecca Collins will then wrap up the session with additional discussions of the expansion of the program for students participating in the program through the undergraduate and graduate exercise science program curriculum.

T5: OVERCOMING IMPOSTER SYNDROME: EVIDENCE-BASED STRATEGIES FOR EXERCISE SCIENCE AND SPORTS MEDICINE PROFESSIONALS

Zachary Yukio Kerr, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

Imposter syndrome is a psychological experience in which individuals feel persistent self-doubt and fear being exposed as frauds. Studies suggest that over half of academics frequently experience imposter syndrome, with higher levels among women, underrepresented minorities, and first-generation students. Imposter syndrome has also been associated with reduced performance, lower productivity, and increased attrition from academic careers. This has implications for exercise science and sports medicine professionals, a field growing in diversity and perspectives. Students and early-career researchers may struggle to assess their capabilities, especially after academic setbacks. This disconnect can lead to missed opportunities and affect future career paths. Such feelings of imposter syndrome may heighten feelings of inadequacy and discourage diverse voices from entering the field. Understanding and combating imposter syndrome is essential to support the value that each individual brings to the field. This tutorial examines imposter syndrome using current research to identify its estimated prevalence, associated factors, and intervention strategies. The session examines both individual and institutional factors that may contribute to imposter feelings in academic settings. The tutorial includes interactive skill-building components focused on evidence-based intervention strategies. Participants will engage in guided exercises to identify imposter syndrome indicators, explore how to counter and re-frame negative self-talk, and develop peer support strategies. This tutorial will also examine mentor training and tools to recognize and address imposter syndrome in students and their mentees. The intended audience includes early-career professionals, established professionals in mentoring roles, and academic administrators. Learning objectives are to: 1) Analyze current research on imposter syndrome and its impact; 2) Apply evidence-based strategies to manage imposter syndrome; and 3) Create mentoring plans to identify and address imposter syndrome. Following this session, attendees will be able to implement strategies to recognize and address imposter syndrome in themselves and their mentees.

T6: CAFFEINE: PERFORMANCE, PERCEPTION AND FUTURE INQUIRIES

James M. Green, FACSM[1], Lauren G. Killen[2]. *[1]University of North Alabama, -Florence, AL. [2]University of North Alabama, Florence, AL.*

Caffeine is one of the most widely consumed ergogenic aids in the sport industry. It is a CNS stimulant found in coffee, energy drinks, and many dietary supplements. Ergogenic properties show positive effects in multiple aerobic and anaerobic performance paradigms. Additionally, it supports a blunting for perpetual measures (RPE) during and after exercise. Caffeine's ergogenic benefit may be mediated through the central nervous system and an analgesic effect. Altered RPE frequently associated with performance enhancement supports the notion that attenuated pain is among the mechanisms of action. These findings support the potential for caffeine to increase high-intensity exercise tolerance, and total energy expenditure making application plausible directly and indirectly for weight reduction. Despite caffeine's ergogenic effects on performance, the magnitude and direction of impact shows considerable inter-individual variability due to dosage, metabolism rate, and protocol differences. This tutorial will review current research involving a) brief historical perspective of caffeine, b) caffeine's impact on perceptual responses (in task and session ratings), c) individual response variability and d) future research avenues including delivery method. The presentation will focus on current research including multiple studies from our lab. The tutorial will close with audience Q and A as well as discussion and recommendations for future inquiries.

T7: ARE YOU READY FOR IT? BUILDING YOUR FUTURE IN BIOMECHANICS: AN INTERACTIVE ROUNDTABLE EXPERIENCE

Alana J. Turner[1], Christopher M. Wilburn[2], Ryan Colquhoun[3], Diego Ferreira[4], Mariana V. Jacobs[5], Carly Rauch[6], Nicole K. Rendos, FACSM[7,8]. *[1]University of Southern Mississippi, Hattiesburg, MS. [2]Auburn University, Auburn, AL. [3]University of South Alabama, Mobile, AL. [4]Lander University, Greenwood, SC. [5]University of Kentucky, Lexington, KY. [6]East Carolina University, Greenville, NC. [7]Florida Institute for Human and Machine Cognition, Pensacola, FL. [8]University of West Florida, Pensacola, FL.*

As biomechanics continues to advance, students preparing for careers in academia, industry, and clinical practice face exciting opportunities and evolving challenges. Attendees are invited to participate in guided discussions to identify actionable steps for enhancing student preparedness and fostering sustainable career development within the biomechanics community. The SEACSM Biomechanics Interest Group Executive Board will share student-focused insights and practical advice, drawing from their varied experiences in research, teaching, clinical work, and community engagement. This interactive roundtable will support students in biomechanics in key professional areas, such as career development, graduate school application strategies, interview preparation, and diverse career trajectories that extend beyond traditional academic roles including clinical practice opportunities. Emphasis will be placed on cultivating critical transferable skills, such as communication, leadership traits, and problem-solving strategies. This roundtable will also help identify non-governmental funding sources in biomechanics-related careers.

T8: THE HIGH-CARBOHYDRATE FUELING REVOLUTION: BRIDGING THE GAP BETWEEN SCIENCE AND PRACTICE

Patrick Benjamin Wilson. *Old Dominion University, Norfolk, VA.*

The practice of high-carbohydrate fueling has attracted significant attention in the press and on social media in recent years. In sports such as endurance running, road cycling, and triathlon, a growing number of athletes are ingesting carbohydrate at rates >90 g/h, which exceeds recommendations from organizations like the American College of Sports Medicine. Presently, there is scarce direct evidence to support this practice of high-carbohydrate fueling, especially as it relates to performance outcomes. However, the lack of supportive data may be the result of existing research not closely mimicking the demands of sports for which high-carbohydrate fueling is likely to be applied (e.g., multi-week cycling races, ultra-endurance running events). A variety of circumstantial evidence suggests that high-carbohydrate fueling could contribute to improved performance under certain circumstances, in part by leading to greater daily carbohydrate intakes, reducing the risk of low energy availability, reducing within-day energy deficits, and stimulating the central nervous system. The purpose of this tutorial is to provide an up-to-date analysis of the practice of high-carbohydrate fueling in the context of endurance sport. Topics covered include the development of historical carbohydrate intake guidelines, contemporary research on high-carbohydrate fueling, theorized benefits of high-carbohydrate fueling in relevant sports, potential risks/disadvantages of high-carbohydrate fueling, and methods of personalizing carbohydrate intake prescriptions. This tutorial should appeal to a broad range of students, researchers, and practitioners who are interested in sports nutrition and athletic performance.

T9: FORCE PLATES: A ONE-STOP SHOP, OR ARE THEY REALLY?

Jeromy D. Miramontes[1], Katie Forage[1], Megan Ward[2], Jaynesh Patel[3], Nicole K. Rendos, FACSM[4],[5], Ryan J. Colquhoun[1]. *[1]University of South Alabama, Mobile, AL. [2]Prisma Health, Columbia, SC. [3]University of South Carolina, Columbia, SC. [4]Florida Institute for Human & Machine Cognition, Pensacola, FL. [5]University of West Florida, Pensacola, FL.*

The accessibility of force plates has increased exponentially, with force plates becoming common instruments within the health and fitness, sports medicine, and sport science communities across a wide-variety of clientele. Several force plate manufacturers have created "all-in-one" systems aimed at providing their users with as much information as possible when collecting data. However, without a firm understanding of the foundational principles behind testing and the use of force plates, it can be overwhelming for users to understand where to begin when deciding on what metrics, tests, etc. are most appropriate for their clientele. The primary aim of this tutorial is to help ease this burden, particularly in students and early careers practitioners and researchers, by taking a hands-on, step by step approach through a data collection session using a force plate. The proposed tutorial will allow the attendees to gain hands-on experience of the setup, collection, and analysis of force plate metrics. Further, the diverse background of presenters will allow for a wide-variety of perspectives and allow for the exploration of a variety of scenarios depending on the interest of the attendees. The panel will discuss typical protocols used within their field of expertise, standard metrics that are institutionally agreed upon, and issues that come up that must be addressed and handled. The professionals will provide a live demonstration with situational differences that pertain to their fields. The target audience for this tutorial will be anyone who will or potentially will use force plates in their career.

T10: COMPARISON OF CHILDREN AND ADULTS RELATIVE TO EXERCISE AND TRAINING

James S. Skinner, FACSM. *Indiana University, Bloomington, IN.*

Most knowledge of the physiologic responses of humans to exercise is based on studies with adults. Less data are available on the effects of acute or chronic exercise on children and adolescents. Although some of our considerations regarding exercise testing and prescription for children can be borrowed from those available for adults, specific characteristics of the child require a special approach. First, a child's metabolic, cardiopulmonary, neuromuscular, thermoregulatory, and perceptual responses to exercise are somewhat different from those of mature individuals. Secondly, methods and protocols used for testing adults are not always applicable to children, whether due to differences in size, mental ability, attention span, and emotional maturity, or to ethical constraints. Additional differences are clinical, i.e., the major pediatric diseases are different from those prevalent in young or middle-aged adults. The purpose of this presentation is to compare the responses to exercise of children and adults. The learning objective is to understand these differences and how they might affect exercise testing and exercise prescription.

T11: PRACTICAL STRATEGIES TO MITIGATE AI MISCONDUCT AND MAXIMIZE STUDENT LEARNING

Jason Allen Campbell[1], Eric K. O'Neal[2]. *[1]Wake Forest University, Winston Salem, NC. [2]University of North Alabama, Florence, AL.*

Artificial intelligence (AI) can be a useful tool for exercise science students from the undergraduate to the PhD level. However, in recent years, it is likely that educators find themselves overwhelmed with unethical student use of AI. This can quickly transform into a feeling of loss of control in the classroom. Many of your students have likely become accustomed to a learning environment where AI misconduct is so common that it is not viewed as cheating by their peers. The short-term rewards of not having to dedicate time to prepare for academic tasks and potentially getting a better grade can create a moral dilemma for students. It is likely they may feel their own academic record may suffer compared to classmates if they fail to engage in appropriate AI use themselves, and there is a long-term risk for the validity of higher education if AI misconduct is continually overlooked by instructors and administrators who do not know how to prevent or respond to AI misconduct. This presentation is designed for instructors or administrators who feel unprepared or under-equipped to address AI-related academic misconduct challenges. Dr. Campbell will begin the tutorial focusing on (1) common examples of AI-assisted cheating and the prevalence of different techniques, (2) what AI-based technological solutions have emerged to assist educators in authenticating original vs. AI-generated student work, and (3) the innate limitations of tech-based solutions due to reliability and accuracy issues. Dr. O'Neal will conclude the presentation with (1) a focus on developing a positive, proactive mindset for handling AI challenges, (2) integrating a department-to-institution-wide team approach for curbing AI misconduct, and (3) sharing a practical, 3-tiered approach he uses to mitigate AI misconduct in online courses.

T12: FROM IDEAS TO IMPACT: REGIONAL STRATEGIES FOR EIM-ON CAMPUS SUCCESS

Patricia Sawyer-Simmons[1], Rebecca A. Battista, FACSM[2], Mark Schafer[3]. *[1]Florida Gulf Coast University, Ft. Myers, FL. [2]Appalachian State University, Boone, NC. [3]Western Kentucky University, Bowling Green, KY.*

Previous presentations on Exercise is Medicine-On Campus (EIM-OC) have highlighted gaps in the literature, showcased campus programming and events, and explored cross campus collaborations, particularly with mental health services, and emphasized the need for EIM-OC participation and outcome measures. Moving forward, it is essential to examine how campuses can work together regionally and develop strategies for long-term sustainability. This symposium will focus on policy and institutional integration, using examples from SEACSM EIM-OC programs to illustrate actionable approaches. We will discuss funding strategies, current participation, programming numbers, and persistent challenges, while highlighting creative internal solutions and providing cross-campus and institutional

comparisons to inspire new ideas. While a national casebook has been suggested, regional resources may better support program growth. Alignment on common outcomes will strengthen our collective impact and allow for meaningful comparisons. Examples from EIM-OC for each respective author's campuses (e.g., FGCU, App State, WKU) will highlight collaboration across university departments and the need for consistent data collection. We will also explore solutions for campuses without referral networks and discuss whether Gold Status is essential for success or if Silver and Bronze recognition can still provide meaningful impact. With challenges such as low referral response rates and difficulties demonstrating outcomes, finding practical ways to promote campus supported engagement in physical activity on campus is critical. By the end of this session, participants will be able to recognize the value of sharing stories, strategies and lessons learned among EIM-OC programs, identify approaches to create collaborations to strengthen institutional support, and explore strategies to promote program sustainability. Generative AI statement: Artificial intelligence (AI) tools were used in the writing (revising) of the abstract/presentation.

T13: PROGRESSION OF ACSM GUIDELINES AND CURRENT RECOMMENDATIONS

Lauren G. Killen, J. Matthew Green, FACSM. *University of North Alabama, Florence, AL.*

The ACSM is the leading organization providing guidelines for health screening prior to exercise testing and prescription. ACSM guidelines continually evolve to parallel current knowledge to optimize safety for exercise participation. Effective screening reduces risk by a) identifying individuals "at risk" for adverse exercise-related cardiovascular events, b) suggesting medical clearance by trained individuals prior to exercise participation when deemed necessary, and c) guiding initial exercise intensity recommendation. In the last decade, pre-participation guidelines have undergone significant changes to reduce unnecessary medical referrals prior to exercise participation. These changes include transitioning from stratifying individuals with an emphasis placed on present CVD risk factors to an increased reliance on individual's current physical activity levels. Effective pre-screening is critical for scientists in laboratory (research) settings and practitioners working with clientele. This tutorial will a) discuss the progression of changes to the current guidelines published in 2025, b) explain effective utilization of the current pre-participation screening process, c) identify and analyze current challenges (including a study from our lab) within screening guidelines to enhance effectiveness of use in both teaching and research. The target audience will be students and faculty desiring to extend their understanding of the progression and implementation of the ACSM pre-participation guidelines to optimize safety.

T14: PROMOTING PHYSICAL ACTIVITY ACROSS BORDERS: A FULBRIGHT SCHOLAR'S GUIDE

Jason R. Jaggers, FACSM. *University of Louisville, Louisville, KY.*

As physical inactivity and chronic disease continue to rise worldwide, there is a growing need for exercise scientists and health professionals to collaborate across borders. The Fulbright U.S. Scholar Program provides unique opportunities for ACSM members to share expertise in physical activity and exercise science while learning from international colleagues. Each year, more than 800 scholars engage abroad through Fulbright awards that range from one month to a year, offering flexibility for different career stages and professional commitments. This session will provide an overview of the application process, including eligibility requirements, proposal strategies, and timelines. Attendees will discover how Fulbright projects can advance research, teaching, and community engagement in exercise and health promotion, while also gaining insight from the firsthand experience of a Fulbright Scholar in the field. By understanding available resources and program incentives, ACSM members can leverage Fulbright to enhance their careers and contribute to global health through the promotion of physical activity.
Learning Objectives:
1) Identify Fulbright award types and formats that align with professional goals in exercise science, health promotion, and physical activity research.
2) Apply strategies for developing a competitive proposal that demonstrates the global significance of exercise and health-related work.
Intended Change for Attendees: Following this session, attendees should be able to incorporate Fulbright opportunities into their professional development, initiate international collaborations in exercise science, and expand their role in addressing physical inactivity and health disparities worldwide.

T15: BRIDGING CURRICULUM AND CREDENTIALING: STRATEGIES FOR STUDENT SUCCESS IN CLINICAL EXERCISE PHYSIOLOGY CERTIFICATION

Rebecca M. Kappus[1], Dave Verrill[2], Olivia McCallum[1]. *[1]Appalachian State University, Boone, NC. [2]University of North Carolina at Charlotte, Charlotte, NC.*

Certification as an American College of Sports Medicine (ACSM) Clinical Exercise Physiologist (CEP) serves as a formal recognition of advanced competency in managing individuals with chronic diseases and complex health conditions. This credential not only affirms proficiency in developing evidence-based exercise interventions for populations affected by cardiovascular, pulmonary, and metabolic disorders, but also reinforces alignment with established professional standards. For students, attaining certification enhances professional credibility, broadens career pathways, and underscores a commitment to safe, effective, and interdisciplinary clinical practice. Therefore, it is imperative to ensure effective and comprehensive preparation for the ACSM-CEP examination, encompassing both faculty-led instruction and student-centered learning strategies. This tutorial will focus on the following topics: (1) curricular development for acquiring the knowledge and skills important for exam content; (2) strategies for exam preparation from an expert perspective; (3) tips for success from a student who recently passed the exam and successfully secured a CEP position. Attendees will leave with strategies for the development of effective course content, insights into effective content engagement, and techniques for improving exam preparation.

Oral Presentation Sessions

O101: RELIABILITY OF PHYSIOLOGICAL PARAMETERS IN A FATIGUE RECOVERY PROTOCOL FOR BREAST AND GYNECOLOGICAL CANCER PATIENTS

Callum Allison[1], Grace Anderson[1], Jolie Guinn[1], Michael Wolfe[2], Frankie Bennett[1], Virginia van Staden[3], Randolph Hutchison[2], Larry Gluck[3], Jennifer Trilk, FACSM[1]. *[1]USC School of Medicine Greenville, Greenville, SC. [2]Furman University, Greenville, SC. [3]Prisma Health, Greenville, SC.*

BACKGROUND: VO_2max is a strong indirect predictor of mitochondrial function, and exercise heart rate (HR) serves as a practical measure of fitness. It is essential to determine the reliability of these parameters and the extent to which they can be replicated, also known as the internal consistency. The purpose of this study was to calculate intraclass correlation coefficients (ICC) to evaluate the reliability of VO_2max and HR in our fatigue recovery protocol for breast and gynecological cancer patients. METHODS: This is a subset of data from a mixed-methods observational design which is being employed in cancer patients to assess mitochondrial dysfunction via near-infrared spectroscopy (NIRS). Patients completed an on/off kinetics cycling protocol while NIRS data was recorded (PortaMon) to assess mitochondrial function using tau (time to recovery), VO_2max, and HR. Data was analyzed using ANOVA: Two Factor Without Replication. Internal consistency was determined using the Koo and Li two-way mixed effects, consistency, and multiple measures ICC model. Interpretation of the coefficients is as follows: <0.5 is poor reliability, 0.5-0.75 is moderate reliability, 0.75-0.9 is good reliability, and >0.9 is excellent reliability. We ran the model on baseline (before starting chemotherapy) VO_2max and HR, chemotherapy cycle 2 VO_2max and HR, and chemotherapy cycle 4 VO_2max and HR. RESULTS: The calculated ICC for baseline HR and VO_2max was 0.983 and 0.943, respectively. The calculated ICC for chemotherapy cycle 2 HR and VO_2max was 0.951 and 0.979, respectively. The calculated ICC for chemotherapy cycle 4 HR and VO_2max was 0.856 and 0.962, respectively. CONCLUSIONS: Using the Koo and Li ICC model, our data indicated that five out of the six metrics (baseline HR and VO_2max, chemotherapy cycle 2 HR and VO_2max, and chemotherapy cycle 4 VO_2max) all exceeded 0.9, indicating excellent reliability. The ICC for chemotherapy cycle 4 was between 0.75-0.9, indicating good reliability.

O102: CHEMOTHERAPY INDUCED ANEMIA ALTERS THE VO2-WORK RATE RELATIONSHIP IN PATIENTS WITH BREAST CANCER

Charles C. Ellison[1], Mckenzie B. Mabalot[1], Nathan R. Weeldreyer[1], Zachariah B. Nealy[1], Antonio Abbate[1], Christiana M. Brenin[1], Patrick M. Dillon[1], Trish Millard[1], Rebecca A. Krukowski[1], Jamie M. Zoellner[1], Glenn A. Gaesser, FACSM[2], Siddhartha S. Angadi, FACSM[1]. *[1]University of Virginia, Charlottesville, VA. [2]Arizona State University, Tempe, AZ.*

INTRODUCTION: Chemotherapy induced anemia leads to reductions in O_2 carrying capacity in patients with breast cancer. Its effects on VO_2 kinetics during cardiopulmonary exercise testing (CPET) have not

been described. **PURPOSE**: To examine the effects of chemotherapy related anemia on VO_2 kinetics in patients with breast cancer during CPET. **METHODS**: We carried out secondary analyses of data from 21 patients with breast cancer who underwent CPET testing to determine VO_2peak 1-2 weeks prior to initiating chemotherapy. Post-chemotherapy testing occurred <10 days after the final chemotherapy dose. Hemoglobin (Hb) and hematocrit (Hct) were analyzed from pre- and post-chemotherapy blood draws. The slope of the VO_2 (mL/min) work rate (W) relationship (VO_2/W) was determined for each participant pre- and post-chemotherapy. Paired samples t-tests were performed to evaluate changes in VO_2/W, Hb, and Hct. Correlations between ΔVO_2/W and ΔVO_2peak, ΔHb, and ΔHct were analyzed using Pearson correlations. α was set at 0.05. **RESULTS**: Data from 21 patients were analyzed for the study (55.3 ± 11.8 yrs, 72.8 ± 12.2 kg, 27.2 ± 5.4 kg/m^2). We observed reductions in VO_2/W (Baseline: 7.94 ± 1.4, Post: 6.89 ± 1.66, ΔVO_2/W = -1.06 ± 1.22 $p < 0.001$, d = -0.87), Hb (Pre: 12.7 ± 1.2, Post: 10.7 ± 1.1, ΔHb = -2.0 ± 1.1 g/dL, $p < 0.001$), and Hct (Baseline: 38.2 ± 2.8, Post: 32.8 ± 3.2, ΔHct = -5.4 ± 3.4 %, $p < 0.001$) following chemotherapy. Eighteen of 21 (86%) participants were anemic (Hb < 12.0 g/dL) following chemotherapy. ΔVO_2/W was significantly correlated with ΔHb (r =0.545, R^2 = 0.30, p = 0.011), ΔHct (r =0.637, R^2 = 0.41, p = 0.002), and ΔVO_2peak (r =0.507, R^2 = 0.26, p = 0.019). **CONCLUSION**: These preliminary data indicate that chemotherapy induced anemia results in a reduction of the slope of the VO_2-work rate relationship. The mechanism is unknown but could reflect increased reliance on non-oxidative energetic pathways during exercise. This may play a role in chemotherapy related fatigue. **Funding**: UVA CPH & iPRIME Seed Funding

O103: DECREASES IN MUSCLE MASS AND QUALITY FOLLOWING 24 WEEKS OF TREATMENT FOR ADVANCED PROSTATE CANCER

Mackenzie Manyin[1], Neeley Heilman[1], Emma Medwedeff[1], Mark Belio[1], Sarah Blount[1], Ayange S. Ayangeakaa[1], Abrar Al Hammadi[1], Kailyn E. Lowder[1], Sam R. Moore[1], Grace Liu[1], Daniel J. Crona[1], Ciaran M. Fairman[2], Young E. Whang[1], Claudio L. Battaglini, FACSM[1], Erik D. Hanson, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]University of South Carolina, Columbia, SC.*

BACKGROUND: Cross-sectional studies indicate that treatment for advanced prostate cancer (PC) with androgen receptor pathway inhibitors (ARPI) have higher total body % fat, with the impact on lean mass being less certain. Less is known regarding the rate of change when commencing ARPI, along with regional assessments that have previously shown greater sensitivity to change and include muscle quality. **PURPOSE:** To examine changes in total and regional body composition in men with advanced PC on androgen deprivation therapy (ADT) initiating ARPI treatment. **METHODS:** In an observational, longitudinal study, 24 participants (age 73±8y) on ADT (3.5±8.1 mo) and ARPI (0.5±2.7 mo) completed testing at baseline, 12, and 24 weeks. Total body composition was assessed using dual energy x-ray absorptiometry for relative and absolute fat and lean mass and bone mineral density while ultrasound was used to measure vastus lateralis cross-sectional area (CSA) and muscle quality. Mean differences (MD) were calculated as the changes from baseline. Effect sizes are reported as Cohen's D. **RESULTS:** At baseline, % and absolute fat mass were 32.4±5.5% and 27.6±8.4 kg, respectively, and neither changed across 24 weeks (MD=1.0%, [95% CI -0.8, 2.7], p=0.550, d=0.176 and 0.6 kg, [-0.6, 1.9], p=0.577, d=0.074). Bone mineral density at baseline was 1.22±0.15 g/cm^2 and remained unchanged (-0.0039, [-0.022, 0.014], p=0.788, d=0.026). Initial % lean mass was 63.7±5.5% and did not change (-0.8%, [-2.6, 1.0, p=0.401, d=0.144) while absolute lean mass was 53.4±8.3kg and demonstrated an overall decrease that approached significance (p=0.072), with a -2.3% decrease at 24 weeks versus baseline (-1.2kg, [-2.3, -0.2], p=0.028, d=0.144). Vastus lateralis CSA remained stable (-0.3 cm^2, [-1.8,1.2], p=0.756, d=0.087). Muscle quality showed overall declines that approached significance (p=0.080), where 24 weeks was 5.7% lower than baseline (-4.3 a.u., [-8.1, -0.6], p=0.027, d=0.275). **CONCLUSIONS:** In contrast to prior cross-sectional studies, ADT+ short-term ARPI use suggests % fat remains stable, with potential decreases in total body lean mass and muscle quality. The use of exercise training should remain a priority during advanced PC treatment because they could counteract adverse changes in body composition caused by ARPIs.

O104: SKILL DEVELOPMENT AND APPLICATION FOLLOWING AN EXERCISE INTERVENTION IN BREAST CANCER SURVIVORS: A QUALITATIVE STUDY

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BACKGROUND: Regular physical activity (PA) engagement can reduce treatment-related symptoms, increase physical function, and improve quality of life (QOL) in breast cancer survivors (BCS). Despite these benefits, the majority of BCS are not physically active, with less than half meeting national PA guidelines. Although exercise interventions are effective ways to increase PA, long-term PA is often discontinued following intervention completion. Few studies have explored the skills gained from an intervention and how participants apply those skills afterwards to maintain PA. **PURPOSE:** The purpose of this qualitative study was to explore perceptions of BCS related to skills obtained from a 24-week functional impact training (FIT) or yin yoga (YY) intervention and application of those skills following the intervention. **METHODS:** BCS completed a 24-week FIT or YY intervention, which consisted of 45-min sessions 2x/week. Following the intervention, participants completed semi-structured interviews with questions related to skills learned and application of those skills. Interviews were transcribed and analyzed via first and second cycle coding to identify emergent themes. **RESULTS:** Sixteen BCS (63±8 yrs; FIT: n=7; YY: n=9) completed the interviews. Five skills were identified: 1) exercise knowledge; 2) skill to exercise independently; 3) exercise self-efficacy; 4) improved activities of daily living; 5) breathing and relaxation techniques (YY only). Three themes emerged regarding how participants will apply skills learned: 1) continuation of exercise program; 2) stress relief; 3) self-prioritization. **CONCLUSIONS:** Findings suggest that both a high-impact (FIT) and low-intensity (YY) intervention can develop skills that promote continued PA, stress relief, and self-prioritization of health, which can have continued benefits on physical function, independence, and QOL. In addition, YY specifically provided participants with skills related to relaxation, highlighting the importance of yoga for stress relief and its benefit for BCS who may require lower-intensity programs. Future studies should objectively assess knowledge and skills to better inform intervention design and promote long-term adherence. **Funding:** ACSM Foundation Student Research Grant; NSCA Foundation Student Research Grant

O105: THE EFFECTS OF COMBINED TREATMENT ON SKELETAL MUSCLE DYSFUNCTION IN MALE COLORECTAL CANCER RODENTS

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BACKGROUND. Cancer cachexia, a devasting muscle wasting disorder, affects up to 50% of colorectal cancer patients. Unfortunately, this inflammatory driven disease remains without standardized treatment. While single target treatments aimed at inflammation (i.e., non-steroid anti-inflammatory drugs, NSAID) have failed, combining multiple treatments strategies may offer greater protection. Therefore, this study investigated the efficacy of combined treatment (aerobic exercise and NSAID) for colorectal cancer-mediated skeletal muscle dysfunction. **METHODS**. Male Balb/c mice (10 weeks old) were randomly assigned to one of four groups: sedentary tumor control (T); sedentary, tumor, NSAID (NSAID); tumor, wheel running exercise control (WR); tumor, combined treatment (NSAID+WR). All groups were tumor bearing (5x10^5 C26 cells in flank). Animals in WR groups underwent a 4-week voluntary wheel running intervention, animals in the NSAID groups were treated with NSAID milled into food, and SED animals remained sedentary. Skeletal muscle function was followed by *in vivo* grip strength assessment throughout the study. **RESULTS**. Mice in the T group exhibited the lowest skeletal muscle mass and the worst skeletal muscle function (grip strength) compared to all groups (P<0.05). T mice also exhibited the largest tumor mass and tumor volume compared to all other groups (P<0.05). Conversely, combined treatment (NSAID+WR) resulted in significantly greater skeletal muscle mass (P<0.001 vs T) and function (grip strength; P<0.05 vs T) compared to the T group. Interestingly, combined treatment (NSAID+WR) also had significantly smaller tumors compared to the T group (P<0.001). **CONCLUSIONS**. Combined treatment (aerobic exercise and NSAID) offered the greatest protection against colorectal cancer-mediated skeletal muscle dysfunction. Compared to single target treatment, it is possible that the combined treatment strategy targets multiple pathways and systems (including tumor and muscle) to offer greater myoprotection and a more comprehensive treatment strategy. Future investigations will explore the inflammatory-proteolytic axis for muscle specific therapeutic targets. These findings support the utility of combined exercise and drug therapy for muscle wasting disorders, like cancer cachexia.

O106: PHYSIOLOGIC DETERMINANTS OF CHANGE IN VO2PEAK IN PATIENTS WITH BREAST CANCER UNDERGOING CHEMOTHERAPY

Mckenzie M. Mabalot, Charles E. Ellison, Nathan R. Weeldreyer, Cheyanne Helms, Zachariah B. Nealy, Antonio Abbate, Christiana M. Brenin, Patrick M. Dillon, Trish Millard, Rebecca A. Krukowski, Jamie M. Zoellner, Siddhartha S. Angadi, FACSM. *University of Virginia, Charlottesville, VA.*

BACKGROUND: VO_2peak predicts morbidity and mortality in breast cancer (BC) survivors. VO_2peak declines due to chemotherapy. However, the physiological determinants underlying this decline are not fully understood in this population. Therefore, the purpose of this analysis was to explore physiologic factors associated with changes in VO_2peak (ΔVO_2peak) in patients with BC undergoing chemotherapy. METHODS: 24 patients with BC scheduled to undergo chemotherapy were randomized to: 1) moderate-intensity exercise (MOD): 150min/week of moderate-intensity walking at 70-75% peak heart rate (PHR) or 2) high-intensity interval training (HIIT): 3 session/week of 4x4 intervals at 85-95% PHR. Another 12 patients were recruited into a nonrandomized, non-exercising control group (NE) that received standard of physical activity care recommendations from their oncologist. Baseline VO_2peak testing, resting echocardiogram, and blood draws occurred 1-2 weeks prior to chemotherapy initiation. Post-testing occurred within 10 days of final infusion. A stepwise multiple linear regression was used to examine determinants of ΔVO_2peak, while minimizing effects of collinearity. The dependent variable was ΔVO_2peak, and independent variables were changes in the VO_2 work-rate relationship (ΔVO_2/W), PHR (ΔPHR), resting stroke volume (ΔSV), resting cardiac output (ΔCO), and hemoglobin (ΔHb). Alpha was *a priori* set at *p*&lt0.05 for entry and *p*&gt0.10 for removal. RESULTS: 20 participants completed all aspects of the study (MOD: n = 7, 55±9.5yrs, 26±5.2kg/m^2; HIIT: n = 7, 55±12yrs, 28±5.5kg/m^2; NE: n = 6, 59±11yrs, 27±5.6kg/m^2). The model was significant ($F(1,17) = 8.376$, $R^2 = 0.588$, $p = 0.010$) with ΔHb and ΔCO significantly predicting ΔVO_2peak (ß = 0.638, $t = 4.095$, *p*&lt0.001; ß = 0.451, $t = 2.894$, $p = 0.010$, respectively). ΔVO_2/W, ΔPHR, and ΔSV did not contribute significantly to the model (*p*&gt0.10). CONCLUSIONS: ΔHb and ΔCO at rest are strong predictors of ΔVO_2peak in patients with BC undergoing chemotherapy. Chemotherapy-induced declines in Hb and resting CO accounted for ~39% and 20% of changes in VO_2peak respectively. Improvements in VO_2peak would be expected as Hb returns to baseline, however, whether cardiac function returns to baseline, remains to be seen. Funding: UVa CPH & iPRIME Seed Funding

O107: EXAMINING THE FEASIBILITY AND ACCEPTABILITY OF 10-WEEKS OF CREATINE AND RESISTANCE TRAINING IN COLORECTAL CANCER

Genevieve L. Bottone, Colin F. O'Mahony, Alexander M. Brooks, Brett M. Scott, Kylah E. Jackson, Ciaran M. Fairman. *University of South Carolina, Columbia, SC.*

Background: Colorectal cancer (CRC) and its treatments impair physical function and muscle strength. Resistance training (RT) is a feasible and effective approach for improving muscle mass and function, and evidence in non-cancer populations suggests creatine supplementation may augment these adaptations. However, the feasibility and acceptability of creatine supplementation in combination with RT have not been well studied in cancer survivors. The primary aim of this trial was to examine the feasibility, safety, and acceptability of a 10-week hybrid RT program with creatine supplementation in CRC survivors. **Methods:** In this double-blind randomized controlled trial, participants were allocated to creatine (SUPP) or placebo (PLA). Both groups completed supervised RT three times weekly for 10 weeks. Feasibility outcomes included recruitment (eligibility, enrollment, retention), adherence (relative dose intensity [RDI] and supplement adherence), and adverse events. Acceptability was assessed post-intervention using a 5-point Likert scale evaluating ease, quality, and difficulty. **Results:** Over a 12-month recruiting period, 1,378 mailings were sent; 410 individuals were contacted and screened, and 27 (7%) enrolled, with 24 (89%) completing the intervention (2 withdrew due to time constraints, 1 removed for an unrelated adverse event). Participants had a mean age of 64.2±12.7 years, BMI 29.6±4.8, and time since diagnosis of 86.3±81.0 months. Mean RDI was 92.2±10.9% (SUPP 92.3±8.4%, PLA 92.0±13.9%). Supplement adherence was 94% (SUPP 95%, PLA 95%), and 90% of participants rated the intervention as acceptable. Nine mild-moderate adverse events were recorded. **Conclusions:** A 10-week hybrid RT program with creatine supplementation was safe, feasible, and acceptable among CRC survivors. While adherence and retention were high, recruitment yielded only 2% of those contacted, indicating that future trials will require modified enrollment strategies.

O201: EFFECT OF HIP SYMPTOM DURATION ON JOINT POWER DURING A SINGLE LIMB SQUAT IN INDIVIDUALS WITH HIP RELATED PAIN

Holly Stanze[1], Bethany Wilcox[2], Anthony Mangino[1], Kate Jochimsen[3], Michael Samaan[1]. *[1]University of Kentucky, Lexington, KY. [2]Mass General Brigham, Boston, MA. [3]Mass General Hospital, Boston, MA.*

BACKGROUND: People with hip joint-related pain (HRP) exhibit lower limb muscle dysfunction, yet the association between lower limb energetics and symptom duration in people with HRP is not well understood. The purpose of this study was to analyze whether hip pain during a single limb squat (SLS) and power-related parameters during the eccentric and concentric phases of a SLS differ based on symptom duration in individuals with HRP. **METHODS**: 25 subjects with HRP underwent 3D motion analysis and reported hip pain while performing a SLS. Similar to our prior work, subjects were divided into shorter (≤ 36 months) and longer (> 36 months) symptom duration groups. Sagittal plane joint power was calculated as the product of joint moment and joint angular velocity. Total sagittal power was calculated by summing the hip, knee and ankle joint powers. Peak total power as well as the corresponding magnitudes of the hip, knee and ankle joint power at peak total power were calculated during the eccentric and concentric phases of the SLS. Between-group differences in demographics, power-related outcomes, and hip pain were assessed using independent t-tests, Fisher's Exact test, and Mann-Whitney U tests, as appropriate (α=0.05). **RESULTS**: The longer symptom duration group reported worse hip pain during the SLS. Despite similar peak eccentric and concentric total powers, the longer symptom duration group exhibited lower hip energy absorption and higher ankle energy absorption at peak eccentric total power, as well as lower hip energy generation at peak concentric total power. **CONCLUSIONS**: Individuals with longer hip symptom duration exhibit worse hip pain and lower hip joint energy absorption and generation during the SLS. They also exhibit higher ankle joint energy absorption, which may be a compensatory strategy to reduce hip pain during the SLS. Given the study design, we cannot determine if alterations in joint power are causative or compensatory as it pertains to hip symptom duration.**Funding**: NIH (K23-AT011922, K01-AG073698), American College of Sports Medicine, Mid-Atlantic Regional Chapter (MARC) Early-Stage Investigator Award, West Virginia University Research and Scholarship Advancement Grant

O202: INDIVIDUALS WITH MARFAN SYNDROME AMBULATE WITH ALTERED JOINT WORK

Amara G. Sharp[1], Jaimie A. Roper[2], Mariana V. Jacobs[1], Anthony A. Mangino[1], Mary B. Sheppard[1], Michael A. Samaan[1]. *[1]University of Kentucky, Lexington, KY. [2]Auburn University, Auburn, AL.*

BACKGROUND: Marfan syndrome (MFS) is a connective tissue disorder that is associated with knee muscle weakness and a higher incidence rate of osteoarthritis-related pain, compared to the general population. Our prior work has demonstrated altered joint kinematics and larger joint moments during walking compared to healthy controls. Despite these alterations in gait mechanics, muscle function during walking related to these aberrant gait patterns is not well understood. Assessment of lower extremity joint energetics will provide insight on lower extremity muscle function during gait that leads to these altered joint loading patterns and joint pain observed in individuals with MFS. METHODS: Eighteen individuals with MFS (16 females; age 39±11.30 years; body mass index [BMI] 26.20±5.84 kg·m-2) and 18 sex and BMI matched healthy controls [CTRL] (16 females; age 26±7.58 years; BMI 23.70±3.97 kg·m-2) were tested in this retrospective, cross-sectional study. All subjects underwent a 3D gait analysis at the average level ground walking speed of 1.35 m·s-1. Joint power was calculated as the product of the joint angular velocity and joint moment for the hip, knee, and ankle. The total limb power was calculated as the sum of the hip, knee and ankle powers across the stance phase (initial contact to toe-off). Work was calculated as the time based integral of the joint power curves. Mann-Whitney U tests were used to assess between group differences in demographics. Between group differences in joint work and peak total power and the corresponding hip, knee, and ankle powers at the peak total power were assessed using an ANCOVA, adjusting for age. Statistical significance was defined as alpha=0.05. RESULTS: All joint power based parameters were similar between both groups (p>0.05). The MFS group walked with higher positive hip work (p=0.04), higher positive knee work (p=0.01), higher negative knee work (p=0.04), and higher negative ankle work (p<0.01) compared to CTRL. CONCLUSIONS: The MFS group walked with larger joint work, but similar joint power compared to the CTRL. Larger joint work may suggest lower extremity muscle alterations and be associated with the high incidence of osteoarthritic-related pain in the MFS population. Funding: The Marfan Foundation, NIH (KL2-TR001996, K01-AG073698, K01-HL149984, TL1-TR001997)

O203: HIP ANGLES AND MOMENTS DURING GAIT DIFFER BETWEEN LIMBS IN INDIVIDUALS FOLLOWING ACL RECONSTRUCTION

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University of Georgia, Athens, GA.

BACKGROUND: Individuals with anterior cruciate ligament reconstruction (ACLR) demonstrate aberrant knee gait biomechanics that are related to knee osteoarthritis development. However, limited studies have focused on alterations in hip biomechanics during gait. The study purpose was to compare hip angles and moments between limbs of ACLR participants and limbs of uninjured matched controls. **METHODS:** ACLR participants (n=10; 90% women) were matched to controls (n=10; 90% women) by sex, age, and body mass index. Participants completed 3-5 gait trials collected via a 3D motion capture system. Frontal, sagittal, and transverse hip angles (°) and moments ($Nm \cdot kg^{-1} \cdot m^{-1}$) were extracted during gait stance, down sampled to 101 data points, and averaged across trials for each participant. One-dimensional two sample t-tests and paired t-test statistical parametric mapping (SPM) analyses were used to compare limbs across the gait cycle: (1) ACLR limb vs. random control limb, (2) ACLR limb vs. contralateral limb, and (3) contralateral limb vs. random control limb. **RESULTS:** ACLR limbs demonstrated smaller sagittal plane hip angles during early stance (0-5% gait cycle; mean peak angle = −15.66°, p=0.043), indicating a more flexed hip at initial contact. During loading response (11-17% gait cycle), ACLR limbs demonstrated reduced hip extension moment compared to the contralateral limb (mean peak moment = 0.099 $Nm \cdot kg^{-1} \cdot m^{-1}$, p=0.004), suggesting diminished ability to generate or sustain force at the hip. In late stance (74-100% gait cycle), ACLR limbs demonstrated greater hip flexion moment (mean peak moment = −0.404 $Nm \cdot kg^{-1} \cdot m^{-1}$, p<0.001), reflecting altered loading demands during propulsion. **CONCLUSIONS:** Sagittal plane hip angles and moments during gait differ between the limbs of ACLR participants. These findings suggest compensatory adaptations may influence lower extremity joints beyond the knee after ACLR and highlight the need for gait retraining that addresses bilateral hip function during rehabilitation.

O204: FALL-RELATED GAIT PHENOTYPES ACROSS THE ADULT LIFESPAN: A LATENT PROFILE AND LINEAR DISCRIMINANT ANALYSIS APPROACH

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BACKGROUND: Prior studies have established independent associations between singular spatial or temporal gait parameters and fall risk using variable-centered approaches. Such analyses may miss heterogeneity among the sample and combinations of gait variables that may distinguish gait function. In contrast, person-centered approaches, such as Latent Profile Analysis (LPA) combined with Linear Discriminant Analysis (LDA), might reveal nuanced gait profiles that better characterize fall risk. **METHODS:** 257 adults (21-85y; 49% female) completed a 5-minute usual-pace walk on an electronic gait mat. Nine fall-related variables (gait velocity, cadence, step length, step width, double support time, stance time, stride time variability, swing time variability, and stride length variability) were included and controlled for covariates (BMI, leg length). LPA was used to define profiles, LDA confirmed profile separation and variable importance, and age/sex distributions were examined. **RESULTS:** LPA revealed a four-profile solution (BIC=5320, good model parsimony; entropy=0.94, excellent class separation): Profile 1 (High Functioning: n=23, 35% female, 48% ≥65 years); Profile 2 (Typical Walkers: n=75, 47% female, 27% ≥65 years); Profile 3 (Elevated Risk of Fall: n=12, 17% female, 42% ≥65 years); Profile 4 (High-Risk of Fall: n=120, 58% female, 52% ≥65 years). Standardized z-scores explained why individuals were split across high functioning vs high-risk of fall: Profile 1 displayed higher gait velocity (+0.9), step length (+0.8), and cadence (+0.7); while Profile 4 exhibited higher stride time (+1.4) and swing time variability (+1.30) and lower gait velocity (-1.30). LDA confirmed robust profile separation; swing time variability (r=-0.84), stride time variability (r=-0.78), and double support time (r=-0.71) strongly discriminated the profiles. Sex was unbalanced across profiles, indicating it may be a contributor to fall-risk gait phenotypes. **CONCLUSIONS:** LPA identified 4 distinct gait profiles, ranging from high-functioning walkers to those with elevated or high risk of falling. Notably, the profiles were not homogeneous for age and sex, suggesting functional gait heterogeneity among older adults who either have preserved gait mechanics or who adopt compensatory strategies to aid stability.

O205: MOTOR ADAPTATION IN OBSTACLE CLEARANCE IS DICTATED BY PERCEPTUAL THREAT DYNAMICS

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BACKGROUND: Safe navigation requires the motor system to adapt movements, balancing safety with metabolic efficiency. How this strategy is adapted over repeated exposures to dynamic threats remains unclear. This study determined if the adaptation rate of lead toe clearance is modulated by an obstacle's dynamic and perceptual nature.**METHODS:** Thirty-one healthy adults (22.5 ± 3.1 yrs) walked at a self-selected pace. Markerless motion capture recorded sagittal kinematics during three fixed-order conditions: a 10cm Stationary obstacle, a Perpendicular moving obstacle, and a Head-on moving obstacle on a collision course. A motor synchronized moving obstacles to each participant's gait. A linear mixed-effects model (LMM) analyzed 10 sequential encounters per condition, accounting for inter-subject variability in motor learning. Artificial intelligence (AI) tools were used in the collection and analysis of data and writing of the abstract. **RESULTS:** A significant Condition × Trial Number interaction was found (p=.004), confirming adaptation rates differed between conditions. Post-hoc analysis isolated this effect to the Head-on condition, showing a significant and rapid decrease in toe clearance (β = -0.40 cm/trial, p=.002). Mean clearance for this condition dropped from 12.26 ± 8.68 cm to 8.71 ± 9.38 cm. Toe clearance remained stable for the Stationary (p=0.66) and Perpendicular (p=0.52) conditions.**CONCLUSIONS:** Motor adaptation during obstacle negotiation is powerfully dictated by the perceptual salience of the threat. The rapid down-regulation of clearance in the head-on condition suggests a distinct motor learning process: an initially cautious, high-cost strategy is rapidly recalibrated as the threat is re-appraised as manageable. This reveals a behavioral signature of how the nervous system optimizes safety margins. Future work integrating dual-task cognitive loading could inform assessment tools for fall risk and athletic agility.

O206: INSTRUMENTED ASSESSMENT OF GAIT, FUNCTIONAL MOBILITY, AND POSTURE IN OLDER ADULTS WITH AND WITHOUT CONCUSSION

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BACKGROUND: Subtle gait, mobility, and postural changes after concussion may go undetected, increasing fall risk. Dual-tasking - performing a cognitive and motor task simultaneously - further challenges mobility and may reveal impairments that are not evident during single-tasking. This study examined whether dual-task (DT) measures better differentiate older adults with concussion from healthy controls than single-tasks (ST). **METHODS:** Eleven older adults with persistent impairments and/or symptoms from fall-related concussion (Age = 71.2 years, Montreal Cognitive Assessment (MOCA) = 24.8, onset since concussion = 0.7 ± 0.62 years, 82% female) and 13 controls (Age = 67.6 years, MOCA = 25.0, 69% female) completed two trials each of: (1) usual-pace ST and DT (word-naming) walking trials, (2) Timed-Up-and-Go (TUG) trials under ST and DT conditions (category fluency), (3) ST 360° turn using APDM inertial sensors, and (4) feet apart quiet ST and DT standing trials (counting backward by 3) on a force platform. A MANCOVA tested group effects, controlling for age, sex, and education. **RESULTS**: A significant multivariate effect (p=0.043) revealed group differences in gait speed (ST: p=0.009 DT: p=0.014), stride length (ST: p=0.007, DT: p=0.006) and ST 360° turn velocity (p<0.001). Pairwise comparisons showed that the concussion group had slower gait speed (ST: 0.78 m/s ± 0.05 vs. 1.00 m/s, ± 0.05; DT: 0.63 m/s ± 0.07 vs. 0.88 m/s ± 0.06), shorter stride length (ST: 0.94 m ± 0.04 vs. 1.11 ± 0.04; DT: 0.80 m ± 0.06 vs. 1.05 m ± 0.05), and slower 360° turn velocity (136.90 °/s ± 10.96 vs. 205.05 °/s ± 10.47). No group effects were observed for the TUG or posture (all *p*> .05). **CONCLUSIONS**: Gait was better at distinguishing older adults with concussion from those without compared to postural measures, likely because gait was more symptom-provoking and therefore more sensitive. DT did not add sensitivity, perhaps because it did not elicit additional symptoms beyond ST measures. These results indicate that incorporating symptom-provoking assessments into fall-risk screening may improve identification of older adults with concussions who are at increased risk of falling. Data collection is ongoing and expected to conclude by February. **Grant or funding information:** Supported by a Graduate Research Assistantship from Augusta University.

O207: BALANCE AND OBSTACLE NEGOTIATION IN INDIVIDUALS WITH LOW BONE MINERAL DENSITY

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INTRODUCTION: Worldwide, it is estimated that 200 million women suffer from osteoporosis and 1 in 3 women and 1 in 5 men will experience a fragility fracture. The proportion of older American adults suffering from osteoporosis is expected to rise by 30% from 2010 and 2030. Low BMD increases bone fragility and predisposes individuals to fractures even under minimal trauma. When combined with slower, less stabilized gait and compromised balance, this biomechanical deterioration hampers protective responses during falls. The purpose of this study was to investigate balance and its impact on gait characteristics during obstacle negotiation in individuals with low bone mineral density. **METHODS:** Forty-two women (21 normal BMD, 21 low BMD) (47 $\pm$ 7.9 years; height of 162 $\pm$ 8.62 cm; weight of 81.21 $\pm$ 19.32 kg) were classified based on the t-score from the DEXA scan. Balance was evaluated using dynamic posturography with the NeuroCom® Equitest System™. Variables of interest were toe clearance during obstacle negotiation and sway velocity components in the medial-lateral (M/L) and anterior-posterior (A/P) directions. Following DEXA examination and the balance protocol, participants completed a randomized gait protocol consisting of 15 normal gait trials and 30 obstacle negotiation gait trials (15 trials low, 15 trials high). Obstacles were set at 20% of the participant's leg length for low and 40% for high. **RESULTS**: Significant differences in A/P sway velocity (1. cm/s; p=.003) and M/L 1.94cm/s; p=.002) were found in sway parameters between individuals with normal and low BMD. Significantly greater sway parameters were seen in individuals with smaller toe clearance during obstacle negotiation at both heights. Toe clearance and A/P sway were negatively correlated, $r = -0.32$, p = .017; as was toe clearance and M/L sway $r = -0.24$, p = .023. **CONCLUSION**: These results provide evidence for the use of lumbar x-ray imaging as a predictor of dynamic postural stability in a fall recovery. These results suggest that greater instability, as measured by an increase in sway, negatively impacts an individual's ability to effectively negotiate an obstacle above floor level, hence increase the risk of a potential fall.

O301: EVALUATING THE EFFECTIVENESS OF THERABODY JETBOOTS IN AFRICAN AMERICAN WOMEN RUNNERS

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BACKGROUND: Optimal recovery is essential for running performance; yet, the effectiveness of specific recovery tools among African American women runners remains under-researched, despite this group being one of the fastest-growing demographics in running. African American women have shown decreased autonomic recovery after exercise, which can prolong rest periods between training bouts or negatively impact performance. This study aimed to evaluate the effectiveness of Therabody Jetboots Prime, a commercially available, FDA-cleared pneumatic compression device, on physiological and psychological elements of recovery in African American women runners. METHODS: This randomized crossover trial recruited eight African American women who identified as recreational runners. All participants completed two, four-week training blocks. In one block, they used the Therabody Jetboots for 20 minutes after each training session; in the other block, no recovery device was used. All participants used a Garmin Forerunner watch for daily suggested workouts across both training blocks. Primary outcomes were collected at three timepoints (baseline and following each block) and included measures of muscle soreness via a Visual Analog Scale (VAS), stress using the RESTQ-sport questionnaire, leg blood flow, 5k run time (on treadmill), and leg girth measurements. Repeated measures ANOVA was used to analyze differences, with significance set a priori at $p < 0.05$. RESULTS: When using Therabody Jetboots, participants reported significantly lower VAS scores (2.85±0.56) than when using no recovery device (3.25±1.24) ($p = 0.04$). Similarly, sleep quality scores on the RESTQ were significantly higher (3.13±0.69) when using Therabody Jetboots compared to the no device training block (4.13±0.72) ($p = 0.04$). All other measurements showed no significant differences between the two groups. CONCLUSIONS: Preliminary findings suggest Therabody Jetboots may reduce perceived soreness and improve sleep quality in African American women runners. While effects were limited to subjective measures, these improvements may support both psychological recovery and exercise adherence. Studies with larger sample sizes are needed to confirm pneumatic compression's role in recovery among underrepresented runners.

O302: SEASONAL CHANGES IN RUNNING LOCOMOTOR PROFILES IN YOUTH FEMALE CROSS COUNTRY SKIERS

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BACKGROUND: Youth cross-country skiing athletes present different aerobic and sprint performances (i.e., locomotor profiles) that change throughout a season depending on training loads and competition demands. Monitoring these profiles over time is essential for optimizing individualized training prescription. We therefore aimed to examine changes in physiological and performance variables and locomotor profile distribution in youth cross-country skiers. **METHODOLOGY:** Eight regional-level female skiers (13-17 y-old) completed pre- (PRE) and post-testing (POST) sessions separated by seven weeks in the preseason (% training session zones 1-2 71%, zone 3 13%, zones 4-5 15%). Assessments included a 6-minute running test to determine maximal aerobic speed (MAS), a 40-m sprint to determine maximal sprint speed (MSS), and measurements of maximal heart rate (HRmax), blood lactate concentration, rate of perceived exertion (RPE) and vastus lateralis muscle oxygenation (SmO_2). The anaerobic speed reserve (ASR) ratio was calculated as MSS/MAS to classify athletes into three locomotor profiles: endurance, hybrid, or sprint. **RESULTS:** No significant changes were observed for distance covered over 6 min ($p = 0.742$), MAS ($p = 0.742$), ΔSmO_2 ($p = 0.363$) or lactate ($p = 0.786$), while HRmax tended to decrease ($p = 0.050$). Sprint time worsened (-5.2%, $p = 0.018$), and MSS (-6.8%, $p = 0.002$), ASR ratio (-7.6%, $p = 0.038$), and RPE (-1.7%, $p = 0.003$) decreased. A redistribution of locomotor profiles was observed: hybrid clustering decreased from 75% to 37.5%, while endurance profiles increased from 12.5% to 50%. The combined adverse and non-response rates for MAS and MSS were 45% and 100%, respectively. **CONCLUSION:** Over preseason training, athletes displayed an almost certain decline in sprint performance without changes in aerobic capacity at group level, despite individual differences. These findings highlight the dynamic nature of locomotor profiles and the importance of repeated monitoring to guide individualized training strategies in cross-country skiing.

O303: PRELIMINARY EVIDENCE FOR ELEVATED LACTATE THRESHOLD IN TRAINED ENDURANCE ATHLETES PERFORMING DOUBLE THRESHOLD TRAINING

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Background: High-Intensity Interval Training (HIIT) improves aerobic fitness but may contribute to menstrual irregularities, psychological burnout, and inflammation, particularly in female runners. Double threshold training (DTT), also known as The Norwegian Method, which utilizes twice-daily, lower intensity sessions, has gained popularity. This cross-sectional study compares lactate threshold (LT) in athletes training with HIIT versus DTT and explores associations with burnout and female-specific outcomes. **Methods**: Endurance runners were grouped into HIIT or DTT cohorts based on their self-reported 8-week training logs. The HIIT group (n=23; 20M, 3F) and DTT group (n=10; 6M, 4F) completed LT testing, an Athlete Burnout Questionnaire [ABQ]. Females completed a Menstrual Related Quality of Life Questionnaire [MEDI-Q]). **Results**: Preliminary data indicates that LT speed is numerically higher and approaching significance in DTT compared with HIIT (11.05 vs 10.63 $m \cdot s^{-1}$; p=0.072). In men, DTT had significantly greater LT speeds (11.43±0.23 vs 10.68±0.65 $m \cdot s^{-1}$; p<0.001), while no difference was observed among women (p=0.48), in part due to the small sample size. In the HIIT group (n=12; 9M, 3F), LT speed was strongly inversely correlated with burnout (ABQ total: r=−0.56, p=0.037). Though limited by a small sample size, there was also a negative correlation (r=-1.0, p<0.001, n=3) between MEDI-Q Total Score and Reduced Sense of Accomplishment. **Conclusions**: Based on these preliminary findings, DTT is associated with higher LT speeds than HIIT, particularly in men, and that LT speed is correlated inversely with burnout scores. We also expect to observe differences in MEDI-Q scores and distinct hormonal and inflammatory profiles between groups.

O304: INFLUENCE OF HIGH VERSUS LOW BODY FAT ON MUSCLE QUALITY IN WELL-TRAINED FEMALE ENDURANCE ATHLETES

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Background: Skeletal muscle plays a central role in glucose regulation, metabolic function, and physical performance; however, muscle quality may be diminished in individuals with higher adiposity due to increased intramuscular fat and reduced force production relative to muscle mass. Thus, the present study aimed to examine the differences in compositional and functional muscle quality in female endurance athletes with either high or low body fat percentage.**Methods:** Fourteen well-trained female endurance athletes, defined as participating in structured running, cycling, or triathlon training ≥5 days/week and competing in endurance events for ≥2 years, participated in the study. Subjects completed a body composition assessment and were stratified into either a lower body fat (LBF; <30%, n=8) or a high body fat (HBF; ≥30%, n=6) group. Following a 20-minute rest period, compositional muscle quality was assessed by measuring the ultrasound-derived echo intensity of the rectus femoris, corrected for subcutaneous fat thickness, to estimate the intramuscular fat percentage. Functional muscle quality was then determined from peak isokinetic knee extension torque at 60º/s (N·m) normalized to rectus femoris cross-sectional area (cm²). **Results:** Group comparisons revealed that HBF athletes had a greater body fat mass (p = 21.6 ± 3.5 vs 14.7 ± 4.4 kg; p = 0.008), higher body fat percentage (32.8 ± 2.1 vs 23.4 ± 4.5%; p < 0.001), and lower relative VO_2peak (33.5 ± 3.2 vs 40.7 ± 3.5 mL/kg/min; p = 0.002). Intramuscular fat percentage was similar between groups (LBF = 13.5±0.93%, HBF = 13.6±0.92%; p=0.859). Functional muscle quality was greater in the LBF group (5.2 ± 0.5 vs. 4.7 ± 0.5 N·m/cm²; p=0.04), but this difference was negated after adjusting for age (p=0.15).**Conclusions:** In the present study, higher body fat percentage in well-trained female endurance athletes was associated with lower aerobic fitness, but not with greater intramuscular fat or declines in functional muscle quality. Therefore, endurance training may help preserve muscle quality despite differences in body composition. Future research should examine how age and adiposity interact to influence muscle quality across athletic populations.

O305: EFFECTS HABITUAL TRAINING SHOE USE ON RUNNING ECONOMY WHEN TRANSITIONING TO HIGH PERFORMANCE RUNNING SHOES

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Background**:** The recent increase in popularity of minimal shoes in endurance running is linked to potential improvements in running economy and reduced injury risk. However, high performance running shoes, specifically designed to improve running economy remain the fastest shoe to wear when racing. Purpose**:** Knowing this, the aim was to examine if habitual use of minimal shoes (MS) increases the benefits received from high performance shoes (HPS). This can impact shoe rotations and training plan prescriptions during race preparation. Methods**:** The study included 5 participants who trained habitually in shod conditions, and 5 individuals in minimally shod conditions. The study consisted of 4 sessions: Sessions 1 and 2 were maximal graded exercise tests in HPS or minimalist MS shoes (randomized order). During Session 3 participants completed three relative velocity running trials (RVRT), 5-minute running bouts in each shoe (6 bouts total) at 50%, 60%, and 70% VO_{2Max}. Session 4 was similar, but the bouts were at absolute velocities (AVRT) of 11.3 kph,12.9 kph, and 14.5 kph. VO_2, HR and running power (RP) (Stryd) were measured throughout each session. Results**:** The results of the three-way repeated measures ANOVA (group x shoe x speed/intensity) showed no main effects between the two test groups across all variables. There were main effects for VO_2 (p<0.001) between footwear, with VO_2 being ~3% higher when wearing MS compared to HPS. There were main effects for RP (p=0.049) between footwear with power being greater in MS compared to HPS. There were significant main effects for speed (AVRT) and relative intensity (RVRT) for VO_2, speed, RPE, and %HRmax (p<0.001). which was expected as the AVRT and RVRT increased intensity across the three stages. There were main effects for speed (p <0.001) between footwear during the RVRT with HPS performing at ~ 3% higher speeds compared to MS at these respective % of VO_{2Max}. There were main effects for the % of HRmax (p=0.003) between footwear, with the % of HRmax being greater in the MS compared to the HPS. Conclusions**:** Regardless of prior experience, the use of minimal shoes increases metabolic expenditure and is less efficient than high performance shoes.

O306: EFFECTS OF AN 11-WEEK OFFSEASON PROGRAM ON JUMP AND FINTESS PERFORMANCE IN FEMALE SOCCER PLAYERS

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Background: The NCAA does not permit required workouts throughout the entirety of summer. Therefore, the purpose of this study was to investigate the effects of an 11-week voluntary offseason summer training program on countermovement jump (CMJ) and endurance performance in division I women soccer players. **Methods:** Thirteen division I women's soccer players completed an 11-week offseason summer training program consisting of 2 weeks of independent workouts and 9 weeks following a voluntary training packet provided by the strength and conditioning staff before the offseason but was not supervised by the strength and conditioning staff. The week prior to the beginning of the program, athletes performed (CMJ) testing and a Bronco fitness test. CMJ testing consisted of three CMJs on force plates (ForceDecks FDLite). Athletes were required to have hands on the hips for all repetitions. The average of the three repetitions were recorded for jump height (JH), relative concentric peak power (CPP), relative eccentric peak power (EPP), and modified reactive strength index (RSI-mod). The Bronco test consisted of 5 sets of a shuttle run consisting of 20, 40, and 60m shuttles (1200m total), with no rest between sets (i.e. continuous shuttle run). Athletes were instructed to perform the test at a maximal intensity. Changes in CMJ performance and Bronco fitness times before and after the program were examined using paired samples T-tests. **Results:** Following the program, Bronco fitness test times significantly increased (i.e. worse performance) (p=0.009). There were no significant changes in CMJ performance for any metrics (p≥0.544). **Conclusion:** Following an 11-week off season program, division I female soccer athletes maintained similar CMJ performance while endurance performance decreased. It is possible this could be due to a lack of consistency performing the program as they were not under the supervision of the strength and conditioning coach during this training period. Thus, practitioners and strength and conditioning coaches may focus on testing and increasing endurance performance during preseason to ensure their athletes return to previous endurance levels. This may also speak to the need of required workouts under the supervision of a strength and conditioning coach to avoid loss of fitness prior to the season.

O307: DISSECTING PERFORMANCE: COMPARING SLEEP CHARACTERISTICS BETWEEN FAST AND SLOW FEMALE COLLEGIATE CROSS COUNTRY RUNNERS

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BACKGROUND: At the elite level, race day performance can be determined by the most minute details. When the difference between first and last place is decided by a matter of seconds, the habits and practices taking place before and after the race can be just as important as those during it. Sleep, for instance, plays a multi-faceted role in priming the body for functional optimization, and as such, could be a major determining factor for race day performance. Therefore, this observational study was designed to compare sleep characteristics between fast and slow female collegiate cross country runners. **METHODS**: Measures of sleep quantity (i.e., duration and performance) and quality (i.e., consistency and efficiency) as well as race performance were assessed in 11 female division one collegiate cross country runners during the 2021 COVID-19-shortened season. Sleep characteristics were determined via use of a vetted wrist-worn heart rate and biometric monitor (WHOOP, Inc., Boston, MA). Additionally, race performance was defined as the average time per kilometer (time/k) during race events. Group analyses were conducted by dividing the athletes into fast and slow groups, using the average time/k of the team as the bifurcation, and comparing the two cohorts via student's t-tests. **RESULTS**: There were 7 races (average distance: 5.8±0.4 km) during the season. Average finish time was 21.6±2.4 mins, equating to 3.7±0.2 mins/km. Following bisection, the fast and slow groups consisted of 6 and 5 athletes, respectively. The fast group's average race pace was faster than that of the slow group (3.57±0.1 vs 4.09±0.1 mins/k; p = 0.002). Sleep duration was greater in the fast group (7.45 hrs) compared to the slow group (6.76 hrs; p = 0.002). The fast group achieved greater sleep performance (80.2% vs 70.6%; p<0.001), sleep consistency (70.6% vs 64.8%; p = 0.009), and sleep efficiency (91.0% vs 88.6%; p = 0.04). **CONCLUSIONS**: When group differences were examined between fast and slow runners, it was seen that the fast group achieved both greater sleep quantity and quality throughout the season compared to the slow group. These findings suggest that sleep habits are imperative to race day performance and underline the importance for

athletes to prioritize these habits throughout the training and race season.

O401: EFFECTS OF AN 8-WEEK VIDEO GAME INTERVENTION ON BODY COMPOSITION IN CHILDREN AND ADULTS

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BACKGROUND: Active video games (AVGs) provide a unique opportunity to merge popular entertainment with health benefits. Approximately 190 million Americans aged 5-90 play video games at least one hour per week, suggesting AVGs may be a viable strategy to improve body composition in home environments. The purpose of this study was to assess changes in body composition among parents and children following an 8-week AVG intervention using *Ring Fit Adventure* for the Nintendo Switch. METHODS: Seven families (9 adults, *M* age = 44 years; 8 children, *M* age = 13 years) participated in an 8-week intervention. Families were instructed to play *Ring Fit Adventure* twice per week for 30 minutes at home. Ring Fit Adventure combines aerobic activities (e.g., running, walking in place) with resistance-based exercises performed using a Pilates-style ring, tracked through the Nintendo Switch controllers. Participants reported weekly in-game statistics for time spent playing the game and exercise time during game play. Body composition was assessed pre- and post-intervention with the Tanita TBF-400 body composition scale. RESULTS: On average, children played 55 minutes per week (42 minutes of exercise), while adults played 22 minutes per week (11 minutes of exercise). Paired t-tests indicated that children significantly increased fat-free mass (*pre* = 37.46±11.59 kg, *post* = 38.5±11.21 kg; p = .002, Hedges' g = 1.1) and decreased fat mass (*pre* = 9.45±8.5 kg, *post* = 8.75±8.31 kg; p = <.001, Hedges' g = 1.0). No significant changes were observed among adults for fat-free mass (*pre* = 54.75±10.6 kg; *post* = 54.30±11.01 kg; p = .19) or fat mass (*pre* = 29.74 ± 23.13 kg; *post* = 29.89±22.55 kg; p = .38). CONCLUSION: AVGs incorporating resistance-style training appear to be a feasible and effective strategy to improve body composition in children, though similar benefits were not observed in adults.

O402: A PILOT STUDY TO PROMOTE A POSITIVE HEALTH CLIMATE AMONG FAMILIES OF PRESCHOOLERS

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BACKGROUND: The home is a vital sphere of influence that may affect the health outcomes of all family members, especially during early childhood, through social interaction and shared environment. Shared health experiences may be used to generate positive health outcomes among families. One such shared health experience is physical activity (PA) co-participation--when families take part in PA together. The two main purposes of the present study were to 1) examine the relationship between family PA co-participation and family health climate and 2) explore changes in these variables following a family-based PA co-participation intervention. METHODS: Families of preschool aged children (n=9 parent-child pairs) were recruited with support from community partners to participate in a 6-week pilot family PA co-participation intervention, Families Moving Together. The 6, one-hour weekly sessions provided parental education, opportunities for PA co-participation, and home-based resources for physical activity. Family PA co-participation levels and family health climate were assessed with self-reported surveys immediately before and after the intervention. Due to the pilot nature of this work, the data were analyzed using Pearson's correlation and Cohen's d effect size. RESULTS: There was a moderate positive association (r = 0.40) between family health climate and PA co-participation before the intervention and a strong positive association (r = 0.67) at post-intervention. There was a small-medium effect on self-reported family health climate pre- to post- intervention (d=0.42). In contrast, there was no significant effect on family PA co-participation (d=0.16). CONCLUSION: These preliminary findings suggest that this brief family PA co-participation intervention may be a promising strategy to encourage early health behavior change by supporting the development of a positive family health culture and enhancing the overall family health climate.

O403: A PHYSICAL ACTIVITY PROGRAM INFLUENCES FITNESS PARAMETERS AMONG EMPLOYEES AT THE UNIVERSITY OF PUERTO RICO

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BACKGROUND: Sedentary behavior is common among employees at the University of Puerto Rico Río Piedras Campus (UPRRP), therefore, increasing disease risk. Physical activity (PA) programs may counteract these effects, yet few studies have evaluated physical fitness (PF) among university employees. The purpose of this study was to determine the effect of a PA program on PF components among employees at the UPRRP. METHODS: A group of 40 UPRRP employees (34 females, 6 males, age: 48 ± 11.4 y) participants in a UPRRP PA Program completed pre and post evaluations. Descriptive variables included age, sex, height, weight, body mass index (BMI), and waist circumference. Standardized protocols were used to assess flexibility (back scratch test, chair sit-and-reach), muscular strength and endurance (chair stand, arm curl), dynamic balance and agility (8-foot up-and-go), and cardiorespiratory endurance (6-minute walk test=6MWT), vertical jump, and handgrip strength. Percent change was calculated for each PF test, and the percentage of participants meeting PF standards were determined. Paired t-tests or Wilcoxon signed-rank tests were conducted to evaluate differences in pre-post measures, and independent t-tests or Mann-Whitney U tests to evaluate sex differences. RESULTS: Although waist circumference had a change of -2.3 ± 3.9 cm, and waist-to-height ratio of -2.3 ± 4.1 cm, these were not statistically significant. Significant changes in flexibility with improved back scratch test (left: +1.5 cm, right: +1.7 cm) but reduced chair sit-and-reach (left: -3.3 cm, right: -3.4 cm); changes in muscle strength and endurance with improved chair stand test (+1.9 reps), handgrip strength (left: +3.1 kg, right: +4.4 kg); and increased vertical jump test (+1.6 cm), were observed. Males had higher muscle strength and power than females. Improvements also occurred in dynamic balance and agility, and cardiorespiratory endurance. CONCLUSIONS: The IUPIAS PA program positively influenced PF components: muscle strength, endurance, power, flexibility, and cardiorespiratory endurance; therefore, showing that physical activity promotion on campus for university employees are effective and must be implemented.

O404: PHYSIOLOGICAL EFFECTS OF AN 8-WEEK HATHA YOGA INTERVENTION FOR ADULT WOMEN

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BACKGROUND: Hatha yoga emphasizes sustained postural alignment, conscious breathing, mindful awareness, and periods of intentional relaxation, all of which promote physical and well-being. This study examined the physiological effects of an 8-week Hatha yoga intervention in adult women. METHODS: Eighteen women, ages 25-55, completed pre-testing and started the intervention. Sixty-minute yoga sessions were held twice weekly and were led by a 500-hour certified yoga instructor. Physical activity was measured using an accelerometer affixed to participants' non-dominant wrist during all yoga sessions. Thirteen participants completed both pre- and post-tests and were included in the final analysis. RESULTS: Participants attended an average of 13.5 out of 16 sessions. A paired sample t-test showed a significant decrease in systolic blood pressure (p = .029) and global sleep score (p = .018), and a significant increase in right (p = .004) and left (p = .009) hand grip strength. There were no significant changes in percent body fat (p = .440), diastolic blood pressure (p = .206) and caloric intake (p = .342). During the first two yoga sessions, in the first week of the intervention, participants spent approximately 72% (43 minutes) in sedentary behavior, 26% (16 minutes) in light and 2% (1 minute) in MVPA. In contrast, during the last two yoga sessions, in the last week of the intervention, participants spent approximately 63% (38 minutes) in sedentary behavior, 21% (13 minutes) in light and 15% (9 minutes) in MVPA. CONCLUSION: The 8-week Hatha yoga intervention produced significant improvements in blood pressure, sleep quality, and grip strength. Participants' increased participation in light PA and MVPA during the final two sessions compared to the first two sessions, may reflect increased physical competence and confidence in performing yoga. This is consistent with previous research showing that repeated exposure to yoga can lead to improved physical function and activity participation.

O405: ABSTRACT WITHDRAWN

O406: EFFECTS OF RESISTANCE TRAINING ON DEPRESSION AND COPING AMONG ADULT FEMALES: A RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: Depression rates among college students have risen sharply, with young adult women disproportionately affected. Aerobic exercise is supported as an effective treatment, yet resistance training (RT) remains underexplored. Emerging evidence suggests RT may reduce depressive symptoms and enhance coping, a key psychological mechanism linked to resilience. This pilot study examined the impact of RT versus health education (HE) on depression, coping self-efficacy (CSE), and quality of life (QoL) in female young adults. METHODS: Forty-five participants (age 21.22±2.23; BMI 25.99±2.95) were randomized to supervised RT (n=25) or HE control (n=20). RT followed ACSM guidelines with twice-weekly supervised sessions using progressive overload for strength exercises (e.g., squats, bench press). Control group viewed online videos focused on life skills. Outcomes were assessed at baseline and week 8. Paired t-tests were used to evaluate changes in muscular strength. Repeated measures MANOVA assessed changes in depression, CSE, and QoL. Mediation analysis tested whether CSE mediated the effect of RT on depression. RESULTS: No baseline group differences were observed. RT significantly improved muscular strength from baseline to week 8 across all exercises ($p < .001$). A significant time x group interaction for depression, CSE, and QoL, Wilks' $\Lambda = .435$, $F(3,41)=17.73$, $p=<.001$, partial $\eta^2=.57$. Univariate analyses showed significant interaction effects for depression, $F(1,43)=35.37$, $p<.001$, partial $\eta^2=.45$; CSE, $F(1,43)=17.98$, $p<.001$, partial $\eta^2=.30$; and QoL, $F(1,43)=20.43$, $p<.001$, partial $\eta^2=.32$. Group significantly predicted changes in CSE ($\beta=-25.77$, $p < .001$) and depression ($\beta=4.59$, $p < .001$), while CSE significantly predicted changes in depression ($\beta=-0.11$, $p <.001$). Mediation analysis confirmed a significant indirect effect of group on depression through CSE (2.91, 95% CI [1.08, 5.17]). CONCLUSIONS: In addition to physical health benefits, RT may be a viable strategy to improve depression among female young adults. This study provides preliminary evidence of the role of coping skills in the reduction of depression symptom severity. CSE partially mediated the effect of RT on depression, suggesting that gains in physical strength may contribute to enhanced psychological resiliency.

O407: THE ROLE OF BINGOCIZE®IN PROMOTING HEALTH AND WELL-BEING AMONG OLDER ADULTS

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BACKGROUND: As the population of older adults grows, effective strategies for healthy aging are necessary[1]. This study evaluates the effectiveness of web-based Bingocize®, a program combining bingo with exercise, in improving the physical health of older adults. METHODS: Eleven (11) participants aged 68.55 ± 6.24 attended a ten-week workshop focused on exercises tailored to age and ability. The primary objective was to assess changes in physical function using standardized measures: Timed Up and Go (TUG) test, grip strength test, 360-degree turn test, and Sit-to-Stand test. Pre- and post-intervention data were analyzed using paired sample t-tests. All data analyses were performed using SPSS software (29), with statistical significance set at $p < .05$. RESULTS: results showed significant improvements in all physical measures (Right Hand Grip Strength Test $t(10) = -3.29$, $p = .008$, Left Hand Grip Strength Test $t(10) = -4.28$, $p = .002$, Sit-To-Stand Test $t(10) = -5.36$, $p < .001$, Timed Up and Go Test $t(10) = 4.218$, $p = .002$, 360-degree Turn Test $t(10) = 3.24$, $p = .009$). CONCLUSIONS:These findings suggest that older adults engaging in a program like Bingocize® can significantly improve physical health. The results highlight the potential of the Bingocize® program to be a cost-effective, engaging intervention for aging populations. Further research is warranted to explore long-term effects and scalability.

O501: ACUTE APNEA INCREASES CENTRAL BLOOD PRESSURE AND ARTERIAL WAVE REFLECTION IN YOUNG HEALTHY ADULTS

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BACKGROUND: Apnea causes sympathetically mediated vasoconstriction and an increase in blood pressure (BP). Reoccurring bouts of apnea (i.e. sleep apnea) are associated with abnormal left ventricular structure, function, and an increased cardiovascular risk. However, it is unclear if acute apnea negatively impacts arterial wave reflections and aortic BP, which often precedes deleterious left ventricular changes. Therefore, we aimed to assess if sympatho-excitation via apnea impacts pulsatile load and wave reflection. METHODS: Twenty-eight apparently healthy adults (n = 14 females, 27 ± 5 years, 24.2 ± 2.7kg/m2) participated in this study. Each participant underwent beat-to-beat BP finger cuff recordings and high-fidelity applanation tonometry to record radial artery pressure waveforms. Participants were instructed to hold their breath until volitional breakpoint following inhalation or exhalation in a randomized cross over design with a 15 min washout period between each condition. We compared central blood pressure and augmentation index at baseline with the last 10 seconds of each breath hold (BH). Comparison statistics included paired t-tests. RESULTS: Compared to respective baselines, central SBP increased during exhalation BH (100.0 ± 7.4, 110.0 ± 13.7mmHg, respectively $p < 0.001$) and inhalation BH (100.1 ± 9.6, 110.6 ± 11.5mmHg, respectively $p = 0.0001$). Compared to respective baselines central DBP also increased during exhalation BH and inhalation BH (both $p < 0.001$). Compared to respective baselines, augmentation index increased during exhalation BH (12 ± 13, 21 ± 12%, respectively $p < 0.001$) and inhalation BH (15 ± 12, 24 ± 11%, respectively $p < 0.001$). There were no statistical differences between changes in hemodynamics between inhalation and exhalation BH (all $p > 0.05$). CONCLUSION: Sympatho-excitation via maximal breath holds following exhalation and inhalation significantly increased central BP and arterial wave reflection.

O502: EFFECT OF TYPE I ANAPHYLACTIC FOOD ALLERGIES ON NITRIC-OXIDE-MEDIATED CUTANEOUS VASODILATION IN HEALTHY YOUNG ADULTS

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BACKGROUND: Anaphylactic food allergies are related to increased long-term cardiovascular disease risk. However, the precise mechanisms underlying that relation are unclear. This study aimed to determine whether endothelial function of the cutaneous microvasculature (an easily accessible and representative circulatory bed) is altered by Type I food allergies (T1A) in healthy young adults. We hypothesized that T1A subjects would have poorer nitric oxide (NO)-mediated cutaneous vasodilation responses compared to age, sex, and race-matched non-allergic control subjects (CON). METHODS: An intradermal microdialysis fiber was placed in the forearm skin of five food-allergic (3F/2M; 19-21 yrs) and five non-allergic (3F/2M; 19-26 yrs) participants for local delivery of pharmacological agents. Lactated Ringer's solution was perfused through the fiber during local heating-induced (42°C) cutaneous vasodilation. After attaining a stable elevated blood flow, 15 mM NG-nitro-l-arginine methyl ester (L-NAME; NO synthase inhibiter) was infused to quantify the NO-mediated component of the local heating response. Red cell flux was measured (laser-Doppler flowmetry; LDF) and cutaneous vascular conductance (CVC = LDF/MAP) was normalized to a site-specific maximal response (%CVCmax; 28 mM sodium nitroprusside + 43°C). The NO-mediated component of the local heating response was calculated as the difference in %CVCmax (Δ%CVCmax) between the local heating and L-NAME phases. RESULTS: There were no differences between groups at baseline ($p=0.80$) or in the magnitude of the local heating response (CON, 70.00 ± 17.28% vs. T1A, 58.44 ± 24.76%; $p=0.66$). However, the Δ%CVCmax was significantly lower in T1A compared with CON (37.57 ± 18.05% vs. 54.71 ± 9.81%; $p = 0.05$). CONCLUSIONS: These preliminary data suggest that cutaneous microvascular endothelial function may be altered by T1A, even in apparently healthy young adults.

O503: SEX-SPECIFIC VASCULAR RESPONSES TO HYPEROXIA-INDUCED OXIDATIVE STRESS

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BACKGROUND: Oxidative stress occurs when there is an imbalance between the production of reactive oxygen species and antioxidant defenses and plays a role in the pathogenesis of cardiovascular disease, via endothelial dysfunction, atherosclerotic development, and arterial stiffening. Estrogen has been shown to reduce oxidative stress and may be a mechanism by which estrogen exerts its cardioprotective effect. The purpose of this study was to examine the effects of a stimulated oxidative stressor (hyperoxia) on sex differences in cardiovascular function. METHODS: Twenty participants (mean age = 22 years, 10 males and 10 females), reported to the lab for two visits, conducted in the morning following an overnight fast. Both visits included assessments of brachial and carotid blood pressures (BP), measured using an automated sphygmomanometer and applanation tonometry (SphygmoCor), and arterial function measures assessed via ultrasonography (Arietta 70, Aloka). One visit served as a baseline visit under normoxic conditions and visit two was the hyperoxia trial in

which participants breathed 100% oxygen for 30 minutes using a non-rebreather mask prior to the start of the vascular measures. Conditions (normoxia vs oxygen) were compared using an ANOVA and followed up with independent and dependent t-tests when significant ($p<0.05$). RESULTS: Following hyperoxia, males displayed significantly lower arterial compliance ($p=0.002$; 1.03±0.14 vs 1.33±0.22 mm^2/kPa), higher beta stiffness ($p=0.025$; 5.2±0.8 vs 4.3±0.9 AU) and elastic modulus ($p=0.03$; 61±11 vs 49±11 kPa) compared to females. There were sex effects of oxygen supplementation in carotid systolic BP only, with males displaying significantly higher carotid systolic BP during hyperoxia ($p=0.01$; 116 ± 9 vs 106 ± 5 mmHg). CONCLUSIONS: Males displayed acute arterial stiffening following hyperoxia compared to females. Additionally, there were no changes in brachial BP, but a change in carotid systolic BP in males ($p=0.01$), highlighting that central pressures are more susceptible to an oxidative stressor. Together, these findings suggest that female vasculature may be better protected against an oxidative stressor compared to males, possibly due to the antioxidant properties of estrogen.

O504: TREATMENT WITH A MITOCHONDRIAL ANTIOXIDANT IMPROVES ENDOTHELIAL FUNCTION, BUT NOT BAROREFLEX SENSITIVITY, IN OLDER ADULTS

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BACKGROUND: Endothelium-derived nitric oxide centrally and peripherally affects baroreflex sensitivity (BRS). In older adults, supplementation with a mitochondrial antioxidant (MitoQ) may improve endothelial function (flow-mediated dilation; FMD); however, it is unknown whether this translates to greater BRS. This study evaluated whether improving endothelial function with MitoQ supplementation would translate to improved BRS in older adults. METHODS: Eleven older (66 ± 4 yrs) adults received 6 weeks of treatment with MitoQ and Placebo in a randomized, crossover (4 week washout), counterbalanced fashion. Ten young (24 ± 2 yrs) adults were tested without treatment for age comparisons. FMD was assessed using brachial artery ultrasonography. BRS was evaluated using beat-to-beat blood pressure (finger photoplethysmography) and R-R interval for sequences in which blood pressure and the subsequent R-R interval progressively increased or decreased (≥1.0 mm Hg and ≥5.0 milliseconds, respectively) over three consecutive beats. Linear regressions relating R-R interval to blood pressure were plotted, and the slope of the function was used to estimate BRS. RESULTS: FMD (3.15±2.16% vs. 6.72±2.48%; $p=0.003$) and BRS (7.49±3.80 ms/mmHg vs. 21.04±8.59 ms/mmHg; $p=0.0006$) were lower in older (Placebo trials) compared with young adults. For all subjects combined, there was a positive association between FMD and BRS ($r=0.61$; $p=0.004$). In older adults, 6 weeks of MitoQ treatment significantly improved FMD (4.51 ± 1.44%, $p=0.05$) compared with Placebo. However, MitoQ treatment did not significantly improve BRS (10.25±7.21 ms/mmHg; $p=0.35$) compared with Placebo. There was no relation between the change in FMD and the change in BRS between Placebo and MitoQ trials ($r=0.44$; $p=0.17$). CONCLUSIONS: These data suggest that ameliorating mitochondrial oxidative stress-induced endothelial dysfunction may not translate to improved baroreflex sensitivity in typically-aging older adults. *This research was supported by a pilot grant from MitoQ® *Artificial intelligence (AI) tools were used in the generation of the code to analyze baroreflex sensitivity data.

O505: EFFECTS OF RESVERATROL SUPPLEMENTATION ON ENDOTHELIAL FUNCTION IN COLLEGE-AGED MALES

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Background: Resveratrol (RES), a polyphenol with anti-inflammatory effects, is widely studied for potential cardiovascular (CV) benefits. However, the protective effects of RES may interfere with exercise-induced CV adaptations. While resistance training (RT) generally improves endothelial function, the effect of RES in RT individuals is lacking. The purpose of this study was to examine the effects of a novel cold-water dispersible RES supplement on endothelial function in RT males. Methods: The study utilized a randomized, double-blind, placebo-controlled, crossover design. Nineteen RT males (20.7±1.4 yrs, 26.9±3.8 kg/m^2). Participants were randomized in a counter-balanced fashion to RES (500 $mg \cdot d^{-1}$) or placebo (PLA) for 14 days, taken with water upon waking. Following a washout period of 18 days, participants repeated the 14-day period with the alternate supplement. Participants completed brachial artery flow-mediated dilation (FMD) assessment at baseline and after each 14-day period. Data were analyzed with mixed-design analysis of variance (ANOVA). Statistical significance was set at $p<.05$. Results: The main effect of supplementation on FMD% was not statistically significant ($p=.410$). These data suggest there was no difference in FMD% between baseline (6.99±1.67), PLA (6.2±1.74) and RES (6.59±1.87) supplementation. The interaction effect between treatment order and supplementation was not significant ($p=.072$), suggesting that FMD% did not significantly differ based on treatment order. Additionally, no differences in time to peak dilation (TTP), shear area under the curve (AUC) or FMD normalized to shear (FMD-AUC) were observed. Conclusion: A fourteen-day RES supplementation did not alter measures of endothelial function. The CV benefits of RES may be negligible for healthy, RT males seeking general aerobic health improvements.

O506: INTERRELATIONSHIPS BETWEEN CEREBROVASCULAR HEMODYNAMICS AND ARTERIAL STIFFNESS ACROSS SITTING INTERRUPTION CONDITIONS

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Prolonged sitting acutely increases central arterial stiffness and may impair cerebrovascular hemodynamics, yet direct systemic-cerebrovascular relationships remain unclear. Interrupting sitting may mitigate these effects, but whether changes in arterial stiffness directly translate to cerebrovascular responses is not established. **PURPOSE**: This study examined the relationships among middle cerebral artery velocity (MCAv), cerebrovascular conductance index (CVCi), carotid-femoral pulse wave velocity (cfPWV), and mean arterial pressure (MAP) across sitting interruption strategies, using partial correlation analyses to isolate associations independent of blood pressure. **METHODS**: 33 healthy adults (82% female, 46.6 ± 5.9 years, 88% white) completed 4 visits under different conditions: (1) 4h of uninterrupted sitting (control) and hourly (2) standing, (3) walking, and (4) combined standing/walking interruptions. After semi-recumbent rest, cfPWV was assessed and MAP was derived via pulse wave analysis. MCAv was measured using transcranial doppler ultrasound and CVCi was calculated by dividing MCAv by MAP. Measures were collected pre- and post- condition. Results were analyzed using partial correlations controlling for MAP where appropriate, with a secondary correlation between MCAv and MAP conducted based on prior evidence of an association. **RESULTS**: CVCi declined with prolonged sitting independent of condition (MD = -0.045, 95%CI [-0.079 - -0.011], $p = 0.10$), though it did not reach statistical significance, whereas MCAv and cfPWV did not change across time or condition ($p > 0.05$). No significant correlations were found between cfPWV and MCAv ($r = -0.019$, $p = .802$) or CVCi ($r = -0.019$, $p = .795$), when controlling for MAP. Additionally, MCAv was not associated with MAP ($r = 0.097$, $p = .192$). **CONCLUSIONS:** Acute changes in central arterial stiffness may not directly influence cerebrovascular hemodynamics in healthy adults. Additionally, MCAv showed no association with MAP, which may reflect the limited statistical power inherent to a feasibility study. Ongoing analyses will investigate this relationship in a larger sample size with additional vascular assessments. **FUNDING SOURCE:** National Heart, Lung, and Blood Institute of the National Institutes of Health under Award Number R01HL157187.

O507: BIOELECTRICAL IMPEDANCE VECTOR ANALYSIS OF INTERDIALYTIC INTERVALS IN PATIENTS ON HEMODIALYSIS

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BACKGROUND: Patients on thrice-weekly hemodialysis (HD) experience large fluid and electrolyte shifts, especially after the 3-day interdialytic interval. Bioelectrical Impedance Vector Analysis (BIVA) integrates resistance (R), reactance (Xc), and phase angle (PhA) into vectors reflecting hydration and cellular membrane integrity. We sought to compare vectors at three timepoints: immediately Post-HD, after a 2-day interval, and after the 3-day interval. METHODS: We performed a secondary analysis of the ECON trial. A cross-sectional analysis was performed in 22 patients on HD (54 ± 11, 63.6% men). R, Xc, and PhA were measured at 50 kHz. Differences across timepoints were analyzed via repeated-measures ANOVA. R and Xc normalized to height (R/H and Xc/H) were converted to sex-specific Z-scores. Tolerance ellipses (50%, 75%, and 95%) from U.S. reference data were overlaid on RXc plots with mean vectors for each timepoint. Correlations between BIVA indices and Short Physical Performance Battery (SPPB) score, appendicular lean mass (ALM) measured via DXA, and peak oxygen uptake (VO2Peak) were assessed post-HD. RESULTS: Interdialytic interval had a significant effect on Xc/H ($F=26.3$, $p<0.001$), R/H ($F=19.8$, $p<0.001$), and PhA ($F=24.7$,

p<0.0001). Xc/H (Ω/m) was highest at Post-HD (27.5±9.1), lower at 2-day (24.2±7.4) and lowest at 3-day (22.6±6.7). R/H (Ω/m) was also highest at Post-HD (299.0±68.7), lower at 2-day (283.0±61.1) and lowest at 3-day (271.5±55.8). PhA was higher at Post-HD (5.3±1.4°) compared to both 2-day (4.9±1.3°) and 3-day (4.8±1.2°). All mean vectors were displaced downward on the RXc graph, outside the 95% reference ellipse. Correlations were observed for Xc/H with SPPB (ρ=0.49; p=0.024); R/H with VO2Peak (r=-0.46; p=0.034) and ALM (r=-0.43; p=0.05); and PhA with SPPB (ρ =0.65; p=0.001), ALM (r=0.46; p=0.035), and VO2Peak (r=0.52; p=0.016). CONCLUSION: R and Xc declined with longer intervals, consistent with fluid accumulation. While R values were normal, Xc remained below the reference range at all timepoints, suggesting chronic muscle loss or impaired cellular health, independent of fluid overload. Correlations with SPPB, ALM, and VO2Peak highlight the potential of BIVA indices to reflect functional status in patients on HD.

O601: PRELIMINARY ANALYSIS OF HIGH-PROTEIN VS. STANDARD PROTEIN DIETS ON BODY COMPOSITION, LIPIDS, AND VO_2MAX IN RECREATIONAL RUNNERS

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BACKGROUND: High-protein diets (≥2g/kg/day) are well-documented to improve body composition in resistance training populations by enhancing fat loss and preserving lean mass. To date, most studies have focused on strength athletes, with limited research in runners. Given the unique metabolic demands of running, it remains unclear whether high protein intake confers similar benefits without impairing performance. The purpose of this ongoing study is to compare the effects of a standard diet (1.4g/kg/day) and a high protein diet (3.0 g/kg/day) on body composition, lipids, and VO_2 max in recreational runners. **METHODS:** Recreational runners (n = 9) were randomized to a standard protein (1.4 g/kg/day) or high protein (3.0g/kg/day) diet for 12 weeks. Diets were prescribed at 500 kcal/day below the maintenance energy needs. Participants completed baseline (Pre), 6-week (Wk6), and 12-week (Wk12) laboratory testing, including resting metabolic rate (indirect calorimetry), body composition (DXA), lipid profile, and a maximal treadmill test to quantify VO_2max. Training consisted of 4-5 endurance and 2 resistance sessions weekly, progressing to ~35 miles per week. **RESULTS:** Preliminary analyses indicate significant reductions in body fat percentage over time (p=0.011), with reductions evident at 6 and 12 weeks (Pre: 27.7 ± 2.6%, Wk6: 25.9 ± 2.7%, Wk12: 25.9 ± 2.6%). Fat mass decreased significantly (p=0.009), while lean body mass did not change (p=0.436). Total cholesterol decreased over time (Pre: 196.2 ± 19.6, Wk12: 172.8 ± 14.76 mg/dL; p=0.006, while HDL did not change (Pre: 65.4 ± 5.5, Wk12: 56.3 ± 3.8 mg/dL; p=0.054). VO_2max was unaffected by the intervention (Pre: 47.0 ± 2.7, Wk12: 46.9 ± 2.5 ml/kg/min, p=0.95). **CONCLUSIONS:** Early results suggest body fat percentage and total cholesterol improved with the interventions, while VO_2max and HDL were unaffected. As data collection continues, these preliminary outcomes will help determine whether the high-protein diet provides unique benefits for recreational runners.

O602: PERIMENOPAUSE STATUS AND DIETARY CARBOHYDRATE-TO-PROTEIN RATIO REDUCE METABOLIC FLEXIBILITY

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BACKGROUND: Metabolic flexibility (METFLEX), the ability to optimize substrate use to match energetic demands, may be reduced during perimenopause (PERI) as hormonal fluctuations increase and dietary intake often decreases. The purpose of this study was to determine the impact of estrogen to progesterone (E:P) ratio on METFLEX in PERI females. A secondary purpose was to evaluate carbohydrate to protein (CHO:PRO) ratio on METFLEX in PERI females. **METHODS:** 28 PERI women (irregular cycles or ≥3-month amenorrhea with bleeding within the prior 12 months; age: 48.75±5 yrs; BMI: 31.5±3.3 kg/m²) completed a graded exercise test on a cycle ergometer with 25 watt increments every 2 minutes until 75% of heart rate reserve (HRR). Indirect calorimetry was used to determine fat oxidation (FATox), carbohydrate oxidation (CHOox), respiratory exchange ratio (RER), and change in RER in the following intensity ranges: low (LOW; <30% HRR), moderate (MOD; 31-≤50% HRR), and high (HIGH; 51-75% HRR) intensity. Urinary hormone testing determined E:P and was used to stratify into early (EARLY) (>0.66 ng/mL) and late PERI (LATE)(≤0.65 ng/mL) status. Dietary intake was assessed through a 24 hour food log and stratified into higher (>2.5g) or lower (≤2.5g) CHO:PRO. ANOVA was used to determine analyses of variance. **RESULTS:** LATE females displayed lower METFLEX at MOD (mean difference ±standard error (MD):−0.09±0.11 a.u.;p=0.007) and HIGH intensities (MD: −0.08±0.13 a.u.;p=0.048) compared to EARLY. During MOD, both EARLY and LATE females with higher dietary CHO:PRO ratio intake displayed a lower RER compared to PERI females with lower CHO:PRO ratio (MD: −0.06±0.10 a.u.;p=0.028). **CONCLUSIONS:** Late PERI status and a lower dietary CHO:PRO ratio reduced METFLEX during MOD and HIGH intensity exercise. These findings suggest that both hormonal status and dietary macronutrient balance may impact metabolic health and fuel utilization in PERI females. **Grant or Funding Information:** These data were collected as part of a study funded by the American Diabetes Association, grant 7-23-ICTSWH-04.**Generative AI Statement:** Artificial Intelligence (AI) tools were not used in the collection or analysis of data, writing of the abstract/presentation, or production of graphical elements of this abstract/presentation.

O603: EFFECTS OF ASTAXANTHIN SUPPLEMENTATION ON FUNCTIONAL PERFORMANCE AND LIPID PROFILE IN OLDER ADULTS

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ABSTRACT

BACKGROUND: Astaxanthin (AX) is a carotenoid with antioxidant and mitochondrial-targeting properties, proposed to support cardiometabolic and functional health in older adults.
PURPOSE: To examine the effects of AX supplementation on cardiometabolic health and functional performance in healthy older adults. **METHODS:** Community-dwelling older adults (n = 15; age 68 ± 6 y; BMI 27.2 ± 6.1 kg/m²) completed a randomized, double-blind, crossover trial with 5 weeks of AX (12 mg/day) or placebo (PLA) supplementation. Following each intervention, fasting capillary blood was analyzed for a lipid panel, and functional performance was assessed via Timed Up and Go (TUG) and handgrip strength (GRIP). Data were analyzed with ANOVA ONE WAY ($p < 0.05$). **RESULTS:** No significant differences were observed between AX and PLA for total cholesterol (152 ± 11 vs. 158 ± 13 mg/dL), triglycerides (93 ± 13 vs. 95 ± 15 mg/dL), HDL-c (62 ± 5 vs. 56 ± 6 mg/dL), LDL-c (61 ± 9 vs. 78 ± 11 mg/dL), or non-HDL-c (90 ± 9 vs. 102 ± 11 mg/dL) (all $p >$ 0.05). Functional outcomes were unchanged across conditions: TUG (AX: 8.2 ± 1.2 s vs. PLA: 8.2 ± 1.4 s; $p = 0.99$) and GRIP (AX: 16.6 ± 10.2 kg vs. PLA: 15.7 ± 10.3 kg; $p = 0.73$). **CONCLUSION:** Five weeks of AX supplementation did not significantly alter lipid markers or functional performance in healthy older adults, though supplementation was well tolerated. Future research should consider older adults with impaired lipid metabolism or functional limitations.
Grant or funding: This study was funded by AstaReal, Inc and the authors declare no conflict of interest.

O604: EFFECTS OF VEGETARIAN FOOD SEQUENCE ON POSTPRANDIAL GLUCOSE, SATIETY, AND METABOLIC RESPONSES

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BACKGROUND: Manipulating the sequence of food intake may influence postprandial glycemia and subjective appetite, but little research has examined this effect in vegetarian food choices. Understanding whether the order of carbohydrate- and protein-rich vegetarian foods alters metabolic and perceptual responses could inform practical dietary strategies. METHODS: Thirty-nine healthy adults (28 females, 11 males, 38.6 ± 15.4 y; body fat, 31.1 ± 10.6%) were randomly assigned to consume either 150g of cooked rice followed by 150g of edamame (with salt and butter) (RF) or edamame prior to rice (EF) after ≥6 hours fasting. Anthropometry and body composition (via InBody) were assessed, and gas exchange (VO_2, VCO_2, respiratory gas exchange ratio [RER]), capillary glucose, and appetite perceptions (0-10 scale) were measured at baseline and 30, 60, and 90 minutes postprandially. The data were analyzed using mixed-model ANOVA for glucose and RER values, and independent samples T-Tests for perceptual measures. RESULTS: Although blood glucose levels significantly changed across time points ($p < .001$), there was no significant group effect ($p = .554$), nor was there a group x time interaction ($p = .980$). Blood glucose values were 83±14, 119±27, 103±27, and 95±21 mg/dL at baseline, 30, 60, and 90 minutes in EF, compared to 87±11, 123±25, 105±20, and 98±19 in RF. N=3 participants were excluded from the RER analysis due to having values >1.0. RER significantly changed over time ($p < .001$) with no group ($p = .474$) or group x time ($p = .219$) effects. RER values were 0.78±.07, .75±.07, .78±.06, and .80±.06 mg/dL at baseline, 30, 60, and 90 minutes in EF, compared to .77±.06, .78±.07, .80±.05, and .81±.05 in RF. Independent samples T-Tests

showed no group differences in perception of hunger (p = .780), appetite (p = .653), satiety (p = .288), and fullness (p = .739). CONCLUSION: Consuming rice before edamame versus edamame before rice did not differentially affect postprandial blood glucose, substrate utilization, or subjective perceptions of appetite in healthy adults. The findings suggest that, within this vegetarian meal context, food order may not play a major role in short-term metabolic or perceptual responses.

O605: EFFECTS OF A SODIUM BICARBONATE HYDROGEL SUPPLEMENT ON GASTROINTESTINAL SYMPTOMS AND PERFORMANCE DURING HIGH-INTENSITY RUNNING

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Purpose: This study examined the effects of a novel sodium bicarbonate hydrogel supplement (SBH) on ratings of gastrointestinal (GI) distress and high-intensity running performance in comparison to sodium bicarbonate tablets (SB) and a placebo (PL). **Methods:** Fifteen participants completed a preliminary trial and three randomly counterbalanced experimental exercise trials. Ninety minutes prior to each exercise trial, participants consumed either PL, SB or SBH (0.3 g/kgBM). Each session consisted of a 5-min treadmill warm-up, 20 x 25 s intervals at 100% VO_{2max} and an 800 m time-trial. Blood glucose, lactate and RPE measurements were obtained prior to exercise, following the intervals, and following the time-trial. In addition, GI symptoms were assessed pre-supplementation, pre-exercise, after 10 intervals, following all intervals, and following the time-trial. Repeated measures ANOVAs were performed to assess treatment effects on blood lactate, glucose, RPE, and time-trial performance. Non-parametric analyses (Wilcoxon Signed Ranks tests) were used to determine treatment effects on GI symptoms. **Results:** Lactate responses were similar between SB and SBH, and both supplements elicited higher peak lactate levels (6.7 ± 1.8; 6.6 ±1.4 mmol/L) than PL (4.9 ± 1.6 mmol; $p < 0.05$). With SB, GI symptom scores were elevated post-supplementation and at multiple exercise timepoints (versus pre-supplementation levels of 9.9 ± 1.3; $p < 0.05$). Peak GI symptoms with SB (14.7 ± 6.7) were higher than PL (11.2 ± 2.7; $p < 0.05$). By contrast, GI symptoms with SBH did not change from pre-supplementation (10.3 ± 1.5), and peak values (11.4 ± 3.8) were not different from PL. Total GI symptoms across all post-supplementation timepoints were higher in SB (52.6 ± 18.1) versus PL (42.3 ± 6.8; $p<0.05$), with no differences between PL and SBH (45.3 ± 10.8) trials. No differences in 800 m times were observed between PL (195.2 ± 39.2 s), SB (199.2 ± 50.0 s), and SBH (194.3 ± 43.8 s). **Conclusion:** SBH attenuated the increased GI symptom scores observed with SB. However, no differences in performance were observed between SBH and SB treatments and neither improved performance versus PL, perhaps due to relatively modest changes in peak lactate and GI symptom scores elicited by this exercise protocol.

O606: RECOMBINANT BOVINE LACTOFERRIN SUPPLEMENTATION EFFECTS ON FERRITIN AND IL-6

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Background: Recombinant Bovine Lactoferrin (rbLf) and bovine milk derived Lf (cMDLf) may enhance iron availability. Interleukin-6 (IL-6), elevated during exercise can disrupt iron intestinal absorption/mobilization thereby lowering ferritin stores. The objective of this study was to evaluate the effects of 4 weeks of rbLf, cMDLf supplementation on markers of iron status and IL-6 concentrations in females and males following high intensity running. **Methods:** Sixty females (Age: 26.7±6.8 yrs; BMI: 23.2±3.0 kg/m^2) were randomized to 4 weeks of rbLf, cMDLf, or placebo (PL) while 50 males (Age: 25.1±5.6 yrs; BMI: 24.5±2.9 kg/m^2) were randomized to 4 weeks of rbLf or PL supplementation. Before and after supplementation, participants completed a series of running bouts to exhaustion at 90-110% maximal running speed reached during a graded exercise test. Blood was taken after the running bouts. Data were analyzed using two-way repeated measures ANOVA and relationships were evaluated with a correlation. **Results:** Following rbLf, there were no changes in serum iron in females (rbLf: Δ-1.7±65.5 µg/dL, cMDLf: Δ 6.0±48.6 µg/dL, PL: Δ 6.7±31.6 µg/dL; p=0.82) or males (rbLf: Δ-1.5±37.2 µg/dL, PL: Δ -0.4±38.7 µg/dL; p=0.80). In females, the change in ferritin was not different between groups (p=0.064); rbLF was maintained (Δ+1.3±13.1 ng/mL) and cMDLf decreased (Δ-7.1±14.4 ng/mL). In females, rbLf resulted in a non-significant decrease in IL6 (Δ-85.7±175.9 mg/L) compared to cMDLF (Δ-45.4±92.1 ng/L; p=0.548). In males, rbLf induced a non-significant decrease in IL-6 compared to PL (mean difference ± standard error: -6.94±113.40; p=0.079). **Conclusions:** RbLf did not significantly alter iron status, but in males lower IL-6 was associated with higher ferritin, suggesting a more favorable environment for iron regulation. In females, rbLf prevented the non-significant decline in ferritin observed with both PL and cMDLf, which may hold clinical relevance.

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Generative AI Statement: Artificial Intelligence (AI) tools were not used in the collection or analysis of data, writing of the abstract/presentation, or production of graphical elements of this abstract/presentation.

O607: EVALUATION OF THE EFFECTS OF A CARBOHYDRATE CHALLENGE ON ELECTRICAL IMPEDANCE MYOGRAPHY OF THE VASTUS LATERALIS

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Introduction: Electrical impedance myography (EIM) is a non-invasive method that measures bioimpedance (resistance [R], reactance [Xc], phase angle [PhA]) to estimate intracellular (ICW) and extracellular water (ECW). In healthy states, water is expected to follow nutrients like carbohydrate (CHO) into skeletal muscle, theoretically, lowering R (greater conductivity) and raising Xc (closer cell membranes). Collectively, this would increase PhA, a clinical outcome associated with improved cellular health and nutrient status. Detecting such postprandial changes may support EIM as a non-invasive marker of skeletal muscle nutrient sensitivity. Therefore, the purpose of this study is to evaluate the effects of a CHO challenge on EIM of the vastus lateralis (VL).**Methodology:** Eleven women (Age: 22.7±6.3yrs; BMI: 23.5±1.7kg/m^2; %BF: 29.5±8.0%) completed a CHO challenge during the low hormone phase (days 1-7 of menses). After a fasted baseline EIM assessment of the right VL, participants ingested 75g maltodextrin mixed in water (11mL/kg). Postprandial EIM measures were collected every 30min for 3 hours. Bioimpedance (R, Xc, PhA) and body water (ECW, ICW) were analyzed at 50kHz using time-delay corrected values averaged from two measurements. One-way repeated-measures ANOVA was conducted to evaluate postprandial changes in EIM over time.**Results:** There were significant time effects ($p<0.05$) for all outcomes except ECW ($p=0.375$). R decreased over time (Mean±Standard Error [Mean±SE]: Baseline[BL]: 152.0±10.8Ω; 90min: 148.1±10.9Ω; 180min: 147.0±11.7Ω, $p=0.023$), whereas Xc (Mean±SE: BL:16.0±0.9Ω; 90min: 16.3±0.9Ω; 180min: 16.4±1.0Ω, $p=0.024$), PhA (Mean±SE: BL: 6.3±0.5º; 90min: 6.6±0.5º; 180: 6.7±0.6º, $p<0.001$), and ICW (Mean±SE: BL: 1.08±0.08L; 90min: 1.14±0.09L; 180min: 1.16±0.09L, $p<0.001$) increased over time.**Discussion:** Current findings align with expected postprandial physiological responses in bioimpedance and body water. Results demonstrated a postprandial decrease in R and increase in Xc and PhA, which is supported by the increase in ICW. These results could reflect CHO uptake by VL muscle tissue and provide preliminary support for EIM as a sensitive method of detection. Validation against gold-standard techniques is required for physiological confirmation and interpretation.

O701: PHYSICAL ACTIVITY AMOUNT IN PRESCHOOL-AGE CHILDREN: THE INFLUENCE OF MATERNAL VS. PATERNAL INVOLVEMENT

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Background: Both mothers and fathers have a positive influence on how active their child is, but there are gaps in the literature directly comparing the effect each parent has on their child's physical activity levels. Further, limited studies have examined the role fathers have during shared physical activity with their preschool-aged child. Thus, the purpose of this study is to examine the amount of physical activity preschool-age children obtain when playing with a mother compared to when playing with a father. **Methods:** We recruited parents over the age of 19 with a preschool-age (3-5 years old) child. Participants completed a study visit where the parent and child wore an ActiGraph accelerometer and played together for 20 minutes; the accelerometer captured data in 1 second epochs. Total counts were determined for the child by summing all the counts over the 20 min play period. Student's t-test was used to compare the total counts a child completed when playing with a mother compared to when a child is playing with a father. **Results:** We analyzed data from 10 parent-child dyads (5 mother-child; 5 father-child). On average, parents had a BMI of 28.52 ± 6.97 kg/m^2, while children had an average BMI of 15.52 ± 0.93 kg/m^2 with an average BMI z-score of -0.12 ± 0.69. No statistically significant difference was found in children's activity amount when playing with mothers (30331 ± 18646.07 counts) compared to fathers (31720 ± 28279.56 counts; p=.93). **Conclusions:** Playing with mothers and fathers resulted in similar amounts of physical activity in preschool-age children. These findings

suggest that both parents play an important role in their preschool-aged child's physical activity. Further research should explore how parents influence their child's activity in various contexts and play settings.

O702: DEVELOPING A PHYSICAL ACTIVITY CLEARINGHOUSE FOR EDUCATION TO ASSESS BEHAVIORS DURING SCHOOL HOURS: PROJECT P.A.C.E.

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Background: Although various factors (i.e., school policies, available facilities, teacher engagement, social impacts) may influence the level of physical activity (PA) engagement, post-assessment of state-level mandates using an objective measure provides valuable information regarding the translation of legislation and national recommendations into quantifiable PA. With limited feasibility of elementary schools using accelerometers, the purpose of this study was to utilize university-level resources and expertise to objectively quantify PA in 6-12-year-old students during school hours. **Methods**: In-school PA among elementary students from public and private schools was assessed using tri-axial accelerometers for five consecutive school days. Teachers recorded designated PA periods, such as recess and physical education (P.E.), which were used to analyze activity levels and differences were assessed by one-way ANOVA. **Results**: Results showed that students (N=408, age=9.24±0.91 years) failed to meet the recommended 150 minutes of moderate-to-vigorous PA (MVPA) per week during school hours (19.33±21.15 min/day). Of the 30.32±5.87 minutes of daily recess only 10.49± 7.58 minutes were considered MVPA. P.E. resulted in 8.84±6.97 minutes of MVPA during the 46.79± 10.74 minutes offered daily. Significant differences in PA during recess and physical education were found based on sex, race, academic grade, and the type of PA supervision ($p<0.05$). **Conclusions**: Despite state-level legislation to promote school-based PA, this study showed substantial gaps between policy intent and student outcomes. A lack of assessment for the curricular model of PA opportunities could result in uninformed school staff, underdefined policies and recommendations, and ill-funded support for promoting PA in schools. Utilizing university-level resources to evaluate PA in primary schools could be a valuable tool for monitoring the translation of state PA mandates and establishing a clearinghouse model for assessment. Supporting schools in delivering effective and inclusive PA programs is critical for fostering healthier environments and ensuring all children have equitable opportunities for PA during the school day.

O703: RATE OF FORCE DEVELOPMENT IN HEALTHY AND AT RISK CHILDREN

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BACKGROUND: Explosive leg strength is critical for sports performance and daily activities. The ability to produce force quickly, termed rate of force development (RFD), is governed by neural determinants (motor unit recruitment, firing frequency) and muscular determinants (muscle mass, cross-sectional area). Prepubescent children have less neural drive and smaller muscle mass compared to adults, contributing to lower RFD. While differences in cardiorespiratory fitness and relative strength between healthy and at-risk (overweight/obese) children are well documented, little is known about RFD differences. This study aimed to determine if RFD differs between healthy and at-risk children. **METHODS:** A total of 32 children (23 boys) ages 5-11 years (8.0 ± 1.6 yrs) completed total body DXA scans. A trained investigator quantified mineral-free lean mass (MFLM) of the right thigh, quadriceps, and hamstrings using custom analysis software. Each region was analyzed twice, with mean values used for final analysis. Muscle strength testing was performed on an isokinetic dynamometer (Biodex System 4). Participants completed three maximal voluntary isometric contractions of knee extension and flexion at 90° knee flexion (30s between reps, 2min between sets). RFD was calculated during the first 100ms (RTD100) and 200ms (RTD200) of extension and flexion. Group mean differences were determined ($p < 0.05$). **RESULTS:** BMI for age and sex at-risk children (BMI > 85th percentile; n = 20) had significantly greater thigh (2731.5 ± 1058.7 vs. 1880.6 ± 577.7 g, p = .027), quadriceps (961.2 ± 375.3 vs. 705.2 ± 223.4 g, p = .017), and hamstrings MFLM (974.5 ± 333.2 vs. 718.4 ± 237.1 g, p = .043). No differences were found for RTD (Extension RTD100: 332.1 ± 135.0 vs. 270.6 ± 108.7 Nm/s, p = .172; Extension RTD200: 243.0 ± 113.6 vs. 220.6 ± 98.5, p = .566; Flexion RTD100: 147.3 ± 72.2 vs. 150.2 ± 105.7 Nm/s, p = .939; Flexion RTD200: 121.9 ± 105.6 vs. 95.4 ± 67.6 N•m/s, p = .411). Normalized knee extension torque trended lower in at-risk children (1.98 ± 0.46 vs. 2.33 ± 0.68 N•m/kg, p = .098). Knee flexion torque also trended lower in at-risk children (0.70 ± 0.26 vs. 0.91 ± 0.31 N•m/kg, p = .055). **CONCLUSIONS:** At-risk children have greater muscle mass but not higher RFD, suggesting reduced muscle efficiency compared to healthy peers. Supported in part by UKY PEP Lab

O704: BIDIRECTIONAL RELATIONSHIPS BETWEEN FUNDAMENTAL MOTOR SKILLS AND COGNITION IN PRESCHOOL CHILDREN FOLLOWING A MOVEMENT-BASED INTERVENTION

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BACKGROUND: The development of motor skill performance and cognitive functioning promotes positive developmental health trajectories. However, the interconnectedness and directionality of these outcomes is largely under-investigated in early childhood. Therefore, the purpose of this study was to examine the bidirectional relationships between fundamental motor skills (FMS) and cognitive function following a movement-based intervention in preschool children. **METHODS:** Preschool children (N=29, 4.7$\pm$0.6y) participated in an 8-week movement-based intervention focused on activities to promote improvements in motor and cognitive skills. FMS were assessed using the Test of Gross Motor Development (3rd Edition) at pre-(T1) and post-intervention (T2) time points. Cognition, specifically working memory, was assessed via the Early Years Toolbox [Mr Ant (visuospatial) and Not This (phonological)]; outcomes were accuracy (Acc) and reaction time (RT) for each at T1and T2 time points. A bidirectional cross-lagged panel model was run using AMOS. Four models were run to look at the relationships between FMS and cognition (Mr Ant Acc and RT and Not This Acc and RT). **RESULTS:** T1 FMS correlated with T1 Mr Ant Acc ($r=0.556$;$p<0.001$), T2 FMS did not correlate with T2 Mr Ant Acc. T1 FMS significantly predicted T2 FMS ($\beta=0.71$;$p<0.001$). T1 Mr Ant Acc significantly predicted T2 Mr Ant Acc ($\beta=0.46$;$p=0.042$) and T2 FMS ($\beta=0.31$;$p=0.003$). There were no significant correlations between T1 FMS and T1 Not This Acc or T2 FMS with T2 Not This Acc. T1 FMS significantly predicted T2 FMS ($\beta=0.88$;$p<0.001$) and T2 Not This Acc ($\beta=0.64$;$p=0.001$). For the RT variables, there were no significant correlations or predictions (all $p>0.05$). **CONCLUSIONS:** Visuospatial working memory (Mr Ant) predicted FMS performance in young children after the completion of a movement-based intervention. Conversely, FMS performance prior to the intervention predicted phonological working memory (Not This) after. While not bidirectional, it appears the execution of instructions with visual prompts elicits FMS improvements, while FMS practice may solidify congruency and discrimination concepts. These preliminary data suggest the interconnectedness of FMS and working memory; future studies should further explore these relationships.

O705: LOWERPERCEIVED EXERTION AT MATCHED INTENSITY: BASKETBALL DRIBBLING VS TREADMILL WALKING IN YOUTH

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BACKGROUND: Skill-based tasks like basketball dribbling (BBD) may require greater focus and coordination than treadmill walking (TMW). Despite similar physiological intensity, perceived exertion may differ due to neuromuscular and attentional demands. This study examined age and sex differences in perceived exertion during TMW and BBD at matched intensity. **METHODS:** Participants ages 6-17 from the SKyRoCKeT study, an age- and sex-stratified NIH R01 trial, with measured TMW and BBD VO_2 (using VO_2 mL/kg/min as a proxy for intensity) and ratings of perceived exertion (RPE) were identified. Treadmill walking began at 0.5 mph and increased by 0.5 mph every 5 minutes, with 2-minute rests between bouts, up to 6.0 mph or volitional termination. Basketball dribbling was performed in a figure-eight pattern around three cones in an 8x16 ft area for 5 minutes. Oxygen cost was measured using a COSMED K5, recorded in 30-second epochs, and averaged over the last 2 minutes of each 5-minute bout. Rating of perceived exertion was assessed using the BORG RPE scale during the final 30 seconds of each bout. The TMW bout with the closest VO_2 level of the BBD VO_2 level were matched for each participant, and the corresponding TMW and BBD RPEs were extracted. Differences in RPE by activity (BBD minus TMW) were linearly regressed against participant age and sex, controlling for VO_2 differences. Model selection was performed to select the final model using Akaike Information Criterion. **RESULTS:** Participants (n=44; mean age=11.1, SD 2.96 years; 57% female; 6.1% VO_2 difference) completed both TMW and BBD. The final model included age and sex

but excluded VO_2 differences. Males had significantly lower RPE differences vs. females (p=0.03). Younger ages were not significantly associated with lower RPE differences (p=0.07). **CONCLUSIONS:** Skill-based activities like BBD can match the metabolic demands of walking but may also be perceived as less effortful, especially by males. Similar activities may support greater engagement and exercise adherence in youth. Future studies should explore the long-term effects of skill-based activities on youth fitness and adherence outcomes. Funding information: NIH NICHD, grant number R01HD105768. This content is solely the responsibility of the authors and does not necessarily represent official NIH views.

O706: MOOD CHANGES IN MOTHER'S AFTER A 20 MINUTE PLAY SESSION WITH THEIR PRESCHOOL-AGED CHILD

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Background: There is limited research examining mood change after acute bouts of physical activity outside of clinically depressed patients, college students, and the older population. The purpose of this study is to examine mood change in mothers after participating in an acute bout of physical activity with her preschool-aged child. **Methods:** We recruited 28 mothers of preschool aged children (3-5 years) to participate in the study. First, the mother participants provided consent and questionnaires for demographics and mood via the POMS40, and height and weight were measured to calculate body mass index (BMI). The POMS40 was completed before and immediately after a 20-minute play session with their child. POMS40 data were scored for each subscale and total mood disturbance. Student's t-tests were used to determine differences in total mood disturbance, positive mood, and negative mood before and after the acute physical activity bout. **Results:** The change in mood was analyzed in 23 mothers (37 ± 3.5 years old; BMI = 25.4 ± 5.5 kg/m^2) of preschool-aged children. After 20-minutes of playing with their child, the average total mood disturbance decreased, where the pre-physical activity total mood disturbance was 84.48±7.08, and post-physical activity total mood disturbance was 77.24±7.38 (p=0.0001). Playing with the child resulted in improved positive mood (pre-physical activity: 23.7±6.27 vs. post-physical activity: 25.61±6.27; p=0.02) and decreased negative mood (pre-physical activity: 8.78±7.21 vs. post-physical activity: 3.65±4.92; p= 0.0004). **Conclusions:** An acute bout of physical activity between mother and preschool-aged child significantly improved total mood disturbance, positive mood, and negative mood. These results help support the idea that activity improves mood and shows mothers that participating in physical activity with their children can have benefits other than physical health.

O707: SEX DIFFERENCES IN PHYSICAL ACTIVITY IN ADOLESCENTS WITH OBESITY AS ASSESSED BY WRIST-WORN ACCELEROMETERY

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BACKGROUND. Physical activity (PA) has been shown to differ between male and female adolescents, with males typically engaging in more daily PA. However, this observed difference may be complicated by weight status. Therefore, the purpose of this study was to compare objectively measured PA in male and female adolescents with obesity using wrist-worn accelerometers. METHODS. Treatment-seeking adolescents (N=69; 43 females, 13.7±1.2 yrs; 98.3±1.8%ile for BMI) wore an accelerometer (Actigraph GT3X) on their non-dominant wrist for 7 consecutive days at baseline prior to engaging in a behavioral weight loss program. The GGIR package in R was utilized to determine time spent inactive and engaged in light, moderate and vigorous activities (5 sec epochs) along with time spent in moderate-vigorous PA (MVPA) in 1-min and 5-min epochs for all days, weekdays only, and weekend days only. Associations between PA and weight status were assessed with Pearson-Product Moment Correlations. Since the normality assumptions were not met, Mann-Whitney U tests was used to compare differences between male (M) and female (F) groups on each PA variable. RESULTS. Age, weight, BMI, or BMI %ile was not significantly different between the groups. Significant (p<0.05) negative relationships were observed between all PA measures and weight status in both groups along with a significant (p<0.05) positive relationship between time spent inactive and weight status. Inactive time (M 758.4±87.2 vs. F 759.5±80.9 min/d) and time in light (M 168.0±42.2 vs. F 166.2±42.6 min/d), moderate (M 50.5±22.7 vs. F 44.9±18.6 min/d), and vigorous (M 5.5±5.0 vs. F 3.2±3.1 min/d) PA (5-sec epochs) did not differ between the groups. However, significant differences (p<0.05) were observed in MVPA when analyzed in more sustained 1-min and 5-min epochs for all days and weekdays, but not weekend days, with males averaging ~12 min/day more MVPA (M 43.2±23.0 vs. F 31.3±21.8 min/d). CONCLUSIONS. Male adolescents with obesity accumulated more daily MVPA when measured in sustained periods, particularly on weekdays. These findings highlight differences in activity patterns that may inform tailored strategies to promote PA in adolescents with obesity. Funded by the NICHHD (R21HD084930) awarded to MKB, Children's Hospital Foundation and the NCATS (CTSA award UM1TR004360).

O801: THE EFFECT OF ARM SLOT KINEMATICS ON PEAK ELBOW VALGUS TORQUE IN COLLEGIATE PITCHERS

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BACKGROUND: Arm slot is a combination of lateral trunk tilt, shoulder elevation, and elbow angle, which is assessed at ball release (BR). Previous research has identified relationships between arm slot and peak elbow valgus torque (pEVT). Elevated pEVT has been linked to a higher risk of ulnar collateral ligament (UCL) injuries in professional pitchers. Although these correlations have been established at BR, pEVT occurs around shoulder maximum external rotation (MER), which warrants further investigation into arm slot kinematics during the entire throwing motion. Therefore, this study aimed to assess the effect of arm slot kinematics on pEVT through continuous analysis. METHODS: Motion capture data were collected from 252 NCAA Division I pitchers (1.89±.06m, 92.38±10.30kg, 90.71±2.73mph) with an 8-camera markerless system (300Hz). All pitches were collected during NCAA-sanctioned games, and side-arm pitchers (arm slot ≥ 90) were excluded. Kinematic data from each participant were interpolated to 101 data points, from stride foot contact (SFC) to BR, and the trials of each participant were averaged to obtain a representative trial. Each participant's pEVT was averaged for all trials. Statistical parametric mapping regressions were performed to assess the relationships between arm slot kinematics and pEVT(α=.0167). RESULTS: Increased pEVT was associated with greater elbow flexion angle from 36.0-42.8% (p=.015, r^2=.037) of the pitch. Additionally, an increase in shoulder elevation from 0-33.8% (p=.004, r^2=.051) of the pitch was associated with increased pEVT. CONCLUSION: These results indicate that a greater arm elevation angle early in the pitch, between SFC (0%) and MER(79.6±2.7%), and increased elbow flexion at the middle of the pitch, are associated with increased pEVT. While some associations were observed between arm slot kinematics and pEVT, no significant relationships were found at MER or BR, which contradicts previous literature and warrants future investigation. These results highlight how inefficient arm action, or how the throwing arm moves early in the pitch, typically described as the arm cocking phase, can increase pEVT, which may heighten UCL injury risk in pitchers.

O802: EFFECTS OF ADAPTED PICKLEBALL ON STATIC AND DYNAMIC BALANCE IN YOUNG ADULTS WITH INTELLECTUAL DISABILITIES

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BACKGROUND: The purpose of this study was to examine the effects of an adapted pickleball (APB) program on static and dynamic balance in young adults with intellectual disabilities (ID). **METHODS:** 12 participants with mild ID participated in a 14-week APB program (76.48 ± 19.37kg, 163.48± 9.37cm; 20± 1.61 years of age). The study followed a repeated measures design (pre, mid, post) before the intervention, at 7 weeks, and after 14 weeks. Static balance included bilateral stance and unilateral stance on dominant (DL) and non-dominant leg (NDL). Dynamic balance included a Timed Up & Go (TUG). Center of pressure (COP) sway variables included: average displacement (AD) (cm), average velocity (AV) (cm/s), average 95% ellipsoid area (EA) (cm^2), and path length (cm). Movement time (s) was analysed for dynamic balance. Post-hoc comparisons were performed using a Greenhouse-Geisser correction with $p < 0.05$. The APB program consisted of 28 bi-weekly 50-minute sessions. **RESULTS:** Significant improvements were observed in COP sway variables for both DL (AD p=0.038; AV p<0.01; EA p=0.047; PL p<0.01) and NDL (AD p=0.017; AV p=0.047; EA p=0.008; PL p=0.023) post-intervention. MT also significantly decreased from pre-post intervention (p=0.044) and mid-post intervention (p=0.038). These improvements reflect the nature of APB, which involves frequent shifts in center of gravity across the base of support, quick paddle skills with asymmetrical upper-limb movements, and multidirectional lower-limb actions. The sport's dynamic demands challenge and train the postural control system. No significant main effects were reported

for bilateral stance. **CONCLUSION:** APB may serve as an effective, engaging alternative to traditional fall prevention programs for young adults with ID, promoting physical activity and balance improvements.

O803: NEURAL ACTIVITY OF BASES AND FLYERS IN COED CHEERLEADING

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The prevalence of collegiate cheerleading has risen in the last few years despite high catastrophic injury rates. Most collegiate cheer teams are coed, in which both male (base) and female (flyer) cheerleaders collaborate to execute partner stunts. While skills have increased in difficulty, little is known about the neurological processes related to safe stunt execution. The purpose of this study was to understand how neural activity differs between bases and flyers, and between cheerleaders and controls, when viewing videos of partner stunts. We hypothesized that differences in neural activity will be found between bases and flyers, and between cheerleaders and controls. Male bases (n=3) and female flyers (n=3) were recruited from a D1 coed cheer team. Male (n=3) and female (n=3) controls with no experience in cheerleading or other aesthetic sports (e.g. figure skating, gymnastics) were also recruited. Participants viewed videos of seven different stunt skills, ranging from basic to elite stunts, while wearing a 23-channel electroencephalography cap. Neural data was pre-processed and analyzed in MATLAB. Inter-trial coherence analyses revealed significant differences (at $p<.08$) between both cheerleader and control, and base and flyer groups. Differences in Theta (4-8 Hz) and Beta (12-35 Hz) activity were found during full and first exposure timeframes at frontal, parietal, and temporal brain regions. Compared to controls, cheerleaders exhibited increased theta and beta activity ($p<.05$) in the first exposure time frame, and only beta activity ($p<.05$) during full time. Compared to bases, flyers exhibited increased theta ($p<.05$) and beta ($p<.08$) activity during full time, and only theta activity ($p<.08$) at first exposure. Overall, the more experienced groups (i.e. cheerleaders, flyers) exhibited increased neural activity compared to their less experienced counterparts (i.e. controls, bases).

O804: SURF SMARTER, NOT HARDER: THE ROLE OF BALANCE TRAINING IN SURFING PERFORMANCE

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BACKGROUND: Although core strength and balance are essential for surfing performance, few have looked at specific training programs for surfers. This study set out to assess how surfing performance was affected by a surfing-centric core strength and balance training program. METHODS: Participants (n = 8; 21 ± 1.3 years) were randomly assigned to either a control group that performed standard core and balance exercises or a surf-specific balance board training group. For four to six weeks, both groups trained three to five times a week. Anthropometrics, plank holds, single-leg static balance (eyes open/closed), the Y-Balance Test, and an open-water surf performance trial (time maintaining balance on a surfboard) were all part of the pre- and post-testing. Independent t-tests ($\alpha = 0.05$) and repeated-measures ANOVA were used to evaluate the data. RESULTS: The time of the plank hold had no discernible effects ($p > 0.50$). With no condition or interaction effects, static balance improved with time for both the left leg ($F(1,4) = 8.84$, $p = .041$) and the right leg ($F(1,4) = 11.52$, $p = .027$). Performance on the Y-Balance Test likewise increased over time (both limbs, $p < .05$), once more showing no impacts of condition. Group differences in surf performance were not seen ($t(6) = -0.13$, $p = .904$; mean difference = 0.43 s). For comparisons between groups, the effect sizes were small. CONCLUSIONS: Although surf-specific balance board training did not improve surfing performance beyond conventional core and balance training, short-term training improved balance metrics independent of intervention. Statistical power was hindered by the small sample size, and larger cohorts should be used in future studies. FUNDING: This project was supported by the College of Health and Human Services Quick Turnaround Grant.

O805: SEE THE BALL, HIT THE BALL

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BACKGROUND: Pitchers have refined their skills in pitch tunneling, where different pitch types follow a near-identical path before diverging late, creating challenges for hitters attempting to anticipate pitch types. When pitch tunneling is effective, hitters rely on visual cues such as pitcher kinematics to make timely predictions about the pitched ball's trajectory. We aimed to explore how hitters respond when deprived of these anticipatory cues. Building on visual occlusion research, we hypothesized that removing these anticipatory cues would diminish hitters' attentional engagement and impair performance. **METHODS**: Twelve amateur baseball players (M_{age} = 19.8) participated, each wearing eye-tracking equipment while hitting 40 pitches from a pitching machine placed 60'6" away. Hitters faced two visual conditions: in the *baseline* condition, hitters observed a researcher feeding the machine, thus gaining preparatory visual information; in the *occluded* condition, a black screen occluded the researcher's actions, only revealing the ball after it was launched from the machine. We measured hitters' average fixation and Quiet Eye duration across both conditions, using these metrics to assess attentional focus. Paired-sample t-tests were used to compare average fixation and Quiet Eye durations between conditions. **RESULTS**: Our hypotheses were confirmed, as fixation durations were significantly longer during baseline ($t(11) = 5.16$, $p < 0.001$, Cohen's $d = 1.55$) when compared to the occluded condition. Quiet Eye duration showed no significant difference between conditions ($t(11) = 0.40$, $p = 0.35$, Cohen's $d = 0.12$), suggesting that while total attention suffered without anticipatory information, the ability to stabilize gaze just before swing initiation remained consistent. **CONCLUSION**: Hitters' attentional engagement diminishes when deprived of anticipatory visual cues, though their ability to stabilize gaze through QE remained unaffected. Findings indicate hitters' dependency on pitcher kinematics to anticipate pitch trajectory; the absence of this information reduced average fixation duration by 107ms. More research should be conducted to determine if visual occlusion is a formidable training method to aid athletes in extracting critical information when conventional cues are available.

O806: THE SPORT OF WEIGHT PULL: CANINE KINEMATICS BASED ON WEIGHT PULLED AND PULL FORM

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BACKGROUND: Weight pull is a sport and activity for strength development in dogs and biomechanics is a tool that may aid in strength development and technique optimization. The purpose of this project was to apply biomechanics to understand techniques employed by dogs in weight pull activities. Pilot work has identified 3 pull styles: Style 1-all paws on ground; Style 2-two paws in air; and Style 3-all paws off ground. We hypothesize 1) that increased load will reduce average distance (avg dist) covered in the first two strides and 2) that Style 1 will have the smallest right rear ankle angle (RRAA) compared to Style 2 and 3. **METHODS**: We recruited 8 dogs (age: 3±2 yrs; 4M/4F; body weight(bw): 26±6kg; 5 expert/3 novice) at a 4-day weight pull competition. Dogs were required to have two successful pulls on the same day with >30kg difference in load between pulls. We analyzed videos for right rear paw placement to get the avg dist covered in two strides (3, same foot, foot falls) in two differently weighted pulls. RRAA was measured at cart motion initiation across the three pull styles. Only trials where the dog demonstrated consistent forward progress were used for analysis. Data was analyzed using T-test, regression analysis and a one-way ANOVA. **RESULTS**: For all dogs, avg distance was shorter for the heavier load (27±10X bw; 23.7±8.8cm) than for the lighter load (14±3X bw; 34.2±9.9cm; $T=3.09$, $p=0.02$). A regression analysis suggested that as load increases, the stride length gets smaller ($Y=-0.57x+40.7$; $R=0.29$,$p=0.04$). We analyzed RRAA by pull style using a one-way ANOVA. RRAAs were significantly different between Style 1 (111±7°) and Style 2 (130±5°; $p=0.01$) and Style 1 and Style 3 (135±15°; $p=0.007$), but not between Style 2 and 3. **CONCLUSIONS**: We found that dogs adopted smaller strides at heavier loads regardless of experience levels. Style 1 had smaller ankle angles compared to Style 2 or 3. This information advances our understanding of dog self-selected pulling styles and joint position. Future research should consider this data within the confines of injury mechanisms and performance for dogs.

O807: RELATIONSHIP OF HEART RATE VARIABILITY AND RIFLE SHOOTING PERFORMANCE IN ELITE QUÉBEC BIATHLETES

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Background: Biathlon is a predominantly aerobic Nordic sport where athletes complete laps of a cross-country skiing track before moving onto the shooting range to attempt to hit five targets. During shooting events, athletes must quickly calm down to have the necessary concentration and dexterity to hit as many targets as possible. Their ability to calm down and quickly lower their heart rate is directly influenced by the activity of the autonomic nervous system. Heart rate variability (HRV) is a measure of autonomic nervous system activity and can therefore reflect a state of freshness or excessive tension in endurance sports. **Purpose:** This study aims to observe the relationship between HRV during periods of shooting in the standing

(S) and prone (P) positions and the competitive shooting performance of the best elite Québec biathletes. **Methods:** HRV data were measured during major competitions via R-R intervals using a Garmin HRM Pro+ heart rate monitor and a Garmin FR955 watch in 6 biathletes. The HRV index used to interpret the data is the DFA-α1. We computed mean, minimum, maximum and amplitude to compare DFA-a1 and HR between shooting positions. The relationship between DFA-α1 and shooting performance was also assessed. **Results:** Mean, maximum and amplitude DFA-α1 values were significantly different between S and P positions ($p<0.0001$) whereas there was no any significant difference in minimum values ($p=0.68$). Mean, minimum and amplitude HR values were significantly different between shooting positions ($p<0.0001$) whereas there wasn't any significant difference in maximum values ($p=0.1854$). Successful shooting performances (60 to 100% accuracy) occurred when DFA-α1 values were between 1.0 and 2.0, instead of below 1.0 which exhibited lowest scores. **Conclusion:** The differences in DFA-α1 and HR between S and P shooting positions during events confirmed that HR dynamics are affected by shooting position, which may impact the athlete's ability to perform in rifle shooting events. This also suggests that DFA-α1 might be a reliable HRV index to assess autonomous nervous system activity during shooting bouts. This new index could potentially be a shooting performance predictor in biathlon during prone shooting bouts and opens avenues for training individualisation. **Funding information:** Biathlon Québec, MITACS

O901: ASSOCIATIONS OF PERFORMANCE METRICS AND METABOLIC SYNDROME IN SUBURBAN ALABAMA FIREFIGHTERS

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BACKGROUND: Firefighting (FF) is a physically demanding occupation requiring high aerobic capacity, anaerobic power, and muscular endurance. Despite this, FFs typically present with suboptimal cardiometabolic health, including metabolic syndrome (MetSyn), which may influence FF performance and long-term health. This study aimed to identify predictors of FF fitness and their relation to MetSyn prevalence in the sample. METHODS: 72 male career FF ([M±SD] age: 39.1 ± 9.0 y; body mass index [BMI]: 29.2 ± 3.7) from the southeastern U.S. completed laboratory fitness testing and fasted blood chemistry analysis. Aerobic capacity (VO_2max) was assessed via a graded exercise test. Anaerobic power (W), rate of fatigue, and max RPM were assessed via a Wingate cycle test. BMI, grip strength, and maximal push-up performance were also assessed. Blood pressure and metabolic blood markers were evaluated on a separate day after a 12-hour fast. Two separate linear regression models were developed to identify predictors of FF fitness (VO2max and Peak Power). MetSyn was coded per NCEP/ATP III criteria. RESULTS: In Model 1, VO2max was significantly predicted ($F(5,64) = 16.6$, $R2 = 0.61$, $p < 0.001$) by age ($\beta = -0.35$), BMI ($\beta = -0.45$), rate of fatigue ($\beta = -0.24$), mean power ($\beta = 0.28$), max RPM ($\beta = 0.25$; all variables $p < 0.01$). In Model 2, peak power was significantly predicted ($F(3, 67) = 19.9$, $R2 = 0.54$, $p < 0.001$) by grip strength ($\beta = 0.37$), BMI ($\beta = 0.47$), and push-ups ($\beta = 0.37$; all variables $p < 0.001$). The prevalence of MetSyn was 26.6% in the sample; however, it was not a significant predictor of either performance variable ($p = 0.55$, 0.32 respectively). CONCLUSION: VO2max and peak power are strongly influenced by BMI and muscular performance. The prevalence of MetSyn in this sample indicates notable cardiometabolic risk, though it does not significantly predict performance variables. Our findings highlight the need for routine health screenings and targeted fitness interventions. Future work should include longitudinal monitoring by ACSM standards to guide strategies for maintaining occupational readiness and mitigating health risks.

O902: PHYSIOLOGICAL AND PERFORMANCE EFFECTS OF NORMOXIC AND HYPOXIC THORACIC LOAD CARRIAGE: INFLUENCE OF BIOLOGICAL SEX

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BACKGROUND: Thoracic load carriage is an occupational requirement that increases physiological strain and impairs task performance, particularly in hypoxic environments. Our purpose was to examine the influence of biological sex. **METHODS:** Pulmonary function (forced vital capacity, forced expiratory volume in 1 sec, and peak flow), cardiorespiratory responses (heart rate [HR], systolic and diastolic blood pressures [SBP and DBP], expired ventilation [V_E], breathing frequency [f_B], and tidal volume [V_T]), and respiratory muscle fatigue (maximal inspiratory [MIP] and expiratory [MEP] pressure) were assessed in healthy males (n=8) and females (n=11) during and following 45 min of intensity-matched walking (62.0 ± 3.9% VO_{2max}; speed = 2.1-3.7 mph; grade: 8.0-10.7%) in the following conditions: unloaded normoxic (F_iO_2 = 20.93%; UN), loaded normoxic (25 kg pack; LN), unloaded hypoxic (F_iO_2 = ~13.0%; UH), and loaded hypoxic (LH). Thereafter, unloaded time to exhaustion (TTE) at 95% VO_{2max} was assessed in each corresponding environmental condition. Exercise responses and TTE were analyzed via linear mixed models ($\alpha=0.05$). **RESULTS:** Pulmonary function was lower in females versus males ($p < 0.001$) and with load ($p < 0.01$). During exercise, HR increased more over time with load ($p < 0.01$) and was relatively lower on average over time in hypoxia ($p = 0.004$). Females had higher early exercise HR (min 5; $p = 0.044$) compared to males. DBP was elevated with load during exercise ($p < 0.001$), but there were no differences in SBP. Females exhibited increased V_E in LH compared to UH ($p < 0.001$), but male responses were consistent. This was due to an attenuated load-induced relative change in V_T with females during LH ($p = 0.006$). Despite different breathing patterns, there were no changes in MIP or MEP. Finally, TTE was lower in females compared to males across conditions ($p = 0.023$). Moreover, hypoxia impaired TTE compared to normoxia in females ($p < 0.001$), but not males. **CONCLUSIONS:** Females have an exaggerated ventilatory response to thoracic load carriage and impaired endurance capacity overall in hypoxia. These findings suggest a potential need for specialized training for females in load carrying occupations that require high altitude exposure. **GRANT OR FUNDING INFORMATION:** This study was funded by a 4VA collaborative research grant.

O903: EFFECTS OF PROGRAMMING ON HEALTH AND PERFORMANCE OF INCUMBENT UNIVERSITY POLICE OFFICERS

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BACKGROUND: Law enforcement officers face unique occupational challenges that promote sedentary behaviors (e.g., irregular shift schedule, prolonged sitting, long hours) and may hinder their ability to meet the strength, endurance, and mobility demands of the job. This pilot study investigated the effects of an on-duty 7-week movement-progression training program on health and fitness of police officers. METHODS: University law enforcement officers (n=12) completed a 7-week training intervention while on-shift. Weekly training consisted of two supervised sessions: (1) a strength-based, three superset workout targeting squat, hinge, push, pull, lunge, and carry movement patterns, and (2) a circuit training session emphasizing abdominal strength and cardiovascular endurance. Health and fitness data were measured prior to and upon conclusion of the intervention. Specifically, body weight (WT), blood pressure (BP), resting heart rate (RHR), abdominal circumference (AC), body fat percentage (BF), functional movement screening (FMS), grip strength (GS), vertical jump (VJ), maximal push ups (PU), maximal plank hold (Plank), and 2000m row were recorded. Dependent samples t-tests and effect sizes (Cohen's d) were used to identify mean differences between pre- and post-intervention data with a significance level set at $p<0.05$. RESULTS: Findings revealed significant improvements in the FMS score (Δ2.7 au, $p<0.001$, Cohen's d=1.18) and 2000 m row (Δ27.6 seconds; $p=0.031$, Cohen's d=0.56) following the training intervention. Changes in DPB (Δ-5 mmHg, $p=0.25$, Cohen's d=0.33), RHR (Δ-4 bpm, $p=0.29$, Cohen's d=0.28), PU(Δ3 bpm, $p=0.07$, Cohen's d=0.36, Plank (Δ7s, $p=0.45$, Cohen's d=0.27), GS (Δ5 kg, $p=0.20$, Cohen's d=0.22), VJ (Δ1 in, $p =0.07$, Cohen's d=-0.20) exhibited small-to-moderate practical significance despite a lack of statistical significance. CONCLUSION: A 7-week program inclusive of strength and circuit training performed twice a week appears to elicit improvements in cardiorespiratory endurance and mobility. Higher volumes or longer durations may be required to target additional health outcomes.

O904: FITNESS AND PERFORMANCE RESPONSES TO LOAD CARRIAGE TRAINING IN ARMY RESERVE OFFICERS' TRAINING CORPS

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BACKGROUND: Load carriage specific training has been shown as a key element for success in active military theaters. The purpose of the study was to determine how an 8-week training program with load carriage (LC) exercise affected performance in the 2-mile run (2MR) portion of the Army Fitness Test (AFT) compared to a traditional US Army physical training program. A second aim explored LC specific training on indices of neuromuscular performance that may be linked to injury risk. **METHODS:** ROTC Cadets (n=16; 19.5 ± 1.5 years) were assigned to a load carriage training (LCG, n=8) or physical training group (PTG, n=8). The PTG engaged in traditional ROTC physical training from the Army Physical Readiness Training (APRT)

Manual while the LCG performed 3 days of LC training of varying distances and intensities, with 2 days of circuit-style, full body movements. Pre- and post-training assessments included body composition via skinfold assessment (SKF), neuromuscular performance using a countermovement jump (CMJ), and a standardized 2MR, 48 hours later. **RESULTS:** Both training groups displayed trivial improvements in body fat percentage (LCG: Δ -0.77 ± 2.51%, d=0.13; PTG: Δ -0.91 ± 3.15%, d = 0.15). No significant effects or interactions were observed for 2MR (p>0.05) for the LCG or PTG. There were also no group, time, or group x time interaction effects for any countermovement jump parameters, except relative concentric mean power (CMP/BW), which showed a slight reduction for both groups (p=0.04, *d*=0.36). Jump height (JH) was the only other CMJ metric that approached significance for group x time interactions (p=.053), showing a moderate decrease the LCG cadets (Δ: -3.58 ± 4.37) and a trivial improvement for PTG cadets (Δ: +0.75 ± 0.07). **CONCLUSIONS:** These findings demonstrated that LC training can be implemented along with other physical training without a decline in 2MR performance and with only a slight reduction in 1 parameter related to lower body power as evaluated by CMJ in ROTC Cadets. Therefore, LC training should be implemented in an attempt to improve LC capacity before deployment in the hopes of reducing injury risk, especially considering that load carriage has been shown to be a common etiological component of stress fractures to the lower body and low back in active-duty soldiers.

O905: PHYSIOLOGICAL RESPONSES TO OUTDOOR WORK IN HEAT-ACCLIMATIZED AGRICULTURAL WORKERS IN A HIGH-HEAT STRESS ENVIRONMENT

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Background: Mississippi demonstrates some of the most challenging heat/humidity conditions within the United States and derives much of its economy from agriculture. To date there is no research on the physiological responses and needs of agricultural workers within the state. These individuals perform their work despite enduring high amounts of daily heat stress. This study's purpose was to assess the physiological responses to daily work within agricultural workers during some of the hottest times of the year. Methods: Twenty-four individuals (male, n=12, female, n=12, age 42±15y) were assessed during work in field conditions in various locations in Mississippi during August and September. Researchers spent one day assessing workers from the start of the workday until completion of all outdoor work. Participants were asked to work as they normally would, with no changes to their usual routine. Whole body sweat rate (WBSR), forearm sweat sodium (Na^+), rate of sodium loss (RateNa^+), and heart rate (HR) were measured over the course of the day. Pre-work and post-work urine specific gravity (USG) was measured to assess hydration. Published regression equations were used to estimate whole body sweat Na^+ loss (WBNa^+). All values are reported as means and SD, plus peak values for HR (HR_{peak}). Paired samples t-tests were run to assess pre-work and post-work USG, and change scores were calculated (ΔΥΣΓ). Independent t-tests were run to assess sex differences in WBSR, WBNa^+, and ΔUSG. An alpha level of p<0.05 was set for all tests. Mean WBGT was 30.3±2.3°C. Mean SR was 0.36±0.19L/h, WBNa^+ was 28.85±9.70 mmol/L, and RateNa^+ was 12.10±7.24 mmol/h. Mean HR was 134±18bpm, HR_{peak} was 162±43bpm; work was performed at 52±16% age-predicted HR_{max}. Start of day USG was significantly lower than end of day USG (p<0.001, Δ=-0.006±0.008). There were significant sex differences in WBSR (p<0.05), but not WBNa^+ or ΔUSG. Conclusion: This data shows the relatively high demand of agricultural work in Mississippi. SR was similar to others working in other outdoor manual labor jobs in similar conditions and sodium loss was moderately high. Fluid loss and dehydration level show that these workers do not adequately replace sweat losses. These findings support the growing need for effective communication on heat safety within the occupational sphere.

O906: PERFORMANCE CORRELATES OF THE ARMY FITNESS TEST IN ELITE ROTC CADETS

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BACKGROUND: The U.S. Army replaced the Army Combat Fitness Test with the Army Fitness Test (AFT) to align with modern military demands, emphasizing strength, endurance, and holistic health. Given the recent change, the AFT's performance correlates are unclear, especially in elite populations. This study aimed to identify predictors of AFT performance in an elite ROTC Ranger Challenge Team, top-10 at Sandhurst, over 9 months, focusing on VO2max, vertical jump, isometric mid-thigh pull (IMTP), and body fat percentage.**METHODS:** Seven ROTC athletes (age 20.8±1.5; M:6 F:1) from a Ranger Challenge Team that finished in the top 10 nationally among ROTC programs were assessed at three time points (baseline, 4.5 months, 9 months). Measures included VO_{2max}, vertical jump height (Hawkin Dynamics), isometric mid-thigh pull (IMTP) peak force (Hawkin Dynamics), and body composition (Bodpod). AFT scores were recorded concurrently. Repeated-measures ANOVA assessed changes over time, and Pearson correlations evaluated relationships between variables and AFT performance.
RESULTS: AFT scores (478.3±14.8 to 470.6±15.3 points, p=0.33), VO2max (51.6±6.7 to 49.1±7.5 mL/kg/min, p=0.39), and other variables showed no significant changes. At 9 months, VO2max (r=0.68, p=0.09) and %BF (r=-0.55, p=0.20) showed moderate-to-strong correlations with AFT scores, while vertical jump (r=0.52, p=0.23) and IMTP (r=0.41, p=0.36) were weaker.
CONCLUSIONS: VO2max and lower %BF are key predictors of AFT performance in elite ROTC athletes, informing training for military fitness optimization.

O907: A DESCRIPTIVE INTERPRETATION OF THE GAS EXCHANGE THRESHOLD AND RESPIRATORY COMPENSATION POINT IN STRUCTURAL FIREFIGHTERS

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BACKGROUND: The gas exchange threshold (GET), respiratory compensation point (RCP), and aerobic capacity (VO2max) each serve as important fatigue thresholds relevant to performance. These thresholds have secondary implications on firefighting related to air consumption. Increased ventilation, as is observed above the GET and exacerbated above the RCP, contribute to faster depletion of the self-contained breathing apparatus (SCBA). The purpose of this study was to identify and interpret the oxygen uptake (VO2) and minute ventilation (VE) at GET, RCP, and VO2max in structural firefighters (FF). METHODS: FF (n=35, age=31.9±9.9 yrs, BMI=29.7±6.1 kg/m2) completed a maximal graded exercise test as part of a departmental physical screening. VO2max was confirmed if two of three criteria were met: (1) heart rate within 10 beats of the age-predicted maximum, (2) rating of perceived exertion of ≥17, (3) respiratory exchange ratio of ≥1.1. GET and RCP were determined post-hoc by identifying the nonlinear break in the VO2/VCO2 and VE/VCO2 graphs, respectively, and VO2 and VE were recorded at each threshold. RESULTS: The mean VO2 and VE at GET (n=35) were 25.4±6.0 mL/kg/min (range: 12.7-36.5) and 48.3±11.2 L/min (range: 27.8-72.9 L/min), respectively. The mean VO2 and VE at RCP (n=34) were 34.0±5.7 mL/kg/min (range: 22.5-42.7) and 75.9±12.9 L/min (range: 53.6-98.9). Only 26 FF met the criteria for a VO2max (38.7±6.9 mL/kg/min, range: 22.8-52.5). CONCLUSIONS: Most FF would exceed the GET during routine firefighting tasks, with a mean VE at GET (48.3 L/min) surpassing the SCBA's rated ventilatory rate (40 L/min). More intense occupational tasks (e.g., a stair climb in gear while carrying equipment, ~44.0 mL/kg/min) would require all FF to operate above the RCP, eliciting a VE (75.9 L/min) that would reduce the SCBA's rated duration by approximately half. Notably, these fatigue thresholds are highly variable between FF, reflecting different tolerance levels to occupational tasks. FF should partake in physical training focused on improving each threshold to enhance work capacity.

Thematic Poster Presentations

TP101: IMMERSIVE VIDEO INCREASES EXERCISE ENJOYMENT WITHOUT COMPROMISING INTENSITY DURING AFFECT - REGULATED CYCLING

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BACKGROUND: During exercise, external stimuli reduce feelings of discomfort through attentional dissociation. Studies with music, for example, show that people select an exercise intensity that is higher when instructed to maintain a work rate that made them feel "good." The purpose of this study was to determine whether this benefit of higher selected work rate is present with immersive video (IV) delivered with a head-mounted device during affect-regulated exercise. METHODS: In a repeated-measures crossover design, healthy young adults (N = 27; 18 women/9 men; M_{age} = 19.9 ± 1.0 years, $M_{bodyfat}$ = 23.0 ± 8.8%) completed two 20-min exercise sessions on a cycle ergometer. Intensity was self-adjusted to a Feeling Scale value of +3 ("good"). A IV condition in which a first-person viewpoint video of a bike ride in natural scenery was displayed, and a Control condition with only a physical laboratory setting visible, were

completed in a randomized and counterbalanced order separated by 1 week. Selected work rate was assessed objectively (average power output and heart rate) and subjectively (rating of perceived exertion; RPE) every 5 min. Additionally, enjoyment was assessed after each session with the Physical Activity Enjoyment Scale (PACES). Repeated-measures analyses were completed as appropriate using SPSS, version 30 (α = 0.05). RESULTS: There was no main effect of condition between IV and Control for power output (77.17 ± 30.53 vs 76.65 ± 27.99 W), heart rate (134.37 ± 24.49 vs. 135.21 ± 25.09 bpm), or RPE (3.24 ± 1.25 vs. 3.06 ± 1.21), and no differences at matched time points (p > 0.05 for all). PACES was higher for the IV condition than the Control condition (107.51 ± 14.10 vs. 94.07 ± 18.38; $p \leq$ 0.001, d = 0.73). CONCLUSIONS: Participants asked to select and maintain an intensity that made them feel "good" produced the same overall exercise intensity with IV as in a Control condition. Despite similar objective and subjective work rate, enjoyment was rated higher after the IV condition, an effect which could have implications for exercise adherence.

TP102: EFFECTS OF VIRTUAL HATHA YOGA ON BALANCE, COGNITION, AND EMOTIONAL WELL-BEING

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BACKGROUND: Remote participation in yoga may address many of the established barriers to participation, such as lack of time, social anxiety, or a general lack of resources. Here, we report a novel study utilizing a remote testing approach to evaluate motor, cognitive, and emotional well-being outcomes associated with a 10-week virtual synchronous Hatha yoga intervention. METHODS: All pre- and post-testing, and all yoga sessions, occurred remotely and synchronously using *Zoom*. The yoga intervention consisted of a 60-minute hatha yoga session that occurred once a week for 10 weeks. Participants completed surveys using Qualtrics and motor and cognitive assessments using the Sway Balance Mobile Application (Sway App). Surveys included the Mindful Attention Awareness Scale (MAAS) and the Depression Anxiety and Stress Scale-21 (DASS-21). The Sway App directed participants to complete demographic questions, modified Balance Error Scoring System (mBESS), 30-second chair stand, simple reaction time, visual inspection time, cued Stroop, and go/no-go response inhibition. RESULTS: Fifteen participants (14 women) completed the pre-test, and 14 participants (14 women) completed the post-test. Of the participants that completed the post-test, one participant did not attend any of the remote yoga sessions. Therefore, 13 participants, ages 26-57, completed both testing sessions and attended at least one remote yoga session. Of these participants, attendance ranged from 40% to 100%, with an average of 73%, or 7.3 out of 10 sessions. Paired samples t-tests were conducted to evaluate pre- and post-intervention changes. The results demonstrated improvement in balance for the single-leg-eyes-closed-right-foot condition (p = .031), simple reaction time (p = .037), and visual inspection (p = .035). Other results showed nonsignificant improvements in depression (p = .072), stress (p = .067), and mindfulness (p = .053). All other t-tests for cognitive and balance performance were not significant (ps > .100). CONCLUSIONS: These findings demonstrate the feasibility of a remote and synchronous Hatha yoga intervention and suggest benefits for motor and cognitive performance, as well as emotional well-being.

TP103: THE RELATIONSHIP BETWEEN SOCIAL SUPPORT AND KINESIOPHOBIA IN PATIENTS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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BACKGROUND: More than 250,000 anterior cruciate ligament (ACL) injuries occur in the United States annually, but only 43-63% of patients who undergo ACL reconstruction (ACLR) return to competitive sports. Unfavorable psychological outcomes after ACLR, such as kinesiophobia (i.e., fear of movement/reinjury), have been shown to be associated with low return to sport (RTS) rates. Very few studies have examined how favorable/protective psychological factors, such as social support, may modify these unfavorable psychological outcomes post-ACLR. Therefore, the purpose of this study was to examine the association between social support and kinesiophobia in patients post-ACLR. METHODS: A sample of 28 patients post-ACLR (39.3% male, age 23.5±6.7 years, 19.3±14.6 months since surgery) completed the Multidimensional Scale of Perceived Social Support (MSPSS) to measure social support and the Tampa Scale of Kinesiophobia-11 (TSK-11) to measure kinesiophobia as part of an ongoing point-of-care research study. Higher scores on the MSPSS and TSK-11 indicate higher social support (favorable), and higher kinesiophobia (unfavorable), respectively. A spearman rho correlation was used to assess the relationship between social support and kinesiophobia. Rho was interpreted as weak (0.01-0.39), moderate (0.40-0.59), and strong (0.60-1.00). Significance was set *a priori* p≤0.05. RESULTS: A significant moderate correlation was identified between social support and kinesiophobia (rho=-0.413, p=0.03), suggesting that higher social support is associated with lower kinesiophobia after ACLR. CONCLUSIONS: Higher social support may serve as a protective factor to reduce kinesiophobia in post-ACLR patients. Sports medicine providers should encourage patients to engage with their social networks to enhance clinical outcomes. Future research should examine how social support may impact unfavorable physical outcomes associated with low RTS rates post-ACLR, such as knee function and quadriceps strength.

TP104: THE RELATION OF SEDENTARY TIME TO ANXIETY AND BRAIN FUNCTION IN EMERGING ADULTS

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BACKGROUND: Increased sedentary time (ST) is associated with a greater risk for anxiety and impaired cognitive function in emerging adults. This relationship may influence neural markers, such as the N2 event-related potential (ERP), which is linked to the ability to inhibit conflicting actions. Because emerging adulthood is a pivotal period for establishing long-term behavioral and cognitive patterns, investigating how ST is related to anxiety and brain function can inform mental health interventions. This study examined the relation between trait anxiety, ST, and N2 amplitude in emerging adults. **METHODS:** Young adults (n = 63, mean age 21.7 ± 2.8 years), recruited from undergraduate courses at the University of North Carolina at Greensboro, completed the flanker task while electroencephalography (EEG) was recorded using a 64-channel Neuroscan Quickcap. Anxiety symptoms were measured with the State Trait Anxiety Inventory (STAI). Groups were median split for ST and levels of trait anxiety. **RESULTS:** Independent sample t-tests were computed to compare low and high ST groups with low and high trait anxiety. Results showed that young adults with high trait anxiety and high ST revealed larger N2 amplitude (t = 2.10; p = .05, 95% CI [.074, 6.61]) compared to emerging adults with high trait anxiety and low ST (t = .525; p = .603, 95% CI [-1.95, 3.31]). **CONCLUSIONS:** These findings suggest that emerging adults with high TA and high ST allocated greater resources to manage conflicts compared to high TA and low ST. This difference between ST, anxiety, and N2 ERP underscores the need to reduce ST at work, school, and leisure activities. It is critical for emerging adults to increase active breaks, thereby reducing their mental and cognitive burden.

TP105: SELF-SELECTED AND IMPOSED EXERCISE EFFECTS ON NEURAL INDICATORS OF REWARD PROCESSING IN ADULTS WITH DEPRESSIVE SYMPTOMS

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BACKGROUND: Individuals with depression tend to engage in less exercise than non-depressed counterparts. Hedonic theory of exercise indicates that people will repeat exercise if it is pleasurable. Autonomous exercise (i.e., performed at a self-selected intensity) has been associated with greater exercise adherence compared to prescribed moderate-intensity exercise programs. Exercise-related changes in hedonic capacity can be observed by studying reward processing measured by the electroencephalogram. Reward processing has been studied to elucidate anhedonia (i.e., the loss of pleasure), a core symptom of depression. The present study aimed to determine whether a bout of exercise performed at a self-selected or imposed intensity resulted in similar or differential effects on reward processing. METHODS: Using a within-subjects crossover design, 32 adults (ages 18-40; 71.9% female) with at least mild depressive symptoms completed 30 min of self-selected and moderate-intensity (64-76% of an individual's maximal heart rate [MHR]) aerobic exercise on separate days. Before and after each bout, participants completed a monetary reward task to elicit the reward positivity (RewP), an event-related potential linked to reward responsiveness. RESULTS: HR measured during each exercise bout revealed no difference by condition; however, both conditions were in moderate intensity (Self-selected: 69.1±1.9 % MHR; Imposed: 71.3±1.8 % MHR; p = .330). There was a reduced RewP following the imposed (2.1±0.9 μV) compared to self-selected condition (5.3±0.7 μV; p = .002); however, there were no differences in the RewP at baseline (Imposed: 3.9±0.9 μV; Self-Selected: 4.3±0.7 μV; p = .676). CONCLUSIONS: These findings indicate that autonomy may play an important role in the hedonic experience of exercise. Future studies should consider its role in exercise prescriptions for depression and whether it leads to more subsequent exercise engagement.

TP106: ASTAXANTHIN SUPPLEMENTATION IMPROVES COGNITIVE PERFORMANCE FOLLOWING MENTAL FATIGUE IN RECREATIONALLY ACTIVE FEMALES

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Background: Mental fatigue (MF) is typically defined as a psychobiological state caused by prolonged periods of demanding cognitive activity, often characterized by impairments to cognitive performance. Astaxanthin (AX) is a naturally occurring antioxidant that can cross the blood brain barrier and may help mitigate MF. **Methods:** This study investigated four weeks of AX supplementation (12 mg/day) on markers of cognitive performance (reaction time (RT), speed, and responses correct per second (RCS)) following a MF protocol. Twenty-five recreationally active female subjects (mean ± SD; age, 22 ± 3 y; height, 165.7 ± 6.3 cm; body mass, 63 ± 6.9 kg) were randomly assigned to either AX or placebo (PLA) and completed a battery of cognitive assessments of three different cognitive tasks at baseline and after supplementation. A secondary measure of mental exertion using a visual analog scale (VAS-E) was also assessed at respective timepoints. **Results**: Our results showed that AX supplementation improved RT, speed, and RCS (all $p < 0.05$) for two of the three cognitive assessments. Secondary findings of VAS-E showed a reduction of subjective mental effort in the AX group only ($p = 0.006$, $d = 0.95$). **Conclusion**: The results demonstrated that AX may mitigate MF and subsequently, improve cognitive performance in recreationally active females.

TP107: ASSOCIATION BETWEEN PHYSICAL ACTIVITY, SOCIAL SUPPORT, AND PERCEIVED STRESS IN PEOPLE LIVING WITH HIV: A CROSS-SECTIONAL STUDY

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Introduction: Although antiretroviral therapy (ART) has substantially increased the life expectancy of people living with HIV (PLHIV), the prevalence of comorbidities and HIV-related mortality remains high. Physical activity (PA) emerges as a promising complementary strategy, promoting benefits to mental, metabolic, and cardiovascular health. However, many PLHIV remain physically inactive, which may be related to psychological and social factors. Therefore, it is relevant to identify psychosocial variables associated with PA levels in this population in order to support more effective interventions. The purpose of this study was to assess the association between weekly moderate-intensity PA and self-efficacy for exercise (SE), perceived stress (PS), and social support (SS) for PA in PLHIV. **Methods**: This cross-sectional study included 24 participants (males = 17; females =7) living with HIV, aged 18 to 60 years, without clinical limitations for engaging in PA, and currently taking ART. Moderate PA was assessed using the short version of the IPAQ. SE was measured using the 13-item questionnaire of Garcia & King; PS was measured using the 10-item scale of Cohen et al.; and SS was measured using the 13-item scale of Sallis et al., which includes subscales for family and friend support. Associations were analyzed using Pearson's correlation test ($p \leq 0.05$). **Results**: Moderate PA showed a positive correlation with SE ($p = 0.047$; $r = 0.41$) and friend support ($p = 0.016$; $r = 0.49$), and a negative correlation with PS ($p = 0.010$; $r = 0.52$). Family support and total social support were not significantly correlated. **Conclusion**: Psychological and social aspects, such as self-efficacy for exercise, social support from friends, and perceived stress levels, are associated with the amount of moderate physical activity in PLHIV. PA promotion strategies should consider these factors when counseling this population to adopt daily PA habits.

TP108: REP BY REP, FEEL BETTER? STRENGTH TRAINING IMPROVES AFFECT FOR INFREQUENT LIFTERS

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BACKGROUND: Higher levels of physical activity correlate with better mental health and quality of life. While existing research links aerobic exercise to improved affect, few studies have examined relationships between strength training (ST) and affect, or whether habitual ST influences affective responses to ST. Understanding these associations can inform expectation management for individuals who are new to ST. This study used secondary analyses to examine within-person associations between daily ST and evening affect, with habitual ST as a moderator. **METHODS:** A convenience sample of 91 overweight/obese adults ages between 21-44 years participated in a 21-day study, completing morning and evening surveys assessing four types of affect: positive-activated (e.g., lively, happy), positive-deactivated (e.g., calm, relaxed), negative-activated (e.g., tense, angry), and negative-deactivated (e.g., sad, lonely) on a 0-4 Likert scale. Evening surveys also assessed daily minutes of ST. Habitual ST was calculated as the average number of ST days during the first 7 days. Multilevel models tested whether habitual ST moderated the within-person association between daily ST and evening affect across days 8-21, controlling for between-person differences, sex, and weekend days. **RESULTS:** Habitual ST significantly modified the within-person effect of daily ST on evening positive activated affect (b=-.002, p=.04). Greater-than-usual ST was associated with higher evening positive-activated affect (simple slope=0.005, p=.05) for individuals who typically engaged in less than 1.34 days of ST per week. No such association was observed among individuals who engaged in ST more regularly. **CONCLUSIONS:** Infrequent ST participants experienced small, same-day increases in evening positive-activated affect on days they engaged in more ST than usual. These findings suggest that ST may offer short-term affective benefits, particularly for individuals who engage in ST less regularly.

TP201: SIMILAR FATIGUE TRAJECTORIES BETWEEN SINGLE- AND MULTI-JOINT EXERCISES

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BACKGROUND: The purpose of this investigation was to examine the difference in single-joint (SJ) and multi-joint (MJ) exercises on elbow flexion maximal voluntary isometric contraction (MVIC) and repetition performance across multiple time points. **METHODS**: 26 (15 M/11 F) resistance-trained subjects participated in this randomized within-subject, repeated measures design. Each subject had one of their arms randomized to a single-joint exercise (cable bicep curl (BC)) and the other arm to a multi-joint exercise (single - arm cable lat pulldown (LP)). Subjects performed two MVICs at 90° of elbow flexion at baseline using a load cell on each arm. Following a familiarization session that involved one- repetition and ten-repetition maximum (10RM) testing, subjects performed ten sets to concentric failure with their pre determined 10RM of each unilateral exercise (BC/LP). Two minutes of rest were provided between sets. Post every second set (i.e., Sets 2 (S2), 4 (S4), 6 (S6), 8 (S8), and 10 (S10)) participants completed an additional MVIC. Post data collection on one arm, the opposite arm was prepared, and the same procedure was repeated in an identical sequence with the opposite exercise. The PF from each MVIC was normalized to each subject's pre-testing value (PF_{NORM}). The sum of repetitions completed every 2 sets was calculated and the difference between each time point from S2 to S10 was computed (REP_{DIFF}). Separate exercise (BC/LP) × time (S2/S4/S6/S8/S10) × sex (M/F) repeated measures ANOVAs were run for each DV. **RESULTS**: There were no interaction effects for either outcome (p=0.155-0.494). There were significant main effects for time for both outcomes ($p<0.001$). Post-hoc analyses indicated that when collapsed across exercise and sex, REP_{DIFF} significantly decreased from 19.4±5 to 9.5±4 repetitions from S2 - S10 ($p<0.001$), except between S6 and S8 ($p=0.810$). When collapsed across sex and exercise, PF_{NORM} decreased across time from 86.1 ± 12% (S2) to 73.6 ± 13.8% (S10) ($p<0.001$), but difference between S4 vs S6, S6 vs S8, and S8 vs S10 were not significant (p=0.125-1.000). **CONCLUSION**: PF_{NORM} decreased with time, with no differences from S4 to S10. REP_{DIFF} declined over time as well. This suggests similar fatigue trajectories of the elbow flexors after multiple sets of SJ and MJ exercises that target the elbow flexors.

TP202: RELIABILITY AND VALIDITY OF THREE DIFFERENT VELOCITY-BASED TRAINING DEVICES

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BACKGROUND: Velocity-based training (VBT) devices provide the opportunity to program resistance training load while accounting for fluctuations in daily performance resulting from training fatigue, nutritional intake, sleep quantity/quality, and illness. As VBT devices continue to gain popularity as effective training tools, more affordable and accessible options are emerging. Assessing these new devices for validity and reliability is essential for ensuring the development of safe, evidence-based training programs. The purpose of this study was to assess the validity and reliability of two VBT devices (herein referred to as devices A and B) against a validated linear position transducer (LPT) VBT device. METHODS: Fifteen resistance-trained individuals completed three visits to perform the barbell back squat, each visit separated by 1 week. During the first visit, 1 repetition maximum (1RM) barbell back squat was determined and used to calculate

percentage of 1RM loads. Visits two and three consisted of sets of 3 repetitions at 20%, 30%, 40%, 50%, and 60% of 1RM, and sets of 1 repetition at 70%, 80%, and 90% of 1RM. Mean concentric velocity was collected during every repetition using three VBT devices (A, B, and LPT) attached to the barbell simultaneously. Device reliability was assessed using Intraclass Correlation Coefficient (ICC) and Coefficient of Variation (CV). Device validity was assessed using linear regression (R2) and visually with Bland-Altman plots for agreement. RESULTS: Device A demonstrated good to excellent reliability (ICC: 0.71-0.83; CV: 8.40-16.19) and moderate to good validity (R2: 0.64-0.87, $p<0.001$) for all repetitions performed compared to LPT. Device B demonstrated moderate to good reliability (ICC: 0.86-0.94; CV: 10.06-28.20), but poor to moderate validity (R2: 0.45-0.87, $p < 0.006$) compared to LPT. Blant-Altman plots, for both device A and B, showed visual agreement for device validity. CONCLUSIONS: Devices A and B produce valid and reliable data that can be used in resistance training programming applications. These devices provide alternatives to standard linear position transducer VBT devices at a lower cost ($495 and $15.99/month, respectively, as compared to $1500), increasing accessibility of this beneficial technology to a wider range of user populations.

TP203: IMPACT OF A 6-WEEK HIGH INTENSITY INTERVAL TRAINING PROGRAM ON MEASURES OF FITNESS IN ADULTS

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Background: Only 1 in 4 Americans are estimated to meet the National Physical Activity Guidelines. Evidence suggests that high intensity interval training (HIIT) elicits similar improvements as continuous exercise; however community-based research on its impact on body composition and measures of fitness is limited. **Purpose**: To evaluate the impact of participation in a 6-week HIIT program (ThriveFit) on changes in body composition, blood pressure and strength. **Methods**:14 adults (9 females and 5 males; 42.4±13.6 years, 86.9±25.3 kg, 171.7±10.7 cm) were recruited to participate in a HITT intervention study via community email. Participants completed the PAR-Q+ (Physical Activity Readiness Questionnaire) and a demographic questionnaire. Before and after the program body composition was measured using bioelectrical impedance analysis (ImpediMed SFB7, Australia) and waist circumference, blood pressure was measured using an automated blood pressure cuff (Dario Health Corporation, Taiwan), and strength was assessed using a handgrip dynamometer (Takei Scientific Instruments, Japan). Participants attended 3 weekly sessions of HITT (35-40 min each) for 6 weeks. Sessions consisted of warm up, cool down, and 30 minutes of high intensity exercises (3-4 circuits with 6-8 exercises) utilizing weights, body weight exercises, and continuous movement. Changes pre to post were analyzed using paired t-tests ($p<0.05$). **Results**: Although not significant, a positive trend in lower diastolic blood pressure significantly decreased (Pre: 86.9 ± 15.0; Post: 81.6 ± 13.0 mmHg, $p = 0.06$), higher fat-free mass (Pre: 56.9±15.2 kg; Post: 59.7±17.3, $p=0.06$) and lower fat mass (Pre: 30.0± 13.4; Post: 27.4±12.1 kg, $p = 0.09$) was observed. There were no significant differences for any other variables ($p>0.05$). **Conclusion**: Participation in Thrive Fit showed favorable trends in body composition and diastolic blood pressure. Short-term HIIT may improve fitness in adults, but a larger sample size is needed to confirm findings.

TP204: EFFECTS OF BLOOD FLOW RESTRICTION ON CONTRALATERAL RESISTANCE EXERCISE PERFORMANCE AND PERCEPTUAL RESPONSES

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BACKGROUND: Low-load resistance exercise with blood flow restriction (BFR) exacerbates muscle fatigue development in the restricted limb. Whether BFR impacts the exercise performance in the non-restricted contralateral limb remains largely unknown. Heightened afferent feedback (mechanical, metabolic, nociceptive) has been suggested to influence performance in the contralateral limb. The purpose of this study was to examine whether applying BFR to the opposite limb impairs exercise performance in the tested limb and whether any effect depends on the presence of contraction in the opposite limb (unilateral vs. bilateral). METHODS: Fifteen young healthy individuals (18-40 years) completed four experimental conditions. In every condition, the dominant arm (tested limb) performed the same test (2 sets of dumbbell elbow flexion exercise to failure at 30% 1RM), while the non-dominant arm received: 1) no exercise (Non-Ex), 2) exercise at 30% 1RM (Ex), 3) BFR without exercise (BFR), and 4) BFR exercise at 30% 1RM with 80% arterial occlusion pressure (AOP) (BFR+Ex). Sets were terminated when the dominant arm failed to maintain the prescribed cadence (40 bpm). Across two experimental visits, participants completed two conditions per visit in randomized order, separated by 20 minutes of rest. Repetitions on the dominant arm were compared between conditions. Discomfort ratings (0-100) were given at the end of each set. A Bayesian repeated-measures ANOVA tested differences in repetitions across sets and mean discomfort ratings between conditions. RESULTS: There was no evidence of interaction ($BF_{incl}=0.75$), indicating that condition differences were similar in Set 1 and Set 2. Collapsing across sets, there was moderate evidence for a condition effect ($BF_{incl}=6.06$). Post-hoc analysis revealed fewer repetitions performed with BFR+Ex (22.2 reps) versus Non-Ex (27.3 reps) and versus Ex (31.4 reps), while BFR (25.4 reps) versus BFR+Ex was inconclusive. There was no difference between Non-Ex and BFR ($BF_{incl}=0.93$). The discomfort rating was highest in BFR+Ex (62.8), with no differences among other conditions. CONCLUSION: Performance in the tested limb declined only when the opposite limb was exercising under BFR. Neither contralateral contraction alone nor BFR alone altered performance.

TP205: RIBOSOMAL PROTEOME CHARACTERISTICS ARE LARGELY SIMILAR BETWEEN HIGH AND LOW RESPONDERS TO RESISTANCE TRAINING

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BACKGROUND: The observed inter-individual hypertrophic response heterogeneity of skeletal muscle to resistance training (RT) has led to the investigation of higher responders (HR) and lower responders (LR). Whether specific ribosome characteristics differ between HR and LR is unknown. Therefore, the purpose of this study was to examine the ribosomal characteristics of a cohort of HR vs. LR. METHODS: HR (n=7) and LR (n=7) performed 10 weeks (23 sessions) of RT and were delineated based on changes in vastus lateralis (VL) muscle cross-sectional area (CSA) along with VL mean fiber CSA changes. Herein, a muscle biopsy was collected in the basal state following the 10-week RT period (PRE) and after a single acute training session (POST). Following tissue collection, ribosomes were enriched via ultracentrifugation in a sucrose solution (20%). The subsequent ribosome-enriched fraction was collected in Trizol and RNA and protein fractions were isolated. Downstream RNA-based analyses and shotgun proteomics were performed to determine ribosomal characteristics. Data were analyzed via two-way ANOVAs for RNA based metrics, or bioinformatic analyses analogous to a two-way ANOVAs for proteomic data. Significance was set to $P<0.05$ for RNA-based data, while a more conservative threshold ($P<0.01$) was used for proteomics due to more comparisons being performed. RESULTS: The fractionation method demonstrated good fidelity, where ribosomal proteins and RNAs were almost entirely sequestered to the ribosomal pellet following ultracentrifugation. Ribosome characteristics were similar between HR and LR. Specifically, 18S and 28S rRNA subunits did not show between group differences ($P\geq0.650$) or a group*time interaction ($P\geq0.752$). Similarly, of the 79 ribosomal proteins identified, none showed a main effect of time ($P\geq0.034$), main effect of group ($P\geq0.028$), or a group*time interaction ($P\geq0.094$). CONCLUSIONS: Although limited by sample size, our data suggest that ribosomal characteristics are largely conserved between HR and LR following a single exercise bout after the 10-week training period. Nonetheless, the ribosome pelleting method used herein appears to enrich a fraction of ribosomal proteins and RNAs from small amounts of human tissue (~30 mg), making it viable for future investigations.

TP206: EXTERNAL FOCUS OF ATTENTION IMPROVES MOTOR PERFORMANCE BY DECREASING FATIGUE ON ISOMETRIC STRENGTH TASK

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BACKGROUND: Previous studies have shown that attentional focus impacts motor performances. Individuals can adopt an internal or external focus of attention (FoA) while performing motor tasks. Internal FoA is adopted when one thinks about their body movements, or sensations while executing a movement; while external FoA is adopted when one thinks about the goal of the movement or its trajectory until the outcome of the action. It is broadly known that external FoA enables superior performance. The present study focused on examining the impacts of attentional focus on performance of two fatiguing isometric tasks (wall-sits). METHODS: Sixty (60) physically active participants completed two wall-sit tasks until failure in a counterbalanced order, while adopting either an internal or external FoA. Additionally, our study examined the impacts of FoA on perceived exertion (RPE), exercise enjoyment, muscle activation, physiological fatigue, and muscle oxygenation during the tasks. RESULTS: Results revealed that participants significantly prolonged time to failure on the

wall-sit task when adopting an external FoA (p = 0.002) - External focus [Mean time: 106.68 sec, SD: 30.50 sec]; internal focus [Mean time = 97.06 sec, SD: 25.74 sec]. Moreover, external focus significantly reduced perceived fatigue (RPE) (p < .001) - external (M: 15.10, SD:1.35); internal (M:16.75, SD: 1.66); and unpleasantness during the tasks (p = .020) - External (M: -1.65, SD: 1.79) and Internal (M: -2.12, SD: 1.96). Additionally, no statistical differences were observed for physiological fatigue between conditions (p= 0.26); muscle activation between conditions (p = 0.125), or muscle oxygenation (p = 0.34). CONCLUSION: adopting an external FoA improved performance in the wall-sit task most likely because of the decreased perceived exertion and unpleasantness close to failure, even though physiological fatigue and muscle activation increased similarly across both attentional conditions.

TP207: ISOMETRIC RESISTANCE BAND EXERCISES IMPROVE CERVICAL MUSCULAR PERFORMANCE IN F-16 PILOTS

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INTRODUCTION: Approximately 98% of fighter pilots report flying-related neck pain with 75% reporting worse performance due to neck pain during high-G flight. Improving cervical musculature and endurance is associated with reduced neck pain and disability. Isometric training may enhance cervical musculature but this has not yet been evaluated in F-16 pilots. We hypothesized that a 9-wk isometric resistance band training program would improve cervical muscular performance observed with increased deep neck flexor (DNF) hold time. METHODS: This IRB approved investigation enrolled 27 F-16 pilots (age 29.5 ± 4.1 y; BMI 26 ± 3.1 kg/m2; military service 6.9 ± 4.1 y). Cervical muscular performance was measured using a standardized DNF hold time protocol pre- and post-intervention. Pilots completed a 3-wk progressive cervical hold training program using a 41" resistance band, performed three times per wk. Cervical hold times increased from 12 to 15 to 18 seconds during the training phase. A paired samples t-test to assess for within-group differences with significance set at p<0.05. RESULTS: Pilots demonstrated a significant DNF hold time improvement from pre-to post (82.5±28.9 vs. 107.9±35.9 seconds; p < 0.001). DISCUSSION: Results demonstrated a 30.8% increase in mean pilot DNF hold times. Findings suggest isometric resistance band exercises may improve cervical muscular performance and could reduce F-16 pilot cervical injury risk. Results need to be verified in future randomized controlled trials.

TP208: TEST-RETEST RELIABILITY OF LOAD-VELOCITY SLOPES FOR JAMMER ARM PUNCH PRESSES

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BACKGROUND: The purpose of this study was to assess test-retest reliability of slope and y-intercept parameters derived from load-velocity profiles (LVP) during jammer arm punch presses (JPP). METHODS: Fifteen resistance trained participants (23.3 ± 2.4 years, 174.0 ± 8.9 cm, 80.6 ± 11.2 kg) completed 3 visits separated by 72 hours. During visit 1, participants provided informed consent, completed an exercise familiarity questionnaire (0-10 scale), and performed JPP familiarization. During visits 2 and 3, participants completed a LVP assessment involving progressively heavier unilateral JPP sets. Each set consisted of 3 repetitions per arm, separated by 3 minutes of rest. Load was increased by approximately 10% body mass until participants failed to achieve adequate range of motion. Linear position transducers recorded mean (MV) and peak (PV) velocity. MV and PV were averaged per set and arm to calculate slope and y-intercept. A paired-samples t-test assessed systematic differences between visits. Test-retest reliability was evaluated using a two-way random-effects intraclass correlation coefficient (ICC) for absolute agreement. Both the point estimates and lower 95% confidence limits were used to interpret reliability using standard benchmarks (poor: <0.50; moderate: 0.50-0.75; good: 0.75-0.90; excellent: >0.90). RESULTS: Mean JPP familiarity rating was low (3.1 ± 2.9). No significant differences were observed between visits for any parameter (p>0.05). Slopes reliability was moderate to good for both arms (PV: dominant ICC = 0.53-0.84, non-dominant ICC = 0.70-0.90; MV: dominant ICC = 0.51-0.83, non-dominant ICC = 0.61-0.87). Y-intercept reliability varied: in the dominant arm, MV showed poor to good reliability (ICC = 0.45-0.81) and PV showed moderate to good reliability (ICC = 0.61-0.87); in the non-dominant arm, PV demonstrated poor to moderate reliability (ICC = 0.11-0.69), whereas MV showed good to excellent reliability (ICC = 0.77-0.92). CONCLUSION: The load-velocity relationship for JPP is reliable in resistance-trained individuals, even with low initial familiarity. However, y-intercept reliability, particularly for peak velocity in the non-dominant arm, is inconsistent, suggesting that absolute velocity estimates may benefit from additional familiarization.

TP301: THE EFFECT OF STARTING STATUS ON HYDRATION IN DIVISION I WOMEN'S SOCCER ATHLETES

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Background: Proper hydration is important for optimal health and performance. Despite known differences in physical demands, little is known about the hydration status of starters compared to non-starters in women's soccer athletes. Therefore, the purpose of this study was to compare pre-competition hydration levels and dehydration during a regular season home match in Division I women's soccer athletes. **Methods:** Urine samples were collected ≤ 2 h prior to one home match during the regular season. Wearing compression clothing, athletes were instructed to towel off excess sweat before completing a body weight (BW) measurement (InBody H30). Urine samples were analyzed immediately for urine color (UC) and urine specific gravity (USG) using a handheld refractometer (Atago). Starters were defined as athletes with ≥ 45 min play time. Hypohydration was defined as USG ≥ 1.020. UC was compared against a validated urine color chart. BW was remeasured within 30 min post-match, and dehydration was calculated as:
*Dehydration (% BW) = [(Pre-event BW (kg) - Post-event BW (kg))/Post-event BW(kg)] * 100* **Results**: Nineteen field players participated in this study (1.66 ± 0.7 m, 62.3 ± 6.8 kg, 22.1 ± 6.9% body fat, 26.8 ± 3.0 kg SMM). There was a trend (p = 0.054) for lower body fat in starters (19.5 ± 5.4%) compared to non-starters (25.6 ± 7.5%). Environmental conditions were 23.3°C, 58% RH. Combined pre-competition USG and UC were 1.011± 0.006 and 2.7 ± 1.5, respectively. Athletes lost 1.5 ± 0.8% BW during competition. No athletes arrived to competition in a hypohydrated state. There were no significant differences for USG (1.012 ± 0.006 vs. 1.010 ± 0.006) or UC (2.6 ± 1.4 vs. 2.8 ± 1.9) between starters and non-starters, respectively. There was a trend (p = 0.06) for greater dehydration in starters (1.8 ± 0.8%) compared to non-starters (1.1 ± 0.7%). **Conclusions**: In a Division I Women's Soccer team participating in sports nutrition education, all field players began regular season competition at home in an appropriately hydrated state. Starters trended towards greater BW loss during competition. Accordingly, refueling strategies should be personalized by starting status. **Acknowledgments**: The USC Upstate Office of Sponsored Awards and Research Support and the University of South Carolina Magellan Scholar Program funded this research.

TP302: REPRODUCIBILITY OF WATER DIURESIS: IMPLICATIONS FOR ESTABLISHING THE BEVERAGE HYDRATION INDEX

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BACKGROUND: The Beverage Hydration Index (BHI) compares fluid retention profiles of beverages relative to water via urine output over time. Therefore, reproducibility in the diuretic action of water is essential in the calculation of BHI. Our purpose was to determine if the diuretic action of repeated water trials impacts BHI. METHODS: Fifteen men and women arrived fasted after consuming 500 mL of water in the morning. Following baseline measures, participants consumed one liter of beverage over 30 minutes (4 x 250 mL every 7.5 minutes). Over the next four hours, urine output and body mass were measured. Water ingestion was repeated twice (~4 months apart) and compared to a sugar-free caffeinated electrolyte beverage (CAF). A Friedman non-parametric test was used to compare BHI of the test beverage to the two water controls (set at 1.0). RESULTS: There was no difference (p < 0.46) in urine mass between the repeat water trials or drink x time interaction (p < 0.45). However, intraclass correlations indicated poor reliability (r = 0.11 and r = 0.31) for urine mass output at 2 and 4 h across the repeated water trials. Mean (± SD) BHI of CAF based upon the two water control trials was not different (p = 0.442) at 2 h (0.90 ± 0.17 versus 0.97 ± 0.22) and 4 h (0.99 ± 0.18 versus 1.01 ± 0.21). However, BHIs for CAF at 60 min (0.75 ± 0.21 versus 0.83 ± 0.23) were both significantly lower (p < 0.001, p = 0.008, respectively) than 1.0 (water control). At 60 min, CAF elicited a greater diuresis compared to the water trials by 231 ± 178 g and 174 ± 209 g (p < 0.001, p = 0.019), respectively. The average BHI over time for CAF was similar (p = 0.343) for men (0.91 ± 0.13) and women (0.98 ± 0.14). CONCLUSION: Although urine mass output did not differ across the repeated water trials over time, the reproducibility of the diuretic effect of water ingestion was poor. Yet, despite low reliability, the impact on establishing the BHI of a caffeinated

hydration beverage was not significantly impacted (varying by 7% at 2 h and only 1% by 4 h). The caffeinated electrolyte beverage was less hydrating than water (by 17-25%) but only in the first hour, and not different between men and women. Therefore, the BHI metric appears robust despite potential variations in the diuretic action of water within an individual. Funded by a grant from Liquid IV, El Segundo, CA (A Unilever Company)

TP303: SWEAT PROFILING AMONGST RANGER CHALLENGE TEAMS: ASSESSING THE NEEDS (SPARTAN)

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Background: Ranger Challenge (RC) is the varsity sport of the U.S Army reserve officer training corps. RC cadets compete nationwide in events evaluating physical aptitude and tactical skills, including loaded road marches. Competitors are required to wear operational camouflage pattern uniforms (OCP) and Advanced Combat Helmet (ACH). As a result, convective and evaporative cooling mechanisms are minimized, likely increasing sweat rates and risk of dehydration. A dearth of research exists investigating sweat responses to competitive tactical endurance exercise, with no research on RC populations. Therefore, the purpose of this study was to elucidate sweat rates during a simulated road march in RC competitors. Methods: RC team members (n = 5; male=3, female=2) were recruited for the study. Upon arrival participants completed body composition assessment via dual-energy x-ray absorptiometry (DXA). Sweat collection biosensors (Nix Hydration Biosensor, Nix™ Biosensors Boston, MA, USA) were affixed below the medial deltoid on the outer arm. Participants then completed a self-paced 10 km treadmill test with a standard uniform of: OCPs, ACH, fighting load carrier, drill purpose rifle, and 15.9kg rucksack. Participants were instructed to complete the time-trial as fast as possible. Statistical analysis: Descriptive statistics were used to summarize data. Means and standard deviations (SD) were calculated for all continuous variables. No additional inferential statistical tests were performed. All results are presented as mean ± SD. Results: Participants (height 173.2 ± 16.3 cm; mass 74.1 ± 18.9 kg) completed the ruck in 79.6 ± 13.4 min. During the ruck, total fluid loss was 1.41 ± 0.60 L, at rate of 1.04 ± 0.39 L/hr, with a composition of 58.7 ± 15.9 mg/oz (consisting of Na+, Cl-, K+, Mg+). Electrolyte loss totaled 2905 ± 1668 mg, at a rate of 2183 ± 1301 mg/hr; while sodium loss was 1377 ± 791 mg at a rate of 1035 ± 616.4 mg/hr. Conclusions: RC cadets exhibited large fluid and electrolyte losses during the simulated road march. Use of OCP and external load may increase fluid and electrolyte losses beyond typical endurance events. Therefore, the risk of heat related injury, and impaired performance in this cadet population may be exacerbated. This highlights the need for individualized hydration and heat injury plans for RC cadets.

TP304: IMPACT OF ACUTE HEAT ACCLIMATION PRIOR TO SPACE FLIGHT ON ASTRONAUT SAFETY AND PERFORMANCE

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Background: The physiological challenges associated with microgravity exposure, as experienced during spaceflight, are well-documented. For example, as a result of microgravity, humans experience hormonal, cardiovascular (CV), metabolic, musculoskeletal, and neurophysiological alterations, among others. The purpose of this research was to assess the effects of heat acclimation (HA) as a proposed countermeasure to CV changes during short-duration space flight, as well as how the impact of this countermeasure could potentially enhance astronaut work productivity and safety. **Methods:** Ten recreationally active males completed a graded exercise test to obtain individual VO_{2max}. Following this session, participants completed ten HA sessions over a 14-day period. These sessions included exercising for 45 minutes between 32°-35° C at 60-70% of VO_{2max}. Throughout the HA sessions, heart rate (HR), rating of perceived exertion, and core temperature were assessed every five minutes. Participants then completed a follow-up VO_{2max} test 72 hours following the last HA trial and again at one-month post to compare CV differences at the three time points. In addition to the performance sessions, participants completed a 400-meter run with a 20 lb. weighted vest (WV) to simulate the distance an astronaut would need to run from the shuttle in their flight suit for safety. The 400-meter run was completed prior to and following both the first and last HA sessions, as well as at the midpoint (trial six). **Results:** Results indicated a main effect for HR at the 15 min timepoint across trials 1, 5, 6, and 10 (p=0.04), with post-hoc comparisons demonstrating significant improvements in HR between trials 1&5 (p=0.02) and 1&6 (p=0.05). There was also a main effect observed in the pre-trial 400m WV runs (p=0.02), with post-hoc comparisons indicating significant improvement in running times between trials 1&10 (p=0.04) and approaching significance between trials 6&10 (p=0.07). **Conclusions:** Improvement in HR and WV indicates acute heat acclimation prior to spaceflight may be effective both to astronaut fitness and safety. Being able to separate from a craft as quickly as possible upon landing is important in the event of any mechanical or electrical malfunction. *This research was funded by the NASA Alabama EPSCoR Research Seed Grant program.*

TP305: FLUID INTAKE AND RESTING METABOLIC RATE IN BLACK EMERGING ADULTS

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BACKGROUND: Adequate fluid intake may support metabolic processes, where greater fluid intake acutely increases resting metabolic rate (RMR). Black emerging adults (18-28 years) are at a greater risk for both underhydration and related diseases, such as obesity and hypertension. However, few studies have examined associations between habitual fluid intake with RMR in this population. Using a sample of Black emerging adults from the Sleep, Health Outcomes, and Body Weight (SHOW) study, this analysis assessed associations between habitual fluid intake with RMR and respiratory quotient (RQ). **METHODS:** The SHOW study aims to recruit 150 Black emerging adults and assess health outcomes such as fluid intake and RMR over one year. Baseline data is available in 37 participants (28 females; age, 20±2 y; BMI, 27.9±8.0 kg/m^2). Participants self-reported food and fluid intake for 4 days and were given *ad libitum* access to food and fluids (excluding plain water) from a standard menu for 3 days. All plain water was consumed from a smart water bottle for the 7-day study period. Total fluid intake (mL) was calculated as the sum of plain water intake and water content from food and other fluids and averaged over the 7-day study period. RMR (kcal/day) and RQ were measured in laboratory via indirect calorimetry following an overnight fast. Associations between total fluid intake, RMR and RQ were assessed with Spearman correlations. **RESULTS:** Total fluid intake was 1830±1070 mL/day and RMR was 1736±321 kcal/day. An increase in fluid intake was significantly associated with an increase in RMR (ρ=0.29, *p*=0.03). An increase in fluid intake was associated with a decrease in RQ (ρ= -0.25, *p*=0.13), however, this was not statistically significant. **CONCLUSIONS:** In this sample of Black emerging adults, greater fluid intake was associated with a greater RMR, suggesting that daily fluid intake may have beneficial effects on metabolic function. Future analyses of the SHOW study will include a larger sample size and assess additional measures of hydration, such as urinary hydration markers (e.g., urine volume and osmolality). **Support:** NIH Grant R01HL163804

TP306: ABSTRACT WITHDRAWN

TP307: EVALUATING HYDRATION STATUS IN COLLEGIATE FOOTBALL PLAYERS

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BACKGROUND: Previous hydration research has focused on Olympic sports, leaving a gap in longitudinal data assessing hydration status in American football athletes. The purpose of this study was to investigate hydration status in NCAA Division 1 American football players across the competitive season at a southeastern university. METHODS: Morning urine samples were collected 48 hours prior to each of the 11 games in the 2024 collegiate season. Inclusion criteria for urine collection were players on the starting roster, with a history of dehydration and/or exercised-induced muscle cramps. Urine samples were analyzed using a handheld ATago3749 Pen Refractometer to assess urine specific gravity (USG). USG score >1.020 indicated hypohydration according to the National Athletic Trainer's Association. Dehydrated athletes received an intervention by the performance dietitian without follow-up USG. Statistical analysis included Mann-Whitney test to determine if hydration status influenced football win/loss outcome. RESULTS: 40 players (age 22 ±1 yrs old, BMI 29.8± 2.1 kg/m²) were tested for hydration at least once, with mean USG 1.016 ± 0.008 across all games. Mean USG was maintained at <1.020 across the season, and 69% of players started games adequately hydrated. Athletes tested rotated across the season, with a sample size of 13-37 urine samples analyzed per game. The team won 5/11 games, with no association between wins and hydrated players (U = 7.0; p = 0.144). CONCLUSION: These findings suggest that regular USG monitoring is an inexpensive, non-invasive method to refer dehydrated athletes to dietitian intervention prior to competition. However, USG was not effective in motivating athletes to consume

fluids, as team hydration status did not improve across the season. Future research should investigate more advanced methods of hydration testing followed by individualized recommendations for at-risk players. AI Statement: AI was used for brainstorming, while all writing and analysis were completed by the research team.

TP308: SWEAT LACTATE AS A MEASURE OF EXERCISE INTENSITY

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BACKGROUND: Blood lactate has shown success in monitoring exercise intensity, enhancing endurance training, and predicting athlete success. Due to risks and discomfort associated with drawing blood, this study investigated the utility of sweat lactate as a noninvasive method for monitoring exercise intensity. **METHODS:** Blood and sweat lactate concentration was measured in 18 recreationally active subjects while exercising on a treadmill at moderate (50-75% age-predicted HRmax) and heavy (76-85% age-predicted HRmax) exercise intensities. Heart rate measurements were taken using a heart rate monitor while sweat was collected by placing a modified sandwich bag on the right upper back and a surgical glove on the right hand. Sweat rate was determined utilizing absorbent patches secured to the lower right back. Blood and sweat lactate concentration from both intensities were analyzed using an enzymatic sweat lactate assay with blood and sweat samples treated in the same manner. Paired T-tests were used to compare differences between variables at the two exercise intensities. **RESULTS:** Mean(SD) average heart rate at moderate and heavy-intensity exercise were 137.3(13.2) bpm and 167.6(11.1) bpm, respectively (p<0.001). Mean(SD) local sweat rate values at moderate and heavy-intensity exercise were 1.3(1.3) $mg \cdot cm^{-2} \cdot min^{-1}$ and 2.4(2.1) $mg \cdot cm^{-2} \cdot min^{-1}$, respectively ($p$<0.001). Mean(SD) lactate concentrations for sweat in the sandwich bag at moderate and heavy intensities were 27.8(19.6) mM and 17.2(12.3) mM, respectively (p=0.065). Mean(SD) lactate concentrations for sweat in the surgical glove at moderate and heavy intensities were 138.3(134.2) mM and 56.1(29.4) mM, respectively (p=0.263). Mean(SD) blood lactate concentrations from moderate intensity and high intensity were 2.9(1.4) mM, and 3.6(1.9) mM, respectively (p=0.022). **CONCLUSIONS:** Heart rate, local sweat rate, and blood lactate concentration increased with exercise intensity as expected. However, sweat lactate decreased from moderate to heavy exercise intensity. This decrease is likely due to the increased sweat rate diluting sweat lactate concentration. The decrease in sweat lactate concentration was not significantly different between intensities indicating that sweat lactate may not be suitable for monitoring exercise intensity.

TP401: DIAGNOSTIC ACCURACY OF THE SHORT PHYSICAL PERFORMANCE BATTERY TO DETECT FRAILTY AMONG COMMUNITY-DWELLING OLDER ADULTS

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BACKGROUND: Frailty is a highly prevalent and adverse syndrome among older adults, and there are many different assessments for screening both frailty and frailty process (i.e., frail or pre-frail) with no widely accepted criterion measure. Previous studies have suggested that the Short Physical Performance Battery (SPPB) can be used as a quick screening tool for frailty, demonstrating strong agreement when compared to Fried's phenotype as a criterion. However, to the best of our knowledge, no study has assessed the SPPB's diagnostic accuracy using the FRAIL questionnaire as the criterion. Therefore, the purpose of the study was to evaluate the diagnostic accuracy of the SPPB in identifying frailty and frailty process among community-dwelling older adults. METHODS: In this cross-sectional study, we compared frailty (SPPB≤8) and frailty process (SPPB≤10) classifications for 371 community-dwelling older adults (≥60yrs) by the SPPB to the FRAIL questionnaire using McNemar tables and a receiver-operator-characteristic analysis. RESULTS: The SPPB and the FRAIL questionnaire significantly differed in their appraisal of both frailty and frailty process (X^2 = 23.0, p<0.001). The SPPB demonstrated poor diagnostic accuracy compared to the criterion FRAIL questionnaire. For frailty, the SPPB scored a sensitivity of 38.1%, a specificity of 23.7%, and an area-under-the-curve of 0.22. Additionally, for frailty process, the SPPB scored a sensitivity of 32.0%, a specificity of 40.1%, and an area-under-the-curve of 0.30. CONCLUSIONS: Our findings indicate that the SPPB should not be the sole method of assessing frailty among older adults, given its poor diagnostic accuracy. To address the complexity of frailty, clinicians should attempt to implement multiple assessments that combine biological, social, and functional aspects of frailty.

TP402: THE IMPACT OF HIGH-INTENSITY INTERVAL RESISTANCE TRAINING ON COGNITION IN OLDER ADULTS: A PILOT STUDY

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BACKGROUND: Although traditional aerobic and resistance exercise have been shown to maintain or improve cognition among elderly populations, the effects of high-intensity interval resistance training (HIIRT) on cognitive function remain unknown. The purpose of this pilot study is to evaluate the impact of a HIIRT intervention on changes in cognition in older adults. METHODS: The Lifestyle Interventions for Vitality and Empowerment of Seniors (LIVES) Study randomized adults aged 65 and older (n=30) into two healthy lifestyle groups. The HIIRT group performed various upper and lower body resistance exercises at 30% of their 1-repetition maximum (1RM). The stretching, balance, and range of motion (SBR) group performed 30-minute sessions of large and small muscle group stretches. Both conditions met twice weekly for 12 weeks. The primary outcome was baseline to 12-week changes in cognition, as determined by calculating change scores for executive functioning, cognitive flexibility, reaction time, processing speed, working memory, and sustained attention. For each domain, an ANCOVA was conducted to adjust for baseline scores and compare between-group differences. RESULTS: All ANCOVAs were not statistically significant (all p's >0.05). However, the between-group differences were in the hypothesized direction, suggesting that the HIIRT group demonstrated slightly greater cognitive improvements than the SBR group. The largest differences were in executive functioning and working memory domains. CONCLUSION: This pilot study suggests that high-intensity interval resistance training may have a positive impact on cognitive outcomes in older adults, which are essential for performing activities of daily living and preserving independence. This study was not powered to statistically detect these effects. However, these data will be used to design a full-scale trial to test these effects with adequate power. Understanding the impacts of HIIRT on cognition relative to traditional forms of exercise is imperative to maximizing brain health and preventing age-related cognitive decline.

TP403: FASTER PROCESSING SPEED AND FEWER SEDENTARY BREAKS PREDICT MORE SEDENTARY TIME IN OLDER ADULTS

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BACKGROUND: Prolonged sedentary behavior is linked to poor health outcomes in older adults with poor mobility, but the role of cognitive function in influencing these patterns is not well understood. This study aimed to identify whether various cognitive domains, like processing speed, memory, and executive function, were associated with the percentage of sedentary time in older adults with poor mobility living in community or residential settings. METHODS: This cross-sectional study involved 64 older adults with self-reported poor mobility and no significant cognitive impairment (aged ≥65 years, 39 females; Montreal Cognitive Assessment scores>18) who wore an Actigraph accelerometer on their ankle for at least 4 out of 7 days, including 2 weekend days, to assess sedentary behavior. Cognitive function was measured using standardized assessments: the Digit Symbol Substitution Test (DSST), Montreal Cognitive Assessment (MoCA), Trail Making Test B-A difference, and Rey Verbal Learning Test (RVLT). Multivariate linear regression models were used to identify cognitive predictors of sedentary time, controlling for age, sex, and average sedentary breaks. RESULTS: Participants were sedentary over an average of 83 ± 7% of monitored time. In the fully adjusted model, higher DSST scores (faster processing speed; β = 0.001, p = 0.03, R^2=0.614) and fewer daily sedentary breaks (p = 0.01) were significantly associated with greater sedentary time. Other cognitive measures (MoCA, Trail B-A, RVLT trials) were not significant predictors (p > 0.05). CONCLUSION: Faster processing speed, along with fewer sedentary breaks, predicted greater sedentary time in older adults with poor mobility. These findings suggest that individuals with fast processing speed may be completing cognitively engaging activities while leading sedentary lives. Alternatively, they may have had a cognitively stimulating desk-based career, and these sedentary patterns may have continued into later life. Our results emphasize the need for interventions that mitigate prolonged sitting through regular breaks while promoting substantive cognitive engagement. Promoting physical activity is essential to disrupt habitual sedentary patterns to support healthy aging.

TP404: PHYSICAL ACTIVITY PATTERNS AMONGST MIDDLE-AGED AND OLDER ADULTS BETWEEN SUMMER AND WINTER: A MIDUS ANALYSIS

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Introduction: Physical activity (PA) plays a critical role in healthy aging, yet PA levels often decline with age. As PA patterns may vary across seasons, this study examined PA changes in summer and winter among mid-aged and older adults. **Methods**: Data were drawn from the third wave of the National Study of Midlife in the United States (MIDUS). A total of 2,993 participants aged 40 years and older were categorized into midlife (40-64 years; aged 51.9 ± 6.9 years; female = 1,238, 54%) and older adults (65+ years; aged 70.81 ± 4.7 years; female = 403, 57%). PA was assessed via self-report questionnaires and classified by activity type (chores, job, leisure) and intensity (light, moderate, vigorous). PA levels were determined through frequency rankings from 1 = "several times a week" to 6 = "never". Differences in PA types as well as age categories were analyzed using the McNemar-Bowker test. Significance level was set at α = .05. **Results**: Across all ages and activity types, participants reported significantly higher levels of PA in summer than winter (all $p < .05$) except for light-job activity in female participants who reported higher PA in winter ($p = .015$). Within the 40-64 years group, summer PA was reported significantly higher in all PA types in both sexes (all $p < .05$) except for light-job activity in female ($p = .023$) and both sexes combined ($p < .001$), which showed significantly higher in winter than summer. The 65+ years group showed significantly higher PA levels across all intensity in chores and leisure activities in both sexes during summer (all $p < .05$). **Conclusions**: Seasonal variation significantly influences PA levels in middle-aged and older adults, though differences were smaller among those 65+ compared to midlife adults. These findings highlight the importance of considering seasonality when promoting PA in this population and suggest a need to explore factors that causes the PA pattern shift in older adults.

TP405: IS TUG AN EFFECTIVE TOOL? EXAMINING PULSE PRESSURE, AGE, AND MOBILITY IN ACTIVE OLDER AFRICAN AMERICAN WOMEN

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BACKGROUND: Pulse pressure (PP), the difference between systolic and diastolic blood pressure, is an indirect marker of arterial stiffness and cardiovascular risk. The Timed-Up-and-Go (TUG) test is a brief, widely used assessment of functional mobility and fall risk in older adults. Effective characterization of vascular and mobility relationships in older African American (AA) women is needed. The purpose of this study was to examine bivariate relationships between age, pulse pressure, and TUG performance in active older AA women. METHODS: Participants were community-dwelling African American females (N = 41; mean age = 72.3 years) who all reported participating in physical activity. Resting blood pressure was measured using an automated sphygmomanometer; pulse pressure was calculated as systolic minus diastolic pressure. Functional mobility was assessed with the TUG test (time in seconds). Pearson correlations quantified relationships between age-PP, PP-TUG, and age-TUG. RESULTS: Age was positively associated with pulse pressure (r=0.371, p=0.017), indicating a moderate relationship of higher PP with advancing age. There was no significant relationship between PP and TUG time (r=0.163, p=0.31) or between age and TUG time (r=0.094, p=0.56). CONCLUSION: In this active sample of older African American females, advancing age was associated with higher pulse pressure, whereas associations between pulse pressure and basic mobility (TUG) and between age and mobility were weaker. Given the lack of significant relationships between TUG and either age or PP, it is unclear whether TUG is an effective tool to capture vascular-mobility relationships in this population. Future research should clarify age-related trends and additional mobility measures that may be more sensitive to vascular-related decline. Longitudinal research with multivariate modeling is warranted; however, such work should prioritize identifying the most appropriate mobility assessments, rather than assuming that the TUG alone will detect changes related to elevated blood pressure.

TP406: AN EXPLORATION OF PERCEIVED BENEFITS OF THE COMMUNITY-BASED FAU-WELL PROGRAM IN OLDER ADULTS

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BACKGROUND: Physical activity (PA) improves physical, mental, and social well-being; however, the majority of older adults are not physically active. Community-based exercise programs are one way to promote PA due to accessibility, cost, and guided instruction. The Florida Atlantic University Wellness Program (FAU-WELL) is a community-based student-led program that provides guided, structured PA opportunities for older adults. While the program has been in existence for over 30 years, no research has explored participants' perceptions of FAU-WELL or its benefits. **PURPOSE**: The purpose of this study was to explore older adult participants' perceived benefits of FAU-WELL. **METHODS**: Older adults who attend FAU-WELL participated in audio-recorded, semi-structured qualitative interviews regarding perceived benefits of the program. Interviews were transcribed and coded via first and second cycle coding to identify emergent themes. **RESULTS**: Nine older adults (age: 78±6 years) completed the interviews. Average time involved in the program was 7±6 years. Five themes emerged regarding perceived benefits of the program: 1) Class organization and structure 2) Improved strength 3) Exercise self-efficacy 4) Self-awareness 5) Social environment. **CONCLUSIONS**: Findings indicate that older adults experience several benefits from continuous engagement in FAU-WELL. Participants highlighted the importance of program consistency as well as other aspects including a positive social atmosphere and safe instructional environment that promoted exercise self-efficacy. Maintenance and/or improved strength, functional capacity, and physical awareness were also highlighted. Findings support the importance of community-based exercise programs for older adults to improve PA adherence, activities of daily living, and important quality of life domains. Other universities may benefit from introducing similar intergenerational programs to support the health and well-being of older adults in the community.

TP407: REALLOCATING 24-HOUR MOVEMENT BEHAVIORS: 15-MINUTE TRADE-OFFS AND PSYCHOMOTOR FUNCTION IN OLDER ADULTS

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BACKGROUND: The relationship between 24-hour movement and non-movement behavior and psychomotor function in older adults remains unclear. This study examined how reallocating time among daily behaviors, moderate-vigorous physical activity (MVPA), light physical activity (LPA), sedentary time, and sleep, related to psychomotor function in older adults. **METHODS:** Data were drawn from 713 U.S. Medicare beneficiaries aged 65 and older who participated in the 2021 National Health and Aging Trends Study. Participants wore an Actigraph CentrePoint Insight Watch on the non-dominant wrist for 7 days. Raw actigraphy data were processed using the GGIR R package to classify MVPA, LPA, sedentary time, and sleep duration. Psychomotor function was assessed with the Cogstate battery, with lower score indicating better performance. Compositional data analysis was employed to estimate changes in psychomotor function associated with time reallocation of time among 24-hour movement behaviors. **RESULTS:** Reallocating 15 minutes from sedentary time to MVPA was associated with improved psychomotor function (-0.02 milliseconds; 95% CI:-0.03, -0.01). In contrast, reallocating 15 minutes from MVPA to sedentary time was detrimental (0.04 milliseconds; 95% CI: 0.02, 0.06). Reallocating 15 minutes from LPA to MVPA was also beneficial for psychomotor function (-0.02 milliseconds; 95% CI: -0.03, -0.01). Conversely, reallocating 15 minutes away from MVPA to sleep was associated with poorer psychomotor function (0.039 milliseconds; 95% CI: 0.016, 0.06). **CONCLUSIONS:** Among older adults, reallocating 15 minutes from sedentary or LPA to MVPA was associated with better psychomotor function. These findings underscore the cognitive benefits of even modest increases in MVPA for supporting brain health in late life.

TP408: THE FITNESS-VASCULAR CONNECTION: COMPARING OLDER ADULTS WITH AND WITHOUT INTELLECTUAL DISABILITIES

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Background: Arterial stiffness (AS) is a key risk factor for cardiovascular disease (CVD). Both obesity and low cardiorespiratory fitness (CRF) independently increase CVD mortality risk. Older adults with intellectual disabilities (ID) have higher risks of CVD; Understanding the relation between AS, body composition, and CRF is essential. This study aimed to compare and analyze the correlations among AS, body composition, and CRF in older adults with and without ID. **Methods:** Forty participants (20 with ID; mean (51.5 ± 7.42 y.o., 20 non-ID; mean age 53.25 ± 6.58 y.o.) were assessed. The vascular and arterial stiffness parameters were evaluated by analyzing the pulse wave (PWA) and pulse wave velocity (PWV). Anthropometric variables were measured with bioimpedance. CRF was assessed by using a precalibrated cycle ergometer and an automatic gas analysis system. Group differences were examined using the independent

sample t-test. Pearson's correlations identified relationships between AS parameters, body composition, and CRF. Multiple regression was performed to determine the influence of body composition and CRF on AS markers. **Results:** Adults with ID were shorter (160.3 ± 8.8 vs 171.1 ± 9.5 cm; $p < 0.001$), had lower muscle mass (47.0 ± 7.6 vs 50.2 ± 10.3 kg; $p < 0.002$), and had lower CRF (VO_2/kg max: 19.4 ± 5.9 vs 31.2 ± 8.8 ml/kg/min; $p < 0.001$). A significant correlation was found between central systolic blood pressure (cSBP) and weight (r = 0.658; $p < 0.002$), BMI ($r = 0.709$; $p < 0.001$), and body fat% ($r = 0.546$; $p < 0.016$) in adults with ID. Meanwhile, in non-ID adults, cSBP was correlated with weight ($r = 0.586$; $p < 0.008$), BMI ($r = 0.631$; $p < 0.004$), and skeletal muscle mass ($r = 0.578$; $p < 0.009$). Multiple regression analysis showed that in adults with ID, BMI significantly predicted cSBP ($R^2 = 0.503$; $p<0.05$) and PP ($R^2 = 0.212$; $p < 0.05$). In non-ID participants, BMI ($R^2 = 0.528$; $p < 0.023$) and PP ($R^2 = 0.640$; $p < 0.041$) contributed significantly to cSBP. Age predicted PP in non-ID adults ($R^2 = 0.640$; $p<0.003$). **Conclusion:** Adults with ID demonstrated lower CRF and greater adiposity, which is related to higher CVD risk. Changes in BMI in both groups will lead to positive effects on cSBP by decreasing the afterload and workload on the left ventricle.

TP501: CROSS-VALIDATION OF GAIT METRICS DERIVED FROM A WEARABLE SMART SOCK SENSOR SYSTEM

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Smart socks with embedded textile pressure sensors can remotely quantify clinically relevant spatiotemporal gait metrics in real-time. This technology holds immense potential for use both in the clinic and for tele-rehabilitation. However, smart sock-derived metrics have not been sufficiently validated with clinical measurements. This study evaluated the validity of stepwise gait metrics derived from a novel, clinician-oriented mobile app (Sensoria Walk App), which automates the collection and analysis of data from smart socks. It was hypothesized that gait metrics recorded by the smart sock would show good to excellent concurrent validity when the gait metrics of each step were compared with the clinical gold standard measurement system (Gaitrite).Nineteen adults (Female n=13) participated in the cross-validation study.After providing informed consent, participants were given a pair of smart socks appropriate for their foot size. Participants then performed three normally paced, and three slow paced walking trials over a 10-meter walkway. A Gaitrite mat was placed in the middle 6 meters of the walkway, and the spatio-temporal gait metrics were recorded synchronously by both Gaitrite and Sensoria Walk App. An interclass correlation coefficient (ICC) reliability analysis was used to assess the level of agreement between the Gaitrite and the Sensoria Walk App measures. SPSS (version 29) was used to perform this analysis.All nineteen participants completed the cross-validation study; however, two participant's data was not recorded due to technical issues. The ICC analysis showed good to excellent agreement between the Gaitrite and Sensoria Walk App measures for the following spatio-temporal gait metrics when each individual recorded steps were compared; Step Lenth (ICC = 0.811 p<0.001), Stride Length (ICC = 0.701 p<0.001), Step Time (ICC = 0.945 p<0.001), Swing Time (ICC = 0.871 p<0.001) and Stance Time (ICC =0.824 p<0.001) . Similar good to excellent agreements in measurements were observed at a slower walking speed. Our results demonstrate good to excellent agreement between the individual stepwise measurements made by a commercially available smart sock system and the gold standard clinical measurement tool, providing evidence to support the adoption and clinical integration of this technology

TP502: RELIABILITY OF FORCE INSOLES TO IDENTIFY COUNTERMOVEMENT VERTICAL JUMP PHASES AND STRATEGY METRICS

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BACKGROUND: Vertical ground reaction force (vGRF) signals from a force platform (FP) are used to identify countermovement vertical jump (CMVJ) phases and compute jump strategy metrics. Recently, a wearable force insole has become available and may be an alternative to evaluate CMVJ phases, but the reliability of this wearable device is currently not known. This study evaluated the reliability of a novel loadsol-mlp® (LS) to identify each CMVJ phase and center of mass (COM) strategy metrics versus a traditional FP. **METHODS:** Division II female college athletes (n=15; age: 21±2y; height: 175.3±6.7 cm; mass: 77.6±13.5 kg) completed 5 CMVJ on a force platform recording at 1000 Hz while wearing LS recording at 200 Hz on two occasions separated by one week. The vGRF signal from the FP and vertical plantar force from LS were used to determine jump time (JT) and these CMVJ phases: unloading (UL), eccentric yielding (EY), eccentric braking (EB), and propulsion (PP). Vertical COM depth (COM-D) was computed as the difference in vertical position at the start of the CMVJ and the lowest point during EB. Jump momentum (JM) was computed as the product of vertical COM velocity at takeoff and body mass. Paired *t*-tests assessed differences between the FP and LS. Reliability was evaluated using intraclass correlation (ICC), standard error of measurement, and Bland-Altman procedures. **RESULTS:** The four CMJV phases UL (LS = 0.228 ± 0.172 s & FP = 0.345 ± 0.147 s), EY (LS = 0.090 ± 0.029 s & FP = 0.119 ± 0.033 s), EB (LS = 0.104 ± 0.061 s & FP = 0.143 ± 0.041 s), and PP (LS = 0.171 ± 0.066 s & FP = 0.209 ± 0.040 s) all differed ($p < 0.01$) between instruments. EB phase was of moderate ICC strength (ICC = 0.59; p <0.001, SEM = 0.028 s). ICC (0.40; SEM = 0.002 s) for PP was also significant ($p = 0.048$). UL ($p = 0.28$) and EY ($p = 0.09$) failed to exhibit significant ICC. JM (LS = 93.8 ± 38.1 & kgm/s & FP = 149.8 ± 43.5 kgm/s), JT (LS = 0.593 ± 0.261 s & FP = 0.816 ± 0.173 s), and COM-D (LS = -0.103 ± 0.070 m & FP = -0.178 ± 0.059 m) all differed ($p < 0.001$). Only JM produced a significant ICC (ICC = 0.35; $p = 0.01$, SEM = 31.7 kgm/s). JT and COM-D both had ICC < 0.14. **CONCLUSION:** Significant bias and reduced duration of CMVJ phases, lower JM and COM-D from a LS compared to a FP were identified. Practitioners should continue to use a FP as standard practice to compute jump strategy metrics when evaluating CMVJ performance.

TP503: INVESTIGATING RELATIONSHIPS BETWEEN WEARABLE-DERIVED ACTIVITY AND QUALITY OF LIFE IN BREAST CANCER SURVIVORS

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BACKGROUND: Physical activity (PA) is a known modifiable factor that may influence both physical and mental health in breast cancer survivors (BCS). The Patient-Reported Outcomes Measurement Information System (PROMIS) is widely used in oncology to assess quality of life. This study examined associations between wearable-derived PA behaviors and PROMIS physical and mental health outcomes in BCS. **METHODS:** This cross-sectional study included BCS (n = 36; M_{age} = 59.6 ± 7.9 years) who wore Fitbit activity tracker to capture estimates of light physical activity (LPA), moderate-to-vigorous PA (MVPA), and sedentary time. PROMIS measures of physical function, anxiety, depression, and fatigue were administered using validated self-reported tools. Pearson correlations were conducted to examine associations, with significance set at $p < .05$**.** **RESULTS:** PROMIS physical function was moderately and negatively correlated with MVPA ($r = -.396$, $p < .001$). No significant associations were observed for PROMIS anxiety, depression, or fatigue. **CONCLUSIONS:** At baseline, greater MVPA was unexpectedly associated with lower perceived PROMIS physical function. This may reflect early survivorship dynamics, where individuals with lower function engage in structured MVPA as part of rehabilitation, while higher-functioning survivors rely more on LPA and daily tasks. Alternatively, baseline MVPA may initially exacerbate fatigue or pain, temporarily lowering perceived function. These findings underscore the limitations of cross-sectional designs and highlight the need for longitudinal studies to better understand how objective PA patterns relate to perceived function in survivorship care.

TP504: EVALUATION OF STEP COUNTING ERROR IN RESEARCH-GRADE ACTIVITY MONITORS IN CHILDREN WITH CEREBRAL PALSY: A PILOT STUDY

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BACKGROUND: Steps per day is an easily interpreted measure of daily physical activity for both clinicians and patients but there is limited research focused on children with atypical gait. The purpose of this study was to evaluate the step-counting error of several research-grade wearable activity monitors and a Zeno Walkway in children with cerebral palsy (CP) and limited walking ability, to determine their suitability for measuring total daily locomotion in rehabilitative intervention studies. METHODS: Children with CP (N=5, 4.8 yrs, BMI: 13.04±0.67, 3 female, GMFCS III) completed six walking trials along an 8-meter Zeno Walkway while wearing two ActiGraph GT9X devices at the hips and four StepWatch Activity Monitors (SAM) on the ankles. All trials were video recorded, and hand counted steps served as the criterion. GT9X data were analyzed with and without the low-frequency extension (LFE). SAMs were initialized using four leg motion settings (severely impaired, gentle/geriatric, normal, and fidgety/dynamic). Zeno measured steps were included as a complementary instrumented

measure. Error metrics including mean bias, mean absolute error, and mean absolute percentage error (MAPE) are reported for this pilot sample. RESULTS: SAM initialized with the "severely impaired" setting (mean bias -0.08, MAPE 23.68%) and GT9X on the left hip without LFE (mean bias 0.12, MAPE 14.87%) showed the smallest mean bias relative to hand counts, but variability was elevated (SD ≈ 7-8). GT9X had less error on the left hip compared to the right, where undercounting occurred (mean bias -3.58, MAPE 26.74%). Three SAM settings (gentle/geriatric, normal, fidgety/dynamic) undercounted steps (bias range -1.77 to -7.39; MAPE 16-29%). GT9X LFE caused overestimation (bias 10.10-14.04; MAPE 42-58%). The Zeno showed the least error (mean bias -0.39, MAPE 1.65%). CONCLUSIONS: Both SAM (severely impaired setting) and GT9X (left hip, without LFE) showed the least error, though variability (SD) was elevated. Device placement influenced GT9X error, with left hip outperforming the right and LFE should be avoided due to overcounting in this population. SAM error across initialization settings demonstrates the importance of setting selection. The low error of the Zeno suggests potential as a lab-based step counting criterion.

TP505: STEP COUNT VALIDITY OF TWO WEARABLE DEVICES IN ADULTS WITH DOWN SYNDROME: PRELIMINARY FINDINGS

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Background: Adults with Down Syndrome (DS) face elevated risks of physical inactivity, obesity, and several other non-communicable diseases. Wearable devices, which are often positioned as a technology-based solution to address physical inactivity, are largely under-utilized in individuals with DS, likely owing to a lack of specific validation in this population. This study aims to evaluate the criterion-referenced step count accuracy of two wearable devices among individuals with DS. Methods: In this ongoing multicenter study, adults with DS (N=17; 28±9 yrs; height 150.X±10.X cm; BMI 32.X±6.X kg/m²) completed an overground walking protocol of three 3-mins stages at self-selected slow, normal and fast paces. Device-measured steps were collected from two wearable devices, the InBody BAND 3 (BAND 3) and Samsung Galaxy Watch 7 (GW7) and compared directly with criterion-measured steps (hand-tallied and video verified). Device and criterion total steps were standardized to steps/min to account for bout duration. Equivalence Testing, with mean error and 90% CIs was used to evaluate measurement agreement within a 5% equivalence zone, and mean error and 95% CIs used to infer statistically significant differences.Results: During overground walking, the BAND 3 and GW 7 generally tended to underestimate and were deemed to be not equivalent to the criterion at slow walking pace (mean error and 90% CI: -3.9[-6.9, -0.9] and -3.1[-5.9, -0.4] steps/min, respectively; 90% CIs crossed equivalence zone). However, at normal and fast pace, both devices were equivalent, -1.1[-2.3, 0.2] and -2.4[-4.2, -0.5] steps/min, and 1.3[-1.5, 4.1] and -2.7[-4.5, -0.9] steps/min, respectively; 90% CIs within equivalence zone. In addition, across walking paces, 95% CIs included 0 for GW 7 at slow pace and BAND 3 at normal and fast paces, but excluded 0 (indicating statistical differences) for BAND 3 at slow pace and GW 7 at normal and fast pace.Conclusion: Overall, the preliminary findings of this study suggest promise for using wearable devices for assessment or self-monitoring of step-based physical activity among individuals with DS.

TP506: EVALUATING WHOOP WEARABLE METRICS AS PREDICTORS OF DIVISION 1 COLLEGIATE VOLLEYBALL PERFORMANCE

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Background: Wearable devices are popular with athletes, but their ability to predict sports performance remains uncertain. This study examined whether WHOOP-derived metrics predict objective and subjective performance in attacking and passing efficiency in Division I collegiate volleyball players. Methods: Fourteen University of Tennessee athletes (age 20 ± 1.44 yr; playing experience 8.5 ± 3.01 yr; WHOOP usage 1.16 ± 2.08 yr) participated. WHOOP metrics included strain, recovery, sleep performance, and sleep debt, while outcomes included attacking efficiency, passing efficiency, and weekly Perceived Performance Team Sports Questionnaire (PPTSQ) scores. Data were collected from practices and spring scrimmages and analyzed with regression models (α = 0.05). Results: Practice means were strain 16.68, recovery 64.91, sleep debt 55.09 min, sleep performance 81.47 %, attacking efficiency 0.206, and passing efficiency 1.803. Scrimmage means were strain 17.81, recovery 61.71, sleep debt 42.78min, sleep performance 74.63 %, attacking efficiency 0.341, and passing efficiency 1.899. Higher strain was linked to lower attacking efficiency ($p = 0.0017$, $r2 = 0.029$), and greater sleep performance correlated with higher perceived team performance (PPTSQ; $p = 0.0373$, $r2 = 0.042$). All other WHOOP metrics showed no significant relationships, and effect sizes were small. Conclusion: WHOOP metrics provided minimal predictive value for volleyball performance, highlighting the gap between wearable data and reliable performance prediction. The observed associations between strain, sleep performance, and outcomes suggest potential use for monitoring athlete recovery, sleep quality, and perceived team performance. Larger samples and longer monitoring periods are needed to clarify the reliability of wearable technology for predicting volleyball sports performance. *Artificial intelligence (AI) tools were used in editing the writing of the abstract.

TP507: IMPACT OF RESISTANCE TRAINING ON ENERGEY EXPENDITURE ESTIMATES OF CONSUMER WEARABLES

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BACKGROUND: Consumer monitors provide a convenient method for tracking energy expenditure (EE). While many users perform resistance training (RT), it is unknown how RT impacts estimates of EE from consumer monitors. Therefore, the purpose of this study was to investigate estimation of EE using consumer monitors, compared to measured EE, between observation periods with and without RT. METHODS: Sixteen participants (8 female, mean±sd; age: 37.6 ± 12.1 yrs, BMI: 27.2 ± 5.3 kg/m^2) performed 2-4 free-living visits, each 3-hrs in duration, at a time and location of their choice, of which one visit involved RT. Participants wore a Cosmed K5 portable indirect calorimeter and four consumer monitors (Fitbit, Garmin, Apple, Samsung), two on each wrist, with location and wrist were randomized by participant. Consumer EE estimates for the duration of each visit, in kCals, were obtained from each monitor's respective smartphone application. Measured EE was obtained during the same period using the K5. Mean absolute percent error (MAPE) was calculated for each of the consumer kCal estimates, compared to the K5. Non-RT visit days were compared to the RT days using two-tailed paired t-tests. RESULTS: There were no differences in measured and estimated kCals for any device ($P>0.05$) between non-RT and RT visits. However, MAPE for RT and non-RT visits varied by monitor. MAPE was higher on RT visits for the Apple watch (non-RT, 24.5%±19.8% vs RT 31.2%±18.1%), lower on RT visits for the Garmin (non-RT, 37.4%±21.2% vs RT 29.7±17.5%) and Samsung watches (non-RT, 35.6%±22.0% vs RT 28.2%±13.1%) and similar between visits for the Fitbit (non-RT, 24.7%±15.8% vs RT 23.5%±24.9%). CONCLUSION: While differences between measured and predicted EE were not significantly different between visits there is variation in EE tracking between consumer monitors. The consistency of EE estimation of the Fitbit during RT and non-RT visits indicates that it is the best option for EE tracking for those involved in RT. Funding information: This research was supported by the NIH grant 1R01DK129428.

TP508: CONCORDANCE BETWEEN GARMIN SMARTWATCH-DERIVED STRESS SCORES AND SELF-REPORTED STRESS IN PREGNANT INDIVIDUALS: RADAR STUDY PILOT

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BACKGROUND: Maternal stress during pregnancy is linked to adverse outcomes, including fetal distress and maternal and child neurodevelopmental concerns. Accurate monitoring of stress throughout pregnancy is thus critical for timely interventions. Consumer-grade smartwatches, including Garmin devices that derive stress scores from heart rate variability (HRV), can track stress, but their application in pregnancy remains underexplored. This study evaluated the concordance between Garmin-derived stress (GDS) metrics and validated self-reported stress assessments in pregnant individuals. **METHODS:** Thirty primigravid individuals (mean age = 28.8 years; 60.0% White, 16.7% Black or African American, 16.7% Hispanic or Latino, 6.6% Multiple ethnicities or Other) with singleton pregnancies between 14-20 weeks gestation were enrolled. Participants wore Garmin smartwatches continuously for one week with passive collection of GDS metrics. Self-reported stress was assessed with the 4-item Perceived Stress Scale (PSS) using six scheduled ecological momentary assessments per day and self-

initiated surveys. Two-part multi-level models examined within- and between-person effects of average daily GDS predicting the odds of any perceived stress (average daily PSS > 0) and the level of perceived stress. Results are reported as odds ratios (OR) and prevalence rates (PR) with 95% confidence intervals (CI). **RESULTS:** The results indicated there were no within-person effects of GDS on the odds of reporting any PSS (>0) (OR= 1.30, 95% CI: 0.70, 2.42) or the level of PSS (PR= 1.04, 95% CI: 0.91, 1.18). Similarly, there were no between-person effects of GDS on the odds of reporting any PSS (OR=2.04, 95% CI: 0.57-7.27) or the level of PSS (PR=1.15, 95% CI: 0.88-1.49). **CONCLUSIONS:** GDS scores trended in expected directions but did not align significantly with self-reports, similar to existing findings in a college-aged sample. Daily averaging may have obscured time-specific variation, washing out associations. Future analyses will examine data at a finer temporal resolution, pairing hourly GDS metrics with concurrent self-reports. In our population, smartwatch stress metrics may not represent self-reported stress due to unique changes in HRV across pregnancy trimesters.

Poster Presentation Sessions

P101: PREVALENCE AND PERCEPTIONS OF STRENGTH TRAINING IN COMPETITIVE GYMNASTICS PROGRAMS

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PURPOSE: Injury rates and severity rank high in women's gymnastics compared to other sports. The balance of peer-reviewed research supports strength training improving injury risk and sport performance. This research surveyed competitive club (USAG levels 8-10) and NCAA (Divisions I, I and III) coaches and gymnasts to determine prevalence and perceptions of strength training in their programs. **METHODS:** The institutional review board approved this research and 117 participants (39 club and 24 NCAA gymnasts, 39 club and 15 NCAA coaches) completed an anonymous Qualtrics survey. Participants were recruited in person, by email, QR code posting in gyms and social media. A modified version of the Training Information Survey (TIS), previously reported in the literature, assessed perceptions of strength training effects on health and performance. **RESULTS:** Chi-squared analyses supported statistically significant differences reporting strength training is required in 97.4% of NCAA programs vs. 78.2% of club programs ($p = 0.006$), while 94.9% of NCAA programs report working with a strength and conditioning coach as compared to only 28.2% of club programs ($p < 0.001$). Based on TIS responses, NCAA and club gymnasts and coaches, on average, are in strong agreement regarding the value of strength training for improving health and performance (1.24±0.67 and 1.18±0.53 respectively on a Likert scale with 1 = strong agreement and 5 = strong disagreement). There were no statistically significant differences in TIS responses between NCAA and club gymnasts or coaches. Club coach comments revealed time, equipment and expertise availability as barriers to strength training inclusion. **CONCLUSIONS:** The results of this investigation may inform practitioners as to prevalence and perceptions of strength training in NCAA and club competitive gymnastics. Both NCAA and club coaches and gymnasts report strongly valuing strength training for gymnast health and performance enhancement, but strength training is required significantly less and there is significantly less strength and conditioning coach involvement in club gymnastics. To potentially reduce injury risk and improve performance, resources should be considered to improve education, strength and conditioning coach involvement and equipment availability in club gymnastics.

P102: ACCURACY OF CONSUMER WEARABLES FOR ASSESSMENT OF HEART RATE VARIABILITY ACROSS MENSTRUAL CYCLE PHASES

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BACKGROUND: Heart rate variability (HRV) is a metric reflecting autonomic nervous system and cardiac function that is rapidly gaining popularity in the United States, but its variation across the menstrual cycle and the accuracy of consumer-grade wearables in measuring it are underexplored. This study evaluated differences in HRV across menstrual cycle phases and compared the Apple Watch to an EKG-based, Polar HR monitor assessments of HRV across the menstrual cycle in young adult females.**METHODS**: Thirteen healthy females (ages 19-28, regular menstrual cycles) underwent HRV measurement (standard deviation of NN intervals, SDNN) every 4 days across one menstrual cycle (~28 days, 7 visits) during 5-minute seated rest periods. HRV was recorded simultaneously using an Apple Watch, with integrated mindfulness reading for HRV assessment, and a Polar HR monitor and connected software (Elite HRV app). Menstrual cycle days were determined via self-reported onset of menstruation. Two-way ANOVA (time × device) assessed differences in HRV across phases and devices ($p<0.05$). Bland-Altman analysis was used to further evaluate device agreement.**RESULTS**: Mean SDNN values from Apple Watch across measurement days were 81.3 ± 43.2 ms (day 2), 82.4 ± 45.1 ms (day 6), 87.5 ± 43.8 ms (day 10), 73.2 ± 53.6 ms (day 14), 108.0 ± 61.2 ms (day 18), 90.8 ± 63.0 ms (day 22), and 90.5 ± 72.1 ms (day 26). Corresponding Polar HR monitor values were 82.9 ± 36.4 ms (day 2), 81.0 ± 31.6 ms (day 6), 81.3 ± 28.8 ms (day 10), 78.4 ± 48.6 ms (day 14), 92.7 ± 43.6 ms (day 18), 68.7 ± 28.9 ms (day 22), and 72.7 ± 23.9 ms (day 26). Two-way ANOVA revealed no significant effects of time ($P = 0.08$), device ($P = 0.64$), or their interaction ($P = 0.74$). Bland-Altman analysis indicated strong agreement between Apple Watch and Polar HR monitor measurements (mean difference: 8.1 ± 10.4 ms; 95% limits of agreement: -12.4 to 28.5 ms).**CONCLUSIONS**: In our sample, HRV did not significantly vary across menstrual cycle phases, and the Apple Watch SDNN values were similar to the EKG-based Polar HR monitor ($P>0.05$). These findings support the use of consumer-grade wearables for HRV monitoring in females across the menstrual cycle, enhancing accessibility for health tracking. Studies with hormonal phase confirmation are needed.

P103: MUSCLE TISSUE THICKNESS MAY PREDICT MICROVASCULAR REACTIVITY IN MALES BUT NOT FEMALES

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BACKGROUND: Near-infrared spectroscopy (NIRS) with a vascular occlusion test (VOT) is commonly used to assess microvascular function during post-occlusive reactive hyperemia. The resaturation slope (Slope 2; %/s) during the initial 10 seconds following cuff deflation represents microvascular reactivity. This study investigated the relative contributions of adipose tissue thickness (ATT) and muscle tissue thickness (MTT) to Slope 2 in males and females. The test-retest reliability of Slope 2 was also examined for each sex. **METHODS:** Twenty-eight healthy young adults (14 males: 22.6±4.8 yrs; 14 females: 22.8±4.6 yrs) completed four NIRS-VOT sessions during separate visits. ATT and MTT of the biceps brachii were measured during visits 1 and 2. Independent t-tests were performed to compare ATT, MTT, and Slope 2 between sexes. Full-model linear (Slope 2 ~ ATT + MTT) and stepwise regression analysis were performed separately by sex to identify the most parsimonious model. Reliability was assessed using intraclass correlation coefficients ($ICC_{2,1}$) and coefficients of variation (CV). **RESULTS:** Males (ATT: 0.3±0.1 cm, MTT: 2.7±0.3 cm) demonstrated lower ATT ($p=0.002$) and greater MTT ($p<0.001$) compared to females (ATT: 0.6±0.3 cm, MTT: 1.7±0.2 cm). Slope 2 did not differ between sexes (males: 4.7±1.3 %/s, females: 5.0±1.6 %/s; $p=0.603$). In females, ATT and MTT did not significantly explain Slope 2 (full-model: $R^2=0.224$; $p=0.248$; stepwise MTT only, $R^2=0.224$; $p=0.089$). In males, the full-model explained a significant proportion of variance in Slope 2 ($R^2=0.424$, $p=0.048$; standardized ß MTT=0.84: ATT=0.16), with stepwise regression identifying only MTT as a significant predictor of Slope 2 ($R^2=0.388$, $p=0.017$). Reliability for Slope 2 was poor-to-moderate in both sexes (males: $ICC_{2,1}=0.504$, CV=33.13%; females: $ICC_{2,1}=0.443$, CV=41.29%). **CONCLUSIONS:** Although Slope 2 did not differ between sexes, MTT significantly predicted microvascular reactivity in males but not females. Future studies are warranted to determine whether muscle quality indices (e.g., echo intensity, specific force) better explain potential sex-differences in microvascular function. Given the limited reliability of Slope 2, consistency in testing protocols and participants' conditions is also critical when applying NIRS-VOT.

P104: ADHERENCE AND USER PERCEPTION OF A SMART RING DURING A 4-WEEK TRIAL

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BACKGROUND: Although smart rings allow for accurate real-world estimates of heart rate variability, sleep, and physical activity, there is limited information about the feasibility of using them in research. Therefore, this study evaluated weekly adherence and acceptability of using a smart ring and its associated app across 4 weeks (Wk). METHODS: Across two studies, we enrolled 65 adults (Age: 34.2 ± 12.9 yrs [18-58], BMI: 25.0 ± 3.7 kg/m2 [19.9 - 37.8]) for a 4-Wk period. Participants wore a smart ring on their non-dominant index, middle, or ring finger. Adherence was assessed by minutes of non-

wear time of the smart ring per 24-hour day. Participants completed weekly surveys, which included usage (i.e. app use per day) and Likert-scale questions (i.e. 1 = strongly disagree, 7 = strongly agree) to measure the smart ring's acceptability and feasibility. Repeated measures ANOVAs assessed changes in adherence and acceptability by Wk, with Bonferroni post hoc analyses for significant F-tests. RESULTS: Results showed high adherence (22.4 hrs/day) and a significant effect of Wk on non-wear time, $F(3,192) = 3.862$, $p = .01$, $\eta^2 = .059$ (Wk 1: 77.5 min, Wk 2: 88.6 min, Wk 3: 115.8 min, Wk 4: 108.4 min). However, post-hoc tests indicated no significant Wk-to-Wk differences. 75% of participants agreed that the smart ring improved physical performance, made it easier, and useful to achieve health-related goals. 84% of participants agreed that the app was flexible, clear, understandable, and easy to interact with and use. Agreement with the statement 'the smart ring makes it easier to achieve health-related goals' was significantly higher at Wk 4 (5.3 ± 1.5) vs. Wk 1 (4.9 ± 1.5; $p = .025$), $F(3, 186) = 3.62$, $p = .014$, $\eta^2 = .055$. Participants used the app more often per day Wk 1(3.2 ± 1.6) vs. Wk 3 (2.6 ± 1.4; $p < .001$) and Wk 4 (2.4 ± 1.3; $p < .001$), and more during Wk 2 (3.0 ± 1.6) vs. Wk 4 ($p = .002$), $F(2.331, 144.5) = 14.44$, $p < .001$, $\eta^2 = .189$. CONCLUSIONS: Participants demonstrated high adherence to wearing the smart ring over the 4-Wk trial. Participants found the smart ring useful and easy to use to achieve health-related goals. While app usage declined over time, perceptions of utility improved, suggesting that the smart ring may be a feasible and acceptable tool for use in behavioral and health-related research. FUNDING: Provided by NIH NCATS (UM1TR004406)

P105: FEMALE EXERCISE, MOOD, AND MENSTRUAL EFFECTS VIA ACCELEROMETRY AND CYCLE TRACKING (FEMME-ACT)

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BACKGROUND: There is a significant gap in existing literature on females in exercise research, despite having distinct physiological and psychological differences, the field has historically researched males. This study aims to understand female behavior through the menstrual cycle phases (MCPs) and physical activity (PA) performance. The purpose of this study is to determine how MCPs impact a female's behavior during a three-month resistance training (RT) program, examining how regular PA of daily living are impacted during MCPs through Fitbit accelerometry. METHODS: Ten females, 18-45 years old, will voluntarily participate, regardless of birth control contraceptive status. Each participant will be at least recreationally trained, determined by performing the back squat once a week over the last six months, and 1-RM testing outcomes. After providing consent, the participants will attend a familiarization visit during the early follicular phase (post-menstruation) for initial body composition assessment using the BodPod; researchers will demonstrate the RT exercises. The first month, the participants will complete the three RT sessions per week (upper-body, lower-body, and total-body sessions, respectively) while wearing a Fitbit accelerometer to collect PA data. During months two and three, the participants will complete health-related surveys via Qualtrics after each RT session, and final body composition will be measured at the last RT session. Results will be analyzed using separate within-repeated measures ANOVA; effect sizes will be reported using partial eta squared (η^2p) and Cohen's *d*, and $p<0.05$ indicating statistical significance. ANTICIPATED RESULTS: It is hypothesized that there will be fluctuations behaviorally towards the RT days from the survey data. The researchers also predict that Fitbit data (i.e. minutes/week of PA, and daily PA minutes) will fluctuate based on MCP. Grant or funding information: Researchers have submitted an internal institutional grant for this project.

P106: FORCE-TIME CURVE ANALYSIS OF THE CMJ AND ITS RELATIONSHIP TO PITCHING VELOCITY

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Background: Previous research has shown that the ability of the lower body to produce sufficient energy during baseball pitching is important for ball velocity. The countermovement jump (CMJ) is a commonly utilized assessment for evaluating lower-body performance; thus, investigating its relationship with pitching velocity could provide valuable insights for optimizing training strategies. While coaches often favor discrete metrics, continuous metrics may offer a more comprehensive understanding of performance variables. Limited research has examined CMJ force-time curve correlations with pitch velocity. This pilot study aimed to examine whether CMJ performance is associated with pitch velocity. **Methods:** CMJ data and pitching velocity were collected on ten high school and college athletes (18.7 ± 2.2 y; 1.8 ± 0.1 m; 86.8 ± 9.5 kg). The average of two CMJs on a force plate (1200Hz) were performed. Braking impulse (BI), concentric impulse (CI), and jump height (JH) were calculated from each jump as discrete metrics. For continuous analysis, CMJ trials were normalized from movement onset to the instant of takeoff, with an individual force-time curve generated for each participant. Pitching velocity was measured during fastball throws from regulation distance, with the fastest pitch selected for analysis. Statistical parametric mapping (SPM) regression ($\alpha = 0.05$) was used to identify a relationship between pitch velocity and CMJ force-time curves. A correlation and backward linear regression were conducted for the discrete CMJ metrics and pitch velocity ($\alpha = 0.05$). **Results:** The SPM found no statistical significance throughout the CMJ force-time curve. No associations were observed between the discrete CMJ metrics and pitch velocity. **Conclusion:** While no significance was found in the analysis, a moderate correlation was observed between CI and pitch velocity ($p = 0.06$; $r = 0.60$). These findings suggest that individuals with a higher CI may produce greater power output during explosive movements, potentially offering coaches a practical lower-body metric for pitching velocity. This may be beneficial for athlete profiling or targeted training. However, interpretation is limited due to sample size. Further research is warranted to understand the relationship between CMJ and pitching velocity.

P107: THE EFFECT OF LEG HAIR EXPOSURE ON BODY COMPOSITION MEASUREMENTS VIA AIR-DISPLACEMENT PLETHYSMOGRAPHY

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Background: Exposed facial and scalp hair causes an underestimation in body volume (BV) resulting in a lower body-fat percentage (BF%) for air displacement plethysmography (ADP) measurements. It is not known if exposed leg hair impacts BV and BF%. **Methods:** 33 male subjects (21.8 $\pm$ 5.4 years, Height = 179.6 $\pm$ 6.3 cm, Weight = 79.9 $\pm$ 9.2 kg) completed two consecutive ADP trials, one in compression shorts with leg hair exposed (LH), and one with athletic leggings to eliminate exposed leg hair (NLH). Subjects also completed a DEXA scan and multifrequency bioelectrical impedance (MF-BIA) to record 4-compartment model BF%(4C%) in the same session. For the two conditions, body weight, BV, BF%, and 4C% were compared using paired t-tests. **Results:** Body weight showed a slight, but significant increase to 80.0 $\pm$ 9.2 kg ($p=0.048$). BV significantly increased from 75.043 $\pm$ 9.458 L (LH) to 75.109 $\pm$ 9.427 L (NLH) ($p=0.047$). A statistical trend was seen for BF% increasing from 15.1 $\pm$ 6.0 % (LH) to 15.5 $\pm$ 5.9% (NLH) ($p=0.06$). Similarly, 4C% increased from 13.5 $\pm$ 5.7 (LH) to 13.8 $\pm$ 5.7% (NLH) ($p=0.05$). **Conclusion:** Covering leg hair with leggings in males showed significant increases in BV, causing a trend towards increased BF% from ADP and 4C%. This suggests that exposed leg hair causes a slight underestimation of total BF% as measured by ADP.

P108: TRAINING OVERLOAD ASSESSMENT: ARE SPARTA FORCE PLATE TESTING AND BIOELECTRICAL IMPEDANCE EFFECTIVE FOR ENDURANCE ATHLETES?

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BACKGROUND: Training overload in athletes results in reduced performance and/or overuse injuries. The countermovement jump (CMJ) is a widely used test to assess neuromuscular fatigue due to training overload. Bioelectrical impedance (BIA) measures opposition to an electrical current as it travels through tissue, and can reflect fluid shifts between intra- and extra-cellular fluid compartments. PURPOSE: To determine the effect of training load on CMJ performance and lower body BIA in collegiate distance runners. METHODS: Over a 12-week outdoor track season, 13 male and female runners performed biweekly CMJ testing on Sparta Science force plates analyzing jump height, eccentric impulse and modified reactive strength index (mRSI). BIA was measured across the knee joint during seated flexion-extension (FE) movement. The ratio of resistance values measured at 5 kHz and 100 kHz were computed, with a decreased ratio reflecting a relative increase in extracellular fluid content. Weekly training mileage identified highest and lowest training loads. RESULTS: For Sparta CMJ, eccentric impulse ($p = 0.012$; $d = 0.72$) and mRSI ($p = 0.027$; $d = 0.59$) were reduced following high load compared to low load training. There were no statistically significant differences in jump height between high vs. low load ($p = 0.138$; $d = 0.32$). For BIA, subjects showed a lower ratio of resistance ranges (*R5kHz/R100kHz)* following low load compared to high load ($p = 0.007$; $d = 0.95$). CONCLUSION**:** High training volume in long-distance runners impairs rapid CMJ force production without significantly reducing jump height. This suggests neuromuscular fatigue may alter jump strategy, but gross performance metrics (i.e., jump height) may lack the sensitivity to detect fatigue or injury risk. BIA markers may reflect changes in joint

edema or potential inflammation with higher training loads. These results indicate mechanical and physiological markers may aid fatigue and injury monitoring in endurance athletes. Funded by Georgia Tech Research Institute Internal R & D.

P109: MENSTRUAL CYCLE-BASED PERIODIZED TRAINING: IMPACT ON PERFORMANCE, MUSCLE SORENESS, AND RECOVERY IN ACTIVE WOMEN

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BACKGROUND- While the number of female athletes competing in sports continues to rise, research that considers their unique physiology remains sparse. Past sports science studies with exclusively male participants that have been subsequently generalized to women may be inaccurate or misleading, potentially overlooking key physiological differences. This project aims to address this disparity by testing the implementation of a menstrual cycle (MC)-based periodized training plan and its effects on recovery and performance across the MC. Specifically, it will assess the impact of fluctuating hormone levels on salivary muscle damage biomarkers (CRP and IL-6) and other psychological and physiological variables relating to performance, muscle soreness, and recovery following bouts of exercise. METHODS- The proposed project will be a randomized, crossover study to compare the effects of heavier and lighter resistance training loads during different phases of the MC on performance and recovery. 20 resistance-trained women (≥ 2 days/week for at least 6 months), aged 18-40 years, will be recruited for this study. Additional inclusionary criteria include having self-reported regular menstrual cycles (21-35 days) for the past 6 months. Participants will be asked to attend one baseline visit for one-rep max testing, along with four training sessions at varying intensities: two in the late follicular phase and two in the mid luteal phase, with a follow-up visit at 24 hours following each training session. Participants will be asked to wear an Oura Ring for the duration of the 3-month study to gather additional information on sleep and heart rate variability. Repeated measures ANOVA will be used to analyze the data. ANTICIPATED RESULTS- It is hypothesized that MC phase-based training will yield significant and observable differences in performance and recovery across phases and intensities: the follicular phase being more optimal for higher-intensity exercise, and the luteal phase being more optimal for lower-intensity exercise and recovery.

P110: SOCIAL MEDIA EFFECTS ON ATHLETIC AND MENTAL PERFORMANCE

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Abstract:
BACKGROUND: Social media (SM) use has been found to lower self-esteem and may be a factor in anxiety and depression. Additionally, SM use before sleep may be linked to a decline in athletic performance the next day and negatively affects overall performance of athletes. The purpose of this study was to determine whether SM use prior to exercise affects athletic performance or causes a decline in self-confidence. METHODS: Twenty (10 male and 10 female) collegiate athletes were randomized to look at SM or refrain from SM for at least 30 minutes prior to a training session on two separate days. Participants then performed 3 sets of hex bar deadlift until failure with a three-minute rest period. At the end of each session participants filled out the Self-Compassion Scale Short Form (SCF-SF) to measure self-compassion. A randomized crossover design was used with the same measures repeated either with or without SM use prior to the training session. Results were analyzed using repeated measures ANOVA. RESULTS: No main effects were found on the SCF-SF related to SM use (p= 0.723) or gender (p= 0 .938). Additionally, no interaction effect was found on the SCF-SF between SM group and gender (p= 0.185). CONCLUSION: These findings suggest that SM does not have a significant effect on athletic and mental performance, which conflicts with a previous study showing a decline in volume-load with SM. Since no change was found, no gender effect could be identified.

P111: FUNCTIONAL MOVEMENT SCREENING WITH COLLEGIATE SOCCER PLAYERS

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BACKGROUND: Functional Movement Screening is a popular evaluation method that is used to find asymmetries and dysfunctional movement patterns that could put athletes at risk for injury. Soccer players are more susceptible to ankle, knee, and hip injuries due to the high demands on lower body mobility, stability and repetitive dynamic motions. Scores from the FMS test have been linked to injury risks. The purpose of this study is to conduct and study the FMS testing to decrease injury risk and reduce asymmetry amongst collegiate soccer players, then implement effective interventions. METHODS: Participants (n≈50) will perform seven exercises and six clearing tests. These tests include evaluating the lower body mobility and clearing (hip, knee, ankle), upper body mobility (shoulder), and core stability. ANTICIPATED RESULTS: The expected outcomes are lower scores in the overhead squat, hurdle step, and ankle clearing at the beginning of the season. This reflects repetitiveness of the running motion in the sport of soccer, affecting hip and ankle mobility. Limited shoulder mobility is also expected due to limited overhead demands in the sport. Post-season testing, once intervention is implemented, is expected to improve overall scores, contributing to the reduction of injury risk throughout the season.

P112: LIMB FAT-FREE MASS AND HANDGRIP STRENGTH ASYMMETRIES IN DIVISION I SOFTBALL PLAYERS

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Sports involving emphasized unilateral movements often place unequal demands on limbs, which can lead to strength and composition asymmetries. **PURPOSE:** This study aimed to investigate arm fat-free mass (FFM) and maximal handgrip (HG) strength asymmetries in NCAA DI softball players and, secondarily, to describe position-specific asymmetries. **METHODS:** Softball players (N=23) were tested in the off-season. Right and left arm FFM was obtained through multifrequency bioelectrical impedance analysis. HG maximal strength was measured with a dynamometer. The Bilateral Asymmetry Index was calculated as [(dominant limb - nondominant limb) / (dominant limb + nondominant limb) x 100)] and was used to evaluate FFM asymmetries (FFMA) and HG asymmetries (HGA) between arms. A paired sample t-test was used to determine the differences between limbs, and Pearson's Correlation Coefficient (r) was used to determine the relationship between asymmetries. Descriptive data are presented as team and position-specific values. **RESULTS:** Strength was significantly different between arms ($p<0.001$), and there was no difference for FFM ($p=0.47$), with a moderate correlation between HGA and FFMA ($r=0.42$, $p<0.05$). The average team measures indicate a slight arm FFMA of 0.74 ± 4.5% and HGA of 2.2 ± 3.7 %. HGA and FFMA per position are as follows: pitchers (n= 6; HGA= 4.7± 2.4%; FFMA= 1.4 ± 1.5%), outfielders (n= 4; HGA= 1.8 ± 5.8%; FFMA= 0.2 ± 1.7%), infielders (n= 8; HGA= 1.6 ± 3.72%; FFMA= -0.4 ± 7.3%), catchers (n= 2; HGA= -0.5 ± 4.1%; FFMA= 2.2 ± 1.9%), and utility (n=3; HGA= 1.8 ± 1.1%; FFMA= 2.3 ± 2.9%). Out of a total of 23 athletes, 21.7% (n=5) had a greater HGA and 26% (n=6) had a greater FFMA in their non-dominant arm. **CONCLUSION:** There was a difference between limbs for strength but not FFM, indicating the potential utility of multiple assessment metrics for evaluating asymmetries. While asymmetries are expected in sports with repeated and dominant unilateral motions, systematic monitoring may be valuable for optimizing training adaptations and avoiding potential injury. Future studies should examine the connection between limb asymmetries and in-competition performance, as well as the threshold for possible injuries associated with asymmetries. This abstract was made possible in part by Grant T32-GM081740 from NIH-NIGMS, awarded to GFM.

P113: FEASIBILITY ASSESSMENT OF SMART RESISTANCE TRAINING TECHNOLOGY IN THE FIRE SERVICE

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BACKGROUND: Firefighters are required to perform strenous occupational tasks that require optimal levers of muscular fitness, highlighting the need to regularly perform resistance training exercise while on-duty. Unfortunately, there are numerous barriers to performing exercise safely while on-duty, which may include: limited space for resistance training equipment in stations, lack of guidance to perform exercises correctly, and exercising in a suboptimal physiological state of readiness (due to stress, sleep restriction, etc.) Smart resistance training technology provides a potential countermeasure to address these issues. Specifically, smart resistance training devices offer a space-efficient, instructional, auto regulatory training methodology that may be useful in the Fire Service. Despite the potential utility of this technology, research is needed to establish its feasibility in the Fire Service. Therefore, the purpose of this study is to determine the feasibility of integrating smart resistance training

technology in the Fire Service. METHODS: This study will utilize a qualitative research methodology whereby career firefighters (N=10) will be recruited to form small focus groups. Firefighters will perform on-duty exercise in companies (n=3-4 firefighter/company) for 3 weeks using a smart resistance training device (Tonal, Foxconn, San Francisco, CA, USA). A researcher will supervise the exercise sessions to ensure safety and provide guidance as needed. Tonal utilizes a bilateral cable and pulley system to direct constant electromagnetic resistance on 280 preset resistance exercises targeting primary muscle groups. The device offers specialized modes to simulate a spotter, eccentric loading, and simulated accommodating resistance. Following the training period, small focus groups will be utilized to obtain firefighters' perspectives, attitudes, and perceptions regarding the feasibility and potential efficacy of smart resistance training technology in the Fire Service.ANTICIPATED RESULTS:It is hypothesized that the focus groups will indicate that smart resistance training technology provides an effective training modality that is space-efficient, instructional, and accommodating firefighters' physiological needs for optimal adaptability.

P114: CONCURRENT VALIDITY OF THE FIBION SENS® COMPARED TO COSMED CPET® AND EQUIVITAL LIFEMONITOR® SYSTEMS

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BACKGROUND: Wearable devices require validation against gold-standard tools to confirm their utility in research and clinical applications. This study evaluated the concurrent validity of the Fibion SENS® by comparing its PA classifications with those from the Equivital LifeMonitor® and COSMED CPET® metabolic system and the. METHODS: Nineteen healthy adults completed seven physical activity tasks of varying intensity in a laboratory setting. Activity classification outputs from Fibion SENS® were matched against Equivital LifeMonitor® and COSMED CPET®. Agreement was quantified using quadratic weighted Cohen's Kappa and percentage agreement using 266 subjects/items and 4 raters/measurements. To ensure a valid comparison across devices, all activity classifications were recoded into a uniform 3-level scale (Sedentary, Light, Moderate/Vigorous) prior to analysis to avoid sparse categories and enhance interpretability. RESULTS: The Fibion SENS® demonstrated a high observed agreement of 84.2% with the Equivital LifeMonitor® and a more moderate agreement of 59.8% with the COSMED CPET® system. Inter-rater reliability was almost perfect with the Equivital LifeMonitor® ($\kappa = 0.87$, SE = 0.02, 95% CI = 0.83-0.91) and substantial with the COSMED CPET® ($\kappa = 0.75$, SE = 0.02, 95% CI = 0.71-0.79). These robust kappa values confirm that the concordance between devices was significantly greater than what would be expected by chance. CONCLUSIONS: The Fibion SENS® demonstrated excellent agreement with the Equivital system and substantial agreement with the COSMED system. The substantial kappa values, coupled with the high degree of observed agreement, support the utility of the Fibion SENS® as a valid tool for classifying physical activity in research settings.

P115: RECOVERY AND OVERTRAINING IN ETHIOPIAN HIGHER LEAGUE FOOTBALL PLAYERS

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BACKGROUND: The knowledge and application of a suitable training load-recovery balance in football is a challenge for most coaches, including coaches in Ethiopia. The aim of this study was to monitor recovery, well-being and potential overtraining among Ethiopian National Football League players over two phases across ten weekly micro-cycles of a season. **METHODS**: A squad of twenty-five male footballers (age 22.08±1.41 years, weight 70.24±6.45 kg height 175.60 ±7.01 cm, BMI 22.78±1.77 kg/m2) playing for a professional team in the Ethiopian Higher Football League were tracked over a macrocycle of the season comprising ten weeks. Forty observations were made of the players' recovery using a well-being review comprising ratings of fatigue, sleep quality, muscle soreness, stress levels and mood. **RESULTS**: Overall the components of well-being over the season showed a mean value below the mid value norm of 3. Fatigue ratings (2.80±0.21) were somewhat, but not significantly ($p>0.05$,) better than sleep quality (2.67±0.11), muscle soreness (2.63± 0.15), mood (2.63±0.10) and stress level (2.62±0.21). Fatigue was rated worse during pre-season (2.63±0.44) than in-season (2.84±0.28), but sleep quality, muscle soreness, and stress were all rated worse during the in-season, while mood declined significantly ($p\leq0.005$) from pre-season (2.89±0.39) to in-season (2.57±0.33). Well-being components showed an inverse relationship with variations in training load, and all remained below a normal value of three across each weekly micro-cycle of the season. C**ONCLUSION:** Players' recovery and well-being consistently remained below the average score over the season, indicating the presence of non-functional overreaching due to a poor periodization plan. The potential impact of recovery on the performance of teams needs to be considered for further analysis.

P116: COMPARISON OF ISOKINETIC AND HANDHELD DYNAMOMETRY KNEE FLEXION AND EXTENSION IN YOUNG CHILDREN

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BACKGROUND: Muscle strength is an important component of physical fitness. However, measuring muscle strength can be problematic because criterion measures using electromechanical dynamometry (EMD) are expensive, require dedicated space, and are fixed (non-mobile) devices. Handheld dynamometry (HD) offers less expensive, mobile devices that require no dedicated space. Thus, the purpose of this study was to compare peak knee flexion and extension torque measures using an EMD versus a HD device in young children. **METHODS:** A total of 32 children (23 boys) ages 5-11 years (Mean ± SD: 8.0 ± 1.6) performed muscle strength testing. Participants completed a RAMPing protocol at 90° knee flexion consisting of two warm-up contractions at 50% and 75% perceived effort followed by three maximal voluntary isometric contractions (MVIC) of knee flexion and extension using an isokinetic dynamometer (IKD) (Biodex System 4) and handheld dynamometer (Lafeyette Instrument; Model 01165A). A between-subjects analysis of variance (ANOVA) was used to evaluate group mean differences while correlational analyses and explained variance were used to assess agreement and association of peak knee flexion and extension torques between IKD and HD. **RESULTS:** Group mean analysis revealed no significant differences in IKD (27.4 ± 14.0 N•m) versus HD (40.9 ± 11.5 N•m) peak knee flexion torque and IKD (63.5 ± 35.9 N•m) versus HD (40.9 ± 25.6 N•m) peak knee extension torque. IKD peak knee flexion torque explained 52.8% of the variance in HD peak knee flexion torque while IKD peak knee extension torque explained 70.8% of the variance in HD peak knee extension torque. **CONCLUSIONS:** HD demonstrated a strong association to IKD and is considered a valid and reliable method for muscle strength testing in young children.

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P117: EXERCISE-INDUCED MUSCLE SWELLING AND IMPEDANCE CHANGES IN THE BICEPS BRACHII

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BACKGROUND: Bioelectrical impedance spectroscopy (BIS) is a non-invasive method that assesses body fluid distribution using resistance (R), reactance (Xc), and phase angle (PhA) across a range of frequencies. Strenuous exercise increases blood flow to active muscles, leading to acute muscle edema due to shifts in intracellular and extracellular water balance, partly driven by metabolic byproducts such as lactate and hydrogen ions. Segmental BIS studies suggest that post-exercise increases in muscle thickness are associated with transient changes in intra- and extracellular fluid volumes. However, to our knowledge, no study has directly examined electrical impedance myography (EIM) changes with ultrasound and passive tissue properties in the context of exercise-induced swelling. METHODS: Thirty resistance-trained adults (18-54 years) will be recruited. Each participant will complete 2 visits. During visit 1, hydration status will be confirmed by assessing urine specific gravity, followed by anthropometric measurement, body composition analysis via whole-body bioimpedance analysis, localized EIM, ultrasound imaging, and passive tissue property assessment via myotonography. The first visit will include familiarization, a one-repetition maximum bicep curl assessment of the dominant arm, and initial baseline measurements. Dominant arm will be self-reported as the arm the participant uses for most tasks. During Visit 2, participants will perform 4 sets of 10 bicep curls ~70% 1RM. EIM, ultrasound, and myotonography measurements will be repeated between sets of the dominant and the contralateral arm that does not undergo exercise. Intersession reliability will be assessed using intraclass correlation coefficient of each of the primary outcome measures. A repeated-measures ANOVA will assess changes across time, with post hoc analyses as needed. ANTICIPATED RESULTS: We hypothesize that EIM will detect progressive alterations in the biceps brachii during exercise, including a decline in R and Xc, and a corresponding change in PhA, allowing assumptions of acute fluid shifts associated with muscle swelling. These impedance changes are expected to correlate with increases in muscle thickness (via ultrasound) and alterations in passive mechanical properties (via myotonography).

P118: SEX DIFFERENCES IN RUNNING ECONOMY AND BIOMECHANICS WITH ADVANCED FOOTWEAR TECHNOLOGY
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BACKGROUND: Shoes containing advanced footwear technology (AFT) have shown to improve running economy (RE) by about 4% (Hoogkamer et al. 2018). AFT has resulted in significant reductions in the top road racing times for long distances, with larger improvements seen in women (Senefeld et al. 2021). However, the degree of improvement varies between runners. Furthermore, why women tend to see greater gains in racing performance is not fully understood. The purpose of this study is to identify what lower extremity kinematics while running are associated with alterations in RE with AFT and to further identify sex differences with these responses. METHODS: For this study, 24 participants (12 men and 12 women) between the ages of 18 to 45 years old will be recruited. Each participant will complete 4 visits. Visit 1 will include health screening and anthropometric measurements. Visits 1 and 2 will identify VO2peak via a maximal step-wise exercise test on the treadmill while wearing the Nike Revolution 5 (R5, training shoe) or Nike Alphafly Next% (AF, AFT shoe). Visits 3 and 4 will involve two sets of 4x5 minute running trials on the treadmill at 13 and 14 km/hr (women) or 14 and 15 km/hr (men) while wearing AF and R5 in a randomized order. On Visit 4, runners will also perform overground running trials at ~14 km/hr over a force plate for both shoe conditions. Gas exchange will be collected via a metabolic testing cart to identify RE. Differences in lower extremity kinematics and ground reaction forces between shoe types will be identified via a Stryd Running Power Meter, 3D Motion Capture, and force plates. RE and kinematic differences between sexes and high/low responders to AFT will be analyzed. Repeated measures ANOVA will be used to determine significant differences in RE and all measured kinematic variables between AF and R5. ANTICIPATED RESULTS: It is hypothesized that participants will see greater improvements in RE with AF compared to R5. Ground contact time, stride frequency, metatarsal phalangeal and ankle joint flexion velocity, and foot strike pattern will significantly explain some of the variability in RE response between shoe types. Women will display higher stride frequencies and shorter ground contact times compared to men that elicit greater improvements in RE with AFT.

P119: STUDENTS' UNDERSTANDING OF HPV AT A FAITH-BASED UNIVERSITY
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Background: The human papillomavirus (HPV) is a common sexually transmitted infection (STI), and there is a vaccine, but many college-age students lack an understanding of its benefits. This study sought to understand how students whose educational and social interactions had limited secular interaction and were religion-centric (measured as religious insulation) might have even less understanding. Methods: Survey data were collected from students at a faith-based university in the midwestern United States (n = 225; mean age = 20.0 ± 2.4 years), measuring HPV vaccination status, HPV knowledge, demographic data, sources of HPV information, and religious insulation. A logistic regression was used to examine predictors of vaccination status, and linear regression was used to examine predictors of HPV knowledge. Results: Thirty percent of respondents indicated they had not received the vaccine, 34% indicated they had, and the remaining 36% were unsure. Logistic regression showed that respondents with greater insulation scores were less likely to be vaccinated (OR = 0.73, 95% CI [0.59, 0.89]) and males were less likely than females (OR = 0.37, 95% CI [0.14, 0.90]). Greater knowledge of HPV showed a trend toward increased likelihood of vaccination (OR = 1.23, 95% CI [0.99, 1.54]). In a separate linear regression, insulation (β = 0.20, p < .05) and number of information sources (β = 0.44, p < .001) significantly predicted higher knowledge scores.Conclusion: Our results suggest that simply presenting religiously-insulated students with more knowledge is unlikely to affect their HPV vaccination outcomes because they have at least as much knowledge as their more-likely-vaccinated peers. Artificial intelligence (AI) tools were used in the collection and analysis of data, writing of the abstract/presentation, and production of images or graphical elements of this abstract/presentation.

P120: A 25-YEAR ANALYSIS OF ATHLETE MORTALITY: CAUSES, TRENDS, AND RESOURCE DISPARITIES
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BACKGROUND: Despite advancements in preparticipation physical exams and cardiovascular evaluations, sport-related mortality persists. This study assesses athlete mortality over 25 years, stratifying data by sport, state, cause of death, socioeconomic factors, and age.
METHODS: A retrospective search of athlete deaths occurring during games or practice from 1999 to 2024 was conducted using an online search engine (Google.com). Inclusion criteria required deaths to be directly related to athletic activity. Unrelated cases were excluded. The socioeconomic status of athletes was determined through the area deprivation index (ADI). Poisson regression was used to compare mortality rates with respect to sport type and region.
RESULTS: A total of 593 athlete deaths were recorded, with a mean age of 16.2 years (range: 5-43). Most deaths occurred in male athletes (92%), at the high school level (70%), and during football participation (65%). Cardiovascular events were the leading cause of death (51%), followed by neurological causes (18%) and exertional heat stroke (11%). Mortality was highest during practice (69%) and was significantly more frequent in rural areas ($p < 0.001$). States with the highest mortality rates had an average national ADI of 67.8, indicating moderate socioeconomic deprivation, while states with the lowest mortality rates had an average ADI of 43.8. Exertional heat stroke accounted for 87.5% of deaths in football and was most prevalent in the South Atlantic region ($p = 0.0003$).
CONCLUSIONS: Football had the highest rate of all-cause athlete mortality, driven by cardiovascular events, traumatic brain injuries, and exertional heat stroke. Mortality was disproportionately higher in rural areas and during practice. Higher mortality rates positively correlated with great socioeconomic deprivation, as indicated by ADI values.

P121: PHYSICAL ACTIVITY, KNEELING, AND KNEE PAIN IN ADULTS: CLINICAL FINDINGS FROM THE OAI
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BACKGROUND: Knee osteoarthritis (OA) is a leading cause of pain and disability worldwide. Physical activity (PA) is first-line care, yet what people do may matter: beneficial overall activity versus high knee-loading tasks (e.g., kneeling). We examined whether overall PA and kneeling frequency relate to knee pain at enrollment. METHODS: We used the Osteoarthritis Initiative (OAI) open-access database, approved by local institutional review boards. The OAI comprises data on 4,796 men and women aged 45-79 years at baseline. Exposures were overall PA (PASE; standardized z-score) and kneeling ≥30 min/day categorized as none, ≤1 day/week, 2-3 days/week, 4-5 days/week, or nearly every day. Outcome was right-knee KOOS Pain (0-100; higher = less pain). General Linear Model (Univariate) adjusted for age, sex, and BMI; we report the adjusted PASE coefficient and adjusted contrasts for kneeling (reference = none).RESULTS: We included 4,748 individuals (58.5% female; mean age 61.1 ± [9.2] years; mean BMI 28.6 ± [4.8] kg/m²). Higher overall activity was associated with slightly less pain: each 1-SD higher PASE related to a 0.69-point higher KOOS Pain (95% CI 0.17-1.22, p=.009). Kneeling showed a significant overall association (p<.001). Adjusted mean KOOS Pain (SE) was 83.88(0.29) for none, 87.27(0.69) for ≤1 day/week, 84.31(0.89) for 2-3 days/week, 80.08(1.79) for 4-5 days/week, and 82.28(1.50) for nearly every day. Versus none, ≤1 day/week was +3.38 points (95% CI +1.91 to +4.86; p<.001; less pain), while 4-5 days/week was −3.80 points (95% CI −7.36 to −0.24; p=.036; more pain). Differences for 2-3 days/week and nearly every day were not significant. Higher BMI related to worse pain; sex was not significant after adjustment.CONCLUSIONS: Clinically, more overall activity is linked to slightly less knee pain, while kneeling frequency shows a non-linear, task-specific pattern: occasional kneeling (≤1 day/week) is associated with better pain scores than none, but frequent kneeling (4-5 days/week) is worse. Findings support encouraging overall PA while being cautious with frequent high-load kneeling and motivate longitudinal analyses to clarify directionality.
Keywords: Osteoarthritis, knee, KOOS pain, PASE

P122: PARKS AS A RESOURCE FOR PHYSICAL ACTIVITY AND HEALTH: EVIDENCE FROM SOUTHEAST TENNESSEE
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BACKGROUND: Residents of a small, non-metropolitan community in East Tennessee face obesity, physical inactivity, and poor health rates above state and national averages. Furthermore, this community has limited exercise opportunities, including fewer parks, a built environment feature linked to higher activity levels and wellbeing. The purpose of this study is to determine the association between park use, physical activity (PA), and quality of life. METHODS: Participants

accessed the self-report survey by scanning a QR code on signage placed within five parks in Athens, TN. Questions assessed park use, PA behaviors, and general health. Responses were summarized using descriptive statistics. Data was not normally distributed; therefore, Wilcoxon Signed Rank tests were run to compare park users poor mental and physical health days/month to McMinn County level data. RESULTS: Analysis included 26 survey respondents. Most were female (69.2%), white (76.9%), and college graduates (50.0%). The mean age of participants was 43.3±17.2 years with a mean body mass index of 27.2±5.2 kg/m^2. Most participants lived within 15 minutes of their primary park (76.9%); however, no one used active transportation to access the park. When visiting the parks (average of 14.1±10.0 days/month and 118.9±95.3 minutes/visit), walking was the most popular activity (50.0%), followed by watching their children play (15.4%) and running (15.4%). 76.9% of respondents reported accumulating 150+ minutes/week of moderate-intensity aerobic PA. Park users experienced fewer poor mental health days/month (4.5 vs 6.5, p=.024) and fewer poor physical health days/month (2.2 vs 5.1, p=<.001) compared to county-level data. Additionally, a lower proportion of park users reported poor or fair health compared to county-level data (7.7% vs 20.0%, respectively). CONCLUSIONS: Park users reported higher physical activity levels, fewer poor mental and physical health days, and better overall health compared to county-level data. These findings suggest that parks may serve as an important community resource for promoting physical activity and improving quality of life in non-urban areas. Future research should explore strategies to increase park access and examine long term health outcomes associated with regular park use.

P123: ASSOCIATION BETWEN LIFESTYLE MEDICINE SCORE AND PHYSICAL FUNCTION IN U.S. ADULTS: 2007-2010 NHANES

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PURPOSE: Examine the associations between adherence to the six pillars of lifestyle medicine promoted by the American College of Lifestyle Medicine and physical function in U.S. adults. A lifestyle medicine score (LMS) was created to quantify adherence, with the hypothesis that greater adherence to lifestyle medicine pillars would be associated with better physical function. METHODS: Sample included U.S. adults aged ≥ 40 years who participated in the 2007-2010 National Health and Nutrition Examination Survey. The LMS was constructed from six pillars: nutrition, physical activity, stress management, restorative sleep, social connectedness, and avoidance of risky substances (alcohol and tobacco). Physical function was self-reported difficulty standing from an armless chair (STA) (N=2032), lifting or carrying 4.5 kg (LC) (N=1990), and performing household chores (HC) (N=1,944). Multivariate logistic regression was conducted to evaluate the magnitude of associations between LMS and each physical function outcome. RESULTS: A greater LMS was significantly associated with better physical function. In fully adjusted models, each one-unit increase in LMS was associated with 35, 32, and 38% (P <0.0001 for all) lower odds of reporting difficulty STA, LC, and HC, respectively. When utilizing the composite LMS in groups (>3 vs. ≤2), participants reporting >3 lifestyle pillars were found to have 38, 25, and 61% (P <0.0001 for all) lower odds of reporting difficulty STA, LC, and HC, respectively. CONCLUSION: Greater adherence to the lifestyle medicine pillars was associated with lower odds of impaired physical function in U.S. adults. Increased LMS appeared protective against limitations in STA, LC, and HC. The results underscore the role of lifestyle medicine in preserving independence and reducing the disability burden among the aging U.S. population.

P124: EVALUATING PHYSICAL ACTIVITY USING ACT-24 IN A NON-URBAN COMMUNITY

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BACKGROUND: The Activities Completed Over Time (ACT-24) survey has proven to provide accurate group level estimates for active and sedentary time but has hardly been used to assess non-urban populations. The purpose of this study was to assess gender differences in physical activity (PA) in a small, non-urban community using the ACT-24 survey. METHODS: ACT-24 is a validated 24-hour activity recall tool that asks participants to report the time they spend participating in PA and sedentary behaviors. Participants were recruited from McMinn County, TN, and were enrolled for seven consecutive days. Participants completed an initial survey to assess PA and general health. Then, on two randomly selected days over the 7-day study period, participants were sent the ACT-24 survey to recall their previous day's activity. Descriptive statistics summarized participant characteristics and ACT-24 survey responses. Additionally, *t*-tests were used to determine if differences were present between males and females. RESULTS: The mean age of participants (N=8) was 50.1±15.5 with a mean body mass index of 25.9±3.6 kg/m^2. Of the eight participants, 50% were female, 87.5% were white, and all were college graduates. Overall, participants averaged 9.6±1.9 hours of sedentary time and 6.2±1.8 hours of active time per day. Compared to females, males reported more sedentary time (10.4 vs 8.8 hours, p=0.27) and more time spent doing moderate-vigorous activities (4.0 vs 2.3 hours, p=0.31). Whereas females, compared to males, reported more active time (6.6 vs 5.7 hours, p=0.55) and time spent doing light-intensity activities (4.3 vs 2.2 hours, p=0.10). Specific to MET hours, males reported 14.2±10.2 moderate-vigorous MET hours, while females reported 8.8±4.4 moderate-vigorous MET hours; however, this was not found to be significant (p=0.36). CONCLUSIONS: These findings demonstrate the ACT-24 captured detailed activity patterns in non-urban residents and highlights potential gender-based differences in sedentary and active time. Future research with larger, more diverse samples is needed to confirm these patterns and further evaluate the locational- and activity-specific data that the ACT-24 survey collects.

P125: WEIGHTLIFTING INJURIES ACROSS THE LIFESPAN: EPIDEMIOLOGY, MECHANISMS, AND SEVERITY

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BACKGROUND: Weightlifting is a popular form of exercise with demonstrated health benefits for all age groups. The purpose of this study is to analyze a national database to identify and compare the epidemiology, injury mechanisms, and severity of weightlifting-related injuries across distinct age cohorts. **METHODS:** This study will utilize a 20-year dataset (2005-2024) from the National Electronic Injury Surveillance System (NEISS) (n = 6,956,802). Cases will be identified using the product code 3265 for "weightlifting." Data will be stratified into four age cohorts: pediatric (<13 years), adolescent/young adult (13-25 years), adult (26-59 years), and elderly (60+ years). Analyzed variables will include injury diagnosis (categorized as acute/traumatic, overuse/soft tissue, or other), body part injured, injury severity (using a ordinal scale based on emergency department disposition: 1=Treated/Released, 2=Transferred, 3=Hospitalized), and injury location (home vs. recreation facility). Injury mechanisms (e.g., direct lifting, dropped weight, fall) will be categorized through qualitative analysis of case narratives and analysis of secondary products involved. Statistical analyses, including chi-square tests and ANOVA, will be used to compare injury characteristics across age groups and by sex within each cohort. **ANTICIPATED RESULTS:** We hypothesize that significant differences in injury patterns will exist across the lifespan. The pediatric and elderly cohorts are expected to demonstrate the highest injury severity, characterized by a greater proportion of fractures (e.g., of the hands/feet in children, hip/spine in the elderly) and higher hospitalization rates, forming a U-shaped curve for severity. The adolescent/young adult cohort is anticipated to have the highest proportion of sprains and strains, particularly affecting the shoulder and lower back from direct lifting. We further hypothesize that injury mechanisms will shift from "dropped weights" in children to "direct lifting" in young adults, and to "falls" in the elderly. A greater proportion of injuries are expected to occur at home in the pediatric and elderly cohorts compared to recreational facilities in younger adults.

P126: SURFACE ELECTROMYOGRAPHY: A QUALITATIVE AND QUANTIATIVE EVALUATION OF MEDIAN FREQUENCY USING WEARABLE TECHNOLOGY

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BACKGROUND: Age-related neuromuscular decline impacts function. Wearable surface electromyography (sEMG) offers a practical alternative to lab assessments. This study examined wearable sEMG to assess age-related fatigue during repeated thirty-second sit-to-stand (30-STS). **METHODS:** Twenty adults (50-79 years) performed repeated 30-STS. The Myontec M3 Shorts assessed median frequency (MF) in quadriceps, hamstrings, and gluteal muscles. One-way ANOVA compared MF between three age groups (50-59 years, 60-69 years, and 70-79 years). Regression explored links between MF, age, and activity (RAPA). Normality tested using Shapiro-Wilk. **RESULTS:** Eta-squared was used as a measure to find what part of the muscle variance was accounted for by age group in the ANOVA analysis**:** MF showed a negative shift with age, especially between 60-79 years (Cohen's d = -1.212 between 60-69 and 70-79), indicating a meaningful effect. While one-way ANOVA ($F(2,13) = 2.641$, $p = 0.109$) was not statistically significant due to the small sample size,

the observed moderate effect size ($\eta^2 = 0.289$) suggests that age might account for a noticeable proportion of variance in MF. No significant relationships were found during regression testing. **CONCLUSIONS:** Despite sample size limitations and lack of statistical significance, wearable sEMG demonstrates potential for monitoring functional changes in the 30-STS, capturing meaningful trends in age-related neuromuscular fatigue. Future research should explore other age-related factors. Grant or funding information: Concordia Saint Paul Department of Kinesiology - 2,000.00

P127: DOES HAMSTRINGS-TO-QUADRICEPS RATIO INFLUENCE KNEE VALGUS ANGLES DURING CUTTING AND SINGLE-LEG SQUAT MOVEMENTS AMONG FEMALES?

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Background: The knee is a commonly injured joint, with higher injury rates in females compared to males. Knee valgus angles have been used to assess potential injury risk by measuring the repetitive force placed on the ligamentous structure during certain movements.**Purpose:** This study compared the differences in knee valgus angles during cutting movements (CMs) and bodyweight single-legged squats (BWSLs) for individuals with above versus below average hamstrings-to-quadriceps ratio (HTQ).**Methods:** A total of 27 recreationally trained college-aged females (age = 21.3±2.35, height = 165.71±7.17 cm, weight = 65.86±11.39 kg) participated. Peak torque (PT) was taken from maximal voluntary isometric contractions (MVICs) and isokinetic knee extension and flexion from 60-300°·s^{-1} for each leg. HTQ was calculated as PT from knee flexion divided by PT from knee extension for all muscle actions. The average HTQ for each isometric and isokinetic muscle action were determined. Participants were then separated into above and below average HTQ groups for each leg. Participants performed BWSLs on both legs, and CMs, which were lateral jumps and landings on both legs, on force plates. For the knee valgus, the BWSL was split into two phases of "eccentric" and "concentric," and CM was "landing" and "propulsion."**Results:** On the right leg during the CMs there were no differences between groups at MVIC and 120-300°·s^{-1} for landing or propulsion knee valgus ($p \geq 0.075$). At 60°·s^{-1} for propulsion knee valgus, the below average group had significantly larger values ($p = 0.040$). During the BWSL, there were no differences between groups for concentric or eccentric knee valgus ($p \geq 0.079$). On the left leg, during the CMs there were no differences between groups for landing or propulsion knee valgus ($p \geq 0.082$). During the BWSL, there were no differences between groups for concentric or eccentric knee valgus ($p \geq 0.064$).**Conclusions:** There were minimal differences in estimated knee valgus angles when comparing women with above and below average HTQ. The only difference was found during the propulsion phase of the cutting movement at 60°·s^{-1}, where the below average group had larger valgus values, which suggests there may be potential issues with elastic storage and usage during slower contraction speeds, though future research is required.

P128: LOWER-LIMB MECHANICS DURING ASYMMETRICAL LENGTHENING CRANK ARM CYCLING

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BACKGROUND: Cycling is a common modality for lower extremity injury rehabilitation. It has been shown to decrease the load placed on the lower extremity compared to weight-bearing exercises. Recent studies have investigated the effects of symmetrical shortening and asymmetrical shortening of the bike crank arms on knee-joint mechanics during cycling. The effect of simultaneous asymmetrical shortening in combination with lengthening has not been previously investigated. Therefore, the purpose of this proposed study is to investigate the effect of combining asymmetrical lengthening and shortening of the crank arms during cycling on knee-joint biomechanics. METHODS: The study would include healthy recreationally active individuals with no major surgeries or lower limb injury within six months of participation. Participants would pedal on an electromagnetically braked cycle ergometer with a constant work rate (70 Watts) and cadence (70 revolutions per minute). The baseline condition includes cycling with a symmetrical crank arm length of 170mm on both sides. Two asymmetrical shortening conditions, which include cycling with a 170mm crank arm length on one side, and the reduced crank arm lengths of 155mm and 140mm on the other side. The fourth condition involves a lengthened crank arm of 185mm on one side and a 170mm crank length on the other side. Conditions five and six involve a 185mm crank length on one side and shortened crank lengths of 155mm and 140mm on the other side. Kinematic data will be collected by a 12-camera motion analysis system (Vicon Motion Analysis Inc., Oxford, UK), and pedal reaction force data will be collected using a pair of custom-built instrumented bike pedals (Type 9027C, Kistler, Switzerland). A 2x6 (limb x condition) repeated measures ANOVA will be used to evaluate the effects of crank arm lengths. ANTICIPATED RESULTS: We hypothesize to see a reduction in the knee range of motion (ROM) in shortened conditions and an increase in ROM in the lengthened with a reduction in the knee extension moments.

P129: INFLUENCE OF HIP-SHOULDER SEPARATION ON PITCH VELOCITY IN DIVISION I COLLEGE BASEBALL PITCHERS

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BACKGROUND: Pitch velocity is a highly valued attribute in baseball pitching, owing to its positive influence on performance outcomes. Hip-shoulder separation has been theorized to contribute to pitch velocity using the stretch-shortening cycle to generate trunk rotation velocity. However, existing research on this relationship presents mixed findings, possibly due to the assumption that the association is uniform across all pitchers. Therefore, the purpose of this study was to investigate the association between hip-shoulder separation and pitch velocity using multilevel modeling. METHODS: A total of 335 NCAA Division 1 pitchers were analyzed (1.88 ± .06 m; 91.6 ± 10.0 kg; 223 right-hand pitchers, 112 left-hand pitchers). In-game kinematics were collected using an 8-camera markerless motion capture system (300Hz). To assess whether individual pitchers display different relationships between hip-shoulder separation and pitch velocity, a series of multilevel models with random intercepts and slopes was employed. RESULTS: The final model demonstrated a small, positive relationship between hip-shoulder separation and pitch velocity at the pitch and pitcher level, with high individual variability. At the between-pitcher level, a 1° increase in hip-shoulder separation increased pitch velocity by 0.03 mph ($p = .027$). At the within-pitcher level, a 1° increase in hip-shoulder separation relative to a pitcher's individual average led to an increase in pitch velocity by an average of 0.08 mph ($p < .001$). However, this within-pitcher association ranged in both direction and magnitude. CONCLUSION: These findings indicate a modest, positive relationship between hip-shoulder separation and pitch velocity, though the within-pitcher relationships were not consistent across all pitchers. Consequently, it can be inferred that increased hip-shoulder separation may contribute to higher pitch velocities, but due to significant individual variability, performance assessments should be conducted on a case-by-case basis, with sufficient data collection for each athlete. This study was limited to elite pitchers, so these results may not be generalizable to players at lower levels; thus, future research should investigate within-pitcher relationships in youth and high school pitchers.

P130: PELVIS KINEMATICS DURING THE SINGLE LEG SQUAT AND ITS RELATIONSHIP TO VALGUS TORQUE

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BACKGROUND: The baseball pitch is a complex movement requiring transfer of energy from the lower extremity through the kinetic chain to the throwing hand and ultimately the ball. Dysfunction within the kinetic chain, such as altered lumbopelvic control, can affect pitching mechanics and increase injury risk. Despite the increasing interest in the lumbopelvic region, the role of the lumbopelvic hip complex (LPHC) remains largely unexplored. Therefore, the purpose of this study was to investigate whether pelvis kinematics during the eccentric phase of the SLS can serve as predictors of peak elbow valgus torque (pEVT) during pitching. METHODS: Kinematic data were collected on 30 youth baseball pitchers (11.3±1.54 y, 1.5±0.12 m, 51.1±12.16 Kg) using an electromagnetic motion capture system. All pitchers were injury-free. Participants completed an SLS with the ipsilateral leg to the throwing hand, followed by 3 fastball pitches at maximum effort. Pelvis flexion, rotation, and lateral flexion angles, as well as average pEVT were extracted for analysis. Kinematic data were exported at 100hz and interpolated to 101 data points from the start (knee flexion angle velocity ≥ -5deg/sec) to the bottom of the SLS (max knee flexion angle), and pEVT were averaged for each participant. Statistical parametric mapping regressions (SPM) were performed to evaluate the effect that pelvis kinematics during the SLS have on pEVT ($\alpha=.05$). RESULTS: SPM results showed that an increase in contralateral pelvis rotation angle was associated with pEVT from 28.41%-32.21% ($p=0.049$, $r^2=0.237$) of the eccentric portion of the SLS. No significant results were found between all other kinematics and pEVT. CONCLUSION: Increased contralateral pelvis rotation during the eccentric phase of the SLS is associated with elevated pEVT during pitching. This reflects reduced control of the hip internal rotators, potentially leading to premature pelvis rotation during the pitch. The current findings highlight the importance of training the LPHC in

younger populations to minimize injury risk. Further research is needed to know how altered lumbopelvic hip control, assessed via SLS, affects kinematics during the pitching motion.

P131: MOBILITY BUT NOT STRENGTH DIFFERENTIATES OLDER ADULTS WITH MILD TRAUMATIC BRAIN INJURY FROM HEALTHY PEERS

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BACKGROUND: Fall-related mild traumatic brain injury (mTBI) is often undiagnosed in older adults due to factors such as a lack of research, poor physician training, treating other co-occurring injuries, and misconceptions about injury severity. Older adults may present with a variety of symptoms (e.g., headache, dizziness) and impairments (e.g., cognitive, gait), further complicating diagnosis. Whether clinical tests can distinguish older adults with mTBI from healthy older adults remains unclear. Understanding these effects may improve treatment plans and quality of life. Therefore, this study aimed to determine if clinical tests can differentiate the two groups. METHODS: The mTBI cohort (n=11, 31% male, age=67.6± 3.4 years, 0.70± .62 years since onset, Montreal Cognitive Assessment (MoCA)=25±2.9) and the healthy cohort (n=13, 18% male, age=71.2± 8.4 years, MoCA=24.8±3.3), completed the following: Short Physical Performance Battery (SPPB), grip strength, single-task Timed-Up-and-Go (TUG) duration (stand up, walk 3m, return and sit), dual-task TUG duration (naming fruits/animals), 5x sit-to-stands duration, single-task gait speed (4m), and dual task gait speed (naming same-letter words). RESULTS: The mTBI cohort preformed worse during: SPPB (7.5±1.7points vs 10±1.6points, p=.004), single-task TUG (14.4±3.8s vs 11.2±2s, p=.015), dual-task TUG (17.6±3.7s vs 11.8±3.1s, p<.001), single-task gait (.69±.14m/s vs .86±.10m/s, p=.002), dual-task gait (.59±1.9m/s vs 78±.1m/s, p=.004), and sit-to-stands (16.6±2.4s vs.11.8±2.2s, p<.001). Grip strength did not differ between cohorts (p=.48). CONCLUSIONS: The mTBI cohort had poorer mobility performance than healthy peers, but similar strength. Perhaps grip strength showed no differences because it does not provoke symptoms, whereas mobility tasks provoke symptoms, thereby increasing sensitivity in detecting differences between mTBI and healthy controls. Data collection is ongoing; thus, these findings are preliminary.

P132: ACUTE EFFECTS OF VARIOUS JUMP STYLES ON AN ELASTIC SURFACE ON COUNTERMOVEMENT JUMP PERFORMANCE

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BACKGROUND: Trampolines are used by clinicians as a therapy modality and by individuals looking to improve jumping performance. Interacting with an elastic surface, such as jumping on a trampoline requires an increase in proprioception, postural demand, and supraspinal input. It also requires a change in vertical body stiffness when the individual returns to a stiff surface. Understanding how various jumping strategies with an elastic surface can impact jumping performance on a hard surface is necessary. The purpose of this study is to investigate how various jumping styles on a trampoline impact jump performance on a hard/stiff surface. METHODS: Participants will include 20 males and 20 females aged between 18-35 years old. Participants will be excluded if they have any cardiovascular, neurological, or musculoskeletal diseases, excessive subcutaneous fat, are pregnant, or have an injury to their lower extremities within six months of data collection. Delsys Trigno wireless surface electromyography (EMG) devices placed on the vastus lateralis (VL), lateral head of the biceps femoris (BF), tibialis anterior (TA), and lateral head of the gastrocnemius (GS) of the dominant leg will be used to measure the muscle activity of the lower extremities during the jumping activities. Participants will then perform various jumping-related activities, resulting in 5 conditions: (1) baseline (hard-surface), (2) hard-surface control condition, (3) drop-jump (DJ) elastic condition, (4) drop elastic condition, and (5) elastic surface condition. Following conditions 2-5, participants will perform the 5 hard surface CMJ jumps to determine if the testing conditions (2-5) influenced jumping performance. Kinematics will be collected and analyzed using OpenCap. A force plate will be used to collect peak ground reaction forces and estimate rate of force development (RFD). ANTICIPATED RESULTS: We predict that the DJ condition will result in a greater peak ground reaction force and jump height. However, the CMJ on the elastic surface will result in a faster RFD.

P133: RELIABILITY OF A WEARABLE FORCE INSOLE TO EVALUATE COUNTERMOVEMENT VERTICAL JUMP PERFORMANCE

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BACKGROUND: Wearable technology may provide a cost-effective and practical alternative to assess countermovement vertical jump (CMVJ) performance compared to force platforms (FP). The novel loadsol-mlp® (LS) is a wireless force insole that measures vertical plantar force between the foot and shoe. This study aimed to determine the absolute reliability of the LS sensor in comparison to CMVJ performance metrics of a traditional FP (AccuGait, Advanced Medical Technology, Inc., Watertown, MA, USA). **METHODS:** Female NCAA Division II athletes (n = 15) performed five CMVJ with their hands on their hips on the FP (1000 Hz) wearing the LS (200 Hz) on two different days to produce 30 total CMVJ samples. Vertical jump height was averaged across the five CMVJ and computed using two different methods: 1) vertical velocity at takeoff (JH_{VEL}) and 2) total flight time (JH_{FT}) using a vertical ground reaction force (GRF) threshold of 50 N to determine takeoff and landing. Jump time was computed as the total time from the initiation of the CMVJ and takeoff. Reactive strength index (RSI) was calculated as the ratio of JH_{VEL} to jump time. Reliability was assessed via a four step procedure: (a) paired *t* tests, (b) intra-class correlation (ICC), (c) standard error of measurement (SEM) calculated as the square root of the mean square within subject residual error, and (d) mean and 95% upper and lower levels of agreement using the Bland-Altman technique. **RESULTS:** JH_{VEL} (LS = 9.9 ± 7.6 & FP = 19.3 ± 6.1 cm) JH_{FT} (LS = 10.3 ± 6.8 & FP = 19.9 ± 7.3 cm) and RSI (LS = 0.16 ± 0.09 & FP = 0.24 ± 0.07 m/s) all differed significantly ($p < 0.001$). ICC were 0.13 ($p = 0.24$), 0.15 ($p = 0.20$), and 0.39 ($p = 0.03$) for JH_{VEL}, JH_{FT}, and RSI, respectively. The SEM and (JH_{VEL} = 6.3 cm, JH_{FT} = 6.4 cm, RSI = 0.007 m/s) and Bland-Altman levels of agreement were not supportive of high reliability for the LS. **CONCLUSION:** The low acquisition rate of the LS device compared to the FP makes it challenging to derive accurate CMVJ performance metrics using vertical GRF data. While the LS is a cost-effect wearable device, we recommend that it not be substituted for a FP when evaluating CMVJ performance.

P134: HOW DO PATIENT REPORTED OUTCOMES RELATE TO QUADRICEPS STRENGTH?

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BACKGROUND: Following anterior cruciate ligament reconstruction (ACLR), individuals experience quadriceps strength deficits which is a primary component of Return to Sports (RTS) criteria and has been shown to be a predictor of the risk of ACL reinjury. While patient-reported outcomes such as the Knee Osteoarthritis Outcomes Score (KOOS) are often included with RTS, there associations with physical performance is less clear. The purpose of this study was to determine if there is a correlation between patient reported outcomes and quadriceps strength to understand what practices we can best implement into the recovery process following ACLR. METHODS: A sample of 35 subjects (19 ACLR, 16 controls) completed the Marx's Activity Rating Scale and KOOS surveys. Each subject then had isokinetic quadriceps strength tested concentrically at 60°/s from 90 degrees of knee flexion to full extension. Participants underwent a 2-repetition warm up before performing 5 maximal effort isokinetic repetitions. Correlations between KOOS sub scores and peak quadriceps strength were determined and a stepwise regression predicting quadriceps strength from KOOS sub scores was run. RESULTS: There were significant positive correlations between isokinetic quadriceps strength (2.1 ± 0.55 Nm/kg) and KOOS quality of life (78.4 ± 17.8; r=.350, p=043), KOOS sports function (84.6 ± 16.0; r=0.444, p=.009), and KOOS symptoms (84.3 ± 13.9; r=.451, p=.007). A stepwise regression to predict quadriceps strength from the KOOS sub scores revealed that only the KOOS symptoms loaded into the model and explained 20.3% of the variance ($R^2 = 0.203$, $p = 0.007$). CONCLUSION: Based on these findings, patient-reported outcomes appear to be moderately associated with quadriceps strength. In particular, the KOOS symptoms scores explained a meaningful portion of variance in isokinetic quadriceps strength (roughly 20%), suggesting that individuals' perceptions of their knee health are related to physical performance to some extent. These results highlight the value of combining subjective patient-reported outcomes with objective strength testing to provide a more comprehensive assessment of recovery and functional capacity.

P135: PITCH MIX AND VELOCITY INCREASE ODDS OF SHOULDER LABRAL REPAIR IN PROFESSIONAL PITCHERS

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BACKGROUND: Shoulder labral tears are a common injury in Major League Baseball (MLB) pitchers and often require arthroscopic shoulder labral repair (ASLR) for return to play. This study aimed to determine whether pitch-specific characteristics, including velocity, spin rate, and pitch type usage, are predictive of ASLR in MLB pitchers. METHODS: A retrospective analysis was performed on MLB pitchers who underwent ASLR between 2017 and 2024. Pre-injury pitch metrics, including velocity, spin rate, movement profiles, and pitch usage, were obtained from Baseball Savant and compared with healthy league averages. Mann-Whitney U tests and logistic regression models were used to evaluate statistical differences and identify predictors of ASLR.
RESULTS: Twenty-seven pitchers who underwent ASLR were compared with 6,444 healthy league-average pitchers. Pitchers who threw changeups at higher velocities demonstrated an increased risk of ASLR ($p = 0.0028$; OR = 1.263). Significant associations were also identified for pitch usage, with higher percentages of changeups ($p = 0.0279$; OR = 0.942) and off-speed pitches ($p = 0.0058$; OR = 0.929) appearing protective, while higher sweeper usage was associated with increased risk ($p = 0.0194$; OR = 1.071) of undergoing ASLR.
CONCLUSIONS: MLB pitchers who throw higher-velocity changeups are at increased risk of undergoing ASLR. In contrast, throwing a higher proportion of changeups and off-speed pitches and fewer sweepers may reduce the risk of labral repair. These findings suggest that pitch-specific characteristics influence the likelihood of surgical intervention and highlight the importance of incorporating biomechanical and sabermetric data in injury risk assessment and prevention strategies for professional pitchers.

P136: SAGITTAL-PLANE JOINT MOMENTS AND JUMP PERFORMANCE ARE UNAFFECTED BY CARBON-FIBER INSOLES

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Introduction: Carbon-fiber midsoles and stiffened shoe plates have emerged as performance modifiers in running biomechanics. By altering longitudinal bending stiffness, these devices improve running economy and sprint performance. However, their effect on jump performance remains less explored. This study used force plates and motion capture to examine the influence of carbon-fiber midsoles on the take-off phase of four jump types. We hypothesized that carbon-fiber midsoles would affect reactive but not non-reactive jumps.Methods: Twelve recreationally active participants (8 male, 4 female; 22.9 ± 2.7 years) completed a standardized warm-up of stationary cycling and dynamic stretching prior to testing. The protocol consisted of four jump types: approach, drop, countermovement, and squat. Each jump was performed in running shoes with and without a carbon-fiber midsole. Sagittal-plane moments at the midfoot, ankle, knee, and hip during the propulsion phase were analyzed using statistical parametric mapping ($\alpha = 0.05$).Results: Statistical parametric mapping revealed no significant differences between carbon-fiber and control shoe conditions for any jump type. Sagittal-plane joint moments at the midfoot, ankle, knee, and hip showed no condition effects. No significant SPM clusters were observed in any joint moment curve ($p > 0.05$). The performance variables jump height and ground reaction force likewise did not differ; approach jump 17.2 ± 4.0 stiff vs. 17.0 ± 3.6 soft, countermovement jump 12.6 ± 2.7 stiff vs. 13.3 ± 2.9 soft, drop jump 10.9 ± 3.2 stiff vs. 10.9 ± 2.8 soft, squat jump 11.8 ± 2.4 stiff vs. 11.6 ± 2.8 soft. This indicated that carbon-fiber midsoles had no measurable impact on take-off mechanics in either reactive or non-reactive jumps.Conclusion: Carbon-fiber midsoles did not alter joint kinetics or performance outcomes across four jump types. The absence of a familiarization period may have limited participants' ability to adapt to the midsoles. Future research should examine whether extended use or training with carbon-fiber midsoles influences jump performance.

P137: VOLLEYBALL FOOTWEAR AND ANKLE BRACING: IMPACT ON BALANCE EQUILIBRIUM SCORES WITHIN FEMALE COLLEGIATE CLUB PLAYERS

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BACKGROUND: In the past four decades, participation in Division-I women's volleyball has increased by 100.3% while the number of sponsoring institutions has grown by 46.9%. This has subsequently led to an increase in injury rates, specifically in the ankle and knee. Both joints are involved in motor strategies used to maintain human balance so the need to study ankle bracing and shoe collar height are vital. Sport-specific footwear and ankle braces are used to help reduce the likelihood of injury; however, it is unclear if utilization of this equipment impacts proprioception and balance. Therefore, this study examined how volleyball specific footwear and ankle bracing affected balance equilibrium scores in female collegiate club volleyball players. METHODS: Nine participants (age: 20.56 ± 1.01 years, height: 171.70 ± 6.07 cm, mass: 75.66 ± 14.39 kg) who were on the active travel roster and wore volleyball footwear and/or ankle braces for at least 2 hours a week during their respective season completed the study. While barefoot (BF), participants first performed a Sensory Organization Test (SOT) on the NeuroCom® Balance Master® consisting of three trials for each of the six testing conditions. Participants then completed the same SOT protocol in the remaining four conditions [Low-Top x No Ankle Brace (LTNAB), High-Top x No Ankle Brace (HTNAB), Low-Top x Ankle Brace (LTAB), and High-Top x Ankle Brace (HTAB)] separated by a 5-minute washout period without footwear. A counterbalanced design was implemented for both footwear and ankle brace conditions. RESULTS: A one-way repeated-measures ANOVA showed that footwear condition [BF (78.22 ± 6.10), LTNAB (79.44 ± 5.32), HTNAB (79.89 ± 4.51), LTAB (79.22 ± 5.76), HTAB (79.22 ± 6.02)] did not have a significant effect on composite SOT equilibrium scores, $F(4, 32) = 0.27$, $p = 0.89$, $\eta 2 = 0.03$. CONCLUSION: Footwear and bracing did not seem to affect balance suggesting that in the event of a perturbation, shoe collar height and ankle bracing may not interfere with the small ankle movements initiated by proprioceptors to help maintain an upright position. This may suggest that balance training interventions, rather than equipment, are more critical for postural control. FUNDING INFORMATION: This study was funded through Elon University's Faculty Research & Development committee.

P138: EXTERNAL FOCUS OF ATTENTION TRAINING TO MITIGATE RISK FACTORS ASSOCIATED WITH NON-CONTACT ACL INJURIES

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BACKGROUND: Anterior cruciate ligament (ACL) injury is one of the most common injuries in sport and brings with it life-changing consequences. ACL injury risk reduction programs have been shown to be effective at lowering the rate of non-contact ACL injuries however, they lack retention potentially due to the mode of feedback relied upon. Therefore, the purpose of this study was to determine the efficacy of novel forms of external focus of attention feedback (auditory ExFOCUS and visual ExFOCUS) compared to internal focus of attention feedback (InFOCUS) at improving biomechanical risk factors of non-contact ACL injuries during a jump landing task. METHODS: Forty-three participants were evaluated for differences in biomechanics following four weeks of training with varied foci of attention feedback. Each participant was randomly assigned to one of three feedback groups: InFOCUS, auditory ExFOCUS or visual ExFOCUS. Peak sagittal and frontal plane hip and knee angles and moments as well as vertical ground reaction force (vGRF) were analyzed. RESULTS: When comparing data between the InFOCUS and ExFOCUS groups, there was a significant limb main effect for sagittal plane hip joint angles ($P=0.049$). Further testing revealed that there was significantly greater hip flexion in the non-dominant relative to the dominant limb ($P<0.049$, $d=-0.89$ [-1.36, -0.41]). No other significant differences in knee or hip joint angles were present between limbs ($P>0.05$). No significant differences in kinetic measurements or vGRF were detected during any of the testing sessions between or within any of the groups ($P>0.05$). CONSLUSIONS: While there was a lack of significant differences in biomechanics between groups receiving different modes of feedback our findings did reveal statistically significant limb asymmetries regardless of feedback or time point. These results suggest that applying different modes of feedback during different exercises or in individuals with pre-existing "at risk" biomechanics at baseline may potentially return different results. Furthermore, the study emphasized the importance of screening for limb asymmetries and modifying interventions to address any identified discrepancies.

P139: DOES BIOLOGICAL SEX INFLUENCE THE RECOVERY OF QUADRICEPS NEUROMUSCULAR FUNCTION AFTER ACL RECONSTRUCTION

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BACKGROUND: Anterior cruciate ligament reconstruction (ACLR) is associated with persistent quadriceps dysfunction involving muscular weakness and altered spinal and cortical neural pathways. Comprehensive evaluation of recovery therefore requires assessment across these domains. Prior work suggests quadriceps neuromuscular

outcomes recover at different rates, yet most studies examine them in isolation. Females often demonstrate slower or less complete muscular recovery, though the time-dependent nature of these sex-specific outcomes remains unclear. Our purpose is to examine whether relationships between time since ACLR and quadriceps neuromuscular outcomes differ by sex across muscular, spinal, and cortical domains. METHODS: We will cross-sectionally enroll adults aged 18-35 with a history of primary, unilateral ACLR. Participants will be recruited 6 months to 10 years after surgery to ensure a wide recovery distribution. Time from surgery will serve as the explanatory variable. Peripheral, spinal, and cortical measures of quadriceps neuromuscular function will be recorded for each limb in random order. Peak isokinetic knee extension torque and total work (peripheral), the Hoffmann reflex (spinal), and active motor threshold derived via transcranial magnetic stimulation (cortical) will serve as dependent variables. Outcomes will be expressed for the involved limb and as a limb symmetry index. We will examine associations between time from surgery and neuromuscular outcomes using regression models. Strength outcomes will be analyzed with linear regression, whereas neural outcomes will be modeled with non-linear regression (asymptotic/spline fits); interaction terms will test for sex differences. ANTICIPATED RESULTS: We anticipate that greater quadriceps strength will associate with longer time from surgery, with females demonstrating a weaker association, suggestive of slower or less complete recovery. Spinal excitability is expected to be more impaired early after surgery with gradual improvement, whereas cortical excitability will exhibit prolonged deficits. We expect these relationships to differ by sex, providing a cross-sectional snapshot of neuromuscular recovery and preliminary evidence for sex-specific patterns.

P140: INFLUENCE OF HIGH INTENSITY RESISTANCE EXERCISE ON POSTPRANDIAL METABOLISM IN FEMALES

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BACKGROUND: The western diet is typically characterized by frequent consumption of highly processed, energy-dense meals with high fat content. Consumption of a high fat meal (HFM) results in acute impairment in fat oxidation and may be more detrimental to metabolic health when consumed prior to sleep. This study investigated the acute effects of high intensity resistance training (HIRT) on next-day substrate oxidation rates after consuming HFM the night prior. **METHODS:** Nine females (age, 21.0 ± 2.4 y; height, 163.0 ± 6.5 cm; mass, 62.9 ± 6.7 kg; VO_{2peak}, 34.2 ± 4.2 ml·kg^{-1}·min^{-1}) participated in two randomized trials, acting as their own control. Participants completed either HIRT and then consumed a HFM post-exercise or consumed the HFM absent of exercise pre-ingestion. For both trials, participants arrived in the fasted state (> 4 h) and consumed the same meal for breakfast and lunch for each trial. The next day, participants arrived following an overnight fast (>8 h) in the laboratory to perform a 6-stage, graded exercise test. Indirect calorimetry was used to measure respiratory exchange ratio (RER) differences between groups. **RESULTS:** A 2×6 (condition×stage) repeated measure ANOVA revealed a significant main effect for stage (p < 0.001), although there was no significant main effect for condition (p = .88) or interaction (p = .59). **CONCLUSION**: HIRT completed prior to the ingestion of a HFM and then followed by sleep, does not induce notable changes in post-absorptive RER values in healthy females.

P141: IMPACT OF COLD-WATER IMMERSION AND CONTRAST BATHING ON METABOLISM RESPONSES AND PERCEIVED EXERTION

Courtney Chaise Dillard. *University of North Alabama, Florence, AL.*

Title: IMPACT OF COLD-WATER IMMERSION AND CONTRAST BATHING ON METABOLISM RESPONSES AND PERCEIVED EXERTION **Authors**: Courtney C. Dillard[1], German M. Roca[1], Walter Staiano[2], Benjamin C. Skutnik[3], Thomas S. Lyons[1], & Hunter S. Waldman[1]
Institution: University of North Alabama[1], University of Valencia[2], Indiana University-Bloomington[3]
BACKGROUND: Cold water immersion (CWI) stimulates the sympathetic nervous system, resulting in the mobilization of substrates to fuel the thermogenic process required to defend the body against the cold via shivering and nonshivering thermogenesis. Nonshivering thermogenesis is primarily fueled by lipids via recruitment of type I fibers. Contrast bathing (CB), alteration between cold (CWI) and heat (sauna), presents a sympathetic response intermittently shifting between vasoconstriction and vasodilation, respectively. **METHODS:** Each participant will complete all three conditions: 1) 10 min of CWI 2) CB alternating 2-min intervals for a total of 10 min, and 3) seated rest (CON) for 10 min. The order of the conditions will be randomized for each participant. For each trial, participants will arrive in a fasted (>6 h) state and provide baseline resting metabolic data for 5 min. Then, participants will perform their assigned condition for 10 min, followed by collection of post-metabolic data for 20 min, and ending with a 6-stage graded exercise test (GXT) on a cycle ergometer. Indirect calorimetry will be used to measure all metabolic data. Secondary outcomes include core temperature, a visual analog scale for shivering, and rating of perceived exertion (RPE) during the GXT. **ANTICIPATED RESULTS:** Based on the current literature, it is hypothesized that CWI will elicit a greater increase in fat metabolism (denoted by lower respiratory exchange ratio) during the 20-min period and during the GXT as compared to CB and CON. Regarding secondary measures, CWI will induce an increase in RPE during the GXT due to potential cold-induced stiffness compared to CB and CON.

P142: EVALUATING THE IMPACT OF HIGH-INTENSITY HEART RATE BASED TRAINING ON NEXT-DAY RESTING METABOLIC RATE

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HIGH-INTENSITY HEART RATE-BASED TRAINING INCREASES RESTING METABOLIC RATEChasenne A. Spellman, Kurt A. Escobar, Kevin A. Valenzuela, Evan E. Schick.
California State University, Long BeachBACKGROUND: The marketing claim of a popular commercial gym chain states that maintaining ≥ 84% of maximum heart rate (HRmax) for 12-20 minutes during a single exercise session will increase metabolic rate for up to 24 hours post-exercise. However, this claim has never been scientifically validated. Therefore, the purpose of this study was to evaluate the effect of a single session of high-intensity exercise (12-20 mins at ≥ 84% HRmax) on resting metabolic rate (RMR) the following day. METHODS: Ten moderately active adults (five males, five females; age: 26.6 ± 2.8 years; height: 172.98 ± 11.09 cm; body mass: 72.08 ± 12.07 kg) completed an exercise protocol designed to replicate the target intensity of ≥ 84% HRmax. Resting metabolic rate (RMR) and respiratory quotient (RQ) were measured via indirect calorimetry on Day 1 (RMR_D1 and RQ_D1) and repeated 24 hours post-exercise (RMR_D2 and RQ_D2). Blood glucose (BG) and blood lactate (BL) were measured pre-exercise (PRE), immediately post-exercise (IP), and 10 minutes after cooldown (PCD). RESULTS: Results showed significant time effects for BG (p = 0.009) and BL (p < 0.00001), with BG increasing from PRE (79.1 ± 7.5 mg/dL) to IP (92.5 ± 13.7) and PCD (96.1 ± 13.5). BL increased from PRE (1.6 ± 0.9 mmol/L) to IP (6.4 ± 2.3 mmol/L) before decreasing at PCD (4.1 ± 1.6). Paired-sample t-tests indicated a significant increase in RMR from RMR_D1 (1862.7 ± 244.5 kcal/day) to RMR_D2 (1935.5 ± 223.6; p = 0.043), and in normalized RMR from 26.0 ± 2.1 to 27.1 ± 2.4 kcal/kg/day (p = 0.047). RQ_D2 was elevated relative to RQ_D1 (0.87 ± 0.06 vs. 0.83 ± 0.04, p = 0.021). CONCLUSIONS: These findings lend validation to the claim that maintaining ≥ 84% of HRmax for 12-20 minutes during heart rate-based training elicits a significant increase in RMR 24 hours post-exercise.

P143: LONGITUDINAL AND AGE RELATED RISK OF FEMALE ATHLETE TRIAD IN COLLEGIATE ATHLETES

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BACKGROUND: The female athlete triad is a condition many female athletes either experience or are at a high risk for and includes the three components of decreased bone mineral density, low energy availability, and menstrual dysfunction. The longer an individual suffers from the female athlete triad, the more severe impacts they have on their health such as an increased risk of fractures and osteoporosis later in life. While it is known that the female athlete triad is a prevalent issue in collegiate athletes, the triad risk of athletes based on age and whether their risk decreases once they are aware of the issue is not well studied. The purpose of this study is to assess if age and longitudinal awareness of the triad have an impact on female collegiate athletes' risk of the female athlete triad using the Low Energy Availability in Females Questionnaire (LEAF-Q). METHODS: Female collegiate athletes will fill out the LEAF-Q on REDCap in a self-report format. Once the responses are collected, the data will be analyzed to determine each athlete's risk of the triad, along with descriptive statistics. Analysis of the data will also include correlations to observe the relationship between triad risk and other variables such as age and completion of the LEAF-Q in the past. ANTICIPATED RESULTS: Compared to younger athletes, older athletes will demonstrate greater risk of triad with more reported health complications due to long-term low energy availability. Additionally, it is anticipated that athletes who previously completed the LEAF-Q and gained knowledge of the female athlete triad in the past will have a

lower risk, as increased awareness may influence their lifestyle choices and behaviors.

P144: CHARACTERIZING HORMONE VARIABILITY IN PERIMENOPAUSAL FEMALES LEVERAGING DAILY AT-HOME HORMONE MONITORING.

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BACKGROUND: Perimenopause is characterized by unpredictable fluctuations in estrogen, progesterone, luteinizing hormone (LH), and follicle-stimulating hormone (FSH). The purpose of this study was to describe hormone variability with daily urine hormone testing to better characterize individual variation from daily vs 5-day measurement. A secondary aim was to evaluate the relationship between urine and blood hormones. METHODS: Data from 20 perimenopausal females (mean ± standard deviation: age: 47.4 ± 4.7 years, height: 163.3 ± 5.5 cm, BMI: 31.6 ± 4.4 kg/m^2) were analyzed. Participants completed 24-30 days of at-home urine hormone testing (Inito or Oova Fertility Monitors) and 1-2 single time point urine and serum measurements at laboratory visits. Area under the curve (AUC) was calculated for daily (24-30 days) vs 5-day timepoints to quantify hormone variability; values were compared using a paired samples t-test. RESULTS: AUC comparisons between daily estrogen (5163.6 ± 3730.0 ng/mL), LH (36.8 ± 39.6 mIU/mL), progesterone (124.8 ± 111.3 ug/mL), and FSH (85.2 ± 106.6 mIU/mL) and 5-day estrogen (5356.7 ± 3727.3 ng/mL), LH (44.5 ± 43.7 mIU/mL), progesterone (136.2 ± 136.4 ug/mL), and FSH (83.0 ± 93.2 mIU/mL) were not different at any time point (p>0.05). However, daily urine hormone sampling captured more hormonal trends than 5-day sampling, including increased number of peaks (daily n=7.8 vs 5-day n=2.3) and increased peak magnitude. Hormone concentration percent change from day-to-day measurement resulted in an average change of 132% ± 672%. CONCLUSIONS: Daily monitoring provided clinically relevant insights by detecting fluctuations and trends often missed with less frequent sampling methods, such as single urine and blood assessments. These findings highlight the need for individualized and extended hormone monitoring during perimenopause to provide detailed and regular feedback to women on how their hormones are changing, and to guide associated symptom management. Grant or funding information: American Diabetes Association, 7-23-ICTSWH-04. Artificial intelligence (AI) tools were not used in the collection and analysis of data, writing of the abstract/presentation, and production of images or graphical elements of this abstract/presentation.

P145: THE INFLUENCE OF 16-WEEK MINIMAL EXERCISE INTERVENTION ON METABOLISM AND CARDIOVASCULAR MEASURES IN TYPE-2 DIABETICS

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Background Type-2 Diabetes (T2DM) is a challenging metabolic condition with complicated physical and metabolic consequences. A commonly reported issue with exercise-based treatment of T2DM is that duration of prescribed interventions is too long. Therefore, the purpose of this study was to determine the effectiveness of a 16-week intervention of a minimal dose high-intensity bodyweight circuit (HIBC) program on markers of metabolic and cardiovascular function in persons with type 2 diabetes (T2DM). **Methods:** 19 Participants between the ages of 40-65 years who were diagnosed with T2DM were recruited for this study. Prior to the intervention, participants underwent assessments of glycosylated hemoglobin (HbA1c) and fasting plasma glucose (FG), oral glucose tolerance test area under the curve (AUC), systolic blood pressure (SBP), and diastolic blood pressure (DBP). Metabolic markers were collected via finger stick blood sample. SBP was taken via Finapres NOVA. Participants then completed a 16-week HIBC intervention consisting of a circuit of 10 modified bodyweight squats, 5 modified pull-ups, 5 modified push-ups, and 10 abdominal crunches. Participants completed as many cycles of circuit as possible within 5-minutes and progressing to 10-minutes during the 16-week intervention. Session frequency progressed from 3 to 4 days per week. All assessments performed at baseline were repeated after 16 weeks of training. **Results:** A total of 12 participants completed the study: female (n=5, 50.6 ± 7.09yr), male (n=7, (52.16 ± 2.86 yr). A paired samples t-test showed decreases in HbA1c: (p=.034*), SBP: (p=0.042*), and DBP: (p=0.202), while increases were found in FBG: (p=.088) and (AUC): (p=.179). **Conclusion:** The HIBC resulted in significant reductions in HbA1c and SBP, while failing to alter FBG or AUC. This may be the result of inter-participant glycemic variability or anticipatory fluctuations, continued glucose monitors should be used in future research studies. HIBC showed to be a beneficial intervention for reducing HbA1c and SBP.
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P146: CHRONIC TURKESTERONE SUPPLEMENTATION ON BODY COMPOSITION/ATHLETIC PERFORMANCE.

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Purpose: Turkesterone, a phytoecdysteroid derived from Ajuga turkestanica, has gained popularity as a natural anabolic supplement, yet little research exists in humans. The purpose of this study is to examine the effects of 6 weeks of turkesterone supplementation on body composition, athletic performance, and perceived stress in resistance-trained adults.
Methods: A randomized, placebo-controlled, double-blind intervention design will be employed. 30 resistance-trained males and females (18-35 yrs) will complete a standardized resistance training program combined with either daily turkesterone supplementation (500 mg/day) or a placebo for 6 weeks. Assessments will be conducted at baseline and post-intervention. Body composition will be measured via bioimpedance analysis. Performance outcomes will include a squat one rep max, countermovement jump height, and squat reps to failure. The Cohen's perceived stress scale will measure stress. Participants will complete weekly supplement compliance logs, training logs, and symptom/adverse event questionnaires. A repeated measures ANOVA will be used to compare baseline and post-intervention values
Anticipated Results: It is hypothesized that turkesterone supplementation combined with resistance training will result in significant increases in lean body mass, maximal strength, and power compared to baseline, with minimal changes in fat mass. Perceived stress is expected to decrease. It is further anticipated that the supplement will be well-tolerated, with few adverse events reported.

P147: β-ALANINE SUPPLEMENTATION DOES NOT ATTENUATE INFLAMMATION OR IMPROVE MUSCLE FUNCTION FOLLOWING RESISTANCE EXERCISE

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This study assessed the effects of β-alanine supplementation on the inflammation response, as measured by Interleukin-6 (IL-6) levels, and subsequent muscle function in resistance-trained individuals following a single bout of resistance exercise. Fourteen resistance-trained subjects were recruited for a double-blind, between-group experiment. Subjects were randomly assigned to receive either 6.8 g of β-alanine daily or a placebo. After the supplementation period, subjects performed a standardized exhaustive squat protocol (10 sets of 10 repetitions at 60% of their estimated 1RM). Venous blood samples were collected pre-exercise, 24 hours post, and 72 hours post to assess plasma IL-6 levels using an enzyme-linked immunosorbancy assay. Muscle function was assessed via vertical jump height, ground reaction force, and peak and mean isokinetic leg extension torque at the same time points. A two-way analysis of variance (ANOVA) with repeated measures was used for statistical analysis.A significant main time effect for IL-6 levels was observed (p=0.028), as levels increased 24 hours post-exercise and declined by 72 hours in both groups, but no significant time*group interaction was detected (p=0.573). No significant main effect of time (p=0.368) or interaction effect (p=0.307) was observed for peak vertical jump, despite numerically higher scores in the β-alanine group across all time points. Similarly, no significant time or interaction effects were found for ground reaction force. A significant main time effect was observed for peak isokinetic leg extension torque (p=0.039), showing a decrease at 24 hours and a return towards baseline at 72 hours. However, no significant time-by-group interaction was found for peak (p=0.165) or mean (p=0.893) isokinetic leg extension torque. β-alanine supplementation did not significantly alter the post-exercise inflammation response or subsequent muscle function in resistance-trained individuals compared to a placebo. This suggests that in this specific context, β-alanine's influence on these recovery markers following an acute bout of resistance exercise is minimal.

P148: EXAMINING THE EFFECTS OF CREATINE SUPPLEMENTATION WITH RESISTANCE TRAINING ON BODY COMPOSITION IN COLORECTAL CANCER

Brett M. Scott, Alexander M. Brooks, Genevieve L. Bottone, Kylah E. Jackson, Colin F. O'Mahoney, Ciaran M. Fairman. *University of South Carolina, Columbia, SC.*

Background: Individuals with cancer frequently experience adverse changes in body composition as a result of anti-cancer therapies. Resistance training (RT) is an established strategy to improve body composition, and creatine supplementation has been suggested as a potential adjunct to enhance lean mass adaptations. However, its

effects in cancer remain underexplored. The purpose of this study was to evaluate whether creatine supplementation augments body composition adaptations during a 10-week RT intervention in colorectal cancer (CRC).**Methods:** CRC survivors completed a 10-week RT program in a randomized, placebo-controlled design. Participants (n=23) were randomized to receive either creatine monohydrate (CRE) (n = 12; 20 g/day for 7 days, then 5 g/day for 9 weeks) or placebo (PLA) (n = 11). RT was conducted three times per week, targeting major muscle groups. Dual-energy X-ray absorptiometry was used to assess body weight, fat mass (FM), lean body mass (LBM), and appendicular lean mass (ALM) at baseline and post-intervention. Group (CRE v PLA) × time (pre vs post) effects were analyzed using mixed ANOVAs.**Results:** Mixed ANOVA revealed significant main effects of time for ALM (CRE: +1.59 ± 2.08 kg; PLA: +0.56 ± 1.64 kg; $p < 0.001$) and LBM (CRE: +1.77 ± 2.69; PLA: +0.58 ± 1.80 kg; $p = 0.018$), indicating overall increases across participants. Significant main effects of group were also observed for ALM ($p = 0.03$) and LBM ($p = 0.01$). However, there were no group × time interactions (ALM $p = 0.11$; LBM $p = 0.47$). Body weight showed a main effect of group ($p = 0.007$), but not time ($p = 0.21$) or interaction ($p = 0.41$). Fat mass showed no significant effects.**Conclusion:** Ten weeks of supervised resistance training improved LBM and ALM in CRC, with no additive effects of creatine. Resistance training appears effective for enhancing body composition, while the role of creatine remains uncertain and warrants further study.

P149: CREATINE SUPPLEMENTATION AND RESISTANCE TRAINING EFFECTS ON MUSCULAR STRENGTH AND POWER IN COLORECTAL CANCER.

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BACKGROUND: Colorectal cancer (CRC) is the third most commonly diagnosed cancer in the US and has an overall 5-year survival rate of approximately 65%. Rising incidence and survival rates have resulted in a growing population of individuals treated for CRC at risk of functional decline. The positive effects of resistance training (RT) on physical function among cancer survivors are well documented. Creatine supplementation has been demonstrated to augment adaptations in muscular strength and power when combined with RT across a variety of populations, though its application has not been studied extensively in oncology. This study evaluates whether creatine supplementation combined with RT enhances muscular strength and power compared with RT alone in individuals treated for CRC. **METHODS:** We conducted a 10-week double-blind randomized controlled trial with 22 individuals treated for CRC (mean age: 62.5 ± 12.8 years). Participants were randomized to a creatine group (CRE [n = 11]) or a dextrose placebo group (PLA [n = 11]), with each consuming 7g/day. Both groups performed resistance training 3 times per week (2 in-person, 1 virtual). Pre- and post-intervention assessments included sit-to-stand power (STSP; using a linear transducer) and one-repetition maximum (1RM) for chest press and leg extension. Group (CRE vs PLA) × time (pre vs post) effects were analyzed using two-way repeated-measures ANOVA and statistical significance was defined as $p < 0.05$. **RESULTS:** Significant time effects for strength (1RM) were observed from pre- to post-intervention ($p < 0.01$) for chest press (CRE: +8.0 ± 5.2kg; PLA: +6.8 ± 3.8kg) and leg extension (CRE: 12.3 ± 9.3kg; PLA: 11.7 ± 7.2kg). A significant time effect for STSP was found from pre- to post-intervention ($p < 0.01$) (CRE: 189.0 ± 314.8W; PLA: 208.8 ± 260.9W). No significant group × time interactions were observed for any outcomes (all $p > 0.5$). **CONCLUSIONS:** 10-weeks of RT improves muscular strength and power in individuals with CRC, with no apparent additive effects of creatine supplementation.

P150: RELIABILITY STABILITY AND VALIDITY OF A READINESS TO TRAIN SCALE IN CANCER SURVIVORS

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BACKGROUND - Exercise improves functional capacity and reduces side effects for people with cancer. However, current research has yet to identify stable, reliable, and validated measures to aid exercise professionals in understanding day-to-day variations in the patient's perceived ability to perform a prescribed exercise. Readiness to train (RTT) is an increasingly used construct in exercise prescription to subjectively identify the potential fluctuations in patients' ability to perform exercise. Here, the scale has been adapted for use in cancer. Thus, the purpose of this study is to examine the reliability, stability, and validity of the RTT scale within and across exercise sessions in people affected by cancer. METHODS - We propose to recruit 200 people with a cancer diagnosis enrolled in the Get Real and Heel (GRH) exercise program, a mixed modality exercise training program specialized in increasing physical activity levels in cancer patients and survivors. The RTT scale takes 1-2 min. to administer and will be completed at 3 timepoints per session (pre-exercise, 10 min. into exercise, and 30 min. post-exercise) across 4 separate sessions within a 4-week window. Each exercise session consists of 20-30 min of aerobic exercise followed by 20-30 min of resistance training. Rates of perceived exertion (RPE), heart rate, exercise intensity, and exercise compliance will also be assessed. Reliability and stability will be assessed using Cronbach's alpha and intraclass correlations coefficients (ICC). Construct and criterion validity will be assessed using correlations and regression analyses. ANTICIPATED RESULTS - It is hypothesized that our RTT scale will be reliable overall (Cronbach alpha >0.8) with moderate to good stability (ICC = >0.7) between sessions. It is also expected that RTT scores taken 10 minutes into exercise will most closely align with heart rate, RPE, and exercise compliance, and changes in these outcomes will correlate with changes in RTT that will indicate validity.

P151: AFFECTS OF LIPID LOWERING MEDICATION ON BODY COMPOSITION OF MASTER ATHLETES

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BACKGROUND: Sports cardiology is an emerging field that addresses the cardiovascular health of active individuals. Despite the high prevalence of cardiovascular risk factors among master athletes, limited data exist on whether lipid-lowering medication (LLM) influences body composition. Understanding these relationships is essential as both LLM use and master athlete participation continue to rise. PURPOSE: To evaluate whether LLM use is associated with differences in body composition among master athletes with cardiovascular risk factors. METHODS: Thirty-two master athletes (53% male, 47% female; age 32-73 yrs) underwent BOD POD assessments. Sixteen reported LLM use, and sixteen did not. Measured variables included body fat percentage (BF%), fat mass (FM), fat-free mass (FFM), fat-free mass percentage (FFM%), body mass (BM), body volume (BV), body density (BD), thoracic gas volume (TGV), and BMI. Group comparisons were conducted with independent samples t-tests (SPSS v27.0), $p < 0.05$. Effect sizes (Cohen's d) were calculated to assess the magnitude of differences. RESULTS: LLM users showed slightly lower BF% (23.1 ± 6.8 vs. 25.9 ± 7.2%, $d = 0.40$, $p = 0.09$) and FM (17.2 ± 5.9 vs. 19.8 ± 6.3 kg, $d = 0.42$, $p = 0.08$), and higher FFM% (76.9 ± 6.8 vs. 74.1 ± 7.2%, $d = 0.39$, $p = 0.10$) compared with non-LLM athletes. No significant differences were observed for BM ($p = 0.28$), BV ($p = 0.25$), BD ($p = 0.21$), TGV ($p = 0.34$), or BMI ($p = 0.30$). Although not statistically significant, small-to-moderate effect sizes suggest a potential favorable trend toward lower fat mass and higher lean mass among LLM users. CONCLUSION: This study provides preliminary evidence that LLM use may be associated with modestly improved body composition profiles in master athletes with cardiovascular risk factors. While statistical significance was not reached, observed trends and effect sizes warrant further investigation in larger, multi-site studies to clarify the role of LLMs in body composition and cardiovascular risk management in aging athletic populations.

P152: A NETWORK VIEW OF CARDIO-NEUROMUSCULAR COUPLING IN ELITE SOCCER

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BACKGROUND: Elite soccer requires concurrent cardiovascular and neuromuscular adaptations. Traditionally, cardiac remodeling (e.g., left ventricular hypertrophy) and explosive power are studied in isolation. The Network Physiology of Exercise framework, however, posits that these systems function as an integrated, inter-system coupled network. The purpose of this study was to use a network analysis approach to determine if a unique, direct link exists between left ventricular mass (a key marker of cardiac remodeling) and peak explosive power, after accounting for all other related performance variables. METHODS: Nineteen elite male soccer players from the Greek Super League participated. Participants underwent 2D echocardiography to measure the left ventricular mass index (LVMI) and a 15-repetitive vertical jump test to assess multiple neuromuscular variables, including maximum jump height (hMAX). A partial-correlation network model was then constructed to map the unique relationships between all variables simultaneously. RESULTS: The network analysis revealed a single, significant inverse connection

between LVMI and hMAX (partial r = -0.41, p < 0.05). Critically, this negative link was highly specific; LVMI was not directly connected to any other jump metrics in the network.This indicates a targeted trade-off between cardiac mass and peak power, rather than a global suppression of neuromuscular performance. CONCLUSIONS: When the cardio-neuromuscular system is analyzed as an integrated network, a clear functional trade-off emerges: a heart adapted for endurance is specifically linked to a lower peak explosive output. This systems-level insight moves beyond simple correlation and provides a more precise foundation for monitoring athlete sand optimizing training to preserve explosive power. This study highlights the value of a network approach in sports science.

P153: EFFECTS OF VAGAL NERVE STIMULATION ON POINCARÉ PLOT INDICES IN WOMEN WITH RHEUMATOID ARTHRITIS

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BACKGROUND: Vagal modulation is decreased in women with rheumatoid arthritis (RA). Transcutaneous vagal nerve stimulation (tVNS) may increase vagal modulation, as indicated by changes in non-linear measures of heart rate variability (HRV). The purpose of this study is to examine the effects of tVNS on non-linear measures of HRV in women diagnosed with RA. **METHODS:** Three women diagnosed with RA (Age: 51±5 years, BMI: 25.1±8.7 kg/m^2) volunteered to participate. Participants attended the laboratory for three visits separated by 10 days. At Visit 1, anthropometric data was collected, and participants were familiarized with heart rate (HR) assessment using a chest strap (PolarH10) and mobile phone application (Elite HRV). Participants were instructed to assess their morning HR daily. At Visit 2, 10-day HR data was exported from participant's cell phone (baseline) and participants were familiarized with tVNS (Xen) and a mobile phone application (Neuvana). At Visit 3, 10-day HR data was exported (post tVNS). Non-linear HRV measures were derived using Poincaré plot analysis (Kubios HRV software). Poincaré plot indices included: SD1, the standard deviation (SD) of the minor axis, which reflects vagal modulation; SD2, the SD of the major axis, influenced by both vagal and sympathetic tones; and the SD1/SD2, the axis ratio, demonstrating the relationship between these components. 10-day averages of SD1, SD2 and SD1/SD2 indices at baseline and post tVNS were calculated. Significant differences between SD1, SD2 and SD1/SD2 indices at baseline and post tVNS were determined using Wilcoxin Tests. Significance was accepted a priori $p \leq 0.05$. **RESULTS:** There were no significant differences ($p > 0.05$) between baseline and post tVNS for SD1 (baseline: 19.6±12.7ms, post tVNS: 19.6±11.5ms), SD2 (baseline: 51.5±25.7ms, post tVNS: 42.8±16.5ms), or SD1/SD2 (baseline: 3.1±0.7, post tVNS: 2.8±0.5). **CONCLUSIONS:** The preliminary findings of this study suggest that 10 days of tVNS does not improve non-linear measures of HRV in women with RA. However, given the small sample size these results should be interpreted with caution. Future research with a larger cohort is warranted to more definitively determine the potential of tVNS as a therapeutic strategy for autonomic dysfunction in RA.

P154: ABSTRACT WITHDRAWN

P155: A COMPARISON OF FUNCTIONAL TEST CEILING EFFECTS IN INDIVIDUALS WITH CANCER

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BACKGROUND: Accurate assessment of physical performance is critical for cancer survivors, as treatment can affect mobility, strength, and function. The Short Physical Performance Battery (SPPB) is widely used to assess lower extremity function. However, it may lack sensitivity in detecting changes in higher-functioning individuals due to ceiling effects. The Bellarmine Norton Assessment Tool (BNAT) was designed to provide a broader evaluation of functional capacity by incorporating additional domains such as endurance, muscular strength, and mobility. The purpose of this study was to compare the ceiling effects of the SPPB and BNAT in a diverse cohort of cancer survivors. METHODS: Participants (n=62); mean age 61 ± 11 years; 81% female) completed both the SPPB (range 0-12) and BNAT (range 0-25). Means, standard deviations, and frequency distributions were calculated for total and subtest scores. Ceiling effect was defined as the percentage of participants achieving the maximum possible score for each measure. The proportion scoring within minimal clinically important difference (MCID) of the maximum was calculated for each test. RESULTS: The mean SPPB score was 10.93 ± 1.84, while the BNAT mean was 20.06 ± 4.38. Thirty-three participants (53%) scored the max SPPB score, compared with four participants (6.5%) who scored the max BNAT score. When accounting for scores within the range of MCID, 48 participants (77%) scored within one point of the SPPB max, whereas 27 participants (44%) scored within three points of the BNAT max. CONCLUSIONS: The SPPB showed a notable ceiling effect in this cohort of cancer survivors, limiting its ability to differentiate among higher-functioning individuals. The BNAT showed fewer ceiling effects and greater variability across domains, suggesting it may provide a more sensitive assessment of physical performance. Further research is needed to confirm these findings and to evaluate the BNAT in larger and longitudinal samples.

P156: BONE MINERAL ADAPTATIONS TO CALORIC RESTRICTED DIET AND AEROBIC TRAINING IN OBESE PATIENTS WITH HFPEF

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BACKGROUND: Heart failure with a preserved ejection fraction (HFpEF) is a rapidly increasing, more prevalent, and higher health risk concern than other forms of heart failure. Patients with HFpEF do not have a treatment regimen like patients with a reduced ejection fraction. Research on the treatment of comorbidities of HFpEF such as obesity (80% of HFpEF patients) have shown promising results through lifestyle interventions of aerobic training (AT) and caloric restricted diet (CR). These results have highlighted 10% reduction in body weight, although ~35% of that weight loss was skeletal muscle mass. The bone mineral adaptations of this weight loss have not been evaluated and could lend to more insight on the treatment of HFpEF. Thus, the purpose this secondary analysis of the SECRET trial was to determine the bone mineral adaptations from a weight loss program on patients with HFpEF. METHODS: Participants (N=100, age 67+-5, body mass index 39.3+-5.6) were randomized to either AT, CR, AT+CR, or control. Of the 100 participants, 96 completed a 20-week intervention at an academic medical center. Bone mineral adaptations were measured using a full body Dual-Energy X-Ray Absorptiometry (DXA, Hologic Delphi QDR, Bedford, MA, software Version 12.3) scan at baseline and follow up. The outcome variables included total bone mineral content (BMC, g). A mixed ANOVA was conducted to examine whether change in BMC differed by condition, and a Pearson correlation was conducted to investigate the strength of the relationship between weight loss and bone mineral adaptions. RESULTS: The mixed ANOVA revealed no significant group by time interaction; F(3,81) = 0.33, p = 0.81, eta^2 = 0.01. The main effect for time approached statistical significance; F(1,81) = 3.62, p= .06 , eta^2 = 0.04. Descriptive statistics revealed this was driven by a reduction of 11.7 g. The main effect for group was not statistically significant; F(3,81) = 1.33, p = 0.2 0, eta^2 = 0.05. A bivariate correlation revealed a very weak correlation between weight loss and bone adaptation (r = .04, p = .70). CONCLUSIONS: These findings suggest that AT and CR interventions in patients with HFpEF have minimal impact on bone mineral content. Further investigation is warranted on whether these findings are persistent on weight bearing regions of the skeleton such as the hip and spine.

P157: PHYSICAL FUNCTION OUTCOMES IN VIRTUAL VS. IN-PERSON CANCER EXERCISE PROGRAMS

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BACKGROUND: Individuals with cancer often experience declines in functional performance that affect quality of life. While in-person exercise programs improve function, the effectiveness of virtual delivery is less understood. This study compared changes in functional performance following an 8-week resistance training program delivered virtually or in person. METHODS: Participants were recruited from local hospital systems in South Carolina and enrolled in an 8-week supervised resistance training program delivered virtually (Zoom/FaceTime) or in person. Each session included 6-8 resistance exercises targeting major muscle groups. Assessments were conducted one week before and after the intervention using the Bellarmine Norton Assessment Tool (BNAT) and additional functional measures. Linear mixed-effects models with fixed effects for group, time, and their interaction and random intercepts for participants were used. Mean (± SD) change scores were calculated, with significance set at $p < 0.05$. RESULTS: A significant main effect of time was observed for BNAT ($F(1,18) = 36.68$, $p < 0.001$), with improvements from pre- to post-intervention in both groups; no main effect of group ($p = 0.39$) or Group × Time interaction ($p = 0.29$) was detected. Physical activity did not change significantly ($F(1,18) = 1.88$, $p = 0.19$), and neither group ($p = 0.48$) nor interaction ($p = 0.69$) effects were observed. Performance on the two-minute step test ($F(1,18) = 6.42$, $p = 0.021$), sit-to-stand ($F(1,18) = 7.98$, $p = 0.011$), and arm curl ($F(1,18) = 94.61$, $p < 0.001$) improved significantly over time. No group or interaction effects were identified for any outcome. DISCUSSION: Participants demonstrated significant improvements in

multiple functional outcomes over the intervention, with no differences between delivery formats. Both virtual and in-person approaches appear feasible for supporting functional gains in individuals with cancer.

P158: INTERMITTENT PALM COOLING'S EFFECT ON HEART RATE AND THERMAL MEASURES FROM MULTIPLE SCLEROSIS PATIENTS

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BACKGROUND: Heat intolerance is common among multiple sclerosis (MS) patients. Currently, prescribing exercise to MS patients is a double-edged sword; while it helps maintain or restore neurological function, the added heat production exacerbates their heat intolerance and difficulties they experience in lowering body temperatures. Palm cooling, a form of conductive heat transfer, was examined for its impact on heart rate and thermal changes produced by exercise. METHODS: Twelve MS patients were recruited for this study. Each workout was done either with, or without, palm cooling determined by random draw as they pedaled against prescribed workloads. Heart rate, thermal flux, palm and tympanic temperatures were each measured before workouts, at the end of the 3-minute warmup on the ergometer, the 5th and 15th minute of exercise, as well as the 30th, 45th, and 60th minute of post-exercise recovery. Heart rate and the three thermal measures were each examined with two-way ANOVAs, with repeated measures for treatment and time. A Bonferroni correction for multiple comparisons, to reduce type I error rates, lowered the alpha level to denote significance to $p=0.0038$. RESULTS: Nine participants completed both cycle ergometry workouts, which were used in the final analysis. Palm temperature, thermal flux, and heart rate each had significant interactions between groups and across time points ($p<0.01$). Palm temperature and heart rate results included significantly higher values for the no palm cooling treatment at multiple times by 13% on average during and after workouts. Conversely, thermal flux had significantly higher values for the palm cooling treatment across time by an average of 370% ($p<0.01$) during and after workouts. CONCLUSIONS: These data show that palm cooling reduces heart rate during submaximal exercise compared to no palm cooling, possibly due to higher thermal flux that also occurred during the workouts with palm cooling. Large effect sizes contributed to the two-way interactions and offer evidence of palm cooling's merits. Since MS patients must rely on thermal conduction more than healthy persons for heat transfer, palm cooling is an option they should consider to reduce their heat intolerance.

P159: COMPARING LUNG FUNCTION SCORES OBTAINED FROM PORTABLE SPIROMETERS VS. A COMPUTERIZED SYSTEM: A RELIABILITY STUDY

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BACKGROUND: Spirometry is a clinical tool used to assess lung function and screen for signs of lung disease. Many hand-held, battery-operated spirometry devices only measure Vital Capacity (VC) and Forced Expiratory Volume in 1 Second (FEV1). These two variables mostly reflect airflow through large airways, making it difficult to detect abnormalities in smaller airways, where signs of lung disease may show up sooner than in large airways. Thus, these commonly used portable devices may not be best for detecting early signs of lung disease. On the contrary, computer-based spirometry systems can measure airflow from both small and large airways (Forced Expiratory Flow 25-75%; FEF2575), and may detect abnormalities that some hand-held devices may miss. The purpose of this study is to compare spirometry data obtained from a hand-held device that measures only FEV1 and VC to a hand-held device and a computerized system that both measure FEV1, VC, and FEF2575; allowing an examination of device reliability and validity. METHODS: Thirty adults (age 18 yr and older) with and without asthma will be recruited. Participants will complete spirometry testing in random order on all three devices on two separate occasions: one day for the computer-based testing and one day for both hand-held devices. One way ANOVA and Pearson correlations will be used to determine any significant differences between devices as well as determine device reliability for each variable. ANTICIPATED RESULTS: All three devices will be significantly correlated with regard to VC, FEV1, and FEF2575. FEF2575 scores will be below normal in those with asthma despite normal values for VC and FEV1.

P160: CONSTRUCT VALIDITY OF A SIT-TO-STAND POWER TEST FOR ASSESSING PHYSICAL FUNCTION IN CARDIAC REHABILITATION

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BACKGROUND: Physical function assessment is an important component of cardiac rehabilitation (CR) to guide exercise prescription and monitor progress. Common assessments include 6-minute walk distance (6MWD), gait speed, and grip strength. The 5-time and 30-sec sit-to-stand (STS) assess lower body function; however, performing repeated STS may be challenging for patients with frailty, high fall risk, or contraindications to strenuous exertion. A single STS with the Tendo Power Analyzer (TENDO) may offer a safe and time-efficient alternative to quantify muscle power and function while minimizing overexertion. The utility of this test and its relationship with common CR assessments have not been established. **PURPOSE:** The purpose of this study was to examine the association between a single STS with the TENDO and gait speed, grip strength, and 6MWD. **METHODS:** Thirty CR patients (78±9 years) completed a single STS with the TENDO to determine peak and average power. Grip strength (Jamar Hand Dynamometer), 4-meter gait speed, and 6MWD were also measured. Pearson product-moment correlations determined the relationship between STS power and grip strength, gait speed, and 6MWD. Significance was accepted at $p<.05$. **RESULTS:** Peak and average power were 580±274 and 302±121 watts, respectively. Heart rate increased minimally (4±6 BPM) during the STS. Peak power was associated with grip strength ($r=.71$; $p<.001$), gait speed ($r=-.53$; $p=.003$), and 6MWD ($r=.69$; $p<.001$). Average power was associated with grip strength ($r=.67$; $p<.001$), gait speed ($r=-.56$; $p=.001$), and 6MWD ($r=.62$; $p<.001$). **CONCLUSIONS:** Findings showed a moderate-to-strong correlation between the STS and established CR assessments, suggesting the single STS may be a valid assessment in CR. It elicited small heart rate changes and was well-tolerated in patients with varying diagnoses and capabilities, supporting its use as a safe and time-efficient clinical assessment. Future research should establish normative STS values.

P161: EXPLORING BREAST CANCER SURVIVORS' PERCEIVED QUALITY OF LIFE FOLLOWING A GROUP EXERCISE INTERVENTION

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BACKGROUND: Structured group exercise interventions can improve health, functional capacity, and treatment-related outcomes in breast cancer survivors (BCS), which positively affect quality of life (QOL). Less is known regarding how BCS perceive QOL and how their exercise experience influences it. A qualitative approach can address this gap by providing a more in-depth exploration, which can inform intervention design and improve clinical care. **PURPOSE:** The purpose of this study was to explore QOL perceptions in BCS and understand how a 24-week functional impact training (FIT) or yin yoga (YY) group exercise intervention influenced QOL. **METHODS:** Sixteen BCS (age: 63±8 years; FIT: n=7; YY: n=9) completed semi-structured interviews following the two interventions. Participants were asked to define QOL and discuss how the intervention influenced it. Interviews were audio recorded, transcribed, and analyzed using first and second cycle coding. **RESULTS:** Adherence to FIT and YY was 87±11% and 94±5%, respectively. Four themes represented participants' QOL definition: functional freedom, comprehensive health, social connection, and contribution to the greater good. Five themes emerged related to how the intervention influenced QOL: enhanced physical health, psychological benefits, increased exercise self-efficacy, motivation to move, and community. Themes were consistent across both groups. **CONCLUSIONS:** BCS had a comprehensive QOL definition, which included freedom to do activities they enjoy, finding balance between physical and mental health, forming social connections, and positively impacting others. Despite differences in exercise mode, FIT and YY groups expressed similar perceptions: improved physical and mental well-being, confidence in ability to exercise, motivation to be physically active, and enhanced relationships developed from the intervention. Therefore, YY may be a viable option for improving QOL in BCS who have functional limitations and may require a program of lower intensity. These findings demonstrate that FIT and YY improved multiple domains of QOL, highlighting the benefit of group exercise for BCS.

FUNDING: ACSM Foundation Student Research Grant; NSCA Foundation Graduate Student Research Grant

P162: DO COMPRESSION GARMENTS ENHANCE POTS SYMPTOM RELIEF DURING LOW-INTENSITY PHYSICAL ACTIVITY?

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BACKGROUND: Postural Orthostatic Tachycardia Syndrome (POTS) is characterized by atypical hemodynamic responses to changes in body position, consisting of tachycardia, hypotension and disrupted sleep. There is no known cure for POTS, but evidence suggests that physical activity is beneficial for symptom management due to plasma volume expansion and improved autonomic compliance. Despite these benefits, physical activity adherence in individuals with POTS is poor due to symptom-related discomfort. Compression garments have demonstrated effectiveness in improving venous return and hemodynamic responses during head tilt studies, with greater compression surface area leading to more normalized hemodynamic responses. No known studies have examined compression garment effectiveness in patients with POTS during physical activity. This study aims to advance current knowledge in POTS symptom relief by exploring the impact of varying levels of garment compression on hemodynamic function during self-paced walking. **METHODS:** Five premenopausal women with diagnosed POTS will participate in a single, cross-randomized trial including four 400-meter bouts of self-paced walking wearing varying degrees of garment compression (none, lower legs only, abdominal only, and legs plus abdominal compression). Measurements of heart rate, ECG-based heart rhythms, blood pressure, perceived exertion, and walking speed will be collected during each trial. Multivariate repeated measures ANOVA will be used to explore within-subjects differences in hemodynamic indicators, perceived exertion, and walking speed across compression conditions. **ANTICIPATED RESULTS:** A dose-response relationship will exist across compression levels, indicating that compression garments may enhance POTS symptom relief during low-intensity physical activity.

P163: IMMUNE CELL MOBILIZATION IN HEALTHILY INDIVIDUALS: CONTEXTUALIZING ROLES OF EXERCISE WITHIN CANCER PREVENTION AND CONTROL

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BACKGROUND: A well-structured exercise program can be a safe, effective, and non-pharmacological means of improving immune function and physical function. One of the most salient effects of acute exercise is a rapid mobilization on effector immune cells to the blood. In the context of cancer prevention, these transient exercise-induced immune mobilizations are thought to enhance tumor immunosurveillance and be a major mechanism behind the protective effects of exercise. However, cancer patients and survivors are often not able to exercise intensely. Therefore, it is important to determine the relative mobilization of different effector PBMCs during various intensities of exercise. To address this, we characterized immune mobilization to a single bout of moderate intensity exercise in healthy individuals. METHODS: 43 healthy individuals, 25 males and 18 females, performed a 25 minute stepwise graded exercise test cycling up to 80% of VO2max. Blood samples were obtained at baseline (Rest), 60%, 80%, and 1-hour post-exercise (1h Post). Participants' whole blood was then processed and analyzed; red blood cell composition was assessed by a complete blood count (CBC) analyzer. Major immune cell lineages were identified via multicolor flow cytometry. A one-way ANOVA was used to assess differences in immune cell concentration across timepoints. Fold changes were also calculated across timepoints relative to rest. RESULTS: There was an increase in mobilization across all major immune cell lineages at 60%. At 80% intensity this trend continues with cell mobilization doubling compared to 60%. In the effector, NK cells, this increase was most prominent. When comparing fold changes at 60% and 80% intensity NK cells and NK DC56dim cells exceeded a 2-fold and 4-fold change respectively. These changes were statistically significant ($p < 0.0001$). CONCLUSIONS: There's a clear increase in immune mobilization in response to exercise, especially in effector NK cells. Demonstrating the significant acute response aerobic exercise has, even at 60% of VO2max. This novel finding helps contextualize exercise immunology in healthy and diseased individuals. Even lower intensities of aerobic exercise are important to consistently partake in, to maintain our immunosurveillance.

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P164: BIOMECHANICAL STRESS IN VOLLEYBALL: COMPARING UNILATERAL AND BILATERAL ACROSS VOLLEYBALL POSITIONS

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Jump-based movements in volleyball, specifically unilateral landings, generate a much more significant injury risk, especially to the anterior cruciate ligament (ACL). These unilateral landings pose such injury risks due to asymmetrical ground reaction forces and joint instability in the patellar region. This risk is more dominant in outside and right-side hitters, who commonly land on a single foot after performing spikes. Studies show that unilateral landings produce higher peak forces and lower knee flexion compared to bilateral landings, which lead to increased biomechanical stress (Xu et al., 2021; Camacho-Gomez et al., 2021). Additionally, lead-limb dominance and player position further influence landing strategies and limb loading (Mercado-Palomino et al., 2021). Using VERT, a technological software that can be used to track biometrics such as height, frequency, and landing impact, along with synchronized video analysis, will produce a focused study comparing unilateral versus bilateral landings across volleyball hitter positions—outside hitter, middle blocker, and right-side hitter. The purpose of this research is to identify patterns in landing type and impact force to recognize individualized injury prevention strategies. Unlike common jump load studies, this study focuses on movement, symmetry, limb dominance, and position-specific risks. Using VERT data in routine training will provide an easier and more accessible way to track real-time landing mechanics without disturbing how athletes play. Beginning with a small cohort: female collegiate volleyball players at Nova Southeastern University, and expanding based on impact findings, this project aims to support early detection of injury risk and help coaches implement targeted biomechanical interventions for their athletes.

P201: RELIABILITY OF METABOLIC, PERCEPTUAL, AND PERFORMANCE PARAMETERS FOR HEART RATE-CLAMP EXERCISE

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BACKGROUND: To improve cardiorespiratory fitness, exercise prescription is based on percentages of the maximum heart rate (HR_{max}), oxygen consumption rate (VO_{2max}), or ratings of perceived exertion (RPE) that reflect vigorous intensities (77-95%HR_{max}, 64-90%VO_{2max}, 14-17 RPE). This study examined the test-retest reliability of metabolic (VO_2), perceptual (RPE), and performance (power output [P], time to target HR [T_{HR}]) parameters for HR-clamp trials. **METHODS:** Fifteen females (22±5 yrs) performed a cycle ergometer graded exercise test to determine max parameters, followed by 2 visits involving identical 20-min HR-clamp exercise trials at 86%HR_{max} (159±7 b·min^{-1}). For the HR-clamp trials, P was set to the P associated with 86%HR_{max} (126±28 W), and the T_{HR}, VO_2 (VO_{2HR}), and RPE (RPE_{HR}) were determined when the HR was reached. The 20-min HR-clamp trial started when the target HR was reached, and P was adjusted to keep HR constant (± 2 b·min^{-1}). Average VO_2 (VO_{2avg}), RPE (RPE_{avg}), and P (P_{avg}) were determined for the 20-min HR-clamp trials. Analyses included paired samples t-tests ($p \leq 0.05$), intra-class correlation coefficients ($ICC_{2,1}$), standard errors of the measurement (SEM), minimal differences (MD), and coefficients of variation (CV). **RESULTS:** Trials 1 (T1) and 2 (T2) were significantly different for T_{HR} ([T1, T2] 2.3±1.3, 3.2±1.5min, $p=0.021$) and P_{avg} (98±29, 103±23W, $p=0.044$), but not VO_{2HR} (25.18±6.21, 25.81±5.12 mL·kg^{-1}·min^{-1}, $p=0.230$), VO_{2avg} (22.31±5.18, 22.69±4.24 mL·kg^{-1}·min^{-1}, $p=0.352$), RPE_{HR} (11±3, 12±2, $p=0.681$), or RPE_{avg} (13±3, 13±2, $p=0.719$). The T_{HR} (ICC=0.463, SEM=0.96 min, MD=2.67 min, CV=35.1%) and RPE_{HR} (ICC=0.554, SEM=2, MD=5, CV=15%) indicated poor reliability. The RPE_{avg} (ICC=0.627, SEM=2, MD=4, CV=11.7%) demonstrated good reliability, while VO_{2avg} (ICC=0.948, SEM=1.09 mL·kg^{-1}·min^{-1}, MD=3.01 mL·kg^{-1}·min^{-1}, CV=4.8%), VO_{2HR} (ICC=0.939, SEM=1.39 mL·kg^{-1}·min^{-1}, MD=3.84 mL·kg^{-1}·min^{-1}, C =5.4%), and P_{avg} (ICC=0.937, SEM=5.80 W, MD=16.08 W, CV=5.8%) demonstrated excellent reliability. **CONCLUSIONS:** Despite poor reliability for T_{HR} and RPE_{HR} and systematic error for P_{avg}, the VO_{2HR} was reliable as well as metabolic and perceptual parameters across 20-min HR-clamp trials. Therefore, VO_2 and RPE may be used to monitor intensity during continuous HR-clamp exercise.

P202: THE EFFECTS OF USING AN OXYGEN RESISTANT TRAINING MASK TO IMPROVE AEORBIC FITNESS

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BACKGROUND: Aerobic fitness is a key component of overall performance, especially in endurance-based activities. Elevation

training masks (ETM) are a training tool purported to enhance aerobic capacity by restricting airflow. It is claimed to improve oxygen efficiency, VO2 max, and endurance over time, but research on its effectiveness has produced limited supporting evidence. METHODS: Twelve college-aged athletes were recruited for the initial entry phase of the study. Baseline (BASE) assessments included VO_2 max and time to failure in the VO_2 max. Following BASE participants were randomly assigned to one of two identical six-week cardiovascular training programs. Half of the group completed the program using an ETM(MASK), while the other half trained without it (CON). BASE measurements were reassessed after the six-week intervention (POST). RESULTS: For VO_2 max, the main effect of time was non-significant ($p = 0.497$), as was the interaction between time and group ($p = 0.825$). For VO_2 max time to failure, the main effect of time was also non-significant ($p = 0.652$), with a non-significant interaction effect ($p = 0.530$). CONCLUSION: The use of an ETM did not yield significantly greater improvements in VO_2 max or endurance compared to traditional training.

P203: RELATIONSHIPS BETWEEN SHOULDER AND HIP ROTATION STRENGTH AND THROWING PERFORMANCE IN COLLEGIATE THROWERS

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Title: RELATIONSHIPS BETWEEN SHOULDER AND HIP ROTATION STRENGTH AND THROWING PERFORMANCE IN COLLEGIATE THROWERS Authors: Peyton Horn, Zack Gillen, Michael Mydlo, Marci Hoppa, Benjamin Wax Institution: Mississippi State University BACKGROUND: Maximum shoulder and hip strength is an important determinant of throwing performance in athletes competing in throwing events. The purpose of this study was to examine the relationships between internal rotation (IR) and external rotation (ER) strength and throwing performance of field athletes. METHODS: Using the VALD force frame, throwing field athletes (n=15) who compete in either a single or numerous events, including the Discus Throw ((DT)n=8), Hammer Throw ((HT)n=8), Shot Put ((SP)n=8), Weight Throw ((WT)n=9), and Javelin Throw ((JT)n=6) performed a maximum of 3 maximal voluntary isometric contractions (MVICs) to evaluate maximum force of IR and ER of the left (L) and right (R) hip and shoulder. For each repetition, athletes were instructed to contract as hard as possible. The maximum peak force for each movement was taken to represent L and R shoulder and hip IR and ER performance. Longest throwing distance was taken from available competition data for each event. Pearson product moment correlation coefficients examined the relationships between IR and ER MVIC performance and throwing distance. RESULTS: DT performance was not significantly related to IR and ER MVIC performance of the shoulders and hips ($r \leq 0.598$). HT performance was significantly related to R hip IR ($r = 0.766$), and L and R shoulder IR and ER ($r \geq 0.704$). SP performance was significantly related to L shoulder ER ($r = 0.706$). WT was significantly related to L shoulder ER ($r = 0.781$) and R shoulder IR ($r = 0.688$). JT performance was significantly related to L and R hip IR ($r \geq 0.918$), as well as L shoulder ER ($r = 0.833$) and L and R shoulder IR ($r \geq 0.958$). CONCLUSION: Overall, the present results demonstrate several significant relationships between shoulder and hip IR and ER and throwing performance in collegiate throwers. Furthermore, based on these results, it appears several relationships may be event specific. Nevertheless, although the present sample size was small, these results support the importance of improving shoulder and hip IR and ER strength for improving throwing performance in collegiate throwers.

P204: A COMPARISON OF BODY COMPOSITION METHODS IN RURAL STRUCTURAL FIREFIGHTERS

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BACKGROUND: Firefighters (FF) are encouraged to monitor body composition regularly, as excess body fat (BF) can impair job performance and overall health. Dual x-ray absorptiometry (DXA) has emerged as a gold standard method of measuring BF%, but it may be unrealistic for fire departments due to cost, radiation, and space required. Bioelectrical impedance analysis (BIA) can be obtained for a fraction of the price and may be a feasible alternative to assess BF%. The purpose of this study was to compare BF% obtained from DXA and BIA. METHODS: Male, structural FF (n=61) from a rural southeastern region of the United States consented to the release of data gathered during an annual health screening. FF arrived for testing in the morning, immediately after completing a 24-hour shift and in a fasted state. BF% was recorded using a foot-to-foot BIA scale (Tanita TBF-300A) before completing a DXA (Lunar Prodigy) scan. BF% was classified according to ACSM guidelines. Descriptive statistics were calculated for mean ± SD, range, and frequency distributions. Paired samples t-tests and Cohen's d effect sizes were used to compare methods, and Weighted Cohen's Kappa was used to determine the agreement between the two tests. RESULTS: DXA measured significantly greater BF% (29.2±9.8%, range=4.9-47.9%) compared to BIA (25.5±8.5%, range=7.3-55.4%) ($p<0.001$, Cohen's $d=0.40$). This represented an average systemic difference of 5.1±3.7% (range=0-13%). The discrepancy resulted in DXA classifying a significantly higher percentage of participants (71%) into the very poor fitness category compared to BIA (54%), with moderate agreement between the overall classifications (Weighted $\kappa=0.59$). CONCLUSIONS: BIA may present as a feasible method to monitor BF%, but FF should remain consistent in their use of a tool, as discrepancies exist between methods. Furthermore, interventions that emphasize reducing BF among FF may be necessary for fire departments, as a majority were considered to have very poor BF%.

P205: EFFECTS OF CAFFEINE AND L-THEANINE ON FOCUS, ANXIETY, AND COGNITIVE AND PHYSICAL PERFORMANCE

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BACKGROUND: Caffeine's effect on physical and cognitive performance has been well established. Higher doses may induce jitteriness and anxiety. To mitigate these side effects, caffeine may be combined with L-theanine, a non-protein amino acid shown to promote relaxation and reduce stress. Coupling caffeine and L-theanine may improve attention-switching accuracy and reduce susceptibility to distraction. This is especially relevant for developing functional supplements aimed at performance, mental focus, and mood regulation, factors important in sport performance and specific work paradigms. The purpose of this study is to determine the effects of caffeine + L-theanine on cognitive function and physical performance. METHODS: Individuals (n = 30) of various aerobic fitness will complete a VO_2 peak trial, and two treatment bouts (double-blind, counterbalanced crossover) following ingestion of a caffeine (96 mg) + L-theanine pouch (120 mg) or a matched placebo. Participants will complete an array of cognitive tasks to determine one's attention, inhibition, working memory, reaction time, in addition to assessments for focus, anxiety, and mood. Afterward, participants will self-select a treadmill speed (1% grade) that elicits a 4 (on the 0-10 omni scale) for 10 minutes. After 10 min, participants will select a velocity to produce an RPE 7 for 10 min. Heart rate and metabolic variables will be collected. Following recovery, a 10-point Likert scale will be administered to assess subjective feelings (restlessness, tremors, stomach distress, fatigue, elevated mood, nervousness) potentially influenced by caffeine. Results will be analyzed using paired t-test to assess significance between caffeine and L-theanine vs. placebo. ANTICIPATED RESULTS: Caffeine + L-Theanine will have a positive impact on both cognitive and physical performance compared to placebo. GRANT INFORMATION: this project is supported by Belter Caffeine Pouch.

P206: THE RELATIONSHIP BETWEEN ENERGY EXPENDITURE AND MUSCULAR FORCE DURING CLOSED KINETIC CHAIN EXERCISE

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BACKGROUND: Occupation-related musculoskeletal injuries cost $140 billion annually and are largely caused by low physical fitness paired with excessive physical activity (PA) and energy expenditure (EE). Numerous commercial fitness trackers are used to assess occupational PA and EE, however they primarily use accelerometry and heart rate, while not accounting for force production and anaerobic demands of heavy labor. Therefore, the purpose of this study was to quantify the relationship between closed chain muscular force production (CCMF) and EE. METHODS: Fifteen college-aged (18-24y), recreationally physically active adults (53% female) completed the study. First, descriptive measures were taken: height, body mass, composition, and limb circumferences via 3D scanning and grip strength via hand grip dynamometer. The ParvoMedics TrueOne 2400 was used to assess EE during the subsequent experimental protocol where participants first completed a five-min baseline resting EE measurement in the seated position. Next, participants completed one min of weighted kettlebell (KB) goblet squats at a cadence of 46 beats/min on Vald ForceDecks to measure CCMF. Males used a 22.7 kg KB and females used a 15.9 kg KB. Following the squat, participants completed a final five-min post-exercise resting EE measurement in the seated position. Pearson's correlations were used to examine the relationship between EE resulting from squat and the CCMF during squat. A linear mixed model (LMM) was used to examine the relationship between EE and CCMF during the squat, with sex, lean mass, thigh circumference, height, % fat, grip strength, and body mass serving as covariates. RESULTS: There was a strong, significant correlation between CCMF

and EE (r^2=0.868, p<0.001). The LMM covariates showed no significant effect on EE. CONCLUSIONS: The results from this study suggest that CCMF is a distinct and measurable contributor to EE and should be factored into EE estimation models. These data provide initial evidence that integrating CCMF into fitness tracking and health monitoring systems has the potential to reduce risk of injury and optimize performance. Replicating this study with a larger sample, as well as analyzing additional closed chain exercises and occupational-specific activities, is an important next step.

P207: CHARACTERIZING INDIVIDUALIZED MAXIMAL POWER-CADENCE RELATIONSHIPS AT VARIOUS FATIGUE LEVELS FOR RECREATIONAL CYCLISTS

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BACKGROUND: Our work builds upon the well-known parabolic relationship between maximal cycling power and pedaling cadence by quantifying reductions in relation to fatigue. METHODS: Four subjects were recruited, and each participated in six test sessions, separated by at least one week to ensure full recovery. All protocols were approved by an institutional review board. The first four sessions for each subject were focused on determining their critical power and anaerobic work capacity by forming their power-endurance time curves. The second phase tested maximal power at various fatigue levels. Each subject was fatigued in stages by having them pedal at their CP8 (power to completely exhaust a subject in 8 minutes) levels for two minutes. In between, five sprints were conducted at varying resistances to determine the participant's power-cadence curve at those different fatigue levels. This protocol was repeated twice across two separate days to verify the results. Paired T-Tests were used to calculate differences between a fresh and fatigued state for maximal power, maximal cadence, and cadence at maximal power. Significance was set at p<0.05. RESULTS: We found across all subjects that the parabolic power-cadence curve contracted with fatigue. Additionally, each power-cadence parabolic model had R^2 values of greater than 0.9, indicating excellent fits. Comparing maximal power, cadence, and cadence at maximal power between the fresh and fatigued states, there were significant differences between maximal cadence (p=0.039), cadence at maximal power (p=0.039), but not maximal power (p=0.101). CONCLUSION: The results of our experiment confirmed our original hypothesis of a contracting parabolic relationship with a fatigued state. This protocol could be used toward individualizing exercise training regimes and optimizing race performance.

P208: THE EFFECTS OF AN ACUTE BOUT OF EXERCISE ON DUAL-TASK GAIT AND FUNCTIONAL MOBILITY

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BACKGROUND: An acute bout of aerobic exercise improves cognition for up to 20 minutes, potentially due to increased cerebral blood flow. However, its impact on concurrent cognitive and motor demands (dual-tasking (DT)) is unknown. This study aimed to determine the effects of an acute bout of exercise on gait and functional mobility parameters during single- and dual-tasking.
METHODS: Twenty-one healthy adults (ages: 20.71±1.65 years; BMI: 23.19±2.88 kg/m^2; 52.4% male) wore inertial sensors during 2 walking conditions: a 4-meter walk and a 3-meter Timed-Up-and-Go (TUG) - each performed with 3 single- and DT trials (listing items by category or counting backwards by 7's, respectively). Participants then completed a 20-minute walk/jog at 55-65% of their maximum heart rate. Every 2 minutes, the heart rate, treadmill speed, and perceived rate of exertion were recorded. A repeated measures analysis of variance (ANOVA) analyzed the performance of the same mobility tests completed pre-exercise, post-exercise, and after 24 hours.
RESULTS: There was a trend towards significance in the Condition by Measure by Time interaction (p=0.089) for gait parameters. There was a trend towards significance on the Measure by Time interaction for TUG parameters (p=0.065). Paired t-tests revealed improvements under these DT conditions: pre- to post-exercise gait speed (p=0.018) and TUG duration (p=<0.001); post-exercise to 24-hours later gait speed (p=0.001) and stride length (p=0.006). In the DT condition, gait speed increased (baseline: 0.83 ± 0.16 m/s; post-training: 0.88 ± 0.16 m/s; 24 hours later: 0.93 ± 0.15 m/s) and TUG duration improved with a 1.05 ± 0.47 s decrease from pre-exercise to 24 hours later. No significant changes were observed in the single-task gait or TUG conditions.
CONCLUSIONS: Contrary to our hypothesis, an acute bout of exercise did not significantly impact single- or DT gait or functional mobility. The trends towards significance for DT gait speed, TUG duration, and stride length suggest that acute exercise may enhance motor-cognitive performance over time due to practice effects, rather than acute exercise, but these exploratory findings warrant further confirmation.
GRANT INFORMATION: This study was funded by the Center for Undergraduate Research at Augusta University.

P209: LOCOMOTOR PROFILE CLASSIFICATION OF CROSS-COUNTRY SKIERS IN RUNNING AND ROLLER SKIING

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BACKGROUND: The anaerobic speed reserve (ASR), defined as the ratio of maximal sprint speed (MSS) to maximal aerobic speed (MAS), has been used in track and field to establish runner locomotor profiles and individualize training prescription. In cross-country skiing, training encompasses varied activities that involve lower and upper body engagement and present distinct biomechanical characteristics. This descriptive study aimed to determine whether the locomotor profiles of cross-country skiers depend on the mode of locomotion. **METHODS:** Twelve regional-level female skiers completed two performance assessments in running (RUN) and roller skiing (SKI): a 6-minute test (half-Cooper) to determine MAS and a 40-m sprint to establish MSS. The ASR ratio was calculated to classify athletes into three profiles: endurance, hybrid, or sprint. **RESULTS:** Aerobic performance was higher in SKI (17.2 ± 1.3 m·s^{-1}) compared to RUN (13.8 ± 0.9 m·s^{-1}; t = -8.69; p < 0.001). Similarly, sprint performance was greater in SKI (23.4 ± 1.2 m·s^{-1}) than in RUN (20.1 ± 1.3 m·s^{-1}; t = -8.91; p < 0.001). However, the ASR ratio did not significantly differ between modalities (t = 1.14; p = 0.28). Among the 12 athletes, the majority were classified as Hybrid in RUN (58%) and SKI (67%), while Endurance and Sprint profiles represented 17% and 25% in RUN, and 17% and 17% in SKI, respectively. **CONCLUSIONS:** Our findings indicate that most athletes retain a Hybrid profile regardless of whether testing emphasizes lower (running) or upper body (roller skiing) movements, although some shifts in classification were observed, particularly among the most extreme profiles of Endurance and Sprint. The relative stability of ASR ratio between modalities suggests that this parameter reflects intrinsic characteristics of the athlete, less affected by the locomotion mode. Thus, the ASR ratio appears to be a reliable and relevant indicator for tracking and comparing athletes across different testing modalities.

P210: THE ACUTE EFFECTS OF A MOBILITY TRAINING INTERVENTION ON COUNTERMOVEMENT JUMP AND HOP TEST PERFORMANCE

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BACKGROUND: Mobility exercises are used by athletes and active individuals as part of warm-up routines, but the direct impact of such training on explosive lower-body performance remains underexplored. This investigation sought to determine whether a 10-minute mobility intervention could produce measurable performance benefits in tasks that emphasize different stretch-shortening cycle (SSC) characteristics. The purpose of this study was to examine the acute effects of a brief, structured mobility training session on performance outcomes in countermovement jump (CMJ) and hop test (HT), as well as on body composition analysis. METHODS: Twelve healthy, recreationally active females participated in a pre- and post-test design. Each subject completed baseline testing that included body composition and anthropometric assessment, followed by CMJ and HT evaluations. Participants then engaged in a standardized 10-minute mobility training protocol targeting major lower-body joints and muscle groups. Immediately following the intervention, participants repeated the CMJ and HT assessments under identical conditions. RESULTS: Significant improvements were observed in multiple CMJ variables following mobility training. Jump height (25.6 ± 6.1 vs. 27.8 ± 5.5 cm, p = 0.008), peak landing force (2388.8 ± 622.3 vs. 2692.5 ± 950.2 N, p = 0.040), peak power normalized to body mass (41.5 ± 6.3 vs. 44.4 ± 5.8 W/kg, p = 0.001), and modified RSI (0.288 ± 0.062 vs. 0.333 ± 0.077 m/s, p < 0.001) all increased post-intervention. In contrast, HT performance demonstrated limited benefits, with only the mean peak force significantly improving (2580.1 ± 335.8 vs. 2750.8 ± 358.8 N, p = 0.025). No significant differences were found for HT mean jump height (13.7 ± 3.4 vs. 14.9 ± 3.8 cm, p = 0.106) or mean RSI (0.542 ± 0.175 vs. 0.593 ± 0.181 m/s, p = 0.125). CONCLUSION: A short-duration mobility training intervention acutely enhanced performance in long SSC tasks, such as the CMJ, likely by improving joint range of motion, enhancing muscle preloading, and optimizing force transmission. These findings suggest that mobility-focused warm-ups may be most beneficial when the subsequent performance task involves prolonged SSC demands, other preparatory strategies may be better for more explosive tasks.

P211: PERFORMANCE DETERMINANTS OF TOP END SPEED IN COLLEGIATE WOMEN'S SOCCER

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BACKGROUND: An on-field performance metric, top end speed (TES) is the maximum speed a player reaches during match play. It is considered an important metric of on-field success for many athletes. While TES was examined in men, professional and youth athletes, as well as sprinters, a literature gap shows little information on the metric exists from female team sport athletes during competition. METHODS: Preliminary data collection from 34 collegiate female soccer players occurred during actual NCAA/ACC match play using accelerometers (Catapult; Melbourne Australia) worn by subjects during match play. In addition, preseason yoyo tests and anthropometric data were also collected from those same subjects. Multivariate regression attempted to explain the TES variance with the following independent variables: body mass, fat mass/fat-free mass ratio, estimated maximum aerobic speed, and estimated VO_2 max. An 0.05 α denoted statistical significance. RESULTS: A non-significant amount of TES was explained by the four predictor variables ($p = 0.59$; $r = 0.30$). The predictor variable that had the strongest correlation with TES was estimated VO_2 max ($r = 0.169$). CONCLUSIONS: Current results were likely impacted by the majority of performance data collected during actual match play, and not in a laboratory. Interpretation of study results in this area must acknowledge differences in outcomes collected from laboratories and actual match play.

P212: EFFECT OF AN 8-WEEK TRAINING INTERVENTION ON FITNESS AND GOLF-SPECIFIC METRICS IN FEMALE COLLEGIATE GOLFERS

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Background. Golf requires a combination of technique and physical fitness to sustain performance throughout a season. Muscle strength and power directly contribute to determinants of golf performance such as swing mechanics, clubhead speed, and driving distance-which can be improved with training. The use of resistance training in golfers remains understudied, especially among collegiate female golfers. The purpose of this study is to assess golf and fitness outcomes after 8 weeks of prescribed resistance and power training. **Methods**. Nine female collegiate golfers completed body composition via dual x-ray absorptiometry (age 19±1.2y, height 1.6±.07m, weight 59.5±9.1kg, Body fat 27.9±7.4%). Medicine ball throws assessed upper body power, and 3-5 repetition strength testing were used to estimate one-repetition maximum (back squat, chest press, shoulder press, and lat pulldown). Golfers performed a 12-min run to estimate maximal aerobic capacity (VO_{2max}). Golfers performed 5 trials of swings using a 7-iron and driver. The mean of 3 shots was taken to assess carry distance and ball speed (GC Quad, Foresight Sports). An 8-week supervised, structured resistance training program will be conducted 2 days per week, and includes plyometrics, aerobic exercises, and progressive resistance exercises. Post-testing of outcomes will be repeated at the end of 8 weeks. **Anticipated results.** Prior to the training program, the golfers' power via medicine ball throws (shotput right 3.1±0.6m, shotput left 2.8±0.5m, rotational right 5±1.1m, rotational left 4.9±1.1m, forward throw 4.8±1.1m, backward throw 4.1±1.2m), strength (back squat 127 ±28lbs, chest press 60±16lbs, shoulder press 50±11lbs, lat pull-down 98±15lbs), and estimated VO_{2max} (34.8±8.5 $mL \cdot kg^{-1} \cdot min^{-1}$) were determined. After the 8-week training program, we expect to see an increase in power, strength, and aerobic capacity. In addition, we anticipate improvements in carry distance and ball speed.

P213: ENERGY EXPENDITURE OF HATHA VERSUS VINYASA YOGA

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BACKGROUND: Yoga is widely practiced for its associated health benefits, including both physical and mental health. Vinyasa yoga, a more vigorous style of yoga, has been shown to meet criteria for moderate-intensity physical activity (PA) and may yield higher energy expenditure (EE) than other styles. However, research directly comparing EE across yoga styles remains limited. The purpose of this study is to quantify and compare the EE, measured in metabolic equivalents (METs), examined in an acute bout of a more restorative form of hatha yoga compared to vinyasa yoga. METHODS: Forty participants (20 male, 20 female) between the ages of 18 to 40 years will be recruited to complete the present study. Visit one will collect participant demographics, current PA levels (International PA Questionnaire), anthropometrics (height, weight), and body composition (bioelectrical impedance analysis). All participants will be fitted with the COSMED K5 wearable metabolic system and chest strap heart rate (HR) monitor to complete a 10-minute familiarization session demonstrating foundational yoga poses. Following baseline assessments, participants will complete two separate 60-minute yoga sessions (hatha and vinyasa) in randomized order, with a 72-hour washout period between sessions. Participants will follow a standardized pre-recorded video for each session. Blood pressure (BP), HR, mental health questionnaires (Profile of Mood States Short Form [POMS-SF], State Trait anxiety Inventory [STAI]) will be assessed pre- and post-experimental sessions. Breath-by-breath EE, HR, and rate of perceived exertion (RPE) will be measured during each experimental session. Post-experimental sessions, Physical Activity Enjoyment Scale (PACE), Subjective Exercise Experience Scale (SEE) will be administered. Linear mixed models will be used to examine differences between experimental conditions, adjusted for PA, age, body mass index. ANTICIPATED RESULTS: It is hypothesized that a more restorative form of hatha yoga will result in significantly lower METs (primary outcome), HR, BP, RPE (secondary outcomes) compared to vinyasa yoga. Additionally, it is hypothesized the more restorative hatha yoga will have a significantly greater decrease in POMS-SF and STAI total scores compared to vinyasa yoga, post-experimental session.

P214: EFFECT OF CAFFEINE AND G-FUEL ON PHYSICAL PERFORMANCE IN COLLEGE-AGED MALES

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INTRODUCTION: Despite caffeine's well-established benefits for physical and cognitive performance, multi-ingredient formulas such as G FUEL are less understood. G FUEL®, an energy powder, suggested to enhance focus, reaction time, and endurance combines caffeine, amino acids, vitamins, and antioxidants. This study compared effects of caffeine (3 mg/kg and 6 mg/kg) vs. G FUEL (7 g, 140 mg) on anaerobic performance. **METHODS:** Fifteen college-aged males completed a VO_2max trial (30.8 ± 6.0 ml/kg/min) and four anaerobic cycling trials in a randomized crossover design on a Velotron bike (4 x 30 sec Wingates each with four-minute recovery). Capsules (caffeine 3mg/kg or 6mg/kg; CAF3, CAF6 or placebo; PLC) or G FUEL was ingested 1-hour prior. Heart rate (HR), rating of perceived exertion (RPE), wattage, cadence, and fatigue index (FI) were recorded. Post-trial surveys assessed restlessness, tremors, stomach distress, fatigue, elevated mood, and nervousness, potentially influenced by CAF. **RESULTS:** One-way repeated measures ANOVAs showed ($p \geq 0.05$) max watts ($p = 0.1$) and RPMs ($p = 0.09$) approached significance for Wingate 2. For FI among treatments, significance was approached for Wingates 2 ($p = 0.06$) and 4 ($p = 0.09$). There was a significant ($p = 0.01$) difference among treatments for RPE for Wingate 4. Follow-up analysis revealed, FI was significantly lower for CAF3 and CAF6 vs. G FUEL and CAF6 vs. PLC but only approached significance ($p = 0.06$) CAF3 vs. PLC. Additionally, CAF resulted in significantly lower RPE vs. PLC and G FUEL. **CONCLUSION:** Results suggest CAF had a significant impact on FI when participants were fatigued. Despite a significant improvement in performance, participant's corresponding RPE was significantly lower following CAF, providing evidence of an ergogenic effect. A potential explanation for the lack of significance in G FUEL could be due to the absolute CAF content of 140mg, resulting a low dose relative to body mass (less than 3mg/kg).

P215: EFFECT OF CARBON FIBER INSOLES ON COUNTERMOVEMENT JUMP PERFORMANCE: A SINGLE SUBJECT APPROACH

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PURPOSE: Carbon fiber plates, whether built into footwear or as insoles, have gained popularity among elite, tactical, and recreational athletes. Previous investigations have demonstrated increased physical performance capacity when utilizing carbon fiber plates in footwear. When examining the effectiveness of sporting equipment to enhance performance, individual change can be misrepresented by the group data. Thus, this study sought to examine the effect of a carbon fiber insole (CFI) on countermovement jump (CMJ) performance at both the group and individual level. METHODS: Fifteen recreationally trained males (age = 24.8±4.4 yrs, height = 182.9±5.0 cm, mass = 86.3±11.3 kg) completed one testing session wearing a standardized basketball shoe with either the native insole or an experimental prototype CFI in a counterbalanced order. Following a dynamic warmup, participants performed three CMJ trials per condition on a force platform (1000 Hz). Data were processed in MATLAB to calculate jump height (JH), time to take-off (TTT), and reactive strength index

modified (RSImod). Single-subject responses were determined by whether CFI values fell outside the coefficient of variation around the mean of the native condition, with percent change also calculated. Group comparisons were analyzed using paired t-tests. Additionally, Hedge's g effect sizes were calculated. An a priori alpha level of 0.05 was used in the group analysis. RESULTS: 10 of 15 participants displayed changes in JH (6 increased, 4 decreased) (Δ -8.43-10.92%; group Δ = 0.38%). For TTT, 5 individuals displayed a change between conditions (3 reduced TTT and 2 increased TTT) (Δ -10.80-17.98%; group Δ = 0.26%). Lastly, 10 individuals had change in RSImod (2 improved and 8 decreased) (Δ -4.87-4.10%; group Δ= -1.27%). No significant group-level differences were found (JH p = 0.83, *g* = 0.02; TTT p = 0.92, *g* = -0.06; RSImod p = 0.19, *g* = -0.34). CONCLUSIONS: Although no group-level effects were detected, individual responses suggest CFIs may enhance CMJ performance in some athletes. Improvements could in part be influenced by training history and task familiarity. Thus, CFI use should be evaluated individually, and future work should examine insole stiffness and sport-specific footwear interactions. Funding: This project was supported by ARRIS Composites.

P216: PREVALENCE OF LOW-ENERGY AVAILABILITY RISK AND BODY COMPOSITION CHARACTERISTICS IN COLLEGIATE TENNIS PLAYERS

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BACKGROUND: Sustained low energy availability (LEA) is associated with diminished athletic performance and can impact athlete longevity and sport sustainability. Despite extended match durations, bursts of high-intensity efforts, and frequent travel that can complicate fueling, sport-specific LEA data in collegiate tennis players is limited. Therefore, the purpose of this study was to assess LEA prevalence in Division I collegiate tennis players. METHODS: Nineteen collegiate tennis players (9 Male, 10 Female, age=19.9±1.4 yrs) were recruited for this study. Participants completed a whole-body composition scan via DXA to analyze fat mass (FM) and fat-free mass (FFM) prior to their preseason. A Female or Male LEA Questionnaire (LEAF-Q and LEAM-Q, respectively) was used to assess risk. A 3-day dietary recall was used to estimate average total energy intake (EI), and energy expenditure (EE) was estimated using the Mifflin-St. Jeor equation. Energy availability (EA) was then calculated using FFM, EI, and EE. Categorical outcomes, including LEA risk categories, were summarized using frequency distributions and reported as percentages of the population. Independent samples t-test was used to assess sex differences for body composition variables and calculated LEA. Significance was set at $p<0.05$. RESULTS: Compared to females, males demonstrated lower %BF (17.9±4.4 vs. 27.7±2.7%; $p<0.001$), FM (14.62±4.55 vs. 19.51±2.95 kg; $p=0.02$) and higher FFM (65.97±1.79 vs. 50.58±2.20 kg; $p<0.001$). Questionnaires indicated no males were at risk, whereas 20% of females met the threshold for LEA. EA was 43.2±5.9 kcal/kg FFM in males (55.6% optimal, 44.4% subclinical) and 36.8±8.1 kcal/kg FFM in females (20% optimal, 60% subclinical, 20% clinical). CONCLUSIONS: Questionnaire screening alone under detected LEA risk, while calculated availability identified additional clinical and subclinical athletes and was lower in females. These findings support using both tools to comprehensively detect LEA prevalence and guide fueling recommendations in college athletes.

P217: IMPLEMENTING TRACKMAN, TPI, AND VIDEO ANALYSIS TO PREVENT INJURY AND IMPROVE PERFORMANCE FOR COLLEGIATE GOLFERS

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BACKGROUND: Understanding golf swing mechanics is fundamental in proper performance and sustainability. The golf swing is very complex and requires multiple joints to move simultaneously. Small imperfections in movement can have effects on accuracy, distance, and consistency of shots. Similarly, poor swing mechanics can put unnecessary stress on the spine, shoulders, hips, and wrists, potentially leading to injury amongst golfers. Analyzing swing mechanics is critical for golfers at all levels and in the collegiate level because they are in a phase of development where performance and physical health directly impact their future in the sport. Collegiate golfers fall between the ages of 17 and 22 years old which is a time where their bodies are adapting to higher training loads and developing peak strength and power. A better understanding of golf swing mechanics in collegiate golfers can enhance performance, reduce injury risk, and build a sustainable foundation for long-term success. METHODS: This study utilizes Trackman technology, Titleist Performance Institute (TPI) screening, as well as video analysis to assess the golf swing mechanics of collegiate golfers and the impact it has on performance as well as injury prevention. The data during a competitive collegiate golf season to measure performance. ANTICIPATED RESULTS: Common issues found in the TPI screening include loss of posture early on in swing, lack of proper rotation, as well as improper sequencing of the swing. Trackman errors are expected to include club path error, as well as attack angle. Measurements of the distance of the ball that is hit will be key in determining how the mechanics of the swing are functioning. Using this analysis as well as the data collected on Trackman allows for visual confirmation of mechanical adjustments and how each player performs uniquely. CONCLUSIONS: Through the use of Trackman technology, TPI, as well as video screening, training programs can be tailored to individual swing mechanics, leading to improved performance and reduced injury risk in golf players.

P218: VALIDITY AND RELIABILITY OF THE NOVEL FUNCTIONAL INCREMENTAL STEPPING-IN-PLACE TEST FOR VO_2PEAK ASSESSMENT

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BACKGROUND: Peak oxygen consumption (VO_2peak) assessment via cardiopulmonary exercise testing (CPET) is used for diagnosis, prognostication, and intervention design in clinical populations. Higher VO_2peak predicts better post-surgery and patient-centered outcomes and enhances clinical decision-making and precision rehabilitation. Despite its benefits, CPET in clinical settings is challenging due to cost, space, and equipment needs. The Functional Incremental Stepping-in-Place Test (F-IST) is a VO_2peak assessment that was developed to address these challenges. The F-IST is an incremental test where participants march in place at a gradually increasing pace. Validity and reliability of the F-IST have not been assessed. **PURPOSE:** The purpose of this study was to test the validity and reliability of the F-IST compared to the gold standard treadmill-based CPET for assessing VO_2peak. **METHODS:** Community-dwelling functionally independent adults completed two testing visits. During Visit 1, the F-IST and Modified Bruce treadmill protocols were completed with use of a metabolic cart testing system. During Visit 2, participants repeated the F-IST. Pearson product-moment correlations were used to assess validity. Paired t-tests compared the VO_2peak from the F-IST and Bruce test. Intraclass correlation coefficients (ICC) evaluated test-retest reliability. **RESULTS:** Twenty-five participants (age: 49±15 years; male: 11, female: 14) completed the study. There was a strong association between the VO_2peak measured from the F-IST and Bruce test ($r=.87$, $p<.001$), with no significant difference ($p=.13$) in VO_2peak between tests. Test-retest reliability was excellent (ICC=.927). **CONCLUSIONS:** These findings suggest the F-IST is a valid and reliable alternative to the Bruce test for VO_2peak assessment. Therefore, the F-IST may be a practical alternative to the Bruce test for VO_2peak assessment in clinical settings. Future research should focus on validating the F-IST in distinct clinical groups.**Funding:** Foundation for Physical Therapy Research - Acute Care Grant

P219: DO OPTIONS CHANGE OUTCOMES? A COMPARATIVE STUDY OF AIRFORCE PT TESTING MODALITIES

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BACKGROUND: The United States Air Force Fitness Assessment is a measurement of aerobic fitness, muscular strength, and muscular endurance. These measurements are calculated from a maximal effort 1.5-mile run, push-ups in a minute, and sit-ups in a minute. On January 1, 2022, the Air Force introduced alternative options as an opportunity to opt out of the standard tests. Previous research on the Navy's standard protocol (like the Air Force) and the alternative protocol concluded the alternative protocol yielded higher pass rates with lower perceived effort. The purpose of this study is to evaluate how the alternative components of the Air Force Fitness Assessment influence performance and scoring compared to the standard test. METHODS: I plan to recruit 20 college-aged individuals to complete this quasi-experimental design. Participants will first complete either (a) the standard test battery or (b) alternative test battery (beep test, hand release pushups, and plank hold for time). On a separate day, they will return to complete the remaining test battery, ensuring all participants experience both conditions. The purpose of this investigation is to determine if pass rates differ between standard and alternative test batteries. ANTICIPATED RESULTS: It is expected that the alternative test battery will yield higher pass rates than the standard protocol due to lower physical demands.

P220: PERCEPTIONS OF EXERCISE IS MEDICINE ON A COLLEGE CAMPUS: A PRE-PROGRAM BASELINE ASSESSMENT

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BACKGROUND: Exercise is Medicine® (EIM) is a global initiative promoting physical activity in healthcare and community settings. *Exercise is Medicine on Campus (EIM-OC)* extends this mission to colleges and universities, fostering a culture of health by treating physical activity as a vital sign of overall wellness. EIM-OC encourages broad collaboration among students, faculty, campus health services, and recreation to deliver resources, programs, and opportunities that make active lifestyles more visible and accessible. This study assessed baseline perceptions, behaviors, and service needs related to EIM-OC at a small liberal arts college prior to implementation. METHODS: Eighty-three students (mean age 20.4 ± 1.21; 55% female) completed a 13-item paper survey distributed in high-traffic campus areas. The survey included demographics, physical activity habits, and both closed- and open-ended questions on satisfaction, barriers, and desired health services. Quantitative data were analyzed with descriptive statistics, while qualitative responses were thematically coded. RESULTS: Participants reported exercising an average of 5 days per week for ~128 minutes. Most (60.2%) were satisfied with their activity habits, yet 78.3% had never heard of EIM. Forty percent expressed interest in free peer health coaching, and 76% in free health assessments. The most requested EIM services were nutrition support (18%), guided workout plans (16%), and group activity opportunities (13%). Reported barriers included time constraints (22%), low motivation or energy (11%), and academic demands (10%), with some noting physical, mental health, or diet-related challenges. Among those desiring coaching, 67% preferred in-person over virtual. CONCLUSIONS: Despite moderate-to-high activity levels, most students were unfamiliar with EIM-OC, highlighting a communication gap in campus health promotion. Students demonstrated strong interest in structured, socially engaging, and nutrition-focused services, while also reporting persistent barriers such as time, motivation, and workload. These findings underscore the importance of intentional, student-centered programming and targeted messaging to better align EIM-OC efforts with actual student needs and preferences.

P221: EVALUATING QUESTIONNAIRE ACCURACY FOR DETERMINING PHYSICAL ACTIVITY GUIDELINE ADHERENCE IN UNDERGRADUATE STUDENTS

Caleb Adams, Carley Craig, Kirk A. Abraham, Brantley K. Ballenger. *Transylvania University, Lexington, KY.*

BACKGROUND: To earn gold-level recognition from the Exercise is Medicine On Campus program, universities are required to integrate a physical activity (PA) assessment into campus health services. This study examined the accuracy of four PA assessment tools to determine which is most suitable for campus health implementation and evaluated whether self-reported PA levels predict device-measured PA levels among Transylvania University students. METHODS: Thirty-nine undergraduates participated in the study. Participant self-reported physical activity (PA) was measured with four questionnaires: the Physical Activity Vital Sign (PAVS), Godin Leisure-Time Exercise Questionnaire (GLTEQ), International Physical Activity Questionnaire (IPAQ), and Global Physical Activity Questionnaire (GPAQ). Participant free-living PA levels were measured by an ActiGraph accelerometer, which they wore for seven consecutive days during waking hours. Questionnaire accuracy was assessed by comparing self-reported PA with accelerometer data, and linear regression was used to examine how well self-reported PA predicted accelerometer-measured moderate-to-vigorous PA (MVPA). RESULTS: The GLTEQ demonstrated the highest accuracy (82%), followed by PAVS (70%), IPAQ (67%), and GPAQ (58%) for classifying students as meeting or not meeting the PA recommendation of 150 minutes per week. The PAVS [R^2 = .16, F(1,38) = 5.702, p = .023, β = .39], GPAQ [R^2 = .27, F(1,38) = 11.261, p = .002, β = .52], and IPAQ [R^2 = .15, F(1,38) = 5.572, p = .025, β = .39] all significantly predicted MVPA mins; however, GLTEQ did not predict MVPA mins (p = .081). CONCLUSION: The GLTEQ was most accurate for classifying students as meeting or not meeting PA guidelines, while the PAVS, GPAQ, and IPAQ better predicted device-measured MVPA mins. No single tool was optimal, suggesting universities should choose the questionnaire based on their assessment goals when pursuing Exercise is Medicine On Campus gold-level recognition. Future research should explore strategies to improve the accuracy and consistency of self-reported PA tools within campus health services.
Funding: Transylvania University Jones Faculty Development Program and the Bingham Center for Teaching Excellence Innovation Grant.

P222: COMPARISON OF SELF-REPORTED AND DEVICE-MEASURED PHYSICAL ACTIVITY IN EXERCISE SCIENCE AND NON-EXERCISE SCIENCE STUDENTS

Carley Craig, Caleb Adams, Kirk A. Abraham, Brantley K. Ballenger. *Transylvania University, Lexington, KY.*

BACKGROUND: The Physical Activity Vital Sign (PAVS) relies on accurate self-reported physical activity (PA); however, self-reports may be less accurate among students outside of Health and Exercise Science (HES). This study compared self-reported and device-measured PA between HES and non-HES students at Transylvania University and examined differences in PAVS accuracy across groups. METHODS: Thirty-nine undergraduate students (21 HES; 18 non-HES) participated in this study. Participants completed the PAVS questionnaire to report their PA levels and indicate whether they met current PA guidelines. Participants then wore an ActiGraph wGT3X-BT accelerometer for 7 days to measure free-living PA and objectively assess guideline compliance. Independent samples t-tests compared PA levels between HES and non-HES majors, and paired samples t-tests examined differences between self-reported and device-measured PA within each group. PAVS accuracy was evaluated by comparing whether PAVS and accelerometer classifications of meeting the PA recommendation of 150 minutes per week. RESULTS: HES majors self-reported significantly more PA than non-HES majors (377 ± 338 min vs. 193 ± 191 min; t(37) = 2.12, p = .042, d = .65); however, there was no difference between HES and non-HES majors in device measured PA levels (482 ± 265 min vs. 425 ± 213 min; p = .520). Among non-HES majors, self-reported PA was significantly lower than device-measured PA (193 ± 191 min vs. 425 ± 213 min; t(17) = 3.27, p = .006, d = .87); however, there was no difference between self-reported and device measured PA in HES majors (377 ± 338 min vs. 482 ± 265 min; p = .099). The PAVS questionnaire demonstrated an accuracy of 86% in HES majors and 50% in non-HES majors for classifying students as meeting or not meeting the PA recommendation of 150 minutes per week. CONCLUSION: The PAVS questionnaire is relatively accurate among HES majors but is less reliable for non-HES majors, who may underreport their activity levels. This discrepancy highlights the need for caution when interpreting self-reported PA in non-HES populations. Future research should examine strategies to improve PAVS accuracy among non-HES students.
Funding: Transylvania University Jones Faculty Development Program and the Bingham Center for Teaching Excellence Innovation Grant.

P223: EFFECTS OF AEROBIC AND RESISTANCE EXERCISE ON WORKING MEMORY

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BACKGROUND: Acute bouts of exercise can enhance cognitive performance by increasing cerebral blood flow, neurotransmitter activity, and neurotrophic signaling. Both aerobic and resistance exercise have shown benefits, but it is unclear whether one modality produces greater improvements in working memory. The purpose of this study was to compare the effects of aerobic and resistance exercise on working memory against baseline and against each other. METHODS: Six moderately active participants (3 males, 3 females; 20.2±0.7 yrs; 70.2±10.1 kg; 171.4±6.3 cm) completed three sessions in a randomized crossover design: baseline (rest), aerobic exercise, and resistance exercise. Aerobic consisted of a 20-min treadmill walk at 65-75% HRmax; resistance was a circuit (bench press, leg press, seated row, 3×10 at 60% 1RM). Working memory was assessed immediately after each condition using the Sternberg task, recording reaction time (ms) and errors. Paired t-tests compared aerobic vs baseline, resistance vs baseline, and aerobic vs resistance. OpenAI's ChatGPT and JuliusAI were used for statistical analysis assistance and text consolidation. RESULTS: Reaction time was significantly faster after aerobic exercise compared with baseline (718.8±95.4 vs 800.3±92.7 ms; Δ=−81 ms; p=0.010, Cohen's d=1.64). Resistance also reduced reaction time relative to baseline (730.8±74.1 ms; Δ=−70 ms) but did not reach significance (p=0.071, Cohen's d=0.93). Aerobic and resistance did not differ from each other (p=0.705). Errors did not change after aerobic exercise (p=0.31), while resistance reduced errors compared with baseline (5.2±3.5 vs 8.2±4.5; p=0.027, Cohen's d=1.27), although this did not remain significant after multiple-comparison correction. Aerobic and resistance did not differ significantly in errors (p=0.286). CONCLUSIONS: Aerobic and resistance exercise both improved working memory speed compared with baseline, with no significant differences between modalities. Error rates showed a possible benefit with resistance, but this requires confirmation. These findings suggest that acute exercise enhances cognitive processing in young adults, and the benefit is likely due to exercise overall rather than a specific modality.

P224: THE IMPACT OF EXERCISE IS MEDICINE PHYSICAL ACTIVITY COUNSELING ON PHYSICAL ACTIVITY AND SLEEP
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BACKGROUND: Healthy adults are recommended to obtain 7 to 9 hours of sleep. College students are susceptible to insufficient sleep, which has been shown to be associated with impaired academic performance, reduced concentration, and a heightened risk of depressive and anxiety symptomology. Current research indicates that regular physical activity (PA) enhances sleep quality, feelings of restfulness, increased focus, and productivity. Accordingly, the purpose of the current study is to examine the effects of Exercise is Medicine (EIM) PA counseling on PA, sleep duration, and quality. METHODS: Students referred to EIM by a healthcare provider or by self-referral will be informed of the study. Participants will provide informed consent and complete baseline questionnaires, including the Physical Activity Vital Sign (PAVS) and the Sleep Quality Scale (SQS). Participants will also be issued an ActiGraph, sleep diary, and activity log to monitor PA, sleep latency, disturbances, and total sleep time (TST). After one week of ActiGraph wear, participants will meet with an exercise physiologist for an individualized EIM PA counseling session where an action plan on increasing physical activity will be created. At 30 days post-counseling, participants will repeat all baseline measures, including PAVS, SQS, ActiGraph monitoring, logs, and surveys. PA and sleep data will be extracted using ActiGraph software. Pre- and post-PAVS, SQS, latency, disturbances, and TST, will be compared using paired T-tests (SPSS v31). ANTICIPATED RESULTS: It is hypothesized that after PA counseling, self-reported and objective measures of PA, sleep quality, and duration will increase.

P225: GLUCOSE REGULATION AND IT'S RELATIONSHIP WITH HEART RATE VARIABILITY IN PERSONS WITH TYPE 2 DIABETES
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Background: Blood glucose control is the result of the coordination between multitude systems, including insulin and the autonomic nervous system (ANS), which can be disrupted in Diabetes. Heart rate variability (HRV) is a non-invasive indicator of ANS function. Purpose: To determine if ANS function is predictive of fasting glucose and glucose clearance by measuring HRV prior to a two-hour oral glucose tolerance test (OGTT) on two separate occasions in participants with type 2 diabetes mellitus (T2DM). Methods: Participants between the ages of 40-65 diagnosed with T2DM were recruited for this study. Participants performed an OGTT on two separate occasions, pre and post exercise intervention. Prior to the OGTT, participants' 10-minute resting HRV was collected via electrocardiogram (Finapres, NOVA). The final five minutes of the tracing was analyzed with Kubios HRV Standard (version 3.5.1) for: root mean square of successive differences (RMSSD), standard deviation of normal-to-normal sinus beats (SDNN), high frequency (HF), low frequency (LF) and LF/HF ratio. Fasting glucose (FG) was then measured, followed by consuming a 75g glucose beverage. Glucose was measured at 30min, 60min, 2hr post consumption. Blood spots were collected via protein saver card and analyzed for insulin. All assessments were repeated after 16-weeks. Results: Eleven participants completed the study; 5 females (age=54±5.6yr), and 6 males (53±1.5 yr). Moderate to strong correlations were observed between FG and glucose area under the curve GAUC) (r=0.77), insulin AUC (IAUC) (r=-0.57) and LF/HF (r=0.58). GAUC correlated with LF/HF (r=0.47), RMSSD (r=-0.41) and HF (r=-0.43). IAUC correlated with LF/HF (r=-0.32), RMSSD (r=0.32) and HF (r=0.31). Conclusion: The HRV appears to have a moderate to strong relationships to glucose and insulin function, with the strongest relationship with FG, its clearance and LF/HF ratio. Future tests should measure HRV throughout the OGTT.

P226: AEROBIC EXERCISE FOR THE PRESERVATION OF SKELETAL MUSCLE FUNCTION DURING CANCER
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Background: Cancer remains a leading causes of death worldwide, and nearly all patients with advanced cancer experience cachexia, a muscle wasting syndrome. While there is no standard treatment for cachexia, aerobic exercise exhibits clear benefits for cancer survivors. The American College of Sports Medicine (ACSM) recommends cancer patients engage in 150 minutes of low-moderate intensity aerobic exercise per week; however, many preclinical studies investigating the beneficial mechanisms of exercise during cancer use exercise protocols well above this recommendation. Purpose: To determine if the ACSM recommendation (150 mins aerobic exercise/week) is sufficient to preserve muscle function in a preclinical cancer model. **Methods:** Mice were randomly divided into four experimental groups: sedentary non-tumor (SED + NT); sedentary tumor (SED + T); treadmill exercised non-tumor (EX + NT); and treadmill exercised tumor (EX + T). Mice were implanted with tumor cells (T groups: 5x10^5 LLC cells in flank) or remained NT for 4 weeks. Mice in the EX groups performed 30 minutes of low-intensity treadmill exercise (5 days/week). Skeletal muscle function was assessed via grip strength throughout the study. **Results:** SED + T mice lost a significant amount of weight, had smaller gastrocnemius masses, and exhibited significant skeletal muscle dysfunction (lower grip strength) compared to healthy controls ($p<0.05$). This coincided with significantly more early-phase autophagosome formation ($p<.001$), indicating a potential mechanism of tumor-mediated muscle wasting and dysfunction. Conversely, exercise appears to modulate this upregulation of autophagosome formation, which is likely one mechanism responsible for exercise's preservation of skeletal muscle function (grip strength) and abrogation of muscle wasting during tumor bearing ($p<0.05$, EX+T vs SED+T). **Conclusion:** Based on our translational preclinical tumor model, ACSM's recommendation for 150 minutes of low-moderate intensity exercise during cancer appears to be sufficient to preserve skeletal muscle function during cancer, which may be attributed to exercise's modulation of autophagic flux. Such data are critical for creating safe and effective prescriptive exercise interventions aimed at preserving healthy muscle function for cancer survivors.

P227: COMPARING CAFFEINE, METHYLLIBERINE, AND THEACRINE WITH LOW- AND MODERATE-DOSE CAFFEINE ON COGNITIVE AND PHYSICAL PERFORMANCE
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Background Caffeine is one of the most widely consumed supplements on the planet. Doses ranging from 3-6 mg/kg have consistently been shown to improve cognitive and physical performance but may cause undesirable side effects. Lower doses may mitigate these side effects. However, inconsistent ergogenic effects are reported with low doses. A combination of caffeine, methylliberine, and theacrine may elicit ergogenic effects without adverse side effects. Yet, few data exist on the efficacy of lower caffeine doses combined with methylliberine and theacrine on cognitive performance. No studies using this combination have included female participants and none have examined physical performance. Therefore, this study aims to assess the efficacy of a caffeine, methylliberine, and theacrine combination compared to low- and moderate-dose caffeine on cognitive and physical performance. **Methods** In a double blind, crossover design, 40 female and male participants will be assigned to 1) 100 mg caffeine (LDC), 2) 200 mg caffeine (MDC), 3) 100 mg caffeine + 50 mg methylliberine + 50 mg theacrine (CMT) and 4) Placebo (PLA) in random, counterbalanced order. Visit 1 will consist of anthropometrics, body composition, and familiarization to test procedures. Visits 2-5 will assess cognitive and physical performance before and 60 min after the assigned treatment. Participants will complete visual analogue scales to assess feelings of alertness, fatigue, positive mood/vigor, and anxiety/jitteriness. A computerized Deary-Liewald task will assess simple reaction time (RT). Choice RT will be assessed with the BlazePod™ Trainer device. After a standardized treadmill warmup, countermovement jumps atop dual force plates will assess lower body power and rate of force development. A handgrip dynamometer will assess upper body strength. Upper and lower body muscular endurance will be determined using the YMCA bench press test and static wall sit, respectively. A minimum of 5 days will separate intervention trials. Data will be analyzed using repeated measures ANOVA. **Anticipated Results** We hypothesize that all groups will improve cognitive performance and mood compared to PLA with CMT and MDC being more effective than LDC. Further, we hypothesize that CMT and MDC will improve physical performance compared to PLA, but LDC will not.

P228: CALIBRATION OF MITOCHONDRIAL FUNCTION MEASUREMENTS
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BACKGROUND: Mitochondrial oxygen consumption assays using Clark-type O_2 electrodes are commonplace. These electrodes generate an electrical signal that is proportional to the O_2 tension (PO_2) which is proportional to the dissolved O_2 concentration ($[O_2]$) in the respiration medium (RM). The proportionality factor relating PO_2 to $[O_2]$ (Henry's Law constant) depends on medium temperature, ionic strength, and pH, among other factors. Changes in $[O_2]$ with time give O_2 consumption rate (JO_2), an indicator of mitochondrial function. Thus,

validity of the measured JO_2 depends on accurate knowledge of the PO_2:[O_2] relationship under the specific assay conditions. METHODS: Isolated, disrupted bovine and swine cardiac mitochondria (with NADH Oxidase activity) were added to RM or a plasma-like buffer in the Hansatech Oxytherm chamber maintained at 37ºC. After observing a stable PO_2 plateau, NADH aliquots of known mass were added stepwise. With each NADH addition, PO_2 promptly fell to stable plateaus until zero PO_2 was reached. Each NADH delivers 1.0 pair of electrons down the NADH Oxidase pathway to O_2, where ½O_2 is consumed. Thus, 1.0 nmol of added NADH consumes 0.5 nmol O_2. Therefore, stepwise NADH additions evaluate the PO_2:[O_2] proportionality coefficient (Henry's constant). Oxytherm (or similar devices) use published values of medium [O_2] that were acquired with a similar technique. The devices apply this proportionality constant to convert PO_2 changes to JO_2. Usually, this JO_2 readout is valid, but, if other components are present, such as O_2-buffering molecules (hemoglobin), this direct conversion of PO_2 to JO_2 by the device may not be valid and, indeed, misleading. RESULTS: In 5 different runs in RM or a plasma-like solution, there was excellent agreement between our NADH calibration procedure and the Oxytherm [O_2]. For example, in RM, a plot of NADH determined [O_2] against the Oxytherm data was: $y = 1.0477x + 0.3277$, $R^2 = 0.9997$, a highly linear relationship less than 5% different. CONCLUSIONS: Mitochondrial respiration devices offer medium O_2 solubility values and under most conditions yield valid measurements of JO_2, as supported by our results. However, our results and the theory presented confirm the need to analyze the PO_2:[O_2] relationship when novel components are present in the assay medium.

P229: ASTAXANTHIN SUPPLEMENTATION REDUCES SUBJECTIVE MARKERS OF MUSCLE SORENESS FOLLOWING ECCENTRIC EXERCISE IN RECREATIONALLY ACTIVE FEMALES

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Background: Delayed-onset muscle soreness (DOMS) occurs 24-72 h following physical activity, specifically from eccentric muscle contractions and can impair performance. Astaxanthin (AX) is a naturally occurring antioxidant shown to mitigate DOMS in males, although data are lacking concerning females who may exhibit sex-based differences in DOMS perception. **Methods:** This study examined 4-weeks of AX supplementation (12 mg per day) on DOMS and performance following a muscle-damaging protocol. Twenty-five young adult, recreationally active female subjects (mean ± SD: age, 22 ± 3 y; height, 165.7 ± 6.3 cm; mass, 63.0 ± 6.9 kg) were stratified by reported soreness after DOMS-inducing exercise and demonstrated no differences in reps to failure at multiple percentages of 1-RM by group assignment. Subjects received AX or placebo (PLA) for 4 weeks. A protocol designed to induce DOMS was undertaken, consisting of five sets of ten repetitions at 65% of 1-RM for leg press with a 3 sec eccentric phase. **Results**: AX supplementation decreased subjective soreness (AX: 1.26±0.27; PLA: 3.03±0.28; $p = 0.02$, ~50%) while not impacting repetitions to failure at any percentage of 1-RM ($p > 0.05$). **Conclusion**: The results demonstrated that in comparison to PLA, AX may enhance recovery by reducing DOMS without detriment to performance in recreationally active females. Ingestion of AX may be of interest for those seeking to reduce muscle soreness following intense training periods without impairment to exercise performance.

P230: SCREENING AND EXPLORING DISORDERED EATING BEHAVIORS IN NCAA DIVISION III ATHLETES

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Background: NCAA Division III (DIII) athletes often face nutritional challenges due to limited institutional support, increasing their risk for disordered eating (DE). Early identification is critical to prevent long-term physical and psychological consequences. **Purpose:** This study aimed to screen DIII athletes for DE risk using a modified SCOFF questionnaire, the Eating Behavior Questionnaire (EBQ), and explore the psychosocial and sport-related factors contributing to positive screening responses through semi-structured interviews. **Methods:** Fifty DIII athletes (19 males, 31 females) completed the EBQ electronically. Athletes flagged as at risk were invited to individual interviews. Interviews probed "yes" responses and contextual influences on eating behaviors. Qualitative data were analyzed using constructivist grounded theory. **Results:** EBQ screening indicated 63% of athletes were at risk for DE (males 11%, females 52%). Frequently endorsed items included feeling out of control with eating, body dissatisfaction, and compensatory behaviors. Interview analysis identified four major themes: (1) intrapersonal pressures, including self-esteem and body image concerns; (2) athletic influences, such as performance expectations and sport-specific leanness ideals; (3) interpersonal factors, including peer and coach pressures; and (4) contextual stressors, including time constraints, financial limitations, and limited food access. **Conclusions:** The EBQ successfully identified DIII athletes at risk for DE, while interviews revealed underlying psychosocial and athletic contributors. Findings underscore the importance of proactive DE screening, nutrition education, and targeted interventions in DIII settings, where structured nutritional support is often limited. This study highlights both the prevalence of DE risk and the complex interplay of individual, social, and environmental factors influencing eating behaviors in collegiate athletes.

P231: ASSOCIATIONS BETWEEN REAP-DERIVED DIETARY QUALITY SCORES AND CARDIOMETABOLIC BIOMARKERS IN CAREER FIREFIGHTERS

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ASSOCIATIONS BETWEEN REAP-DERIVED DIETARY QUALITY SCORES AND CARDIOMETABOLIC BIOMARKERS IN CAREER FIREFIGHTERS

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GABACKGROUND: Firefighters face elevated cardiovascular disease risk, with diet as a modifiable factor. The Rapid Eating Assessment for Participants (REAP) is a practical tool to screen dietary quality, but its alignment with objective cardiometabolic risk markers in firefighters is unclear.

PURPOSE: To examine associations between REAP scores and blood lipid profiles, blood pressure, and glycemic control in career firefighters.

METHODS: Sixty-one career firefighters (mean age = 32.5 ± 9.2 years; BMI = 29.0 ± 5.3 kg/m²; 9.5 ± 8.4 years of service) completed the REAP survey. Fasting blood samples were analyzed for triglycerides (TG), total cholesterol (TC), HDL-C, LDL-C, A1c, and glucose. Blood pressure was measured using standard protocols. Associations between dietary quality and cardiometabolic markers were assessed using Spearman and Pearson correlations, Fisher's exact tests, and Mann-Whitney tests. Subgroup analyses by years of service and BMI classification were conducted.

RESULTS: Overall, REAP scores were not consistently associated with lipid or blood pressure measures. Spearman correlations showed one significant association: higher REAP scores were linked to lower TG ($\rho = -0.39$, $p = 0.026$). Pearson tests indicated modest inverse correlations with A1c ($r = -0.33$, $p = 0.028$) and glucose ($r = -0.33$, $p = 0.030$). No associations were found for TC, HDL-C, LDL-C, or TC:HDL ratio. Fisher's and Mann-Whitney tests showed no significant associations between REAP and dyslipidemia categories. Subgroup analysis suggested a potential inverse REAP-TG relationship among firefighters with <5 years of service ($\rho = -0.46$, $p = 0.07$).

CONCLUSIONS: REAP scores showed weak, inconsistent associations with cardiometabolic risk markers. While modest links to glycemic control emerged, REAP does not appear reliable as a stand-alone screening tool for lipid abnormalities in firefighters. Larger studies are needed to evaluate its utility for identifying at-risk individuals for targeted interventions.

P232: KETONE MONOESTER INGESTION, WITH AND WITHOUT CAFFEINE, DOES NOT ENHANCE MARKERS OF COGNITION IN COLLEGE-AGE ADULTS

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BACKGROUND: Maintaining optimal cognitive function under conditions of mental fatigue (MF) is a growing concern among college-aged individuals, despite regular exercise, sufficient sleep, and balanced nutrition. While ketogenic diets have demonstrated cognitive benefits through elevated blood ketone levels, long-term adherence remains challenging. Exogenous ketone supplementation offers a practical and accessible alternative, capable of rapidly increasing circulating ketones without dietary restriction and may support cognitive resilience and enhance mental clarity. METHODS: Fourteen apparently healthy adults (n=14; age: 23.5±4.1 y, height:168.5±10.5 cm, mass: 77.8±16.9 kg) completed three randomized, counterbalanced visits: placebo (PLA), ketone monoester (KME), and ketone monoester with caffeine (KME+C). Capillary ketone and glucose concentrations, along with cognitive performance, were assessed before and after a MF inducing protocol. Cognitive tests included Task Switching (TS) and Incongruent Flanker (IF). RESULTS: A 3×2 (condition×timepoint) and a 3×3 (condition×timepoint) repeated-measures ANOVA was used for assessing differences to reaction time (TS and IF) and blood concentrations, respectively. Analysis found no significant interaction or main effect of condition (all $p > 0.05$) for reaction time in either TS

or IF. However, a significant interaction was found for blood glucose and ketone concentrations (both $p < 0.05$). Ingestion of a KME and KME+C prevented a subsequent rise in glucose observed only in the PLA group (KME, 93±13 mg/dL; KME+C, 93±11 mg/dL; PLA, 104±15 mg/dL; p=0.03). Likewise, ingestion of a KME and KME+C significantly elevated blood ketone concentrations throughout the protocol in comparison to a PLA (KME, 1.3±0.1 mM; KME+C, 1.4±0.1 mM; PLA, 0.4±0.1 mM; p<0.001). CONCLUSION: Although acute ingestion of a KME, with and without caffeine, elevated blood ketone concentrations in comparison to a PLA, no significant differences were observed to reaction time in markers of cognition following a MF protocol.

P233: THE EFFECTS OF L-THEANINE SUPPLEMENTATION ON STRESS AND HEART RATE VARIABILITY IN FIREFIGHTERS
Magdalynn Stewart, Allie Anderson, Elizabeth Harrington, Jarrett Walbolt. *Montreat College, Montreat, NC.*

BACKGROUND: Firefighters experience high occupational stress that can affect health and performance. L-theanine, an amino acid commonly found in green tea, has been associated with relaxation and stress reduction. Heart rate variability (HRV) is the marker of managed stress, but research has not yet determined whether L-theanine supplementation can enhance HRV in high stress occupational groups such as firefighters. The purpose of this study is to examine the effects of daily L-theanine supplementation on stress levels and HRV in firefighters.METHODS: 20 firefighters will be recruited and split into two groups, one receiving daily L-theanine supplementation of 200 mg capsules (SUPP) and one receiving a placebo (PLAC). The study will be conducted over a four week period. HRV trials will be measured at the baseline (BASE), end of week two (2POST), and end of week four (4Post). Perceived stress will be measured using an online occupational stress questionnaire administered at BASE and 4POST. Group comparisons and changes will be analyzed to determine the effects of L-theanine on stress and HRV.ANTICIPATED RESULTS: We anticipate that firefighters receiving daily L-theanine supplementation will show increased HRV and decreased perceived stress compared to the control group. By week four, the supplementation group is expected to demonstrate more consistent improvements in HRV markers and report lower stress levels on the occupational stress questionnaire. These findings would suggest that L-theanine may be an effective strategy for supporting stress management in high stress areas like firefighting.

P234: EFFECTS OF ASTAXANTHIN SUPPLEMENTATION ON WALKING ECONOMY AND FAT OXIDATION IN OLDER ADULTS
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ABSTRACT: BACKGROUND: Astaxanthin (AX) is a dietary carotenoid with antioxidants and mitochondrial targeting properties, proposed to support metabolic health and energy efficiency in older adults. Walking economy, defined as oxygen consumed per meter walked, is impaired with aging, while fat oxidation is often reduced due to metabolic inflexibility. This study examined the effects of AX supplementation on walking economy and fat oxidation in healthy, older adults. METHODS: Community-dwelling older adults (n = 15; age 68.0 ± 6.0 y; BMI 27.2 ± 6.1 kg/m²; females = 9, males = 6) completed a randomized, double-blind, crossover trial with 5 weeks of AX (12 mg/day) or placebo (PLA) supplementation. Walking economy ($mL \cdot kg^{-1} \cdot m^{-1}$) was measured during submaximal treadmill walking at 3.2, 4.0, 4.8, and 5.6 km/h. Fat oxidation was interpreted using respiratory exchange ratio (RER). Data were analyzed with repeated measures ANOVA ($p < 0.05$). RESULTS: Walking economy did not differ between AX and PLA across all speeds (e.g., 4.8 km/h: AX 0.18 ± 0.04 vs. PLA 0.19 ± 0.05 $mL \cdot kg^{-1} \cdot m^{-1}$; $p > 0.05$). Similarly, fat oxidation remained unchanged, with no significant differences in RER values between AX and PLA (e.g., 4.8 km/h: AX 0.87 ± 0.04 vs. PLA 0.86 ± 0.05; $p > 0.05$). No significant condition × speed interactions were detected (all $p > 0.05$). CONCLUSION: Although no detrimental effects were associated with AX supplementation, five weeks of AX supplementation did not influence nutrient utilization or oxygen consumption in a healthy and older population. Future studies may consider supplementation with AX in older populations presently symptomatic of metabolic and/or cardiovascular dysfunction. Grant or funding:
This study was funded by AstaReal, Inc. The authors declare no conflict of interest.

P235: EXAMINATION OF THE RELATIONSHIP BETWEEN SLEEP QUALITY AND ENERGY INTAKE IN RECREATIONAL HIGH-INTENSITY FUNCTIONAL-TRAINING (HIFT) ATHLETES.
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Sleep quality and energy intake have long been evaluated both separately and together in active populations to assess performance, recovery, and more. However, little research exists examining the relationship between sleep quality and energy intake, particularly at the macronutrient level, in recreational HIFT athletes.
PURPOSE: To determine the correlational relationship between sleep quality and macronutrient intake in recreational HIFT athletes.
METHODS: Recreational HIFT athletes (n=30; females: n=18, males: n=12; ages: 30.5±7.9 years) were surveyed for demographic information, completed a Dual-Energy X-Ray Absorptiometry (DEXA), completed the PSQI, and were assigned to a two-week training program broken up between two 5-day periods, during which they were requested to wear a BodyMedia SenseWear Armband and record their energy intake through dietary food logs.
RESULTS: Most participants under consumed carbohydrates (Week 1: 96.7% n=29; Week 2: 100% n = 30). Significant differences were observed between sex for intake of protein ($F_{1, 29} = 5.29$, $p = .029$), fat ($F_{1, 29} = 8.76$, $p = .006$), and carbohydrates ($F_{1, 29} = 8.24$, $p = .008$). Significant differences between sex were observed for: EI ($F_{1, 29} = 11.1$, $p = .002$), EEE ($F_{1, 29} = 16.89$, $p < .001$) and TDEE ($F_{1, 29} = 86.46$, $p < .001$). There were no statistically significant differences between sex for LEA and sleep quality. Over half of all participants (63.3%, n=19) displayed poor sleep quality and LEA (Week 1: 67.7%, n = 20; Week 2: 56.7%, n=17).
CONCLUSIONS: While there were significant sex differences in energy intake and expenditure, no significant associations were found between sleep quality, energy availability, and macronutrient intake. The relationship between sleep and LEA was not significant, but there was a high prevalence of both poor sleep and LEA. Further investigation is needed on the combined impact of energy availability and macronutrient intake on sleep quality in this population.

P236: BODY COMPOSITION AND METABOLIC FLEXIBILITY IN INDIVIDUALS OF SOUTH, EAST, AND SOUTHEAST ASIAN DESCENT
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BACKGROUND: Asian populations have an increased risk for metabolic disorders at lower BMIs compared to Non-Hispanic White populations. Increased central adiposity, low lean mass (LM) and decreased metabolic flexibility are contributing factors to metabolic dysregulation. However, these factors have not been examined extensively in Asian populations. Further, the Asian ethnic category often includes multiple ethnicities (e.g., East and South Asian) who do not demonstrate the same metabolic characteristics; South Asian populations show higher metabolic disease rates compared with other Asian ethnicities. Therefore, the purpose of this study is to characterize and evaluate the associations between resting metabolic measures, body composition, and metabolic flexibility in 60 East, South and Southeast Asian participants. METHODS: The proposed cross-sectional, observational study will aim to enroll individuals of South (n=20), East (n=20), and Southeast (n=20) Asian descent between the ages of 18 and 35 yrs. A dual energy X-ray absorptiometry scan will measure LM, visceral adipose tissue [VAT], and android/gynoid [A/G] ratio. Resting metabolic rate (RMR) and resting respiratory exchange ratio (rRER) will be collected via indirect calorimetry while the participant lies supine under a ventilated hood for 25 minutes. Metabolic flexibility will be assessed by the slope and absolute ΔRER collected via indirect calorimetry during a submaximal exercise test on a cycle ergometer. Separate ANCOVAs will assess differences in RMR, rRER, LM, A/G ratio, and VAT between ethnic groups while covarying for age, sex, and physical activity. Multiple linear regressions will be used to assess the associations of body composition variables and metabolic flexibility after accounting for ethnicity. All statistical analyses will be performed using SPSS with an alpha level of <0.05. ANTICIPATED RESULTS: We expect to see ethnic differences in RMR and rRER, with lower RMR and higher rRER in South Asian individuals. We also expect to see ethnic differences in body composition, with South Asian individuals exhibiting lower relative LM, higher A/G ratio, and higher VAT. We expect LM will be positively associated with metabolic flexibility, and VAT and A/G ratio will be negatively associated with metabolic flexibility for all groups.

P237: BASELINE LUNG FUNCTION IN FIREFIGHTER RECRUITS
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BACKGROUND: Firefighters are required to wear a self-contained breathing apparatus around smoke and fumes, which places a significant burden on the lungs, thus requiring optimal lung function to safely perform occupational duties. Forced Expiratory Volume in 1 second (FEV1) and Peak Expiratory Flow (PEF) are methods to assess

lung function. The purpose of this study was to compare baseline FEV1 and PEF values of firefighter recruits to reference values and determine the correlations between these measures and body composition. METHODS: Eleven male firefighter recruits (23.8 ± 4.8 years old) fasted for ≥8 hours and completed body composition and lung function tests. Height was measured with a wall stadiometer, and body fat percentage (BF%) with standing bioelectrical impedance. PEF and FEV1 values were obtained by the participant holding a spirometer to their mouth and breathing as fast and as forcefully as possible for 5 seconds while standing. The measure was repeated 3 times; the highest values were recorded. Pearson's correlation coefficients were used to determine the association between lung function and body composition parameters. RESULTS: Average height was 71.0 ± 2.2 in, average BF% was 14.0 ± 5.6%, average FEV1 was 4.1 ± 0.6 L, and average PEF was 413.5 ± 63.8 L/min. Correlations with height were r=0.578 (p=0.062) for FEV1 and r=0.033 (p=0.922) for PEF. Correlations with BF% were r=-0.150 (p=0.659) for FEV1 and r=-0.254 (p=0.450) for PEF. CONCLUSION: The average recruit FEV1 (4.1 L) was consistent with normative values for males of similar age and height (3.5-4.5 L). In contrast, their average PEF (413 L/min) was lower than expected for males of comparable age and height (540-664 ± 100 L/min). Our findings in this small sample demonstrated that these lung function tests were not correlated to height or BF%, although FEV1 and height trended toward significance. These baseline findings will be compared with post-fire school values to assess training effects.

P238: ASSOCIATIONS BETWEEN HEMODYNAMIC PARAMETERS AND ARTERIAL STIFFNESS IN FIREFIGHTERS

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BACKGROUND: Firefighters are at an increased risk of cardiovascular disease (CVD). Arterial stiffness is a predictor of CVD; however, measurements of arterial stiffness assessed by pulse wave velocity require specialized equipment not commonly found in fire stations. Hemodynamic parameters, including pulse pressure, mean arterial pressure, and systolic blood pressure, are commonly assessed in this population. Thus, the purpose of this study is to determine which hemodynamic parameter exhibits the strongest association with arterial stiffness in full-time firefighters. METHODS: Twenty full-time male firefighters with a mean age of 39.4 ± 12.5 years and a mean BMI of 31.0 ± 5.2 kg/m² visited the laboratory in a fasted state. They rested in the supine position for at least five minutes prior to testing. Arterial stiffness was assessed via pulse wave velocity (m/s), and pulse pressure, MAP, and systolic blood pressure (mmHg) were assessed via pulse wave analysis using non-invasive estimations with the Vicorder device. Pearson's correlation coefficients were used to determine the association between pulse wave velocity and each hemodynamic parameter. RESULTS: Pulse wave velocity averaged 6.5 ± 0.9 m/s. Mean pulse pressure, mean arterial pressure, and systolic blood pressure were 62.3 ± 5.7 mmHg, 94.7 ± 8.8 mmHg, and 127 ± 8.9 mmHg, respectively. Pulse wave velocity was not significantly associated with pulse pressure (r = -0.036, p = 0.881). In contrast, pulse wave velocity showed moderate positive correlations with both mean arterial pressure (r = 0.463, p = 0.040) and systolic blood pressure (r = 0.452, p = 0.045). CONCLUSION: In this sample of firefighters, mean arterial pressure and systolic blood pressure demonstrated similar and significant associations with pulse wave velocity. These findings suggest that mean arterial pressure and systolic blood pressure may be better indicators of arterial stiffness than pulse pressure in firefighters.

P239: AGE-RELATED MICROVASCULAR ENDOTHELIAL DYSFUNCTION IS PRIMARILY MEDIATED BY NON-MITOCHONDRIAL OXIDATIVE STRESS

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BACKGROUND: Increased oxidative stress in older-adults causes microvascular endothelial dysfunction, characterized by reduced nitric oxide (NO) production and bioavailability. However, the specific source(s) of oxidative stress that contribute to microvascular endothelial dysfunction in older adults remain unclear. The present study sought to determine the relative contributions of mitochondrial- and non-mitochondrial oxidative stress in age-related cutaneous microvascular endothelial dysfunction. **METHODS**: Three intradermal microdialysis fibers were placed in the ventral forearm of sixteen older (67 ± 3 yrs; 7 M, 8 F) adults for the local delivery of pharmacological agents. Sites were randomly assigned for treatment with 10mM Tempol (superoxide dismutase mimetic), 1mM mitoTempo (mitochondria-specific superoxide dismutase mimetic), and a vehicle control (Ringer's). After ~20 min baseline, a standard local heating protocol (42°C) induced cutaneous vasodilation. After observing a stable local heating plateau, 15mM N-Nitro-L-arginine-methyl ester Hydrochloride (L-NAME; NO synthase inhibitor) was perfused at each site to quantify the NO-contribution to the local heating response. Red cell flux was measured at each site by laser-Doppler flowmetry (LDF) and cutaneous vascular conductance (CVC=LDF/MAP) was expressed as a percentage of maximum (%CVC_{max}; 28mM sodium nitroprusside+43°C). NO-mediated dilation was calculated as the difference between the local heating and L-NAME plateaus (%CVC_{max}). **RESULTS**: Tempol improved the local heating response compared with Ringer's (76.37 ± 18.99 vs. 51.07 ± 23.36, p = 0.02), but mitoTempo (68.66 ± 30.74, p = 0.25) did not. Likewise, Tempol improved Δ%CVC_{max} compared with Ringer's (61.40 ± 15.92 vs. 37.02 ± 20.64, p = 0.01), but mitoTempo (44.36 ± 25.91, p = 0.69) did not. There were no significant differences between Tempol or mitoTempo in the local heating response (p = 0.73) or Δ%CVC_{max} (p = 0.14). There were no differences in baseline (p = 0.89) or CVC_{max} among treatments (p = 0.13). **CONCLUSIONS**: These data suggest that, although mitochondrial oxidative stress may partially contribute, age-related cutaneous microvascular endothelial dysfunction is primarily mediated by non-mitochondria-derived oxidative stress.

P240: IMPACT OF MENSTRUAL CYCLE PHASE ON CARDIAC FUNCTION AT REST AND WHILE CYCLING

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Background: Hormonal fluctuations during the menstrual cycle may influence cardiovascular function. This study investigated cardiac output (Q), stroke volume (SV), and heart rate (HR) at rest and during exercise across menstrual cycle phases using non-invasive cardiography. **Methods**: Thirteen healthy women (aged 19-28) with regular menstrual cycles were studied during menstruation (M), late follicular (LF), and mid-luteal (ML) phases, verified by ovulation kits. Participants completed a VO2max test to determine a workload eliciting ~60% VO2max. Cardiac function (Q, SV, HR) was measured at rest and during a 10-minute cycle ergometer test at 60% VO2max using a PhysioFlow device with six electrodes. Two-way ANOVAs assessed phase and condition (rest vs. exercise) effects. **Results**: No significant differences in Q, SV, or HR were observed across phases at rest or exercise (p > 0.05). From rest to exercise, Q rose from 6.4 ± 1.2 to 13.2 ± 2.2 L/min (M), 6.5 ± 1.1 to 13.5 ± 3.1 L/min (LF), and 6.4 ± 1.0 to 13.7 ± 2.3 L/min (ML); HR from 75.8 ± 11.5 to 129.2 ± 14.9 beats/min (M), 75.0 ± 8.9 to 128.5 ± 12.9 beats/min (LF), and 72.2 ± 11.7 to 127.7 ± 2.3 beats/min (ML); SV from 84.0 ± 7.8 to 102.6 ± 13.7 mL/beat (M), 87.1 ± 9.8 to 104.5 ± 18.6 mL/beat (LF), and 90.3 ± 13.1 to 108.8 ± 19.8 mL/beat (ML) (all p < 0.05). No phase-condition interactions were significant (p > 0.05). **Conclusions**: Q, HR, and SV increased significantly from rest to exercise across all phases (p < 0.05), but no differences were found between phases, indicating stable cardiovascular responses across the menstrual cycle.

P241: THE INFLUENCE OF CIRCADIAN RHYTHM ON THE ANTIHYPERTENSIVE EFFECTS OF EXERCISE

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BACKGROUND: Circadian rhythm is the intrinsic time-keeping system of the human body that regulates various physiological processes. One such process, blood pressure (BP) regulation, follows a diurnal pattern, rising in the morning, oscillating during the day, and dipping during sleep. Inter-individual differences in circadian rhythm are reflected in *chronotype*, the behavioral manifestation of circadian rhythm. Evidence on how time of day influences hemodynamic responses to exercise is inconclusive, and the role of chronotype in these responses remains largely unexplored. To address these gaps, our study will investigate the influence of time of day and chronotype on hemodynamic responses to acute aerobic exercise performed in the morning or evening. METHODS: A repeated measures cross-over design will be utilized in which 36 young adults (18-40 y), stratified by chronotype, will participate in all conditions. Each participant will attend four laboratory sessions on separate days. These will include morning control and experimental sessions as well as afternoon control and experimental sessions. Control sessions will include comprehensive hemodynamic assessments, and experimental sessions will include 30 min of high-intensity interval cycling and a select number of hemodynamic assessments will be performed immediately before and for 1 h post exercise to capture acute responses. The exercise protocol will include 6 repeated 5-min bouts. Each 5-min bout will include 4 min of moderate intensity cycling (~40% heart rate reserve [HRR]) and 1 min of high intensity cycling (>75% HRR). Both control sessions and both experimental sessions will be identical except for time of day: one conducted in the morning and the other in

the evening. Experimental sessions will be separated by a minimum washout period of 48 h. At the conclusion of each control and experimental session, participants will be outfitted with an ambulatory BP monitor to record BP responses for 24-h outside of the laboratory. Data will be analyzed using hierarchical linear modeling to evaluate main and interaction effects (time of day × chronotype). ANTICIPATED RESULTS: We hypothesize that hemodynamic responses to exercise will differ between morning and evening exercise, and these differences will be contingent on chronotype.

P242: THE EFFECT OF AVERAGE BIN SIZE ON ULTRASOUND ESTIMATES OF BLOOD FLOW: A PILOT STUDY

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BACKGROUND: Studies use pulsed-wave (PW) and B-mode ultrasound to estimate blood flow through an artery and typically make use of different bin sizes when estimating blood flow. These bins range from 3 to 20 cardiac cycles. Since breathing causes rhythmic changes in blood flow, there exists the possibility that the bin location in the breathing cycle could affect the estimated blood flow value. Therefore, the purpose of this study was to use ultrasound to record blood velocity in the brachial artery, and from that recording estimate limb blood flow using bin sizes of 3, 5, 10, and 20 cardiac cycles. METHODS: Five participants volunteered for this pilot (women=2) and visited the laboratory on one occasion. Following anthropometric measurements, participants rested supine for 15 minutes. After rest, blood pressure was measured up to three times. The right brachial artery was imaged using B-mode ultrasound, and PW ultrasound was used to estimate blood velocity over time. Thirty seconds of blood velocity data was recorded, after which participants followed a guided breathing application at a breathing rate of six seconds inhalation, six seconds exhalation, for five minutes. While continuing to follow the program, an additional thirty seconds of blood velocity data was recorded. For each condition, volumetric blood flow for twenty-four cardiac cycles was estimated, and then bins of 3, 5, 10, and 20 cardiac cycles were averaged. The minimum and maximum of each bin size was recorded. Data was analyzed using repeated-measures ANOVA. Statistical significance was set a priori at α=.05. RESULTS: There was no statistically significant group (breath style) x bin size interaction (P = .146). There was a statistically significant main effect of bin size (P = .006); however, following simple pairwise comparison using Bonferroni correction, the main effect was washed out (P > .05 for all). Minimum to maximum flow values ranged from 51.95 ml·min^{-1} to 66.44 ml·min^{-1} in the three-cycle bin, respectively, and 58.44 ml·min^{-1} to 59.77 ml·min^{-1} in the twenty-cycle bin, respectively. CONCLUSION: The results of this pilot study, while statistically insignificant, do show the possibility of a binning effect when averaging volumetric blood flow over several cardiac cycles. This is an ongoing research project and more data may change these results.

P243: CHARACTERIZATION OF LP-PLA2 MASS CONCENTRATION BEFORE AND AFTER EXERCISE TRAINING IN THE HERITAGE FAMILY STUDY

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Background: Elevated lipoprotein-associated phospholipase A2 (Lp-PLA2) is a risk factor and therapeutic target for coronary artery disease. However, the effects of exercise training on Lp-PLA2 have not been widely studied. We hypothesized that endurance training would reduce Lp-PLA2 in sedentary adults and that training responses would aggregate in families. Methods: Lp-PLA2 mass concentration (ng/mL) was measured before and after 20 weeks of standardized, endurance training in participants of the HERITAGE Family Study (n=705, 55% female, 33% Black). Paired t-tests were conducted to examine training effects. Analyses were performed in the total sample and stratified by race and sex, as well as across age-, sex-, and race-specific baseline Lp-PLA2 quartiles. Results: Lp-PLA2 showed stronger familial aggregation at baseline compared to changes with training (2.4 vs 1.3 times more variance between than within families, respectively). At baseline, Lp-PLA2 was 17% and 25% higher (p<0.0001) in male and White participants compared to female and Black participants, respectively. On average, Lp-PLA2 significantly (p<0.009) decreased 1.6% with exercise training in the total sample and decreased 1.2% and 2.0% in male and female participants, respectively, with the decrease only significant in White participants (-2.4%, p=2.8E-6). Importantly, when examined by age-, sex-, and race-specific quartiles of baseline Lp-PLA2, Q3 & Q4 (50th percentile and up) significantly decreased Lp-PLA2 with training by 4.7% and 11.7%, respectively. Conclusions: Baseline Lp-PLA2 and its responsiveness to exercise training varied by sex and race groups. Endurance exercise training decreased Lp-PLA2. Importantly, exercise-induced reductions in Lp-PLA2 were largest in individuals who started with the highest Lp-PLA2 levels at baseline, suggesting that those at higher risk may derive the greatest benefits from regular exercise in terms of this risk factor.

P244: THE EFFECT OF JOINT VERSUS SOFT TISSUE FLOSSING ON OVERALL PERFORMANCE IN THE LOWER EXTREMITIES

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Effective warm-ups result in less muscle soreness post-exercise, a lower risk of injury, and enhanced performance output ability. Existing research has shown promising effects of muscle tissue flossing, a novel method of warming up in which a latex band is used to apply pressure to a specific area in the body. PURPOSE: To determine how active, healthy college students respond to flossing applied to both a joint and soft tissue, focusing on the ankle joint and calf muscle. METHODS: This study utilized a randomized crossover study design. Floss bands were applied bilaterally to either the ankles or calves for each of two visits and remained in place for a total of two minutes. The bands were applied at 50% tension and 50% overlap. Subjects walked around post-band removal to regain blood flow before completing each of the three outcome tests. Twenty minutes post-treatment, each of the three outcome tests were repeated. Subjects (n=7, 86% female, age 22.1±1.9 yrs) completed tests on power (vertical countermovement jump test (VJ)), range of motion (weight-bearing lunge test (WBLT)), and balance (dynamic leap and balance test (DLBT)) that were compared between the two flossing treatment sites via paired sample t-tests. RESULTS: There was no significant difference in performance between the immediate post-treatment and the 20-minute post-treatment outcome measures, aside from DLBT number of right-side errors (3.1±2.5 vs 2.4±1.8, p=0.047) and DLBT left-side time (39.00±4.40s vs 36.30±3.68s, p=0.007) for the ankle treatment and WBLT straight left leg (57.6±7.5° vs 54.9±6.6°, p=0.004) and DLBT right-side time (41.10±8.38s vs 36.00±5.94s, p=0.042) for the calf treatment. The calf and ankle treatment sites were equally effective for each of the outcome measures, aside from a significant difference found for the VJ immediately following removal of the floss bands in favor of the ankle site (0.44±0.11m) over the calf site (0.42±0.10m, p<0.001). CONCLUSION: Active college students' power, range of motion, and balance responded equally to floss band application to a joint and soft tissue area in the lower extremities. The floss band treatment may be a feasible warm-up option, especially for those looking to not increase their exercise load. Application to either the ankle joint or the soft tissue of the calf may be an option.

P245: AEROBIC CAPACITY CHANGES FROM AN EXERCISE INTERVENTION DONE ON GRAVITY-INDEPENDENT HARDWARE

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BACKGROUND: With manned Mars missions slated to begin within the next decade, optimizing in-flight exercise on future flights is vital. Mars missions will use spacecraft with room for one piece of exercise hardware that must abate numerous physiological (bone loss, muscle atrophy and strength deficits, aerobic deconditioning, etc.) losses, which some deem impossible. Yet recently gravity-independent hardware (Impulse Technologies; Knoxville TN) evoked significant lower body strength and bone gains from 30 workouts over a 70-day period. The hardware places a modest load along its low-friction 1.9 m track to permit high-speed repetitions. This study's purpose examines aerobic capacity changes from this same hardware. METHODS: The current exercise protocol is based on prior research that also used a gravity-independent device and will include four 4-minute sets of squats. Repetitions require subjects to descend to a depth whereby their femurs are parallel to the ground. Sets are separated by 3 minutes of stationary rowing that serve as active recovery. Workouts will last ~30 minutes. Aerobic capacity will be measured within 2-4 days of the start and finish of the 15-workout intervention by a graded exercise stationary cycle ergometer test. Four subjects used to test the protocol over 45 days averaged a 6.1% aerobic capacity gain. After data collection is completed, it will be assessed for compliance to ANOVA assumptions (normality, independence, equal variances). Paired t-tests will measure aerobic capacity changes from the two cycling tests subjects perform. ANOVAs will measure changes to heart rate and the volume of work done over the intervention. An 0.05 alpha will denote significance. ANTICIPATED RESULTS: With a larger sample, it is hypothesized the 15-workout intervention will yield significant increases in aerobic capacity and the volume of work performed, as well as significant heart rate changes. If the current hypothesis is

affirmed, and when combined with prior strength and bone outcomes, the gravity-independent hardware warrants consideration for in-flight exercise on Mars missions.

P246: HIGH METAPHYSEAL FILLING RATIONS IN HUMERAL STEMS RESULT IN ORIF OVER REVISION ARTHROPLASTY
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INTRODUCTION: The purpose of this study was to assess how prosthesis humeral filling ratios affect the indicated revision procedure of either revision reverse arthroplasty or open reduction and internal fixation (ORIF) with a plate for periprosthetic fractures.
METHODS: Patients were retrospectively analyzed from a single academic institution from 2012 to 2024. Two groups were created based on the surgery patients received: revision reverse arthroplasty or ORIF with a plate after a periprosthetic fracture. Demographic data, prosthesis stem length, and metaphyseal and diaphyseal humeral filling ratios were collected. Inclusion criteria were patients who, after a periprosthetic fracture, received a revision reverse arthroplasty or ORIF with a plate. Exclusion criteria were patients with fractures fixated with humeral medullary nails, fractures distal to the arthroplasty prosthesis, and patients without complete pre-fracture imaging.
RESULTS: Eighteen patients received revision reverse arthroplasty, and sixteen patients received ORIF with a plate. Demographic data of age, sex, BMI, ASA, diabetes status, tobacco use, and alcohol use did not differ between groups. The average age of patients was 74.1 ± 0.5 years, with 12 males (33%). The metaphyseal filling ratio was significantly larger in the ORIF with plate group (0.8 ± 0.07) than the revision reverse arthroplasty group (0.69 ± 0.11; p = 0.001). The diaphyseal filling ratio (0.73 ± 0.12 vs. 0.78 ± 0.10) and prosthesis stem length (102.7 ± 36.2 mm vs. 116.5 ± 52.0 mm) did not differ between groups.
CONCLUSIONS: Patients with higher metaphyseal humeral filling ratios are more likely to receive ORIF with a plate for periprosthetic fractures.

P247: INFLUENCE OF PHYTOECDYSTEROIDS ON SKELETAL MUSCLE CAPILLARIZATION IN RESPONSE TO EXERCISE IN MICE
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BACKGROUND - Exercise training can induce angiogenesis, or the expansion of the capillary network within the skeletal muscle. The reason for angiogenesis in skeletal muscle is to increase blood flow/supply to the exercising muscle, which subsequently can improve exercise performance. Phytoecdysteroids are natural plant steroids that possess anabolic properties, like testosterone, but without negative side effects. Research from our lab has demonstrated that phytoecdysteroid (20-hydroxyecdysone; 20E) supplementation: 1) enhances the recovery of eccentric contraction-induced muscle damage and 2) increases skeletal muscle mass in response to exercise training in mice, compared to control-treated mice. It is unknown if phytoecdysteroid supplementation also enhances angiogenesis within skeletal muscle. The purpose of this research project will be to investigate skeletal muscle angiogenesis in skeletal muscle of mice after 9 weeks of either endurance or resistance exercise training. METHODS - Briefly, young (3-6 months old) C57BL/6 male mice will be randomly sorted into six groups: control + sedentary, control + endurance running, control + resistance running, 20E + sedentary, 20E + endurance running, 20E + resistance running. The treatment groups consist of control (normal rodent chow) and 20E (50 mg/kg body mass) will be incorporated into the normal rodent chow for the phytoecdysteroid treatment. All mice will be individually-housed for the entirety of the 9-week training protocol and have free access to a running wheel to voluntarily run (except sedentary mice). Resistance running groups will have weight progressively added to their wheels (via magnets), thus providing resistance to the wheel to mimic a progressive resistance training program. At the end of the training, the mice will be sacrificed and their muscle tissues frozen for the analysis of capillaries via immunohistochemistry. Statistical significance in outcome variables will be evaluated using a two-way ANOVA ($p \leq 0.05$), followed by Fisher's LSD post-hoc analyses. ANTICIPATED RESULTS - I hypothesize that 20E supplementation will enhance angiogenesis in skeletal muscle of mice in response to both endurance and resistance exercise training, compared to control mice.

P248: THE EFFECTS OF SINGLE-LEG CYCLING ON EARLY STAGE DIABETIC PERIPHERAL NEUROPATHY
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BACKGROUND: Diabetic peripheral neuropathy (DPN) is a clinically significant nerve disorder that primarily affects the lower extremities, resulting from prolonged hyperglycemia. Approximately 31.5% of adults with type 2 diabetes (T2D) are affected by DPN. DPN can impair balance and increase risk of falls, foot ulcers, amputations, and mortality. Double-leg cycling (DLC) has previously improved symptoms of DPN, blood glucose, and HbA1c in individuals with T2D. However, the peripheral vascular dysfunction associated with T2D may limit muscle blood flow and adaptations. Single-leg cycling (SLC), allows for greater blood flow to the active muscle, compared to DLC, with similar central cardiovascular responses. Moreover, SLC has demonstrated superior increases in skeletal muscle glucose transportation and carbohydrate (CHO) oxidation in healthy populations. These changes observed in healthy populations suggest that SLC could result in greater limb-specific blood flow, CHO oxidation, and mitigate symptoms of DPN and hyperglycemia-induced nerve damage in individuals with T2D. The purpose of this study is to determine the effect of SLC on fasting glucose, HbA1c, CHO oxidation, skeletal muscle oxidative capacity (SMOC), and DPN symptoms in individuals with T2D. METHODS: 34 participants under 60 years old with T2D and early-stage DPN will be recruited. Participants will be randomly assigned to DLC or SLC exercise. Three exercise sessions will be completed per week for 8 weeks. Each session will consist of 4 minutes of cycling at highest tolerable limit followed by 6 minutes of active recovery. DLC will perform one session, while SLC will perform two sessions—one with each leg. Fasting glucose, HbA1c, DPN symptoms, and SMOC will be measured pre- and post-intervention. CHO oxidation will be measured via gas exchange. SMOC will be assessed using Near-Infrared Spectroscopy. DPN symptoms will be assessed using the Michigan Neuropathy Screening Instrument and the Berg Balance test. Data will be analyzed using a two-way mixed model ANOVA to determine significant differences. ANTICIPATED RESULTS: We hypothesize that SLC training will yield greater improvements in fasting glucose, HbA1c, exercise CHO oxidation, and SMOC than DLC. Moreover, that SLC training will also have greater improvement in symptoms of DPN.

P249: THE ASSOCIATION OF HANDGRIP STRENGTH AND TOTAL BODY STRENGTH IN CHILDREN AGES 5 TO 11 YEARS
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BACKGROUND: Handgrip strength (HGS) is commonly used to represent total body strength thus suggesting that in clinical settings HGS can be used as a tool to provide a rapid indication of general muscle strength in children. HGS has been reported to be significantly associated with leg strength in young and older adults, however, this association in young children has not been fully elucidated. Thus, the purpose of this study was to determine the association between peak torque knee flexion and extension torque to peak HGS. **METHODS:** A total of 32 children (23 boys) ages 5-11 years (8.0 ± 1.6) performed muscle strength testing. Participants completed a RAMPing protocol for the knee flexion and extension and HGS. The RAMPing protocol consisted of two warm-up contractions at 50% and 75% perceived effort followed by three maximal voluntary isometric contractions (MVIC) using a handheld dynamometer (Lafeyette Instruments; Model 01165A) and handgrip strength dynamometer (Lafeyette Instruments; Model J00105). Correlational analyses and explained variance were applied to evaluate the association between handgrip strength and total body strength. **RESULTS**: A moderately significant association was observed for both HGS (26.5 ± 10.3 lbs) and handheld peak knee flexion torque (R^2 = 0.41; 40.9 ± 11.5 N·m) and HGS and handheld peak knee extension torque (R^2 = 0.56; 40.9 ± 25.6 N·m). **CONCLUSIONS:** Similar to young and older adults, leg strength and HGS are significantly and positively associated in young children using mobile dynamometers. While significantly associated, when combined during assessment these may provide a better muscle strength profile in young children.This study was supported in part by the University of Kentucky Pediatric Exercise Physiology Laboratory Endowment.

P250: ASSESSING THE RELATIONSHIP BETWEEN MRI AND MULTIMODAL BODY COMPOSITION METHODS FOR DETERMINING LEAN MASS

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Background: Magnetic resonance imaging (MRI) is considered the gold standard for lean mass evaluation. Despite its validity, cost and accessibility remain barriers. This study explored the relationship between MRI, peripheral quantitative computed tomography (pQCT), dual-energy x-ray absorptiometry (DXA), ultrasound (US), and multi-frequency bioelectrical impedance analysis (MF-BIA) for estimates of whole-body and regional lean mass in perimenopausal women. **Methods**: Measurements were taken following an 8 hr fast in 28 perimenopausal women (age: 48.8±4.5 yr, BMI: 31.7±3.3 kg/m^2). Thigh muscle volume (cm^3) of the right leg was obtained by whole-body MRI and determined using segment statistics module in 3D slicer. In the right thigh, 50% of the distance between the greater trochanter and the knee, muscle area (MA; mm^2) was determined by pQCT, and muscle cross-sectional area (cm^2) from US. Whole-body and right leg lean soft tissue (LST) were obtained from whole-body DXA (kg) and MF-BIA (kg). A bivariate correlation and stepwise linear regression were used to determine relationships and predictors for lean mass outcomes. **Results**: MRI right thigh muscle volume was significantly correlated with DXA LST (r=0.480, p=0.011), pQCT MA (r=0.430, p=0.025), and MF-BIA LST (r=0.458, p=0.016). No significant relationship existed between MRI and US (r=0.181, p=0.367). Across methods, the strongest correlations were with DXA for all outcomes (r=0.480-0.927; p<0.001). pQCT MA and US were significantly related to all measurement outcomes (r=0.441-0.651; p<0.021). DXA whole body LST significantly predicted MRI thigh muscle volume, accounting for 20% of its variance (R=0.480, p=0.011). **Conclusion**: DXA, pQCT, and MF-BIA were significantly related to MRI when estimating lean mass, providing potentially more feasible measurement tools in perimenopausal women. DXA whole body LST could prove to be a more feasible predictor of MRI thigh muscle volume.**Grant or Funding:** This study was funded by the American Diabetes Association, grant 7-23-ICTSWH-04. **Generative AI Statement:** Artificial Intelligence (AI) tools were not used in the collection or analysis of data, writing of the abstract/presentation, or production of graphical elements of this abstract/presentation

P251: COMPARING HIGH VOLUME TRAINING AND MONTHLY UNDULATING TRAINING FOR MUSCLE HYPERTROPHY: A PILOT STUDY

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BACKGROUND: There is controversy among bodybuilders whether high intensity training (HIT) or cycling high volume training (HVT) and HIT training is more effective for muscle hypertrophy. This training style is best described as being monthly undulating periodization (MUP). The current scientific consensus has established that muscle tension is the primary driver of muscle hypertrophy: HVT appears most effective at eliciting muscle hypertrophy. Studies directly comparing HVT and MUP are sparse. The purposes of this pilot study are to compare full-body hypertrophy outcomes via limb circumferences and air displacement plethysmography between HVT and MUP with an in-subject design and to test this study design for validity. METHODS:For this pilot study, three healthy untrained college students completed a 12-week exercise intervention consisting of dual exercise routines: one for the left limbs and one for the right limbs. The left limbs only performed HVT while the right limbs performed MUP. It was hypothesized that HVT would result in similar muscle gain compared to MUP, as both methods achieve high muscular tension within a high percentage of motor units. RESULTS: Body composition measurements were taken pre- and post-intervention: on average, participants gained 2.4 kilograms of lean mass and lost .2 kilograms of fat mass during the 12 week intervention. Left and right upper arm circumference increased by .5cm on average and .3cm on average, left and right upper thigh circumference increased by 1.2cm and 1.3cm on average. CONCLUSIONS: The small sample size precludes any statistically significant findings. Tools used to assess body composition were not optimal, and data were biased by participant one. Excluding participant 1 from the data, participants lost 1.4 kilograms of muscle mass and gained 2.2 kilograms of fat mass on average. A larger sample size and segmental body composition tools are required to adequately test the hypothesis and validate the study design.

P252: CRITERION VALIDITY OF THE FIBION SENS IN CLASSIFYING PHYSICAL ACTIVITY UNDER LABORATORY CONDITIONS

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BACKGROUND: The Fibion SENS® is a wearable motion sensor designed to classify physical activity (PA) type and intensity. The aim of this study was to evaluate its criterion validity by comparing its PA classifications to directly observed activity in a controlled laboratory setting. METHODS: Nineteen healthy adults (7 females, 12 males) completed a structured protocol comprising sedentary behavior (i.e., lying, sitting, standing) and ambulatory activities (i.e., slow walk, brisk walk, jog, run) across two trials. The Fibion SENS® was worn on the anterior thigh. Activity bouts were time-synchronized and aligned with human-recorded observations (True PA). Categorical agreement between Fibion and True PA was assessed using quadratically weighted Cohen's Kappa (κ), with percentage agreement (Po) computed from a 266-item matrix. To ensure a valid comparison across devices, all activity classifications were recoded into a uniform 3-level scale (Sedentary, Light, Moderate/Vigorous) prior to analysis to avoid sparse categories and enhance interpretability. RESULTS: The Fibion SENS® demonstrated almost perfect agreement with observed PA classifications (κ = 0.99, SE = 0.00463, 95% CI = 0.98-1.00), and 98.9% observed agreement. Agreement was highest for sedentary and light activity categories, with minor misclassifications noted in moderate bouts. CONCLUSIONS: The Fibion SENS® shows excellent criterion validity in classifying PA type and intensity under controlled conditions. Its classification performance supports its use for objective movement monitoring in research settings.

P253: COMPARING THE EFFECTS OF PROLONGED SITTING INTERRUPTIONS IN ADULTS AT RISK FOR CARDIOVASCULAR DISEASE

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Prolonged sedentary behavior (SB) is associated with increased arterial stiffness (AS), a measure of cardiovascular disease (CVD) risk. In prior studies, acute bouts of prolonged SB led to a 0.2-0.4 m/s increase in AS. Mitigation strategies remain unclear. As CVD incidence rises among US adults, modifiable health behaviors such as SB represent potential targets for interventions aimed at CVD risk mitigation. PURPOSE: To investigate the efficacy and acceptability of two SB interruption strategies on AS in middle-aged and older adults. METHODS: In a randomized controlled cross-over trial, participants (n=18, ≥ 45 years old, ≥ 2 cardiometabolic risk factors) completed three laboratory visits. Experimental conditions included: 2 h 20 min of uninterrupted sitting (Con), sitting interrupted with 5 min of walking (Walk), and sitting interrupted with 5 min of pedaling using an under-desk ergometer (Pedal). The primary outcome and indicator of AS was carotid-to-femoral pulse wave velocity (cfPWV), assessed at the beginning and end of each visit. Secondarily, qualitative data was collected to evaluate participant reported acceptability and feasibility. A linear mixed model adjusted for mean arterial pressure and/or blood pressure medication was used. Effect sizes were reported as Cohen's d. RESULTS: Overall, cfPWV was 7.25 [6.67, 7.82 m/s] at baseline and showed minimal change over time with prolonged sitting (0.12 m/s [-0.18, 0.43], p=0.434). There was no significant condition x time interaction (p=0.404) for either interruption strategy relative to control (W: -0.09 m/s [-0.5,0.3], p=0.657; P: -0.3 m/s [-0.7, 0.1], p=0.187). Blood pressure medication was a predictor of cfPWV (d= -0.514, p=0.010), with medication having lower cfPWV (6.90 ± 0.17 m/s) compared without (7.51 ± 0.16). 82% of participants reported that this study changed the way they thought about sitting. 100% would consider incorporating SB interruption into a daily routine. CONCLUSION: Under acute conditions, the SB interruptions were insufficient to alter AS, although differences between conditions likely have clinical relevance. Longer interruption durations at higher intensities should be examined for future studies but must be balanced with practicality and participant acceptability.

P254: CHARACTERIZATION OF 24-HOUR STANDING BEHAVIORS IN ADULTS

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BACKGROUND: The 24-hour physical activity behavior cycle includes sleep, light-to-vigorous-intensity physical activity, standing, and sedentary behavior. Current activity guidelines, supported by evidence over the past two decades, recommend reducing sedentary behavior

and replacing it with light-intensity physical activity. Due to this recommendation, individuals have begun engaging in standing as a way to reduce sedentary behavior. However, there is limited prior research that investigates the relationship between standing behavior and cardiovascular health. Furthermore, this limited existing research presents mixed results as to whether standing is helpful or harmful to cardiovascular health. As researchers unravel this paradox to determine which specific type, pattern, and context of standing is truly helpful to health, it will be important to identify how various populations accumulate their daily standing behavior. This will allow for targeted interventions to populations who most need to reduce harmful standing behaviors and increase helpful standing behaviors. Therefore, the purpose of this study is to investigate the characterization (type, pattern, and context) of standing behaviors among different populations utilizing objective, thigh-worn activity monitors. METHODS: 20 participants will be recruited, aged 18-60 years old, divided across three age cohorts (18-31, 32-45, 46-60). Participants will wear an activity monitor (ActivPAL) for 8 days (7 full days, 1 week). Participants will also keep a diary of daily activities to report sleep and wake times each day, time spent at work, as well as any times the device is removed for swimming, showering, or bathing, and used for clearing and processing of 24 hour activity data. Data across age groups will be analyzed using one-way ANOVA with post hoc Bonferroni correction. This includes comparisons of total daily standing time, contextual daily total standing time (e.g., time spent at work vs. not working), and the number of bouts of prolonged standing time (e.g., >10 minutes). ANTICIPATED RESULTS: It is hypothesized that there will be statistically significant differences in total daily standing time, context of standing time, and amount of time spent standing in prolonged bouts between our age cohorts.

P255: IMPACT OF AFFECTIVE RESPONSE TO ACUTE EXERCISE ON FUTURE PHYSICAL ACTIVITY: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND: Due to numerous health benefits of regular physical activity (PA), recommendations for adults suggest 150 minutes of moderate or 75 minutes of vigorous PA weekly. Despite this, more than 70% of adults fail to meet this recommendation. One framework for the determinant of PA behavior is based upon hedonic theory and the affective response during exercise (i.e., positive affective response is associated with more PA). The purpose of this study is to investigate whether affective response to acute exercise is significantly associated with future physical activity level. METHODS: A systematic review was performed using 10 databases with the following search terms: [Exercise OR "Physical Activity"] AND [(Affect* OR (Affect* AND Arousal) OR (Affect* AND Valence) OR ("Feeling Scale") OR Circumplex OR (Affect* AND Activation*)]. Studies were screened using the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA). A four-level hierarchical meta-analysis assessed the relationship between affective response during or after acute exercise with future physical activity. RESULTS: A total of 23,978 studies were retrieved, and records without affective response to acute exercise and a future physical activity measurement (with no other intervention between) were excluded. Nine peer-reviewed studies met the inclusion criteria, with 623 participants (514 Female). Of these, seven described participants as sedentary or low active, while two had no inclusion criteria based on PA. Seven studies recorded participant physical activity using self-report, while three used accelerometry. In-task affect (k = 8, n = 490) was positively related to future physical activity (r = 0.14, p = 0.024, 95% CI: 0.03 to 0.26), and heterogeneity appeared low (Q = 39.34, p = 0.243). Similarly, post-task affective response (k = 5, n = 431) was positively related to future physical activity (r = 0.13, p = 0.007, 95% CI: 0.04 to 0.22), and heterogeneity appeared low (Q = 4.619, p = 0.9695). CONCLUSIONS: A positive affective response to exercise (both during and following exercise) is associated with PA participation in the future. However, as this relationship is weak, additional studies related to the influence of sex, exercise mode and/or intensity, and the cardiorespiratory fitness level of individuals are warranted.

P256: INFLUENCE OF COLLEGE CONTEXT ON PHYSICAL ACTIVITY BEHAVIORS AND MOTIVES

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BACKGROUND: While compulsory physical activity (PA) is common at military colleges, it is unclear how it may impact participation in other, self-selected PA and overall motives for participation. The purpose of this study was to examine differences in PA participation and motives between military college cadets and traditional college students. METHODS: Undergraduates from a military college (n = 121) and a traditional university (n = 99) completed an online survey. Weekly PA was measured via the International Physical Activity Questionnaire Long Form with emphasis on the occupational (i.e., compulsory) and leisure-time (i.e., self-selected) domains. Instructions for the occupational domain were expanded to include mandatory military and/or varsity sport-related training. Weekly muscle-strengthening activity was assessed for frequency and type (i.e., weighted machines, body weight, resistance bands/free weights, and holistic) via the Muscle-Strengthening Exercise Questionnaire. PA motives (i.e., mastery, enjoyment, psychological condition, physical condition, appearance, others' expectations, affiliation, and competition/ego) were assessed via the Physical Activity and Leisure Motivation Scale. The Mann-Whitney U nonparametric test was used to compare differences between groups (α = 0.05). RESULTS: Occupational PA was higher among military cadets compared to traditional college students (p < 0.001), with no differences in leisure-time PA (p = 0.30). Total weekly frequency of muscle-strengthening exercise was not different based on college context (p = 0.39), however, military cadets reported greater frequency of body weight movements (p = 0.03) compared to traditional students. Military college cadets reported higher PA motivation scores for competition/ego (p < 0.001), others' expectations (p < 0.001), and mastery (p = 0.01) compared to traditional students. CONCLUSIONS: Despite high compulsory PA, military college cadets engage in additional self-selected PA at levels comparable to traditional college students. Cadet motives for PA participation seem to reflect military culture (i.e., hyper-evaluative, hierarchical, with embedded value on physical fitness). Future research should consider how motives within the military context translate to long-term PA behaviors.

P257: THE RELATIONSHIP BETWEEN NATIVITY STATUS, ACCULTURATION, AND CARDIOVASCULAR DISEASE RISK AMONG HISPANIC/LATINA WOMEN

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BACKGROUND: Hispanic/Latina women are a growing demographic projected to make up 25% of the total United States (U.S.) female population by 2050. Notably, Hispanic/Latina women are at increased risks of cardiovascular disease (CVD) including higher rates of hypertension, diabetes and obesity, but paradoxically show lower CVD mortality rates than non-Hispanic white and black women. The "healthy immigrant effect" suggests that foreign-born women initially exhibit protective health behaviors, but that these behaviors diminish with increased length of U.S. residence and acculturation. Few studies have comprehensively examined CVD risk, as defined by the American Heart Association's Life's Essential 8, among Hispanic/Latina women through the lens of nativity and acculturation. **METHODS**: 82 Hispanic/Latina women (41 foreign, 41 U.S.-born; 18-64 years) will be recruited. Participants will complete a survey assessing: self-reported demographics; nativity, acculturation; diet quality; smoking history; height, weight (to calculate body mass index); cardiometabolic conditions and medication use/adherence; physical activity, sedentary, and sleep behaviors. Participants will then complete a laboratory visit to measure: resting brachial blood pressure and arterial stiffness indices (automated cuff-based device); body composition (bioelectrical impedance spectroscopy); and cholesterol, triglycerides and fasted blood glucose levels (biochemical assays). Following the laboratory visit, device-measured physical activity, sedentary, and sleep behaviors, will be collected over 7 consecutive days using a wrist-worn accelerometer. **ANTICIPATED RESULTS**: We hypothesize that foreign-born Hispanic/Latina women will exhibit lower CVD risk resulting from the protective effects of "the healthy immigrant effect" and lower levels of acculturation.

P258: IMPACT OF SLEEP-LOG ALIGNMENT ON ACTIGRAPH VS. ACTIVPAL ESTIMATES OF PHYSICAL ACTIVITY

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In 2018 the Physical Activity Guidelines for Americans Advisory Committee put out a call for more research on step-based metrics and health outcomes, for the purpose of developing a step-based physical activity (PA) recommendation. Needed in that research are studies examining the ability for different devices in measuring PA metrics. The ActiGraph (AG) and ActivPAL (AP) are two widely used devices, but account for sleep time in different ways. **PURPOSE:** To examine the agreement between two validated accelerometers when wear time is precisely matched based on self-report sleep logs. **METHODS:** Fifty adults (33 women, 17 men; age 33 ± 14 yrs, range 18 - 65) wore the AG (right hip) and AP (right thig) concurrently for 4 - 9 days (7 ± 1

days). Participants completed daily sleep logs, and reported sleep times were removed from both devices to ensure time-matched wear periods. Paired sample t-tests, Bland-Altman analyses, mean differences, mean absolute percentage error (MAPE) values, and intraclass correlation coefficients (ICC) were computed. **RESULTS:** The AG recorded significantly higher sedentary time (641 ± 67 min/day) than the AP (441 ± 88 min/day; P = 0.004), with a mean difference of 200 minutes and a MAPE of 51%. Agreement was poor (ICC = 0.09, P = 0.003) and wide variability. For MVPA, the AG reported higher values (52 ± 25 min/day) compared to the AP (47 ± 25 min/day; P < 0.001), with a mean difference of 5 minutes and a MAPE of 28%. Agreement for MVPA was excellent (ICC = 0.84, P < 0.001) with modest limits of agreement. Step counts were lower for the AG (8978 ± 3231) compared to the AP (9823 ± 3318, P < 0.001), with a mean difference of 845 steps and a MAPE of 14%. Agreement was excellent (ICC = 0.86, P < 0.001) but wide limits of agreement. **CONCLUSION:** Agreement between AG and AP was excellent for steps and MVPA but poor for sedentary time. How the AG classifies sedentary time (counts) compared to the AP (posture-based) may result in this discrepancy.

P259: FIREFIGHTER EXCERCISE BEHAVIORS ON- AND OFF-DUTY

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BACKGROUND: Firefighting requires adequate levels of physical fitness to reduce injury risk and sudden cardiac events, and enhance occupational performance. Performing regular exercise can address these critical outcomes. Thus, to guide exercise program design and identify supporting departmental resources, it is important to understand how many firefighters are regularly engaging in exercise and when they are performing select exercise modalities that target these outcomes. Therefore, the purpose of this study was to evaluate the resistance training (RT) and endurance training (ET) behaviors of firefighters while on- and off-duty. METHODS: This study utilized a descriptive cross-sectional design. Firefighters (N=221; Male: 93%; Age: 38.7±9.8 yr; Occupational experience: 14.6±9.1 yr) from one career fire department in the United States were recruited to complete an anonymous electronic survey inquiring about exercise behaviors on- and off-duty. Approximately 36% of department personnel responded to the survey. The participating fire department utilized a 24 hr on-duty/48 hr off-duty shift schedule. Firefighters were asked if they currently performed RT and ET exercises on- and/or off-duty. Descriptive frequencies were reported. RESULTS: 95% (n=209) of responding firefighters reported currently performing some type of exercise. 80% (n=168) of firefighters reported performing RT exercise. Of these firefighters, 59% (n=63) perform RT on- and off-duty, whereas 26% (n=28) perform RT off-duty only and 14% (n=15) perform RT on-duty only. 89% (n=185) of firefighters reported currently performing ET exercise. Of these firefighters, 57% (n=65) perform ET on- and off-duty, whereas 32% (n=37) perform ET off-duty only and 11% (n=13) perform ET on-duty only. CONCLUSION: These outcomes suggest that most firefighters perform some RT and ET exercise. Among exercising firefighters, RT and ET exercises are typically performed on- and off-duty. These findings suggest that strength and conditioning practitioners should utilize training programs that are flexible and encompass on- and/or off-duty training sessions for RT and ET modalities. Furthermore, fire department administrators should provide exercise equipment, educational resources, and policies to facilitate on- and off-duty exercise training.

P260: SLEEP TIMING AND BODY COMPOSITION DIFFERENCES IN BLACK EMERGING ADULTS

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BACKGROUND: Achieving an earlier sleep timing may promote a favorable body composition and reduce the risk of weight gain. Black emerging adults (ages 18-28 years) are at a greater risk of obesity and poor sleep, including later sleep timing, yet few studies have examined these relationships in this population. These preliminary analyses from the Sleep, Health Outcomes, and Body Weight (SHOW) Study examined body composition and anthropometric differences between early, intermediate, and late sleepers in a sample of Black emerging adults. **METHODS:** The SHOW study aims to assess 150 Black emerging adults over 1 year. To date, baseline data is available in 74 participants (52 females; age, 20.3±2.0 yrs; BMI, 26.1±5.9 kg/m^2). Actigraph-measured sleep was identified with the Sadeh algorithm, and sleep timing midpoint (STM; wake-time - ½ sleep duration) was averaged over 7 days. Participants were categorized as early, intermediate, and late sleepers based on STM tertiles (early, 4:09AM±36min; intermediate, 5:32AM±32min; late, 6:45AM±34min). Body composition (via DXA or Bod Pod) and anthropometrics (body weight, waist and hip circumferences) were measured in laboratory. **RESULTS:** One-way ANOVA revealed a significant difference in fat mass percentage between STM categories ($F(2,69)=3.33$, $p=0.04$). Although not significant, Tukey's post-hoc analysis revealed greater fat mass percentage in early *vs.* intermediate (MD: 8.7%, 95%CI [-0.02, 17.4], $p=0.051$), and early *vs*. late (MD: 7.2%, 95%CI [-1.4, 15.86], $p=0.12$) categories. No significant differences in anthropometrics between STM categories were noted. **CONCLUSIONS:** These preliminary analyses confirm a late STM in this sample of Black emerging adults. Contrary to existing evidence, those with an earlier, but not later, STM had greater fat mass percentage. Future analyses of the SHOW study will consider additional sleep dimensions (chronotype, duration, quality, architecture) to prospectively examine obesity risk in this population. **Support:** NIH Grant R01HL163804

P261: CHARACTERIZING ENJOYMENT AND INTENSITY DURING WALKING AND DANCE

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BACKGROUND: Physical activity is critical for healthy aging, but most older adults are insufficiently active. A key driver of activity behavior change is the extent to which an individual finds an activity to be intrinsically enjoyable or satisfying. Accordingly, interest has grown in alternative forms of activity such as dance. Research has highlighted heterogeneity in the uptake of dance, and there are limited data directly contrasting enjoyment and perceived intensity responses to dance and conventional forms of aerobic exercise. The purpose of this study is to determine whether heart rate, enjoyment, and perceived exertion differ between dance and treadmill activity. Additionally, we will explore for variables that differentiate participant responses to dance and treadmill exercise. METHODS: We will recruit 30 older adults who have completed the IGROOVE study, a randomized controlled trial studying different frequencies of dance participation on fitness and cognitive health. Participants in IGROOVE wear a heart rate monitor to track intensity, and rate perceived exertion and enjoyment after completing class. Participants in this ancillary study will walk on a treadmill individually and in pairs, matching the heart rate achieved in dance. Following exercise, perceived exertion will be assessed via the Borg Rate of Perceived Exertion (RPE) scale, and enjoyment will be noted with a Feelings scale. A series of linear mixed models will be used to investigate (1) whether heart rate, enjoyment, or perceived exertion differ by activity type, (2) whether activity type moderates the relationship between exertion and enjoyment, and (3) whether participant characteristics predict enjoyment or perceived exertion. ANTICIPATED RESULTS: We anticipate that dance will result in similar levels of exertion, higher enjoyment, and lower perceived exertion in general; (2) higher levels of activity enjoyment will be inversely associated with RPE, and that this relationship will be more prominent in the dance activity compared to treadmill sessions, especially (3) among women.

P262: EXAMINING SELF-DETERMINED MOTIVATION IN MILITARY CADETS COMPARED TO NON-MILITARY STUDENTS

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BACKGROUND: Confidence in one's physical abilities is strongly associated with persistence and long-term engagement in exercise. Among college populations, this confidence can fluctuate, impacting motivation and performance. Military cadets operate in an environment with regimented physical training, potentially fostering different motivational profiles than their civilian peers. This study investigates how confidence in fitness, as measured through motivational regulation, compares between cadets and a non-military population. METHODS: Cadets (N=523) from a senior military college were assessed using the Behavioral Regulation in Exercise Questionnaire-2 (BREQ-2), with focus on subscales reflecting internalized motivation: identified regulation, intrinsic motivation, and introjected regulation. Normative data were drawn from a previously published dataset (n=589). One-way ANOVAs compared cadet cohorts from 2019-2021, while independent t-tests compared cadets to the normative groups. Longitudinal analyses from 2019-2023 assessed motivation change over time. RESULTS: No significant year-over-year differences were found among cadet cohorts for motivation types, except intrinsic regulation ($p=0.027$). Compared to the normative population, cadets displayed significantly higher introjected and external regulation scores in 2019 and 2020 ($p<0.05$); introjected regulation remained elevated. Longitudinal analysis revealed a significant decline only in identified regulation ($p<0.01$), while introjected regulation trended downward, suggesting a potential

erosion of internalized motivation over time. CONCLUSIONS: While cadets show stronger confidence-related motivation than non-military peers, the drop in internalized motivation over time may reflect built-in beliefs about fitness or the toll of military culture. These findings highlight the need for earlier and targeted efforts to shape lasting motivation and support long-term fitness engagement in tactical populations.

P263: BLACK AND YELLOW: PREFERENCE OF HIGH-CONTRAST MARKERS FOR STAIRWAY SAFETY

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BACKGROUND: Falls on stairs are a leading concern for older adults and can limit their ability to age in place safely. Age in place refers to the capacity of older adults to continue living in their own homes and communities rather than transitioning to assisted living or institutional care. This study compared perceptions of yellow and black stair markers using augmented reality (AR) to assess visual cues that may offer support for safer stair navigation and promote independence. We hypothesized that yellow markers were perceived as more preferable than black markers, particularly under low-light conditions, whereas black markers were expected to be more preferable under standard lighting. METHODS: Older adults (73 ± 7 yrs) performed stair navigation with different visual contrasts (i.e., the contrast between the step edge and its background) in two conditions (black 190033; yellow FFFF00) via a custom Unity application displayed in AR, in two lighting settings (low <10 lx; standard 300 lx). Conditions were randomized across contrast markings, followed by within-lighting conditions. After navigating the stairs with each contrast/lighting condition, participants were asked to rate their experience via a 5-point Likert Scale, followed by what they thought of the contrast marking condition they just experienced. RESULTS: Under standard lighting, 75% of participants reported somewhat (4) or strongly liked (5) black markers. In low lighting, 50% of participants ranked black markers as neutral (3), 17% as strongly (1), and somewhat disliked (2) combined. In standard lighting, 67% of participants ranked yellow markers, and all participants (100%) ranked yellow markers as a 4 or 5 in low light conditions. CONCLUSIONS: Yellow markers were consistently preferred across all lighting conditions, particularly under reduced visibility, while black markers were only favored under standard lighting conditions. Additionally, qualitative feedback further supports a clearer understanding of participant perceptions. These findings suggest that high-contrast yellow markings may be preferred for stair safety and may help promote independence among older adults. Future studies should validate these results in real-world settings and explore the integration of adaptive lighting or AR-based safety technologies.

P264: THE EFFECTS OF HURRICANE HELENE ON MENTAL HEALTH AND PHYSICAL ACTIVITY

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BACKGROUND: Hurricane Helene devastated Southern Appalachia, disrupting utilities, healthcare, and recreation. Previous research has linked natural disasters to declines in mental and physical health, but no studies have examined the effects on distinct types of physical activity (PA). The purpose of this study was to evaluate the effects of Hurricane Helene on mental health and PA. METHODS: Twenty participants completed assessments four weeks prior to Hurricane Helene's landfall (BASE), immediately post (0POST), and four weeks post-landfall (4POST). Both intentional (exercise for health or lifestyle benefits) and incidental (physical labor or transportation) PA were measured via 7-day activity recalls. Perceived stress, depressive symptoms, and post-traumatic stress disorder symptomology were measured by the Perceived Stress Scale (PSS), Patient Health Questionnaire-9 (PHQ-9), and the Impact of Event Scale-Revised (IES-R); respectively. Evacuation status was also reported via survey. RESULTS: Incidental PA increased at 0POST among non-evacuated individuals ($p = 0.002$). PSS and PHQ-9 scores increased from BASE to 4POST (13.7 ± 1.77 to 20.2 ± 1.46, $p = 0.002$; 3.44 ± 0.74 to 6.16 ± 0.89, p=.0017). PSS at BASE positively predicted intentional PA at 0POST ($p = 0.008$), while higher PQH-9 at 4POST predicted reduced intentional PA ($p = 0.038$). Days spent evacuated negatively predicted hyperarousal ($p = 0.007$) and PSS change ($p = 0.006$). CONCLUSIONS: Hurricane Helene negatively impacted psychological health in a rural Appalachian population. Incidental PA increased immediately post-Helene in non-evacuated individuals, likely due to participation in recovery efforts. Evacuation status impacted mental health outcomes, suggesting that greater exposure to ongoing stressors in non-evacuated individuals led to greater psychological risk. Policymakers and future researchers should identify interventions to maintain mental health and exercise patterns following natural disasters.

P265: INVESTIGATING THE RELATIONSHIP BETWEEN SELF-REPORTED FATIGUE AND PHYSICAL ACTIVITY IN CAREGIVING GRANDPARENTS

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BACKGROUND: There is conflicting evidence in the literature regarding the effect of caregiving on health outcomes, such as fatigue, for grandparents. Many studies cite Role Strain Theory, which states having multiple roles in one's life leads to greater individual strain. Under this assumption, grandparents with greater care responsibilities have less time to pursue activities that potentially benefit their health, such as participating in regular physical activity (PA). It is well-supported in the literature that high PA levels are correlated with numerous benefits. Significantly, higher PA levels have predicted lower self-reported fatigue levels. The purpose of this study is to determine the relationship between self-reported fatigue and physical activity habits among caregiving and non-caregiving grandparents. METHODS: We aim to recruit 40 participants from the community aged 65 years or older, who can walk unassisted for 2 minutes, and identify as grandparents. Participants who provide care to a grandchild(ren) at least one day per week will be assigned to the caregiving group. Participants will complete a 7-day PA monitoring period using a hip-mounted accelerometer. Following that, participants will complete the Neuro-QOL Short Form Fatigue Questionnaire to assess perceived levels of fatigue in the past 7 days. Raw data from the accelerometer will be classified according to established data count categories to determine average time spent in moderate, vigorous, and total PA. Pearson's correlation will determine the relationship between fatigue index scores and PA counts, and independent samples t-test will determine differences in fatigue and PA scores between groups. ANTICIPATED RESULTS: Grandparents in the caregiving group will have similar, if not higher, total PA counts compared to non-caregivers, however, time spent in moderate or vigorous activity will be higher in non-caregivers. Additionally, fatigue scores will be higher in the caregiving group.

P301: EXAMINATION OF THE HEART-RATE CLAMP MODEL FOR CYCLE ERGOMETRY

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BACKGROUND: The heart rate (HR)-clamp model describes exercise where the external workload (e.g., power output [P]) is adjusted to maintain a fixed HR. The target HR for this model is typically achieved through the immediate application of the P associated with the HR from a graded exercise test (GXT). However, the reliability of the time to the target HR (T_{HR}) as well as the metabolic (VO_2) and perceptual (ratings of perceived exertion [RPE]) responses at the target HR has not been established for HR-clamp exercise in males. This study examined the test-retest reliability of the T_{HR} as well as the VO_2 and RPE at the target HR for HR-clamp exercise performed within the vigorous intensity range (77-95%HR_{max}). **METHODS:** Fifteen males (age = 22±3 yrs, height = 181.3±7.5 cm, body mass = 76.54±10.6 kg) completed a cycle ergometer GXT to determine VO_{2max} (48.5±8.7 $mL \cdot kg^{-1} \cdot min^{-1}$), HR_{max} (185.4±11.3 $b \cdot min^{-1}$), and peak power output (289.3±47.8 W). This was followed by 2 visits with identical HR-clamp exercise trials at 86%HR_{max} (159±10 $b \cdot min^{-1}$). The subjects completed a 3min warmup, followed by an immediate application of the P corresponding to 86%HR_{max} (210±40W). The T_{HR}, VO_2, and RPE were determined at the point when the target HR was reached. Analyses included a paired samples t-tests ($p \leq 0.05$), intra-class correlation coefficients ($ICC_{2,1}$), standard errors of the measurement (SEM), minimal differences (MD), and coefficients of variation (CV). **RESULTS:** There were no significant differences between trials 1 (T1) and 2 (T2) for VO_2 ([T1, T2] 36.6±8.0, 37.4±6.5 $mL \cdot kg^{-1} \cdot min^{-1}$, $p=0.182$; 75±8%VO_{2max}, 77±7%VO_{2max}), T_{HR} (3.8±1.3 min, 4.3±1.0 min, $p=0.155$), or RPE (13±2.5,14±2.7, $p=0.315$). T_{HR} (ICC=0.359, SEM=0.90 min, MD=2.50 min, CV=22.3%) and RPE (ICC=0.458, SEM=1.58, MD=4.37, CV=11.62%) demonstrated poor reliability, while VO_2 (ICC=0.943, SEM=1.7 $mL \cdot kg^{-1} \cdot min^{-1}$, MD=4.7 $mL \cdot kg^{-1} \cdot min^{-1}$, CV=4.6%) demonstrated excellent reliability. **CONCLUSIONS**: Although there was no systematic error for any variable, T_{HR} and RPE displayed poor reliability and RPE did not consistently reflect values that describe a vigorous intensity (14-17). The excellent reliability for the VO_2 at the target HR, however, indicated a consistent metabolic cost of the initial HR application that was within the vigorous VO_2 range (64-90%VO_{2max}).

P302: THE EFFECTS OF AN ACUTE BOUT OF EXERCISE ON DUAL TASK POSTURAL CONTROL
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BACKGROUND: Chronic exercise improves dual-task postural control (i.e., simultaneous performance of cognitive and motor tasks). An acute bout of aerobic exercise enhances cognitive functions such as short-term memory and cognitive flexibility for up to 20 minutes, possibly due to increased blood flow and neurotrophic factors. Acute exercise may influence dual-task postural control, but this remains to be examined. The purpose of this study was to determine the influence of an acute bout of exercise on dual-task postural control. METHODS: Twenty-one participants (age: 20.71±1.65years, 47.2% female) completed the postural conditions at baseline, post-exercise, and 24 hours later. We assessed single-task posture on a force platform, which involved 3 sets of trials of standing with feet together while completing no cognitive task, and two dual-task postural tasks, which involved standing with feet together while completing a sequence task (i.e., count and sum the occurrence of a specific digit and a 3-digit number sequence), and an equation task (i.e., arithmetic) in a random order. The acute bout of exercise consisted of a 2-min warm-up followed by 20 min on a treadmill at 55-65% of their age-predicted heart rate maximum. Heart rate (Polar chest strap), perceived exertion (Borg Rating of Perceived Exertion), and speed were recorded every 2 min. RESULTS: There was a significant Time x Condition x Measure interaction ($F_{(6,120)}$=2.80, p=0.01). Post-hoc pairwise comparisons revealed significantly greater post-exercise sway area during single- and dual-task standing compared to pre- (p<0.05) and 24-hours later (p<0.05); no differences in area were observed between pre- and 24-hours later for single- or dual-tasking (p>0.05). CONCLUSION: Contrary to our hypothesis, an acute bout of moderate-intensity aerobic exercise did not reduce cognitive load or improve postural control. Instead, it increased postural sway area during both single- and dual-task conditions post-exercise, perhaps due to exercise-induced fatigue, increased metabolic demand, or transient changes in neuromuscular coordination and attentional resources. These effects dissipate within 24 hours, indicating no lasting impact on postural stability.

P303: TIME OF DAY EFFECTS ON LOAD-VELOCITY PROFILES AND POWER OUTPUT OF FEMALE COLLEGIATE ROWERS
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BACKGROUND: Rowing performance over 2,000 meters depends on aerobic and anaerobic energy systems, and power strongly predicts race outcomes. The prone bench pull (PBP) load-velocity (L-V) profile provides a practical index of upper-body load-velocity characteristics in rowers. We will determine whether time-of-day (AM 06:00-07:00 vs PM 16:00-17:00) alters PBP L-V parameters—theoretical maximal load (L_0), theoretical maximal velocity (V_0), maximal power (Pmax), slope—and 15-second rowing peak power (PP) in female collegiate rowers. We hypothesize that all primary outcomes will be lower in the morning. METHODS: We will conduct a quasi-randomized, within-subject crossover across three visits (~1 week; 24-72 hours between). Female collegiate rowers (≥18 years; target sample=17-30) will complete a standardized warm-up, anthropometrics, and resting measures. PBP loading will be 20/40/60/80% of predicted one-repetition maximum (from staff-provided five-repetition maximum), performed as 4×3 repetitions with 5-minute inter-set rest; the fastest repetition per load will enter the L-V model (least-squares), with L_0 and V_0 derived from the regression and $Pmax=L_0 \cdot V_0/4$. Bar kinematics and power will be recorded with a linear position transducer. After a 15-minute seated rest, athletes will perform a 15-second all-out test on a rowing ergometer (Damper=10); PP will be the highest per-stroke wattage recorded by the ergometer. We will assess normality (Shapiro-Wilk), compare AM vs PM with paired t-tests, and apply two-way repeated-measures ANOVA (time-of-day × load) where appropriate (α=.05), reporting effect sizes (Cohen's d; partial η^2) with 95% CIs and reliability (ICC; CV%). Hydration and fasting status will be documented. ANTICIPATED RESULTS: We expect lower morning values for PBP L-V parameters and 15-second PP. This study will provide actionable guidance for scheduling testing and training in female collegiate rowers.

P304: A COMPARISON OF 2000-METER ROW VO2MAX PREDICTION TO MEASURED VO2PEAK DURING GXT ROW
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BACKGROUND: Aerobic capacity is essential for the performance of military personnel and first responders. Traditionally, graded exercise tests (GXT) have been the gold standard for assessing aerobic fitness. However, treadmill running and cycle ergometers may not fully reflect the whole-body demands required in tactical environments. Rowing-based assessments and the Concept II VO_2max prediction formula are widely used across tactical organizations as practical field measures, and most tactical operators are considered inexperienced rowers, of which little research has examined rowing performance. PURPOSE: The purpose of this study is to compare measured VO_2peak from a rowing GXT with estimated VO_2max derived from a 2000-meter row time using the Concept II VO_2max prediction formula in a convenience sample of Army ROTC cadets. METHODS: Participants will complete two testing sessions. In the first session, cadets will perform a maximal effort rowing GXT as part of a larger fitness assessment. In the second session, they will complete a maximal effort 2000-meter row for time. The 2000-meter performance times will be entered into the Concept II VO_2max prediction equation and compared with directly measured VO_2peak values from the rowing GXT using paired-samples t-tests. If significant differences are observed, regression analyses will be conducted with a target minimum of 30 participants using performance and anthropometric variables to explore the development of an improved prediction equation. ANTICIPATED RESULTS: It is hypothesized that the estimated VO_2max from the Concept II formula will significantly differ from the measured VO_2peak obtained via rowing GXT. Additionally, a strong negative correlation is expected between 2000-meter row time and measured VO_2peak. This study may provide evidence for the refinement of rowing-based VO_2max prediction methods, enhancing the accuracy and practicality of aerobic capacity assessments for military and tactical populations.

P305: PREFERENCE AND TOLERANCE FOR EXERCISE INTENSITY RELATIVE TO MUSCLE ENDURANCE AND MUSIC
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The preference and tolerance for exercise intensity has been correlated with behavioral activation/inhibition, rating of perceived exertion (RPE), and HR. However, less is known about the relationship of preference and tolerance for exercise intensity to endurance tasks typical in strength programming. PURPOSE: To determine if preference and tolerance of exercise intensity was related to time to fatigue during abdominal plank holds, the PRETIE-Q, time to fatigue on the plank. Second, to determine if performance on the plank was related to demographic (age, sex, current exercise status, and injury history) and attention factors (internal versus external focus). Preferred music tempo was also collected. METHODS: 54 undergraduate students (22.30±2.73 yrs, N=28 men, N=26 women) were recruited. A brief warm up was performed and then participants paired off and recorded time to fatigue on the plank exercise. In addition, the participants were told that when plank form changed (the lower back began to dip, the arms became too unsteady, or the participant voluntarily stopped) the exercise session was halted. Related to music tempo, participants rated their favorite songs and beats per minute after answering questions about exercise, motivation, injury history, and sport/athlete status. RESULTS: Pearson Product Moment Correlations revealed a significant positive relationship between plank time and preference (r=0. 35, p< 0. 01) and tolerance r=0. 30, p< 0. 05). None of the PRETIE-Q scores were related to music tempo or any other variables. CONCLUSIONS: This study demonstrated that participants who reported higher preference and tolerance for exercise intensity held the horizontal plank longer than those who scored lower on preference and tolerance. Findings are consistent with previous research and demonstrated that individuals with higher preference and tolerance scores have greater post-exercise pain hypoalgesia after circuit training. None of the demographic or attention factors were significantly related to time to fatigue. None of the variables significantly correlated with music tempo. It may be that factors not measured by the present study contribute to preference for music tempo during exercise. The current homogenous sample may not reflect the larger trends in more diverse samples.

P306: PRE-SEASON ISOMETRIC MID THIGH PULL DERIVED NEUROMUSCULAR PERFORMANCE IN FEMALE NCAA DIVISION III BASKETBALL PLAYERS
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BACKGROUND: Over the years, several studies have examined the physiological profile of elite male and female basketball players. However, normative isometric mid-thigh pull (IMTP) neuromuscular performance data for NCAA Division III female basketball players are limited. Therefore, this study aimed to examine IMTP-derived variables in this population. METHODS: Fifteen members of an NCAA Division III women's basketball team (mean ± SD): age (19.13 ± 1.19 yrs); body weight (70.14 ± 13.69 kg); height (1.67 ± 0.07 m); BMI (25.23 ± 4.55 kg·m-2) volunteered to participate in the study. IMTP testing data

included peak force, relative peak force, and time to a maximum rate of force development (RFD). The length of the pull was approximately 5 seconds, and all force values were corrected, and only the force produced by the movement (net force) was counted. Performance testing occurred during the off-season. RESULTS: The study's results provided the following normative IMTP neuromuscular performance data for NCAA Division III female basketball players: peak force (767.73 ± 123.62 N), relative peak force (12.22 ± 3.41 N·kg-1), RFD 0-50 ms (1913.33 ± 1417.05 N·s-1), RFD 0-100 ms (2059.33 ± 1304.34 N·s-1), RFD 0-150 ms (1837.27 ± 939.05 N·s-1), and RFD 0-250 ms (2016.27 ± 794.53 N·s-1). CONCLUSIONS: This study provides normative data for a group of NCAA Division III female basketball players. In comparison to published descriptive data in the literature, the force production abilities of the athletes observed in this study appear to be lower than those of other female professional basketball players.

P307: COLD WATER DISPERSABLE RESVERATROL SUPPLEMENTATION DOES NOT ALTER RECOVERY FOLLOWING FLYWHEEL SQUAT EXERCISE

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BACKGROUND: Resveratrol, a polyphenol with antioxidant and anti-inflammatory properties, has been investigated as a recovery aid, though efficacy appears limited by low bioavailability. A novel cold-water dispersible resveratrol formulation (RES) reportedly improves absorption. This study tested its effects on muscle damage and neuromuscular recovery. **METHODS:** Nineteen resistance-trained males (20.7 ± 1.4 yrs; 177.2 ± 7.1 cm; 84.6 ± 9.9 kg) completed a randomized, double-blind, placebo-controlled, crossover trial. Participants supplemented for 17 days with RES (500 mg·d^{-1}) or placebo (PL), separated by an 18-day washout. On day 14, participants performed flywheel squats (6 × 10 reps at 0.0981 kg·m²) using a waist harness. Blood was sampled before (PRE), immediately-post [IP], 24-, 48-, and 72-hours post-exercise to assess creatine kinase (CK; PRE, 24H, 48H) and C-reactive protein (CRP; all time points). Peak force (PF) and rate of force development (RFD; 0-250 ms) were determined from squat maximal voluntary isometric contraction (MVIC). Vertical jump height (VJH), modified reactive strength index (mRSI), peak propulsive power (PPP), and braking RFD (BRFD) were determined from countermovement jumps (CMJ). Data were analyzed with linear mixed models including fixed effects of condition, time, and their interaction, with random intercepts for participants ($p < 0.05$). **RESULTS:** CK increased at 24H (~1.8-fold, $p < .001$) and 48 h (~1.6-fold, $p < .001$) vs PRE, while CRP was elevated at 24H only (~1.4-fold, $p = .016$), with no condition effects or interactions (p's ≥ .640). Main effects of condition (RES > PL) and time were observed for MVIC PF ($p = .037$ & $p < .001$, respectively) and RFD (p's < .001). PF was significantly reduced at IP ($p < .001$) but recovered by 24H ($p = .218$). RFD decreased at IP ($p < .001$) and 48H ($p = .024$) but was not different than PRE at 24H ($p = .125$) or 72H ($p = .156$). All CMJ outcomes decreased at IP (p's < .001). VJH, mRSI, and PPP recovered by 24H (p's ≥ .107), while BRFD remained suppressed at 24H ($p = .015$), but normalized at 48H ($p ≥ .127$). No significant interactions were detected for MVIC or CMJ (all $p ≥ .441$). **CONCLUSION:** Flywheel exercise elicited transient muscle damage and neuromuscular fatigue that resolved by 48-72H. RES did not alter CK, CRP, or CMJ recovery, whereas MVIC PF and RFD were higher in RES versus PL.

P308: EFFECTS OF TWO-MINUTES VERSUS FOUR-MINUTES ACTIVE RECOVERY ON A "BOOSTER" VO_2MAX TREADMILL TEST IN FEMALES

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Maximal aerobic capacity (VO2max) represents an individual's cardiovascular fitness level. Prior studies have assessed various VO2max protocols with several studies suggesting that a booster max, with a two-minute (2min) and four-minute (4min) active recovery, improves final VO2max values in males. However, a 4min active recovery during booster max testing has not been evaluated in females. The purpose of this study was to assess VO2max values following a 2min vs. 4min active recovery. In a counter-balanced order, 16 aerobically trained females (21.75 ± 2.74 years old) completed a treadmill VO2max GXT (Max1), followed by a 2min or 4min active recovery and a second bout to volitional exhaustion (Max2). Seventy-two hours later, subjects completed a second GXT with the alternate recovery time used during the first trial. Max1 and Max2 values for both 2min and 4min were compared using a Paired-Samples t-Test ($p < 0.05$). For 2min, Max1 (43.48 ± 8.63 ml/kg/min) and Max2 (43.85 ± 9.22 ml/kg/min) were not significantly different ($p = 0.54$). Max1 (45.28 ± 7.55 ml/kg/min) and Max2 (46.51 ± 7.45 ml/kg/min) for 4min were significantly different ($p = 0.035$). Max1 for 2min and 4min were not significantly different ($p = 0.134$). Max2 for 4min was significantly greater than Max2 for 2min ($p = 0.023$). Mean results suggest the 4min active recovery yielded significantly higher values from Max1 to Max2. Additionally, individual data suggest that 43.75% of subjects benefited (+2.11 ± 1.42 ml/kg/min) from a 2min active recovery, yet 81.75% of subjects benefited (+2.82 ± 2.79 ml/kg/min) from a 4min active recovery. Future research should examine potential changes in VO2max with differing treadmill protocols and various athletic populations, using a booster max protocol in both males and females.

P309: ACUTE PHYSIOLOGICAL RESPONSES OF BLOOD FLOW RESTRICTION ISOMETRIC VS NON-BLOOD FLOW RESTRICTION ISOTONIC HANDGRIP STRENGTH EXERCISES

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BACKGROUND: The purpose of this study was to observe the differences in average rate of perceived exertion (RPE), and delayed onset muscle soreness (DOMS) experienced between BFR-isometric (BFR-ISM) and NonBFR-isotonic (NBFR-IST) handgrip strength exercises. **METHODS**: 16 DPT students at Methodist University were randomized to a condition (6 BFR-ISM, 10 NBFR-IST) and participated in 1 pre-assessment trial, 2 gripping sessions, and 2 extension sessions. The pre-trial assessment was used to estimate each subject's 1-repetition max (1-RM) for hand gripping and finger extension. Each exercise session consisted of 5 sets of 20 secs/reps w/ 30 sec rest at an estimated 40% 1-RM for both groups. 50% Limb Occlusion Pressure (LOP) was used for BFR-ISM and was reassessed prior to each session via Suji BFR tourniquet systems. FitBeast hand strengthening set was used for both groups and equipment was assigned to each subject closest to their pre-determined intensity. RPE and DOMS were both assessed on a scale of 1-10, RPE was assessed after each set and DOMS was assessed 48 hours post sessions. **RESULTS:** A total of 16 participants completed all the gripping and extension conditions without a change in DOMS. Averaged gripping RPE increases were 3 points for BFR-ISM and 4 points for NBFR-IST ($p= 0.58$). Average extension RPE increases were 2 points for BFR-ISM and 3 points for NBFR-IST ($p= 0.43$). **CONCLUSION:** There is potential that BFR-ISM and NBFR-IST could elicit similar perceived exercise responses based on the findings of this study. When interpreting the results of this study it is important to consider the inability to quantify participants 1-RM measurements for strength exercises. Currently, standardized 1-RM equations exist only for gross muscle groups, highlighting the need to develop similar equations for fine muscle groups.

P310: BLOOD IRON EFFECTS ON HIGH INTENSITY RUNNING TO FATIGUE: A SEX BASED EVALUATION

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INTRODUCTION: Compared to males, females are particularly susceptible to low iron, a critical micronutrient for oxygen transport and exercise performance. This study sought to examine sex-based differences in blood iron content and high-intensity running (HIR) performance. METHODS: 81 males (n=39) and females (n=42) (mean±standard deviation [SD]: age: 24.9±5.8 yrs, VO2max: 45.5±9.6 ml/kg/min) completed baseline maximal oxygen consumption (VO2max) testing for fitness level and HIR intensity (90%, 100%, 110% of VO2max speed). Time to exhaustion (TTE; secs) trials with 15-minute recovery periods between trials and a blood draw for serum iron (ug/dL) and ferritin (ng/mL) levels were completed. Females were measured in the follicular phase of their menstrual cycle due to physiological levels of serum iron of this phase. One-way ANOVAs were used to examine differences between sex, and correlations evaluated associations between iron and ferritin levels with TTE. RESULTS: Males had significantly higher serum iron levels (122.9±39.8 ng/dL) compared to females (38.6±23.5 ng/mL; $p=0.016$). Males showed longer TTE at 100% (MD±SE: 29.9±65.1 secs, $p=0.050$) and 110% (56.3±78.7 secs, $p=0.004$) compared to females. No relationships existed between iron and any TTE trials ($r=0.059$-0.166, $p>0.05$). Independent of sex, ferritin levels were positively associated with TTE at 90% ($r=0.274$, $p=0.027$) and TTE at 110% ($r=0.250$, $p=0.044$). Fitness status (VO2max) was positively associated with TTE at 90% ($r=0.249$, $p=0.026$). CONCLUSION: Ferritin, a key indicator of iron stores, was positively related to HIR performance (TTE), suggesting that iron storage status (ferritin) may

serve as a more sensitive marker of exercise capacity than serum iron alone. Fitness level (VO_2max) was positively associated with TTE at 90% but not 100%, 110% of max running speed, suggesting aerobic capacity may play a more prominent role in high-intensity exercise performance rather than circulating iron levels.

P311: INFLUENCE OF BODY COMPOSITION ON THE ACCURACY OF PHOTOPLETHYSMOGRAPHIC HEART RATE MEASUREMENT DURING EXERCISE

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Heart rate (HR) can be estimated using wearable technology that employs photoplethysmography (PPG), a technique that measures light reflectance at the epidermis. Because light must travel through subcutaneous adipose tissue before it reaches and reflects off the cutaneous vascular bed, greater subcutaneous fat thickness may increase light scatter and thereby interfere with light transmission, but it is unknown if this affects HR measurement accuracy. PURPOSE: To determine the extent to which body composition influences the accuracy of PPG HR measurement during rest, exercise, and recovery. METHODS: Twenty-seven (52% female) healthy adults (mean±SD; age = 25±5 y; height 172±9 cm; body mass 75.4±14.5 kg; body mass index = 25.3±4.2 $kg \cdot m^{-2}$; body fat = 20.9%±8.1%) completed 1 laboratory visit. The Jackson-Pollock 7-site skinfold procedure was used to measure the sum of skinfolds (SKF_{sum}) and percent body fat (%BF) was estimated using the Siri equation. Participants were outfitted with 3 PPG devices (Apple Watch Series 8, Garmin vivosmart 5, SlateSafety BAND V2) and the criterion device (Polar H10); HR was recorded continuously from all devices during rest, 40 min of continuous stationary cycling (10 min stages at 50%, 60%, 70%, 80% age-predicted maximal HR), and recovery. Data were summarized into 30-s epochs for analysis. Linear mixed-effects models were used to determine whether SKF_{sum} or %BF influenced the mean absolute error of HR (MAE_{HR}) measurement for each device compared to the criterion. RESULTS: Neither SKF_{sum} (Apple, β=−0.001, P=0.41; Garmin, β=−0.0001, P=0.93; SlateSafety, β=−0.004, P=0.22) nor %BF (Apple, β=−0.008, P=0.16; Garmin, β=−0.007, P=0.50; SlateSafety, β=−0.029, P=0.12) were significant predictors of MAE_{HR} for any device during rest, exercise, and recovery. CONCLUSIONS: SKF_{sum} and %BF did not influence PPG HR measurement accuracy in this young, healthy, relatively lean sample during rest, stationary cycling, and recovery. Further investigation should examine the influence of body composition on PPG HR measurement accuracy in a larger, more heterogeneous sample and during different modes of exercise.
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P312: THE ROLE OF HIP INTERNAL ROTATION AND GROUND REACTION FORCES IN GOLFER LOWER BACK PAIN

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BACKGROUND: Lower back pain (LBP) is the most common musculoskeletal complaint and injury among golfers; the high velocity and repetitive motion of the golf swing subjects the lumbar spine to substantial compressive and torsional forces, making LBP primarily an overuse injury. A primary physical risk factor for LBP is limited lead hip internal rotation (LHIR) because the lumbar spine is forced to compensate by rotating excessively to achieve the required range of motion; also, the golf swing relies heavily on the efficient transfer of energy generated from the ground through the lower body, a process quantified by ground reaction forces (GRFs). PURPOSE: Lower back pain is often linked to internal hip rotation limitations. While existing research has separately examined LBP and GRFs, there is a notable gap in understanding of how these two factors are directly correlated. This study addresses this gap by evaluating the connection between GRFs, hip internal rotation, and LBP in golfers. METHODS: This retrospective study utilizes de-identified data from a diverse group of golfers aged 18-55, including amateur, collegiate, and advanced players. Researchers will analyze existing datasets that include golfer health history questionnaires, LBP reports, Titleist Performance Institute (TPI) screening results, and ground reaction force measurements. This data will be reviewed to identify trends and correlations between hip internal rotation limitations, GRF patterns, and reported LBP. ANTICIPATED RESULTS: The anticipated findings of this research will provide a foundation for developing personalized training interventions to prevent overuse injuries and improve performance. We anticipate that golfers with lower back pain will demonstrate altered ground reaction force patterns and reduced hip internal rotation compared to asymptomatic golfers, highlighting potential biomechanical contributors to pain. These findings are expected to support interventions aimed at improving performance while reducing injury risk.

P313: PREDICTING VO2MAX WITH FIELD-BASED TESTS

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BACKGROUND: Fitness tests such as the six-minute walk test have been used as a predictor for maximal oxygen consumption (VO_2 max) in healthy and clinical populations. Predictive equations using distance during a six-minute walk test, combined with variables such as age, sex, body mass index, and heart rate (HR), have shown moderate to strong correlations with VO_2 max. However, limited research exists on the predictive ability of the six-minute walk/run and three-minute distance tests within healthy populations. Therefore, our aim is to assess the predictive accuracy of the 6-minute walk/run and 3-minute distance tests to a lab-based VO_2 max. METHODS: I will recruit 40 healthy individuals aged 18-50 for this study. Participants will complete three 30-minute visits, 5-7 days apart. Test order will be randomized and include a lab-based VO_2 max test using Modified Bruce protocol, an indoor track 6-minute walk/run test, and a 3-minute distance test. Participants will complete a physical activity survey and body composition test during their first visit to provide descriptive metrics. Participants will complete a 5-10 minute warm-up of light aerobic activity and dynamic stretches prior to each test and wear a physiological monitor to assess HR response. Rating of perceived exertion will be recorded during the lab-based VO_2 max and immediately following the field-based tests. Results will be analyzed via regression models to assess the predictive accuracy of the 6-minute walk/run test and 3-minute distance test for estimating VO_2 max. Mixed-effects models will also be used to account for individual variability and to examine demographic factors (e.g., age, sex, body composition, heart rate) influencing prediction accuracy. ANTICIPATED RESULTS: It is hypothesized that both the 6-minute walk/run and 3-minute distance tests will accurately predict VO_2 max in healthy, physically active individuals. Additionally, it is hypothesized that the 6-minute walk/run test will better predict VO_2 max compared to the 3-minute distance test.

P314: NO SEX DIFFERENCES IN MOOD OR COGNITIVE PERFORMANCE OUTCOMES DURING CAFFEINE WITHDRAWAL

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BACKGROUND: This study examined the effects of caffeine withdrawal on mood and cognitive performance in habitual caffeine consumers. While caffeine's ergogenic effects on cognition are well established, the potential confounding influence of withdrawal is less understood. METHODS: In this randomized crossover design, 9 men (23±4 yrs) and 8 women (21±2 yrs) participated after withdrawing from caffeine for 48 (n=8) or 96 (n=9) hours. Mood was assessed via an abbreviated Profile of Mood States (POMS) survey and measured as total mood disturbance (TMD) change scores relative to baseline. Reaction time and sequence recall tasks, measured in seconds, were conducted with the Sport React system. Analysis was conducted with repeated measures ANOVA and Sidak adjusted post hoc tests with significance set at p≤.05. RESULTS: Average reaction time improved from T1 (.390±.057) to T2 (.379±.055, p=.015, ηp^2=.119) but no interaction effect for sex (p=.490) or group (p=.102) occurred. Slowest reaction time significantly improved from T1 (.613 ± .178) to T2 (.582 ± .121, p=.043, ηp^2= .084) but no group (p=.154) or sex interaction (p=.257) was observed. Average sequence recall time decreased from T1 (4.218±1.482) to T2 (3.789±1.127, p=.034, ηp^2=.092). No interaction effect for sex (p =.802) or group (p=.798) was observed. Sequence recall fastest time improved from T1 (3.369±.871) to T2 (3.128±.871, p<.001, ηp^2=.199) with no significant interaction for sex (p=.706) or group (p=.542). No significant differences for fastest reaction time (ps>.170), or slowest sequence recall time (ps>.376) were observed. POMS TMD scores were not significantly different between baseline and group (ps>.066) or sex (ps>.051). CONCLUSIONS: Performance improved across repeated testing, but no differences were observed between 48 and 96-hour caffeine withdrawal or between sexes. Therefore, these results suggest that short-term caffeine withdrawal did not significantly alter mood or cognitive performance.

P315: THE EFFICACY OF ULTRASOUND ECHO INTENSITY IN PREDICTING MUSCLE FUNCTION AND PERFORMANCE

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BACKGROUND: Ultrasonographic echo intensity (EI) is an index of the adipose tissue to muscle ratio in a black and white scale. Studies have shown correlations between intramuscular fat (IMF) and physical

performance while others suggest EI may have value in assessing age-related changes in skeletal muscle. This study aimed to find correlations between EI, muscle contractile properties, and force production. METHODS: Twenty-three (23) subjects performed various health and fitness assessments. A handheld ultrasound device (Vscan Air SL, GE HealthCare, Chicago, Illinois) was used to assess EI on the gastrocnemius (GL) and Rectus Femoris (RF) muscles. A linear transducer (B mode) was placed perpendicular to the middle of each muscle belly (depth=5 cm, 70% Brightness). Post test imaging processing was determined using a standard gray-scale histogram in ImageJ 1.51j8 (National Institute of Health, USA), with EI values expressed as a value between 0 (black) and 255 (white) pixels. Body composition via bioelectrical impedance (i35, Mediana, Korea), maximal isometric force production (ForceFrame, Vald Performance, New Zealand), muscle contractile properties (GK40, Panoptik, Ljubljana, Slovenia) and muscle tissue oxygenation (SMO_2 and ThB) during exercise (Moxy Monitor, USA) was performed in all subjects. RESULTS: EI values were significantly correlated with maximum THb values during exercise in RF (r=-.707, r=-.545). EI values were not correlated with muscle strength or contractile speed values in either muscle measured. CONCLUSION: Correlations with THb were expected as increased blood flow capacity would imply more muscle vasculature, appearing anechoic on ultrasound and producing low EI values. A lack of significant correlations in most variables may be due to the homogeneous sample (young, active adults) making finding differences difficult. Multiple ultrasound measures of each muscle in the future may have improve EI score reliability.

P316: THE EFFECTS OF A FASTED OR FED STATE ON MAXIMAL AEROBIC CAPACITY

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BACKGROUND: Maximal oxygen uptake (VO_2max), a strong predictor of health and performance, can be measured during a graded exercise test (GXT). Standardized testing procedures are necessary for accurate results and making comparisons to population norms. Previous research has shown that exercising after an overnight fast may result in decreased performance. However, it is currently unknown if fasting influences VO_2max testing performance. Thus, the purpose of this study was to examine the effects of a fasted and fed state on VO_2max testing performance. METHODS: Endurance-trained females (n=4, 22.8 ± 5.5 yrs) participated in this study. In a counterbalanced, crossover design, participants completed a GXT in two conditions: 1) fasted for ≥12 hours, or 2) 30 minutes after consuming a breakfast bar consisting of 230 kcals and 36 grams of carbohydrate. Both trials were performed at the same time of day (± 2 hours) within a 7-day period, but with at least 48 hours between trials. The GXT consisted of a 5-minute walk on a treadmill at 3 mph before ramping up to an individualized running speed determined by calculating the participant's current training pace via smartphone running app. Treadmill grade was increased by 1% every minute until volitional fatigue. Oxygen consumption and respiratory exchange ratio (RER) were measured using a TrueOne 2400 metabolic cart. Heart rate (HR) was measured using a Polar heart rate strap. Rating of perceived exertion (RPE) was determined using the Borg 6-20 scale. A 0-10 distress scale was used to measure participants' gastrointestinal distress before and after the GXT. Peak VO2, RER, HR, and RPE were recorded and analyzed using a paired samples t-test between conditions. A Friedman's test was used to analyze differences in gastrointestinal distress. RESULTS: There were no significant differences in peak VO_2 ($p = 0.218$, $d = 0.78$), RER ($p = 0.534$, $d = -0.35$), HR ($p = 0.661$, $d = 0.24$), and RPE ($p = 0.391$, $d = -0.50$). Gastrointestinal distress was not different between conditions ($p = 0.392$). CONCLUSIONS: The results of this study suggest that fasting does not affect VO_2max performance. Therefore, exercise professionals have the flexibility to perform GXTs in a fasted state without concern of obtaining different VO_2max results.

P317: CAREER TENURE AND PHYSICAL FITNESS IN STRUCTURAL FIREFIGHTERS

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BACKGROUND: Fitness is known to decline across the lifespan, including aerobic capacity, muscular strength, endurance and power. In the fire service, career tenure may increase sedentary behaviors due to changing job demands. This study evaluated the health and physical fitness of firefighters (FF) across years of service (YOS). METHODS: Career FF(n=61) participated in an annual physical screening across three sessions. Session 1 involved a functional movement screen (FMS) and push-ups to failure. Session 2 consisted of a maximal graded exercise test to obtain cardiorespiratory fitness (VO2max). Session 3 evaluated strength and power with a countermovement jump (CMJ), 3-repetition maximum bench press expressed relative to body mass (BENCH), maximal isometric mid-thigh pull (IMTP), and maximal plank hold. Descriptive statistics were calculated as means ± SD. The correlation between YOS and each fitness indicator was examined using Spearman (rho) and Pearson (r) correlations to assess robustness to distributional assumptions. Linear regression models were used to estimate the association of YOS with each outcome, adjusting for age; regression coefficients were estimated with robust (Huber-White) standard errors. RESULTS: The group mean YOS was 9.5±8.4 (range: 0.66-30 yrs). Correlation analysis revealed moderate negative correlations between YOS and VO2max (38.4±7.9 yrs; rs=-0.43; p=0.002) and YOS and CMJ (55.1±10.6 cm; rs=-0.36, p=0.01). No significant correlations were found between YOS against BENCH (1.1±0.2 kg/kgBW; rs=-0.22), maximal IMTP (187.3±27.6 kg; rs=0.13), push-ups (25±10 repetitions; rs =-0.10), plank (120.1 sec±67.1; rs=-0.22), and FMS (14±3 au; rs=-0.24). In robust linear regressions, each additional year of service was significantly associated with lower VO2max and CMJ; after age adjustment, YOS effects were attenuated to near zero and were not statistically significant across outcomes. CONCLUSIONS: Implementing a well-rounded training program that addresses all aspects of fitness within the fire service will support optimal FF health and wellness. An emphasis on aerobic capacity and lower-body power may support maintained occupational performance across a FF's career.

P318: EXAMINING THE 60 SECOND AMRAP PUSH-UP TEST AS A PREDICTOR FOR 1RM BENCH PRESS

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BACKGROUND: 1 repetition maximum (1RM) bench press testing is used across many sports as pre-, in-, and post-season testing. Larger teams take more time to properly set up, warm up, and perform the subsequent bench press testing. The heavy weight that is often used during a max effort 1RM bench press assessment can increase chance of injury and spotting error can also contribute to safety concerns. For less experienced lifters, form at heavy weights may also impact the results of the test. In contrast, performing a 60 second push-up test, where the subject performs as many reps as possible (AMRAP), can be a useful tool to limit testing time, increase safety, and reduce bench press form inadequacies. Prior studies have reported the validity and reliability of the 60 second push-up test, and there has been a prior study that compared a predicted 1RM bench press calculated from ballistic push-ups (BPU) to a 1RM bench press that suggested a strong correlation of BPU as a 1RM bench press predictor. However, correlations between the 60 second AMRAP push-up test as a 1RM bench press predictor has not been assessed. Therefore, the purpose of this study is to examine whether a 60 second AMRAP push-up test can be used as an accurate predictor for 1RM bench press performance. METHODS: The study will include 25-30 male subjects and an additional 25-30 female subjects, all between the ages of 18-25 years old. The subjects will be required to have at least 6 months of recreational lifting experience and be physically able to perform a push-up and bench press without ailments. In a randomized protocol, each subject will either first perform a 1RM bench press test with a standardized warmup or the 60 second AMRAP push-up test with a standardized warmup, following up 3-4 days later performing whichever test was not completed. Before each initial testing session, body composition analysis will occur using an InBody 770 model and weight and height data will be gathered. The last successful lift during the 1RM bench press test, after a maximum of 5 attempts, and the amount of push-ups completed during the 60 seconds push-up test will be recorded. A tendo-unit will create a FVP profile using each repetition of bench press and push-up. ANTICIPATED RESULTS: It is hypothesized that a 60 second AMRAP push-up test will predict 1RM bench press performance within ± 6.82 kilograms.

P319: ASSOCIATIONS BETWEEN RACE-RELATED STRESS WITH PHYSICAL ACTIVITY, SEDENTARY AND SLEEP IN BLACK EMERGING ADULTS

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BACKGROUND: Race-related stress (e.g., perceived racism and heightened vigilance) may negatively impact health behaviors, such as physical activity (PA) and sleep. Few studies have investigated associations between perceived race-related stress and 24-hour movement behaviors. We investigated preliminary associations between race-related stress with 24-hour movement behaviors, including PA, sedentary time (ST) and sleep duration in a sample of Black emerging adults ages 18-28 years old.**METHODS:** The Sleep, Health Outcomes and Body Weight (SHOW) study aims to recruit 150

Black emerging adults. Baseline data on 7-day actigraphy-assessed light PA and moderate-vigorous PA (MVPA), ST and sleep, along with self-reported perceived racial discrimination (18-item Racism and Life Experiences Scale) and heightened vigilance (6-item Heightened Vigilance Scale, reverse scored) are currently available in 72 participants (49 females; age, 20.3±2.0 years; weight, 75.0±23.0 kg; fat mass, 21.7±16.0kg; light PA, 257±73 minutes, MVPA, 35±21, sedentary time, 648±157 minutes/day, sleep duration, 6h1min±1h14min), and these results are presented herein. Spearman correlations were used to assess associations between race-related stress and movement behaviors.**RESULTS:** Heightened vigilance was inversely associated with light PA (ρ = -0.24, p = 0.04), but was not significantly associated with sleep duration (ρ = 0.14, p = 0.25) and MVPA (ρ = 0.16, p = 0.17). Greater perceived racial discrimination was associated with shorter sleep duration (ρ = -0.27, p = 0.03) and greater light PA (ρ = 0.23, p = 0.05), but was not related to MVPA (ρ = 0.04, p = 0.75). **CONCLUSION:** These results suggest that those who experience greater race-related stress may experience shorter sleep duration in exchange for greater light PA but not MVPA, which may be the result of more restless sleep or overall restless movement due to greater psychosocial stress.**Support:** NIH Grant R01HL163804

P320: VOICES OF MOTHERS: UNDERSTANDING MATERNAL HEALTHCARE AND MENTAL HEALTH EXPERIENCES IN FORSYTH COUNTY, NC

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Background. Forsyth County, North Carolina faces significant maternal health disparities, with maternal mortality at 27 per 100,000 live births—higher than national averages. Black women experience 3-4 times higher mortality rates than white women, reflecting systemic healthcare inequities. Despite major attention to this important topic in recent years, barriers persist including limited rural prenatal access, insurance gaps, transportation challenges, and socioeconomic disparities. Women's lived experiences and perceptions remain underexplored, limiting patient-centered intervention development. **Methods.** This qualitative study uses trauma-informed narrative inquiry to capture women's maternal healthcare experiences in Forsyth County. Women who delivered a child in Forsyth County will complete one-time, semi-structured phone interviews lasting 30-60 minutes. Trained staff will conduct interviews exploring prenatal access, provider relationships, cultural considerations, emotional support and mental health, system navigation, pain management, postpartum care, and discrimination experiences. Audio-recorded interviews will be transcribed verbatim with anonymized data. Demographics will include age, race/ethnicity, education, income, insurance, and pregnancy history. Thematic analysis will identify patterns across narratives. Participants will receive $25 compensation. **Anticipated Results.** This study will reveal insights into maternal healthcare experiences across demographic groups. Anticipated findings include barriers to quality care, particularly among women of color and lower socioeconomic backgrounds. Results will illuminate implicit bias, communication challenges, gaps in culturally responsive care, and unmet support needs. The study also will identify mother's perceptions of their own mental health before, during, and after pregnancy, and will document protective factors and positive experiences. Findings will support a deeper understanding of factors influencing the mental and physical well-being of women, and will generate recommendations for providers, policymakers, and organizations to develop equitable, trauma-informed maternal health services and interventions in Forsyth County.

P321: EXPLORING THE ROLES OF SOCIETAL INFLUENCES ON BLACK MENS LIFELONG PHYSICAL ACTIVITY BEHAVIORS

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Background: Prior research shows that physical activity (PA) is not central to most people's lives and declines with age, often starting between 18-34 years. Nearly half of U.S. adults don't meet public health guidelines (PAG); Black men are especially impacted, with only 39% meeting recommendations. Understanding PA requires examining barriers and facilitators, especially in vulnerable groups. While many factors apply broadly, research specific to Black adults is limited. This study uses the socioecological model (SEM) to explore PA determinants among Black emerging adult males ages 18-32.**Purpose:** To explore how social factors influence PA behaviors in Black men aged 18-32 years.**Method:** The mixed-methods study recruited Black males aged 18-32 years. After providing informed consent, participants completed questionnaires assessing demographics, leisure-time physical activity, social support, and life satisfaction. Semi-structured interviews further explored additional social influences throughout participants' lifetime. Data was analyzed by thematic analysis.**Results:** Participants (n = 14; 26.2 ± 3.6 years), all held a high school diploma, 12 had at least a bachelor's degree, most (n=7) were employed full-time, and five reported annual earnings of $55,000 or more. Based on the Godin Leisure-Time Exercise Questionnaire, 13 were labeled Active. Life satisfaction averaged 25.6 ± 8.3 (35-point scale); discrimination 29.8 ± 8.4 (54-point scale); motivation 4.04 ± 0.95 (5-point scale). Findings demonstrate that the participants have a high satisfaction with life and motivation, with moderate levels of everyday discrimination. Five themes emerged: 1) Social Influence, 2) Competing Priorities, 3) Structural Barriers, 4) Cultural/Societal Pressures, and 5) Community/Recreation Spaces.**Discussion:** Interview findings reveal that despite being active, many of the Black men did not feel the PAG were reflective of their culture and needs, mainly due to a lack of representation when being developed. Limitations included recruitment, age range, geography, and sample size. Future research should explore culturally sensitive guidelines for underrepresented groups.

P322: CULTURALLY RESPONSIVE NUTRITION INTERVENTIONS TO ADDRESS FOOD INSECURITY IN PATIENTS WITH DIABETES AND OTHER COMORBIDITIES

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Food insecurity is a critical barrier to effective diabetes management, particularly among populations facing cultural and socioeconomic disparities. In partnership with the Community Care Clinic (CCC) in Winston-Salem, NC, this project will design, implement, and evaluate a culturally responsive intervention integrating nutrition education, food access, and patient-centered resources. Patients (n=25) with diabetes will be identified through the CCC's Electronic Medical Record (EMR) to provide relevant demographic and health data to guide intervention tailoring. Semi-structured interviews and surveys will be administered at baseline to assess social determinants of health, food insecurity status, and challenges related to nutrition in diabetes management. Guided by the baseline assessments, food bundles will be provided to each patient containing culturally appropriate, nutritious items aligned with patients' dietary practices and traditions. To support long-term behavior change, supplemental materials such as culturally tailored recipes and cooking guides will be developed to facilitate practical, affordable, and healthy meal preparation for all levels of literacy. To evaluate impact, we will assess the acceptability, utilization, and value of the food bundles and supplemental resources. Patient outcomes will be tracked with follow-up surveys and assessments at 3-/6-months post baseline. Outcome measures will include patient-reported changes in food preparation practices, increased knowledge of healthy eating, perceived improvements in diabetes management, and changes in health outcomes and risks as recorded in the EMR. Findings will inform the role of culturally grounded nutrition interventions in reducing disparities, addressing food insecurity, and enhancing diabetes outcomes. This work emphasizes the importance of integrating cultural relevance, health systems data, and patient-centered education in community-based diabetes care for marginalized populations.

P323: THE INFLUENCE OF SOCIAL ISOLATION ON BLOOD PRESSURE IN YOUNG SEXUAL AND GENDER MINORITY ADULTS

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BACKGROUND: Sexual and gender minority (SGM) adults experience a greater prevalence of cardiovascular disease (CVD) risk factors compared to their heterosexual cisgender counterparts. Social and cultural oppression may exert a weathering effect that contributes to cardiovascular health disparities. Prior evidence suggests that proximal minority stress experience is associated with the development of hypertension in SGM adults. However, there is limited information regarding proximal minority stress and blood pressure components such as nocturnal dipping and morning surge in young SGM adults who are normotensive. METHODS: SGM adults aged 19-30 (n=14, 79% female) participated in this 24-hour ambulatory blood pressure (ABP) monitoring study. Measurements were taken every 20 minutes during waking hours and every 30 minutes during sleep. Nocturnal dipping was calculated as the ratio of average sleep to wake systolic and diastolic pressure. Morning surge was reported as the morning sleep trough, pre-awakening, and rising morning surge for both systolic and diastolic pressure. Participants completed the Daily Heterosexist Experiences Questionnaire (DHEQ) to assess proximal minority stress subscales including isolation, vigilance, and vicarious trauma. Median split of subscales was used to group participants in low versus high minority stress. An independent t-test was used to assess differences in low versus high proximal minority stress groups. RESULTS: Isolation

was the only proximal minority stress that demonstrated significant differences in ABP measurements. Systolic morning sleep trough (11.86 ± 9.15 vs. 23.05 ± 9.93 mmHg, p = 0.049) and pre-awakening systolic surge (7.14 ± 9.17 vs. 21.43 ± 10.03 mmHg, p = 0.017) were significantly higher in the high isolation group. This measure was shown in the absence of differences between averaged systolic and diastolic blood pressure assessments during both waking and sleeping times. CONCLUSIONS: These data indicate that young SGM adults who report higher social isolation have a more pronounced morning surge, an indicator of cardiovascular risk often observed in hypertensive individuals. Future studies are needed to investigate strategies aimed at improving blood pressure regulation through positive health behaviors, such as exercise.

P324: IMPACT OF RESILIENCE AND PERCEIVED DISCRIMINATION ON BLOOD PRESSURE IN EMERGING BLACK ADULTS

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BACKGROUND: Black adults experience the greatest prevalence of cardiovascular disease (CVD) risk of any racial or ethnic group in the United States. Racial discrimination is associated with elevated ambulatory blood pressure (ABP) and may exert a weathering effect that contributes to health disparities. While psychological stress resilience may mitigate CVD risk, there is limited information regarding the impact of resilience on perceived racial discrimination and ABP components such as nocturnal dipping and morning surge in young Black adults. METHODS: Black adults aged 18-29 (n=38, 47% female) participated in this 24-hour ABP monitoring study. Measurements were taken every 20 minutes during waking hours and every 30 minutes during sleep. Nocturnal dipping was calculated as the ratio of average sleep to wake systolic and diastolic pressure. Morning surge was reported as the morning sleep trough, pre-awakening, and rising morning surge for both systolic and diastolic pressure. Participants completed a Brief Resilience Survey and questionnaire that assessed personal-level discrimination. Median splits were used to sort participants into low versus high discrimination and resilience groups. An independent t-test was used to assess differences in discrimination groups that were further separated into resilience groups. RESULTS: In participants with low resilience, low personal-level discrimination resulted in significantly higher sleep trough morning diastolic surge (17.61±4.43 vs. 8.13±7.33 mmHg, p=0.016) and pre-awakening morning diastolic surge (11.50±5.17 vs. 3.75±4.68 mmHg, p=0.013), when compared to those with high personal-level discrimination. This finding was not observed in participants with high resilience. Only participants who exhibited low resilience and high personal-level discrimination were considered non-dippers (<10% systolic dipping percentage). CONCLUSION: Despite young Black adults who report low resilience and higher personal-level discrimination exhibiting an attenuated morning surge, non-dipping nighttime patterns presented in this group may serve as an important risk factor for future cardiovascular disease. Future studies are needed to investigate strategies aimed at enhancing resilience through positive health behaviors, such as exercise.

P325: CONDUCTING COMMUNITY-ENGAGED RESEARCH VIA COMMUNITY ADVISORY BOARD LED FOCUS GROUPS TO ENHANCE RESEARCH PARTICIPATION

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BACKGROUND: Community-engaged (CE) research is essential for conducting ethical, culturally responsive research with underrepresented populations. CE research models address power imbalances through community advisory boards (CABs)—groups of community members who partner with researchers as equal stakeholders to guide study design and implementation. The purpose of this study is to train CAB members to conduct focus groups investigating community preferences for educational materials, barriers and facilitators to research participation, perspectives on effective researcher-community partnerships, and recommendations for enhancing diversity, equity, and inclusion in research initiatives. METHODS: This project will employ a community-based participatory research (CBPR) approach featuring CAB and focus group methodologies. Approximately 160-240 adults residing in Winston-Salem, North Carolina will participate across 20 focus groups (8-12 participants each). Purposive sampling will ensure representation across racial, ethnic, socioeconomic, and geographic diversity. CAB members will receive comprehensive training in focus group facilitation, research ethics, and cultural responsiveness before conducting sessions in accessible, community-based locations. Focus groups will explore participants' research experiences, preferred educational formats, barriers to engagement, and recommendations for strengthening community-academic partnerships. All sessions will be audio-recorded with verbal consent and transcribed verbatim. Data analysis will follow Braun and Clarke's six-phase thematic framework. Transcripts will be independently coded using Dedoose software, with intercoder reliability assessed through Cohen's kappa (target ≥0.80). Disagreements will be resolved through consensus discussion. Member checking will validate findings and ensure understanding. ANTICIPATED RESULTS: We hypothesize that key themes of relevance will include 1) historical context and trust, 2) representation and identity, 3) information seeking, 4) barriers and facilitators of participation, 5) transparency and communication expectations, 6) results dissemination and community benefit, 7) socioeconomic considerations, and 8) power dynamics in healthcare.

P326: THE IMPACT OF PALM COOLING ON PERCEIVED RECOVERY DURING REHABILITATION AMONG FIREFIGHTERS

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BACKGROUND: Firefighters are required to perform intense occupational tasks while wearing personal protective equipment (PPE). The demands of the occupational tasks are exacerbated by the weight and insulating effects of the PPE, which increases firefighters' body temperature. Increased body temperature is associated with reduced neuromuscular function, cognition, and increased perception of effort. It is important to identify feasible cooling strategies that can be utilized during fireground rehabilitation protocols to expedite recovery. Palm cooling (PC) is an understudied methodology that may be useful in the Fire Service. Therefore, the purpose of this study is to evaluate the perceptual responses to PC during recovery in firefighters.
METHODS: This study will utilize a repeated measures crossover design. Career firefighters (N=20; Age:18-45yr) will be recruited to participate in 3 testing sessions. The first testing session will include familiarization with the occupational simulation. To complete the occupational simulation, firefighters will don PPE (self-contained breathing apparatus, helmet, hood, jacket, pants, boots, and gloves) and complete a standard set of tasks indoors at an occupationally relevant pace. Time of task and course completion will be recorded. During sessions 2 and 3, following the occupational simulation, firefighters will complete a 20 min recovery period inclusive of PC or passive recovery. The order of recovery intervention will be randomized. Perceptual responses for rating of perceived exertion, dyspnea, thermal strain, and occupational readiness will be obtained pre, during, and 0 min and 20 min post-exposure. Two-way repeated measures ANOVA will be used to evaluate condition by time outcomes with significance set at $p<0.05$. Firefighters will also provide descriptive responses to the following prompt regarding their experience with the PC device: "Does PC make you feel more comfortable?"
ANTICIPATED RESULTS: It is hypothesized that firefighters will provide similar perceptual responses pre, during, and 0-min post-simulation between conditions, but provide responses indicative of recovery following the PC condition. These findings will inform the use of PC in fireground rehabilitation protocols to reduce perceived responses related to exertion.

P327: COMPARING HEALTH DESCRIPTORS AND PHYSIOLOGICAL STRESS RESPONSES AMONG SUCCESSFUL AND UNSUCCESSFUL SMOKE DIVER CANDIDATES

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BACKGROUND: The Smoke Diver (SD) certification course is an elite training program designed to advance the structural fire suppression and rescue techniques of incumbent firefighters (FF). Understanding what characteristics are associated with successful versus unsuccessful SD candidates would provide valuable insight towards candidate preparation, but has yet to be determined. **METHODS:** Male FFs (N=78; M ±SD; age: 31 ± 7 y; body mass index: 28.6 ± 3.7 kg/m^2; FF experience: 6.8 ± 4.9 y) completed a survey to assess demographics and health descriptors (e.g., post-traumatic stress disorder symptom severity [PCL-5 Total Score]) prior to engaging in a 5-day SD training program. Physiological strain markers (average heart rate [HR], time spent in low, moderate, and high HR zones [<65%, 65-85%, and >85% HR_{max}, respectively], physiological, mechanical, and training intensities) were measured across day one (D1) and during an air consumption course (CC; first event on D1). Independent sample t-tests identified differences in candidate characteristics by group (PASS [n = 48]; FAIL [n = 30]). Level of significance was α = 0.05. Data are presented as mean difference [95% confidence interval of the difference]. **RESULTS:** Compared to the FAIL group, PCL-5 Total Score was higher (i.e., more severe PTSD symptoms) in the PASS group (7.39 a.u. [2.68, 12.09]). Physiological strain markers during the CC also differed, with the PASS group achieving higher mechanical-to-physiological intensity ratio (indicating greater efficiency; 0.03 [0.02, 0.05]), and higher mechanical (0.30 a.u. [0.15, 0.45]) and training (0.64 a.u. [0.22, 1.05]) intensities, respectively. PASS candidates spent more time in low HR zones on D1 (19.2% [6.4, 32.1]), whereas FAIL candidates spent more time in moderate (-13.7% [-23.8, -3.6]) and high (-5.5% [-9.6, -1.5]) HR zones on D1. **CONCLUSION:** Successful SD candidates displayed more optimal physiological responses to SD training and tasks on D1 compared to unsuccessful candidates. Aside from exhibiting more severe PTSD symptoms, no other demographic or health descriptors were associated with SD training success. A larger, more diverse sample is needed to enhance the generalizability of our results and to potentially identify key characteristics to be emphasized during candidate preparation.

P328: TEMPORAL AND HEART RATE RECOVERY FOLLOWING A FIREFIGHTER RECRUIT CONFIDENCE COURSE: A PILOT STUDY

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BACKGROUND: The self-contained breathing apparatus (SBCA) is essential to firefighter's (FF's) protective ensemble, providing clean air in toxic environments. A SCBA signals FFs to cease activity and make a safe exit once only 33% of the air supply remains. FF recruits are taught recovery tactics that control heart rate (HR) to slow breathing and conserve air. The purpose of this pilot study was to describe the temporal and heart rate response of FF recruits during and after their first exposure to a SCBA confidence course (CC). METHODS: Structural FF recruits (n=6; age=24.0±4.5 yr, body fat=19.0±7.7%, VO2max= 44.9±5.6 mL/kg/min) completed a CC in full protective attire to incorporate stress inoculation and develop air management skills. All data were recorded during the first CC of the training academy, reflecting the first exposure to SCBA use. Time and HR were continuously monitored as recruits rotated through a series of simulated occupational tasks. Once the SCBA alerted low air, the recruit was instructed to stop activity and assume a seated position in the bay. Recruits were then coached on air management techniques. The total working time, air management time, and HR during both phases were recorded. Age-predicted maximal HR (APMHR) was determined as 220-age. Descriptive data were calculated to describe the temporal and HR trends during the CC. RESULTS: All recruits completed at least one round of the CC before being alerted to low air, lasting an average 449±79 s. The group mean HR during the CC was 166±12 bpm (APMHR=92±6%). Upon sitting, HR decreased 17±8 beats within the first minute of recovery. The total duration of the air management phase lasted 641±200 s (min-max=429-955 s), with recruits reducing HR by an average of 57±8 beats from start to finish. The group's minimum (i.e., lowest achieved) HR was 120±12 bpm (APMHR=61±7%) during the air management phase. CONCLUSIONS: The preliminary findings indicate that FF recruits exhibit high HR responses during the first exposure of a SCBA CC, but are capable of rapid HR recovery through coaching from fire academy instructors. Future research should investigate changes in the HR response to the CC and air management throughout the training academy. Findings can be used to guide best practices when teaching air management to novice FF.

P329: COMPARING MANUAL AND DIGITAL REFRACTOMETER URINE SPECIFIC GRAVITY MEASUREMENTS IN COLLEGIATE ACROBATICS AND TUMBLING ATHLETES

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BACKGROUND: Urine specific gravity (USG) is often measured using manual refractometers (USGm), though these devices have limitations due to limited precision, environmental factors, and human visual error. Digital refractometers (USGd) offer a potentially faster, bias-free, user-friendly, and more precise alternative. The purpose of this study was to compare manual and digital USG measurements in a collegiate women's acrobatics and tumbling team and contextualize their differences. **METHODS:** Twenty-six female collegiate athletes (age: 19 ± 1 y) provided afternoon urine samples during an athlete assessment session. The same researcher completed USGm and USGd measures. Additionally, USGm was completed first to eliminate the bias that could exist if USGd were known prior to completing USGm. To compare means, USGd was rounded from four decimal places to three decimal places, to match the precision of USGm. Paired *t*-tests were used to compare USG values between refractometers. Data are presented as mean ± standard deviation and a *p*-value of ≤ 0.05 was used to investigate mean differences. Cohen's *d* effect size was calculated to contextualize differences. Finally, a Bland-Altman was utilized to examine error trends. **RESULTS:** A small, trivial difference was observed between USG values ($p < 0.001$; $d = 0.0006$). USGd readings were consistently lower (1.018 ± 0.009) compared to USGm (1.019 ± 0.008). Individual USGd readings were mostly lower (≈ 62%), while ≈ 4% were higher and ≈ 35% were equal to USGm. The Bland-Altman demonstrated a mean difference = - 0.001 (95% UL = 0.000 and LL = - 0.002) and $R^2 = 0.06$ indicating the minimal influence USG had on the magnitude of error and a small, positive slope (m = 0.0194). **CONCLUSIONS:** The findings from this study demonstrate that USGd provides statistically different USG measures when compared to USGm - but these differences lack practical relevance. Importantly, if one were to utilize a USG ≤ 1.020 as the cutoff to indicate a euhydrated status, 0% of these samples categorially changed athlete hydration status - when comparing across devices. Coaches, athletic trainers, and sports scientists should be knowledgeable of the differences when comparing team trends or large datasets that utilize different refractometer types but understand the practical impact on USG is minimal.

P330: EFFECTS OF A CONTROLLED HEART RATE-BASED HEAT ACCLIMATION METHOD ON PHYSIOLOGICAL HEAT ADAPTATION

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BACKGROUND: Heat acclimation occurs with consistent heat exposure, allowing for increased performance and safety of occupational and athletic populations. The most common method for lab-based heat acclimation involves controlled-exercise induced hyperthermia (CT > 38.5°C). This method commonly reports decreased resting core temperature, increased plasma volume, increased sweat rate and decreased sweat sodium, as well as increased heat tolerance. However, a more practical method involves the use of specific heart rate intensities to induce similar acclimation effects. Therefore, we aim to determine the effect of a controlled heart rate-based heat acclimation method on thermoregulatory and physiological measures of heat adaptation. **METHODS:** We will recruit 24 participants aged 19-45 years old and randomize them into a control (CON) or heat acclimation (HA) group. A baseline visit will include aerobic fitness, body composition and blood draws. The CON group will complete one week of their normal activities. The HA group will complete five consecutive days of heat acclimation in a 40.6°C/60% RH (105°F) environment chamber. The second and sixth HA visits will include pre- and post-urine and blood draws to assess osmolality and electrolytes (i.e., Na^+, K^+, Cl^-). The protocol includes a warm up and 60-minutes of treadmill walking/jogging while maintaining a target heart rate of ~65% of their max heart rate. Heart rate, respiratory rate, core temperature, sweat rate, sweat sodium, rate of perceived exertion and thermal sensation will be collected for each HA visit. A final blood draw will be collected after a week of rest (CON) or the day after the HA protocol is finished. Results will be analyzed using *t*-tests to determine the effect of HA on within-subject measures of pre- and post-urine and blood osmolality and electrolytes from the second and sixth day of the study, as well as plasma volume measures from days one and seven. Repeated measures ANOVAs will be used to determine the significance of changes between groups for all variables. **ANTICIPATED RESULTS:** It is hypothesized that five days of consecutive heat acclimation will improve thermoregulatory and physiological measures via decreased resting core temperature,

increased plasma volume and sweat rate, decreased sweat sodium, as well as increased heat tolerance.

P331: THE EFFECTIVENESS OF MICROBREAKS IN ON-DUTY PATROL OFFICERS

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Police officers are exposed to high levels of chronic stress, along with periods of both intense physical activity and extended sedentary time while conducting patrols or completing paperwork. This combination often results in musculoskeletal pain and injury. Micro-breaks, 3-5-minute scheduled stretching sessions for major muscle groups combined with mindful breathing, have been used successfully in populations like long-haul truckers to relieve muscular pain and stress. This study evaluated the effectiveness of micro-breaks in reducing musculoskeletal pain and stress levels among police officers. METHODS: Micro-breaks were implemented hourly during police shifts for 16 weeks. Officers were provided with two similar five-stretch microbreak protocols targeting the back, hips, neck, shoulders, and legs/feet, allowing them to rotate between protocols or choose their preference. RESULTS: Pearson correlations assessed relationships at Week 1. Repeated-measures mixed-effects models were used to examine changes over time. Model fit was evaluated via Akaike Information Criterion (AIC; lower indicating better model fit). Significance: $p < 0.05$; trends: $p < 0.10$. Week 1 stress levels positively correlated with upper back pain ($r = 0.73$, $p = 0.003$), neck pain ($r = 0.52$, $p = 0.055$), and lower back pain ($r = 0.61$, $p = 0.111$). Strong negative correlations were observed between stress levels and both partial ($r = -0.70$, $p = 0.016$) and full ($r = -0.64$, 0.035) completion of the micro-breaks protocol. Mixed-effects models revealed no statistically significant effect of time on stress levels ($\beta1 = -0.037$, $p = 0.373$) or lower back pain ($\beta1 = -0.066$, $p = 0.260$). Due to the large variability, we examined individual changes. Individual analysis revealed a moderate negative correlation in neck ($r = -0.55$, $p = 0.125$) and a near perfect negative correlation with upper back pain ($r = -0.93$, $p < 0.001$) over time for Subject 1. Very strong negative correlations for stress ($r = -0.72$, $p = 0.043$) and low back pain ($r = -081$, $p = 0.017$) over time were observed for Subject 2. CONCLUSION: These findings suggest that while group-level effects were not significant overtime, individual-level improvements in pain and stress indicate individualized micro-breaks may be successful in reducing musculoskeletal pain and stress in police officers.

P332: METABOLIC COMPARISON BETWEEN PATROL GEAR VERSUS CROWD CONTROL GEAR IN LAW ENFORCEMENT OFFICERS

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BACKGROUND: Law enforcement officers (LEOs) are called upon to perform a variety of tasks, ranging from basic patrol (BP) to crowd control (CC). Staffing shortages have resulted in general patrol officers to be called upon in CC roles (Grammich & Wilson, 2024) for which they may not be adequately trained. CC requires heavier gear than BP and is typically performed for a longer duration. Research has been conducted to compare metabolic demands of federal highway police using personal protective equipment (PPE; 9-12 kg) versus no PPE (Marins et al., 2020), showing that officers completed occupational tasks in 6.4% less time when wearing no PPE. The results of this study did not display significant differences in maximal heart rate, although the non-PPE trial elicited higher blood lactate concentrations (Marins et al., 2020). Other research on load carriage in tactical occupations has shown increased metabolic expenditure and oxygen consumption in loaded conditions (Taylor et al., 2016). Furthermore, BP gear has shown to decrement various fitness metrics, including mobility, stability, and power (Frick et al., 2025). To our knowledge, no research has investigated the metabolic demands associated with CC gear compared to BP gear. The purpose of this study is to compare the metabolic demands between BP gear and CC gear in LEOs. METHODS: This study will require active-duty LEOS to complete an Occupational Physical Ability Test (OPAT) over two counterbalanced sessions separated by at least 48 hours. LEOs will wear BP gear in one session and CC gear in the other. The OPAT will be created in consultation with the participating law enforcement agency to accurately encompass BP and CC tasks. The measured variables will be heart rate (HR), perceived exertion, oxygen consumption (via a portable metabolic device), blood lactate, and OPAT time. Dependent samples t-test and effect sizes will be calculated to determine differences between conditions. ANTICIPATED RESULTS: Based on the results of the previous research investigating federal highway police, it is anticipated that the heavier CC gear will decrement performance and increase physiological strain compared to BP gear. Findings from this research will help guide training to better prepare LEOs for diverse occupational duties and load carriage conditions.

P333: INDICES OF CEREBRAL BLOOD FLOW AND COGNITIVE PERFORMANCE DURING THORACIC LOAD CARRIAGE: INFLUENCE OF SEX

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BACKGROUND: Thoracic load carriage is an occupational requirement that can independently influence indices of cerebral blood flow (CBF_i), in both normoxia and hypoxia. The purpose of this study was to assess CBFi, along with cognitive function, and to assess the impact of biological sex on these outcomes.**METHODS:** Cognitive function was assessed with reaction time and accuracy during the Go/No-Go auditory stimulus test at rest and during 45 minutes of exercise, while a Near Infrared Spectroscopy (NIRS) headband was used to assess changes in cerebral hemoglobin (total - THb, oxygenated - O_2Hb and deoxygenated - HHb), which together provide indices of perfusion and oxygen delivery. This was assessed in healthy females (n=11) and males (n=8) at rest and towards the end of 45 minutes of inclined walking (62.0 ± 3.9% VO_{2max}; speed = 2.1-3.7 mph; grade: 8.0-10.7%) in the following conditions: unloaded normoxic (F_iO_2 = 20.93%; UN), loaded normoxic (25 kg pack; LN), unloaded hypoxic (F_iO_2 = ~13.0%; UH), and loaded hypoxic (LH). Exercise responses were analyzed via a general linear model with time (pre/during exercise), altitude (normoxia/hypoxia), and loading (loaded/unloaded) as within subject factors, and sex (males/females) as a between-subject factor (α=0.05). **RESULTS:** All CBF_i markers (THb, O_2Hb, and HHb) increased from rest to exercise, though reaction time and accuracy were impaired by exercise. While both females and males experienced an increase in O_2Hb during exercise, males had larger increases compared to females ($p<0.05$). THb also increased in both sexes with exercise, but males had higher levels both at rest and during exercise ($p<0.05$). Independent of biological sex, there were time x altitude interaction for HHb such that it was elevated in hypoxia but only during exercise ($p<0.05$). There was also a time x load interaction such that loading increased THb during exercise.**CONCLUSIONS:** Loading and hypoxia evoke specific CBF_i responses but there were no interactions between loading and hypoxia. There were sex differences in THb and O_2Hb, particularly during exercise, though these sex disparities did not appear to be systematically influenced by loading or hypoxia. The practical implications of altered CBF_i should be further examined, particularly in the context of tactical operations.

P334: THE RELATIONSHIP OF ENERGY AVAILABILITY, BODY COMPOSITION, AND METABOLISM IN PERIMENOPAUSAL WOMEN

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Background: Energy intake and imbalanced dietary patterns may intensify changes associated with perimenopause. Purpose: To examine the relationship of total daily energy expenditure (TDEE) and availability on body composition and metabolism when accounting for carbohydrate-to-protein intake ratio (CHO:PRO). **Methods**: 28 perimenopausal women (mean ± SD: Age: 48.8 ± 4.5 yrs, BMI: 31.7 ± 3.3 kg/m^2) were assessed for muscle volume from magnetic resonance imaging (MRI, cm^3), muscle area from peripheral quantitative computed tomography (pQCT, mm^2), and fat free mass (kg) from whole-body dual-energy X-ray absorptiometry (DXA). Diet intake was assessed from a 24-hour log analyzed in Food Processor dietary tracking tool. The sample was stratified by CHO:PRO: High (>3.0g CHO:PRO; 4.1 ± 0.9g) and Low (<3.0g CHO:PRO; 1.8 ± 0.8g). Resting metabolic rate (RMR) was measured via indirect calorimetry after ≥8 hr fast. Energy availability (EA) was calculated by TDEE (RMR × activity coefficient using the International Physical Activity Questionnaire) minus calorie intake. Bivarate correlations were used to evaluate outcome relationships. **Results**: In the High CHO:PRO group, EA was not significantly related to any muscle outcomes, yet a moderate inverse trend with fat-free mass (FFM; r=-0.481, p=0.081) was observed. TDEE was negatively associated with caloric difference (r=-0.508, p=0.064) but positively associated with MRI muscle volume (r=0.516, p=0.059), pQCT muscle area (r=0.691, p=0.006), and FFM (r=0.723, p=0.003). In the Low CHO:PRO group, EA was unrelated to muscle outcomes (p>0.05). TDEE was significantly positively associated with pQCT muscle area (r=0.547, p=0.050), FFM (r=0.546, p=0.050), and protein intake (r=0.703, p=0.011). **Conclusion:** Findings suggest that nutrient distribution and TDEE, rather than EA

alone, may play a key role in metabolic and musculoskeletal health in perimenopause.

P335: DIET QUALITY AS A MEDIATOR BETWEEN VISCERAL FAT AND REMNANT CHOLESTEROL IN COLLEGE-AGED ADULTS

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Background: Remnant cholesterol (RC), calculated as total cholesterol (TC) minus high-density lipoprotein (HDL) and low-density lipoprotein (LDL) cholesterol, is an emerging cardiometabolic disease (CMD) risk factor. RC consists of triglyceride-rich lipoproteins, such as intermediate-density lipoproteins (IDL) and very-low-density lipoproteins (VLDL), which are smaller, more metabolically active particles that persist in circulation, even at a young age. This makes RC an intriguing marker of CMD risk in college-based young adults (CBYA). Poor diet quality is associated with higher visceral adipose tissue (VAT), and elevated RC is associated with accumulation of VAT in American adults. However, these relationships are underexplored in CBYA - a population that is often exposed to lower-quality diets while also in a critical period of establishing lifelong behaviors. This study examined (1) the association between VAT and RC in CBYA, and (2) whether diet quality, measured by Healthy Eating Index (HEI), mediates this association. **Methods:** Participants (n=496; mean age=20 [1.7] years) completed the Diet History Questionnaire III to calculate HEI scores (lower scores = poorer diet quality.) VAT was estimated via dual energy x-ray absorptiometry. Fasting blood was analyzed with the Cholestech LDX system, and RC was calculated as TC minus HDL and LDL. Mediation analysis was conducted using the SEM (lavaan) module in Jamovi with bootstrapped confidence intervals (5000 resamples). Confidence intervals not crossing zero indicated significance. **Results:** The direct effect of VAT on RC was positive but nonsignificant (b = 0.003, 95% CI [0.000, 0.008]). Similarly, the total effect was positive but nonsignificant (b = 0.003, 95% CI [0.000, 0.008]). The mediation analysis showed diet quality based on HEI score did not significantly mediate the relationship between VAT and RC (indirect effect b ≈ 0.000, 95% CI [0.000, 0.001]). **Conclusion:** Though VAT showed a positive direct effect on RC, the association was not statistically significant, and diet quality did not mediate RC and VAT in CBYA. This suggests that other mechanisms may underlie the link between VAT and RC in young adults. As this was a cross-sectional analysis, future research should investigate these pathways in longitudinal form with strong covariate control.

P336: ACUTE EFFECTS OF ULTRA-PROCESSED VS. MINIMALLY PROCESSED MEALS AND EXERCISE ON BLOOD GLUCOSE REGULATION

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BACKGROUND: Nutrition is an underlying component of overall health and wellness. While there are hundreds of decisions made each day pertaining to what, when, and how much to eat, recent evidence has indicated the way food is processed may have implications on various health parameters. Ultra-processed foods are associated with an increased risk for metabolic and cardiovascular diseases, among other health risks. Whole foods are minimally processed and nutrient rich, containing various vitamins, minerals, antioxidants, and fibers. The impact of food processing on blood glucose regulation is an emerging area of interest. Alongside methods of food processing is the incorporation of postprandial exercise, which has been shown to improve blood glucose regulation. However, the extent at which light aerobic exercise after a meal influences glucose responses for minimally processed food versus ultra-processed food remains unclear. METHODS: 15 healthy adults between the ages of 18-25 will be recruited for this randomized, crossover study examining postprandial blood glucose. The subjects will complete four experimental conditions separated by a 24-48 hour washout period including (1) ultra-processed meal with rest, (2) ultra-processed meal with post-meal walk, (3) minimally processed meal with rest, (4) minimally processed meal with post-meal walk. Meals will be matched for macronutrient and micronutrient composition, in addition to glycemic load and glycemic index. The post-meal exercise will consist of a 15-minute brisk treadmill walk, commencing 15 minutes after meal consumption, at a self-selected pace targeted at 40% of age-predicted maximum heart rate. This speed will be individualized and repeated for each trial. Capillary blood glucose will be obtained via finger-prick at baseline (fasted) and in 30-minute intervals for 90 minutes postprandially. Primary outcomes will include incremental glucose area under the curve (iAUC) over 90 minutes, with secondary outcomes including peak measured glucose, and satiety ratings. ANTICIPATED RESULTS: It is hypothesized that post-prandial exercise will reduce iAUC compared to the control, with a greater absolute reduction following the ultra-processed meal.

P337: EVENT-SPECIFIC BODY COMPOSITION AND METABOLIC PROFILES IN NCAA DIVISION II TRACK ATHLETES

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BACKGROUND: Body composition and resting metabolic rate (RMR) are important determinants of training and performance in track and field, influencing both energy requirements and event specialization. While such data are well-documented in elite and Division I athletes, limited normative information exists for NCAA Division II (DII) populations, despite their unique competitive demands. **METHODS:** Thirty-two DII track and field athletes (sprinters: n = 21; distance runners: n = 11; age: 19.2 ± 1.0 yr) underwent bioelectrical impedance analysis (BIA) to assess body composition and RMR. Variables included body mass, fat mass (FM), fat-free mass (FFM), height, and RMR. Independent samples t-tests were conducted in Jamovi (version 2.6.26) to compare sprinters and distance runners. **RESULTS:** Sprinters were significantly heavier than distance runners (66.0 ± 7.6 vs. 56.6 ± 6.7 kg; p = 0.002, d = -1.29). They also demonstrated greater absolute FFM (55.4 ± 9.5 vs. 44.3 ± 7.1 kg; p = 0.002, d = -1.27) and higher RMR (1745 ± 268 vs. 1428 ± 196 kcal/day; p = 0.002, d = -1.29). In contrast, distance runners exhibited a higher percentage of body fat compared to sprinters (17.7 ± 7.6% vs. 12.2 ± 6.3%; p = 0.038, d = 0.81), whereas sprinters displayed a greater percentage of FFM (87.8 ± 6.3% vs. 82.3 ± 7.6%; p = 0.038, d = -0.81). **CONCLUSION:** DII sprinters and distance runners display distinct anthropometric and metabolic profiles consistent with the demands of their respective events. Sprinters carried greater lean mass and had higher resting metabolic rates, while distance runners exhibited higher relative body fat. These findings provide normative data for DII athletes and underscore the importance of tailoring nutrition and training strategies to event specialization. Establishing these benchmarks may also help practitioners identify deviations from expected profiles, guide performance optimization, and inform athlete monitoring over time.

P338: RESISTANCE TRAINING AND BINGE DRINKING: IMPACTS ON GLUCOSE REGULATION IN YOUNG ADULT FEMALES

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Background: Resistance training (RT) enhances musculoskeletal, metabolic, psychological, and cognitive health across the lifespan. In contrast, binge drinking is associated with impaired metabolic function, musculoskeletal decline, and adverse psychological outcomes. While vigorous exercise is often linked to higher alcohol intake, the combined effects of RT and binge drinking on health remain unclear in young adult females, a population at elevated risk for alcohol-related complications. Examining this relationship in the context of glucose regulation at this age is important, as these behaviors can shape long-term health trajectories.**Methods:** Females aged 18-30 years (n = 48) were grouped as sedentary low alcohol consumers (SL), sedentary binge drinkers (SB), resistance trained low alcohol consumers (RTL), or resistance trained binge drinkers (RTB). Sedentary participants reported ≤2 weekly exercise sessions for the past two years, while RT participants engaged in ≥4 weekly RT sessions. Low alcohol consumers reported ≤1 drink per week, and binge drinkers reported ≥1 binge episode per week for at least one year. Insulin sensitivity was measured via a 2-hour oral glucose tolerance test (OGTT; 75 g glucose). Blood glucose was assessed at baseline and 30-, 60-, 90-, and 120-minutes post-consumption using a handheld glucose meter.**Results:** Group differences emerged in fasting and 120-minute glucose values. RTL had lower fasting glucose than RTB (88.9 ± 12.1 vs. 103.2 ± 10.2 mg/dL; p = 0.008). At 120 minutes, RTL (103.8 ± 19.8 mg/dL) remained lower than RTB (137.6 ± 21.5 mg/dL; p = 0.027), SL (148.5 ± 44.6 mg/dL; p = 0.002), and SB (139.3 ± 14.5 mg/dL; p = 0.018). No differences were observed at 30-, 60-, or 90-minutes, nor in glucose area under the curve.**Conclusion:** RT combined with low alcohol consumption was linked to superior fasting and postprandial glucose regulation compared to binge drinking and sedentary counterparts. Binge drinking may blunt the metabolic benefits of RT in young females, potentially elevating future health risks. Interventions addressing alcohol reduction and promoting RT may optimize glucose regulation and long-term metabolic health.

P339: COMPARING THE EFFECTIVENESS OF GLP-1 INJECTIONS AND PATCHES ON BODY COMPOSITION CHANGES IN WOMEN WITH OBESITY

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Background: Obesity in women is a global health concern associated with metabolic dysfunction and increased risk of chronic illnesses such as type 2 diabetes and cardiovascular disease. Moderate (BMI 35-39.9) and severe (BMI ≥ 40) obesity can be difficult to treat with lifestyle changes alone, highlighting a potential need for pharmacological interventions. Glucagon-like peptide-1 receptor agonists (GLP-1RAs) have emerged as an effective therapy in this population due to large reductions in body weight and improvements in metabolic function. GLP-1 is typically administered through subcutaneous injections, however, GLP-1 patches are emerging as an alternate route of administration. Data on human pharmacokinetics for transdermal GLP-1, however, is limited. This study will compare the effectiveness between GLP-1 injections and patches on body composition changes in women with obesity. Methods: Participants include women ages 25-55 with obesity (BMI ≥35.0). Exclusion criteria include renal or hepatic impairment, injection phobia, history of GLP-1 therapy, or contraindications to GLP-1 therapy. After informed consent, body composition baseline will be assessed via dual-energy X-ray absorptiometry (DEXA). Participants will be randomly assigned to receive either an FDA-approved semaglutide injection or a GLP-1 transdermal patch weekly for 12 weeks. Participants will maintain their current diet and physical activity (PA) for the duration of the study. Daily PA will be measured via wrist-based accelerometer, and a 72-hour food log and report of any gastrointestinal side effects will be collected every four weeks. DEXA will be repeated after 12 weeks. Analysis: Variables of interest include lean, fat, and total body mass. Repeated measures ANOVA will examine difference within and between groups. Anticipated Results: GLP-1 injections are expected to demonstrate significant reductions in fat mass and total body mass. Patches are anticipated to produce similar results but with greater variability due to absorption differences. Both methods are expected to lower total body mass, but lean mass loss may also occur with fat loss. Patches, if effective, may be a viable alternative although absorption inconsistency may limit their comparability to injections.

P340: IMPACT OF MENSTRUAL CYCLE PHASE ON UPPER EXTREMITY FUNCTION

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INTRODUCTION: There has been a significant rise in the number of female athletes participating across the spectrum of sports. While there are a multitude of research studies looking at physiology in sports on performance, training methods, and injuries; this research is general across genders. When it comes to female-specific physiology concerning training and injuries, there is little research. One such gender-specific physiological focus is the menstrual cycle in the female population. The literature suggests changes in joint laxity and muscle repair throughout the various phases of the menstrual cycle, which can affect how female athletes respond to training. To optimize performance, reduce injury risk, and ensure better care for female athletes, a deeper understanding of these hormonal fluctuations is crucial. **METHODS:** 16 physically active females completed the study. Saliva samples were completed at each visit to confirm menstrual cycle phase and urinary testing was completed prior to visits 2 and 5 to confirm ovulation, while the Proteus Motion was used for physical assessments. The Proteus evaluates the full range, velocity, and power of upper and lower extremity movement profiles. The participants will complete a five-minute testing protocol consisting of 7 different tests. These tests include (1) chest press and pull, (2) straight arm trunk rotation, (3) PNF D2 flexion and extension Visits were timed to occur within 96 hours of the onset of menses, within 24 hours of a positive urinary LH test, and 7 to 9 days post-ovulation, **RESULTS:** There were quantitative and statistical differences across Proteus measures. Most notably, there were significant quantitative differences within cycle 1 for visits 1 and 2 (ΔP= 12.982), visits 2 and 3 (ΔP= 9.471), and visits 1 and 3 (ΔP= 22.453). While there were quantitative differences across matched phases across cycles these differences were insignificant. **CONCLUSIONS:** The results of this study suggest that the luteal phase of the menstrual cycle is associated with enhanced performance in upper extremity tasks involving power, velocity, acceleration, and deceleration.

P341: EFFECTS OF BODY COMPOSITION ON THE METABOLIC COST OF TREADMILL WALKING

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BACKGROUND: Walking is a common form of exercise that has been shown to provide numerous health-related benefits including lowering blood pressure and reducing cardiovascular disease risk. Additionally, walking contributes to daily energy expenditure and can therefore contribute to improve energy balance. Investigating factors that influence energy expenditure during walking can improve our understanding of the bioenergetics of movement and improve our ability to develop effective exercise prescriptions. Data published on the effect of body composition on the metabolic cost of walking (MCOW) has been inconsistent depending on the population studied and the walking speeds investigated. Therefore, the purpose of this study is to evaluate the effects of body composition on the gross and net MCOW in young adults at three different treadmill speed/grade combinations. METHODS: Apparently-healthy adults (N=40) between 18-30 yrs will be recruited to complete three 5-min treadmill walking trials at 2.5 mph/0% grade, 3.4 mph/0% grade, and 3.2 mph/5% grade. Body composition will be assessed with air displacement plethysmography (BodPod, Cosmed USA). Steady-state VO_2 and respiratory exchange ratio (RER) will be assessed at rest and during each walking trial (K5, Cosmed USA) and subsequently used to calculate gross and net values for MCOW ($J \cdot kg^{-1} \cdot m^{-1}$). Results will be analyzed using multiple linear regression analysis with the MCOW as the dependent variable and primary predictors including percent body fat, fat mass, and fat-free mass. ANTICIPATED RESULTS: It is hypothesized that body composition, including body fat percentage and fat-free mass, will be significantly associated with the MCOW.

P342: LIFESTYLE INTERVENTIONS IMPACT QUALITY OF LIFE (QOL) IN HEART FAILURE PATIENTS WITH PRESERVERED EJECTION FRACTION

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BACKGROUND: The fastest growing form of heart failure in the United States is heart failure with preserved ejection fraction (HFpEF). Past studies have shown that exercise interventions could improve the health-related quality of life (QOL) of these patients, but that different QOL instruments may yield different results. We have recently shown the ShortForm- 36 physical component (SF-36), Kansas City Cardiomyopathy Questionnaire (KCCQ) and the Minnesota Living with Heart Failure Questionnaire (MFHF) resulted in significantly different QOL "classifications". However, the previous study did not assess changes in these measures secondary to lifestyle interventions. Thus, the purpose of this study was to determine the effect of exercise (EX), and/or caloric restricted diet/weight loss (CR) interventions on the commonly used QOL measures. METHODS: We evaluated the changes in 3 QOL instruments (and other outcomes) in 100 participants in the SECRET 1 that were randomly assigned to 4 intervention groups: EX, CR, EX+CR, or attention control. Three QOL questionnaires were administered at baseline and at the 5 month follow-up visit. Other outcomes measured at baseline and follow-up include peak exercise oxygen consumption (peak VO2), six-minute walk distance (6MW) and anthropometric/body composition measures.ANTICIPATED RESULTS: It is hypothesized that EX and CR interventions will have a significant positive effect on QOL but that there will be significant differences in results with the 3 instruments. Based on our previous findings, we expect KCCQ is likely to be more sensitive to intervention induced changes than SF-36 or MLWHF.

P343: ASSOCIATIONS OF ACTIGRAPHY-ASSESSED PHYSICAL ACTIVITY, SEDENTARINESS, AND SLEEP WITH HEMODYNAMIC BURDEN IN BLACK EMERGING ADULTS

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BACKGROUND: Greater physical activity (PA), sufficient sleep duration, and lower sedentary time support cardiovascular health, yet their effects on blood pressure (BP) and vascular function in Black emerging adults (ages 18-28) remain unclear. This group faces disproportionately higher hypertension risk, underscoring the need for targeted research. While moderate-to-vigorous PA (MVPA) is generally beneficial, few studies collectively examine PA intensities, sleep duration, and sedentary time with early indicators of hemodynamic burden in this population.METHODS: Data are from 39 Black emerging adults (age=20.7±2.0 years; BMI=25.7±5.9 kg/m²; 56.4% female) enrolled in the ongoing Sleep, Health Outcomes and Body Weight (SHOW) study. Actigraphy assessed sleep duration, sedentary time, light PA, and MVPA. Hemodynamic burden was measured using a SphygmoCor XCEL system, including brachial and aortic BP, pulse pressure (PP), mean BP, resting heart rate, pulse wave velocity, central augmentation pressure, and augmentation index. BMI was considered a covariate in linear regression models, and the Akaike

information criterion was used to identify the model of best fit for each analysis.RESULTS: Participants averaged 6.3±1.0 h/day sleep, 11.1±2.2 h/day sedentary time, 5.1±7.1 h/day light PA, and 0.5±0.3 h/day MVPA. MVPA was positively associated with brachial systolic BP (β=0.398; 95% CI=0.082-0.426; P=0.005), aortic systolic BP (β=0.334; 95% CI=0.032-0.333; P=0.019), and PP (β=0.498; 95% CI=0.091-0.254; P<0.001). No significant associations were found for MVPA with other hemodynamic measures, or for sleep, sedentary, or light PA with hemodynamic burden.CONCLUSION: Preliminary findings suggest greater MVPA may not be protective against hemodynamic burden in Black emerging adults. Future analyses with a larger sample and repeated measures will further clarify these associations.

P344: DOES SEX MODERATE THE RELATIONSHIP BETWEEN SLEEP AND CARDIOVASCULAR DISEASE RISK FACTORS IN MIDDLE-AGED ADULTS?

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Background: Poor sleep efficiency (SE) is associated with subclinical markers of cardiovascular disease (CVD) risk such as arterial stiffness (AS) and heart rate variability (HRV). In middle-aged populations, objective SE has been shown to be lower in females compared to males, but the effect that sex has on the relationship between SE and subclinical CVD risk factors is understudied. Therefore, the purpose of this study was to evaluate if sex impacts the association between SE and HRV and the association between SE and AS in middle-aged adults. **Methods**: 26 middle-aged adults (57.7% female; age: 42.9 ± 5.2 yrs; body fat%: 28.1 ± 6.8%) were enrolled in this study. Participants were provided a smart ring for 4 weeks which they wore on their non-dominant index, middle, or ring finger. At baseline, AS of participants was measured via carotid-femoral pulse wave velocity (cfPWV) using a Vicorder device. Baseline HRV and SE were measured using the smart ring; values were averaged across the first week (days 1-7). Multiple linear regression analyses were used to determine the impact of sex on the associations between SE, HRV, and AS, after controlling for body fat percentage. **Results**: The unadjusted correlation between SE and HRV was positive and significant (r=.452, p=.023), however, SE was not associated with AS (r=-.189, p=0.365). Sex did not significantly contribute to the associations between SE and HRV (p=0.810), or SE and AS (p=0.881) after controlling for body fat percentage. **Conclusions**: In this middle-aged adult sample, sex did not have a significant impact on the association between SE and HRV or SE and AS after controlling for body fat percentage. SE had a significant and positive association with HRV, consistent with existing literature on sleep health. There was no significant association between SE and AS within this study sample. Further research is warranted to determine the sex-specific impacts on the relationship between SE and CVD risk factors in a larger and more diverse cohort of middle-aged adults.

P345: IMPACT OF SLEEP ON BODY COMPOSITION IN ADOLESCENCE: MODERATION BETWEEN PHYSICAL ACTIVITYAND DIET

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BACKGROUND: Sleep, diet, and physical activity are key to a healthy lifestyle, yet most adolescents lack sufficient sleep and do not get the recommended amounts. Poor sleep has been linked to unhealthy behaviors, weight gain, and increased cardiometabolic risk. Few studies have examined these factors together during adolescence when lifelong habits are formed. The study examines how poor sleep affects body composition and whether diet and physical activity moderate this link in adolescents. METHODS: Adolescents aged 17-19 years (n = 227; 70.5% female) were recruited during senior year of high school or first year of college. Sleep regularity, efficiency, and duration were measured using an ActiGraph GT9X Link accelerometer, and sleep satisfaction was assessed using the Pittsburgh Sleep Quality Index (PSQI). Body composition was measured using Dual-energy X-ray Absorptiometry (DXA). Sedentary behavior and physical activity ratio were assessed using activPAL, and dietary habits were assessed using the Automated Self-Administered 24-hour Dietary Assessment Tool (ASA-24). Linear mixed models tested associations between sleep and body composition, with moderation by diet and activity ($p < 0.05$). RESULTS: None of the sleep variables ($p<0.05$) were significantly associated with lean body mass or fat mass. However, biological sex was a significant predictor of fat mass, with females having on average 4.8 kg higher fat mass than males ($\beta = 4.76$, $p = 0.019$). Higher moderate-to-vigorous physical activity (MVPA) was significantly associated with higher lean body mass ($\beta = -0.04$, $p = 0.02$), and higher sleep disturbance was associated with higher percent body fat ($\beta = 0.09$, $p = 0.04$). The Healthy Eating Index (HEI) score was not significantly related to body composition ($\beta = -0.04$, $p = 0.39$). Biological sex was a significant covariate in nearly all models tested. CONCLUSION: Preliminary results show lack of relationship between poor sleep and body fat mass, suggesting that other factors contribute to changes in body composition. FUNDING: National Heart, Lung, And Blood Institute of the National Institutes of Health under Award Number R15HL159650.

P346: REACTIVE HYPEREMIA AS A PREDICTOR OF CHANGES IN VO2 MAX

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BACKGROUND: An association between skeletal muscle tissue oxygenation (StO2) during a near-infrared spectroscopy vascular occlusion test (NIRS+VOT) and maximal oxygen consumption (V02max) have been found. This study seeks to determine if the association persists during a diet training intervention. METHODS: 8 runners (36.2± 6.7 years old) within a diet training study completed a treadmill VO2max test and an additional NIRS+VOT prior to and after 6 weeks into a 12-week aerobic training plan following either a high or standard protein diet. StO2 was collected from a NIRS device on the anterior forearm. An occlusion pressure was applied for 5 minutes followed by 3 min of recovery. Desaturation (S1) and reperfusion (S2) slopes were derived from the NIRS+VOT. Then the participants conducted a runner-specific VO2max test on a motorized treadmill. Random-intercept linear mixed effects models were used to evaluate the interaction between group and time on the NIRS+VOT and VO2max. Repeated measures correlations were used to assess the relationship between NIRS+VOT metrics and VO2max change over the course of the training plan. RESULTS: Mean VO2max, S1, and S2 were as follows: VO2(Pre 48.96 ± 8.99, Mid 45.33 ± 12.92), S1(Pre -0.1 ± 0.02, Mid -0.1 ± 0.02), S2(Pre 2.4 3 ± 0.84, Mid 2.43 ± 0.55). There were no statistically significant effects of time or group on any metric and no group x time interaction for change in VO2max ($p = 0.639$), S1 ($p = 0.124$), or S2 ($p = 0.365$). VO2max was negatively associated with S1 ($r = -0.94$, [-0.996, -0.350], $p = 0.017$) but positively associated with S2 ($r = 0.862$, [0.166, 0.985], $p = 0.027$). CONCLUSIONS: The diet training intervention did not significantly influence the outcome measures of interest. However, our preliminary analyses suggest strong correlations between VO2max and tissue desaturation and reperfusion rates overtime. The NIRS+VOT measures may be used to track adaptations over the course of a diet or training intervention within participants as an alternative to VO2max testing

P347: EFFECTS OF BLOOD FLOW RESTRICTION MODERATE INTENSITY AEROBIC EXERCISE ON CARDIOVASCULAR AND PERCEPTUAL RESPONSES

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BACKGROUND: Blood flow restriction (BFR) has been shown to enhance aerobic capacity and muscle mass when used with aerobic exercise (AE), however, BFR often increases perceived discomfort during exercise. The purpose of this study was to determine the effects of BFR with AE on cardiovascular and perceptual responses. **METHODS**: In this within-subject study, participants completed 3 visits. Visit 1 included a maximal graded exercise test to determine maximal oxygen consumption (VO2max) using the Bruce Ramp protocol. Following a self-selected rest, participants were familiarized with BFR at the speed and grade that 50% VO2max was reached. For visit 2, participants completed AE with bilateral BFR (AEBFR) at a speed and grade corresponding with 50% VO2max with 60% arterial occlusion pressure (AOP) for 15 min or until volitional failure. If oxygen consumption was greater than 50% VO2max, the grade and speed were decreased to a previous stage. For visit 3, participants completed AE using the same protocol as V2 (including speed and grade adjustments) until volume matched. During exercise, heart rate (HR), discomfort (DIS), and pain were recorded every 3 min and averaged over the condition, oxygen consumption (VO2) was monitored continuously, and changes in blood pressure (BP) and weight were recorded 10 min post-exercise. Bayesian Paired Sample T-tests were used to analyze results, with a BF10 ≥ 3 indicating more than moderate evidence for a difference between conditions. Results are presented as mean±SD. **RESULTS**: 23 participants (12 females, age 22±4 yr, body mass 75.9±14.6 kg, height 170.2±10.0 cm, VO2max 43.3±10.3 kg/ml/min) completed this study. HR (bpm) was higher in AEBFR (143±15) than AE (122±13, $BF10=1.63e^{6}$). DIS (A.U.) was higher in AEBFR (3.9±1.3) than AE (0.9±0.9, $BF10=5.89e^{10}$). Pain (A.U.) was higher in AEBFR (2.7±1.7) than AE (0.5±0.9, BF10=38,513.08). ΔSystolic BP (mm Hg, AEBFR (14.6±6.7),

AE (11.9±5.7, BF10=2.77)). ΔDiastolic BP (mm Hg, AEBFR (8.2±7.0), AE (6.4±7.1, BF10=0.34)) and ΔBody mass (kg, AEBFR (0.2±0.1), AE (0.1±0.1, BF10=0.653)) were anecdotal. **CONCLUSION**: Our findings suggest that AEBFR has a greater effect on cardiovascular and perceptual responses than AE during exercise, suggesting that those with cardiovascular concerns may consider avoiding an exaggerated response from BFR.

P348: EXERCISE-INDUCED CHANGES IN SEV MIRNAS IN DEMENTIA: AN EXPLORATORY RANDOMIZED CONTROLLED TRIAL

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BACKGROUND: Exercise is a promising intervention to slow functional decline in people living with dementia (PWD). There are inter-individual differences in the molecular responsiveness to exercise, potentially due to genetic factors. Small extracellular vesicle (SEV) microRNAs (miRNAs) may be potential biomarkers to index biological responses in PWD, but their underlying molecular mechanisms remain poorly understood, as human studies have yet to examine whether exercise influences SEV miRNAs in PWD. The purpose of this exploratory analysis of a randomized controlled trial was to determine whether possible candidate SEV miRNAs change after a 6-month exercise intervention in PWD. METHODS: Fourteen older PWD (mean age 74 ± 6 years; mean MoCA 21 ± 4) were recruited from two local residential care facilities. All participants completed a 6-month lower-body strength, balance, and walking intervention, which consisted of 1-hour sessions, 3 times per week, and they were led by a physical therapist (in groups of 5-7). Participants had fasted blood drawn at baseline and 6 months, and we examined 10 candidate microRNAs (miRNAs: miR-141, miR-144, miR-146, miR-183, miR-200a, miR-200c, miR-203, miR-211, miR-29b1, miR-34a). RESULTS: One miRNA significantly increased in expression (miR-183; p = 0.02), while two miRNAs demonstrated trends (miR-29b1 expression decreased, p = 0.09; miR-200a expression increased, p = 0.09) from baseline to 6 months. Other miRNAs (miR-141, miR-144, miR-146, miR-200c, miR-203, miR-211, miR-34a) showed no change. CONCLUSION: miR-29b1 expression consistently decreased across analyses, with miR-200a and miR-183 showing secondary increases. The miR-29 family regulates extracellular matrix and apoptosis, while miR-200a and miR-183 modulate stress response and synaptic processes. These exploratory findings suggest that this subset of SEV mRNAs — implicated in processes such as extracellular matrix regulation, stress response, and neural plasticity — may act as molecular markers of exercise in PWD. These miRNAs should warrant mechanistic follow-up in larger cohorts with tissue-level validation.

P349: ASSESSING VALIDITY AND PATIENT PERCEPTIONS OF THE K-BUBBLE FOR MEASURING GRIP STRENGTH IN CARDIAC REHABILITATION

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BACKGROUND: Grip strength is a biomarker for strength and functional ability in clinical settings. Although the Jamar Dynamometer is considered the gold standard for measuring grip strength, other devices may be more applicable for populations with upper body limitations or poor strength. Patients in cardiac rehabilitation (CR) often experience frailty and arthritis, making a standard hand dynamometer more challenging to use. A new grip strength dynamometer called the K-Bubble is lightweight and pliable, thus it may be ideal for those who have challenges holding and squeezing a traditional dynamometer. There is a lack of research validating the K-Bubble in clinical settings. **PURPOSE:** The purpose of this study was to assess: 1) validity of the K-Bubble compared to the Jamar Dynamometer; 2) patient comfortability and preference with the K-Bubble. **METHODS:** Thirty participants (78±9 years) were recruited from an outpatient CR clinic. Grip strength was measured using the Jamar and K-Bubble. The highest score of 3 trials was recorded for each device. Pearson product-moment correlations determined the association between grip strength for each device. Difference between values was assessed via paired t-tests. Intraclass correlation coefficient (ICC) determined consistency across three trials for the K-Bubble, and participants' device preference and perceived comfortability were calculated. Significance was accepted at $p<.05$. **RESULTS:** There was a positive association between grip strength measured by the Jamar and K-Bubble ($r=.63$; $p<.001$). Grip strength values between the Jamar (30.2±10.8 kg) and K Bubble (8.8±4.6 kg) were significantly different. The ICC for the K-Bubble showed excellent agreement (ICC=.978) across trials. The K-Bubble was more comfortable (77%) and preferred (80%) over the Jamar Dynamometer. **CONCLUSIONS:** Findings demonstrate that the K-Bubble may be a practical alternative to the Jamar Dynamometer for assessing grip strength. It may be more suitable in those with lower function, hand weakness, or frailty. The K-Bubble was perceived to be more comfortable and preferred, supporting its potential use in clinical populations. Since K-Bubble values were significantly lower than the Jamar Dynamometer, future research should focus on developing new normative values specific to the K-Bubble.

P350: BENEFITS AND BARRIERS OF CARDIAC REHABILITATION IN RURAL CARDIOVASCULAR PATIENTS

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BACKGROUND: With rising prevalence of cardiovascular disease (CVD), cardiac rehabilitation (CR) serves as a supervised and personalized outpatient program encompassing exercise, education, and counseling to improve cardiovascular health and equip patients for long-term self-management. However, barriers such as eligibility, financial burden, and reliable transportation serve as challenges to many rural patients. This study aims to evaluate functional capacity, cardiovascular fitness, and psychosocial health outcomes of Roanoke Valley (Roa) patients recovering from recent cardiovascular events while also identifying program barriers. METHODS: 50 CR patients will complete 36 sixty minute-sessions. Inclusion criteria will include referral, enrollment, and completion of one billable session. Functional capacity will be compared pre-to-post-program using a six-minute walk test comprised of distance, workload, and estimated metabolic equivalents. Cardiovascular fitness will be compared pre-to-post program using the Duke Activity Status Index to estimate peak oxygen uptake (VO_2). Psychosocial health will be assessed using the Patient Health Questionnaire-9. Patients will be given open-ended surveys directed towards program experiences to identify common barriers. Results will be analyzed using a combination of paired tests and descriptive statistics. EXPECTED RESULTS: Roa patients who successfully complete CR are expected to show improved functional capacity, estimated VO_2, and psychosocial health, along with provide vital information capturing patient perspectives on barriers to success in CR programs. This study will holistically display the importance of CR in Roa patients facing CVD.

P351: INFLUENCE OF VAGAL NERVE STIMULATION ON HEART RATE COMPLEXITY IN WOMEN WITH RHEUMATOID ARTHRITIS

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BACKGROUND: Heart rate complexity is decreased in rheumatoid arthritis (RA). Transcutaneous vagal nerve stimulation (tVNS) may increase heart rate complexity as demonstrated by changes in non-linear measures of heart rate variability (HRV). The purpose of this study is to examine the effects of tVNS on heart rate complexity in women with RA. **METHODS:** Three women diagnosed with RA (Age: 51±5 years, BMI: 25.1±8.7 kg/m^2) volunteered to participate. Participants came to the laboratory for three visits separated by 10 days. During the first visit, anthropometric data was collected and participants were familiarized with heart rate (HR) assessment using a chest strap (PolarH10) and mobile phone application (Elite HRV). Participants were instructed to assess their morning HR daily for 1 minute. At the second visit, patients were familiarized with tVNS (Xen) and its mobile phone application (Neuvana). Participants continued morning HR assessment and also performed 20 minutes of tVNS daily. At visit three, baseline and post tVNS HR data from participants' cellphones was imported into HRV software (Kubios) to generate non-linear measures of HRV, including sample entropy (SampEn) and approximate entropy (ApEn), which quantify the complexity of the heart rate. Ten-day averages of SampEn and ApEn at baseline and post tVNS were calculated. Significant differences between SampEn and ApEn at baseline and post tVNS were determined using Wilcoxin Tests. Significance was accepted a priori $p\leq0.05$. **RESULTS:** There were no significant differences ($p>0.05$) between baseline and post tVNS for SampEn (baseline=1.15 ± 0.24, post tVNS=1.05 ± 0.18), and ApEn (baseline=0.51±0.08, post tVNS=0.51±0.03). **CONCLUSIONS:** These initial findings suggest that 10 days of tVNS does not increase heart rate complexity in women with RA. However, due to a small sample size, effectiveness of this treatment is unclear. A larger sample size is needed to determine potential use of tVNS as a treatment strategy in women with RA.

P352: THE INFLUENCE OF SHORT DURATION CIRCUIT TRAINING ON STRENGTH IN DIABETICS

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Background: A relationship between exercise and improved metabolic health is well established, however time availability for exercise remains a commonly-reported barrier. Common interventions for individuals with type 2 diabetes (T2D) are aerobic based, and do not emphasize muscular strength. Recently, a High Intensity Bodyweight Circuit (HIBC) regimen requiring a maximum 40-min of exercise weekly has been developed, but its effect on strength is unknown. Purpose: To determine the effect of a 16-week intervention of a minimal dose HIBC program in persons with T2D on strength adaptations. Methods: Participants between the ages of 40-65 diagnosed with T2DM were recruited for this study. Pre and Post measures of strength were assessed via isokinetic knee flexion and extension at 60 and 180 deg/sec angular velocities and reported as peak torque during extension (PTE) and flexion (PTF) for 60 and 180 deg/sec and average torque during extension (ATE) and flexion (ATF) for 60 and 180 deg/sec. Hand grip (HG) strength was measured pre and post intervention to assess upper body strength. Participants completed the 16-week bodyweight circuit training (10 TRX-assisted bodyweight squats, 5 modified pull-ups, 5 modified push-ups, 10 abdominal crunches). Participants completed as many cycles as possible each session. Session duration progressed from 5-10 minutes, and session frequency progressed from 3-4 sessions per week, as tolerated. Assessments were repeated after 16 weeks of training. Results: A total of 12 participants completed the study: Female (n=5) (50.6 +/- 7.1yr) Male (n=7) (51.6 +/- 3.1 yr). A paired samples t-test demonstrated significant differences between pre and post measures of ATF60 (p = .026), but not for PTE60 (p = .225), PTF60 (p = .181), PTE180 (p = .234), PTF180 (p = .147), ATE60 (p = .151), HG right (p = .892), or HG left (p = .104). Conclusion: HIBC made statistically significant improvements to ATF but not to other strength markers. The sample size is relatively small, further research may demonstrate a greater effect.

P353: FEASIBILITY OF ASSESSING PHYSICAL ACTIVITY PATTERNS AND FATIGUE IN ADULTS WITH IMMUNE THROMBOCYTOPENIA

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Background: Immune thrombocytopenia (ITP) is a rare hematological disorder characterized by low platelet counts and commonly accompanied by fatigue, which can negatively affect daily functioning and quality of life. Although physical activity is known to improve well-being in many populations, there is limited knowledge about activity levels among individuals with ITP. This study aims to assess the feasibility of measuring physical activity in adults with ITP, while also collecting descriptive data on fatigue to analyze its association with physical activity patterns. Methods: One hundred adults (≥18 years) with a confirmed ITP diagnosis and no history of blood cancer will be recruited through the UT Medical Center and social media platforms. Demographic information will be collected. The primary outcome will be the feasibility of recruiting and assessing participants using the International Physical Activity Questionnaire-Long Form (IPAQ-LF). Physical activity levels will be assessed across various activity domains and sedentary time using the IPAQ-LF, allowing for the classification of participants as active or inactive according to established physical activity guidelines. Fatigue will be measured with the Fatigue Severity Scale. The secondary outcome will involve analyzing the association between physical activity and fatigue. Anticipated Results: Feasibility is anticipated to be demonstrated through successful recruitment and completion of assessments among adults with ITP. Participants may report lower levels of physical activity and spend more time in sedentary activities compared to population norms. It is anticipated that more active individuals will experience less fatigue. These findings will help characterize lifestyle challenges in this population and inform the planning of future supportive care strategies. Generative AI statement: Artificial intelligence (AI) tools were used in writing the abstract.

P354: SEDENTARY BEHAVIOR AND CARDIOVASCULAR DISEASE RISK FACTOR INDICATORS IN MEN UNDERGOING CANCER TREATMENT

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BACKGROUND: Prostate cancer (PC) and lymphoma are among the most diagnosed cancers in U.S. men. Primary treatment regimens such as androgen deprivation therapy (ADT) for PC and anthracycline-based chemotherapy (A-bC) for lymphoma may increase cardiovascular disease (CVD) risk. In all cancer patients' sedentary behavior (SB) is prevalent and is independently linked to risk for CVD. METHODS: We analyzed baseline data from two clinical studies including 26 men with PC (45-85 years) on ADT and 22 men with lymphoma (18-85 years) on A-bC, to determine their SB and physical activity (PA) levels and to examine their associated CV risk profiles. In both studies, we collected demographics, clinical data, assessments of functional capacity (6-minute walk test), and participants wore activPal accelerometers for 7 days. Descriptive statistics were used to assess and compare patterns in SB and PA with comorbidity burden and CVD risk factors. RESULTS: Men with PC and lymphoma were a mean age of 71.5 and 51.9 years, and 80% and 81.8% were white with a mean BMI of 29.6 and 26.7, respectively. Men with PC had more CVD and comorbidity burden (hypertension: 54% vs. 9%; stroke: 7.7% vs 0%; and diabetes: 23.1% vs 0%) than men with lymphoma. Men with lymphoma were more sedentary (13.1 hrs./day vs. 9.6 hrs./day, *p*=0.017), yet their PA levels (steps/day: 6460 vs 6530; stepping time: 89.7 vs 86.1 mins/day; standing time: 177 vs 171 mins/day; sit to stands: 44.9 vs 46.3 /day, and Activity Score: 33.0 vs 32.8 MET.h/day; all *NS*) were similar to men with PC. Differences in 6-minute walk distances were clinically meaningful, though not statistically significant (lymphoma:471 vs PC:422 meters, *NS*). CONCLUSIONS: In both men with PC and lymphoma, we identified a subset of moderately active, yet sedentary individuals, suggesting a focus on increasing PA levels alone to reduce CVD risk is likely not sufficient. Tailored interventions should aim to both increase PA and reduce SB across the day while considering individual participant functional capacity limitations that may result from cancer treatments (i.e., fatigue, exercise intolerance).

P355: IMPLICATIONS OF PARKINSON'S DISEASE ON COGNITIVE CONTROL IN OLDER ADULTS

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Background: Parkinson's disease (PD) is the second most common neurodegenerative disease, a chronic and progressive motor impairment affecting around 3.3% of the elderly population and increasing with aging. The purpose of this study was to determine if differences existed in cognitive control of this population with PD and without NPD (no PD), by using two cognitive assessments. Methods: An older adult sample, n=73, aged 62 to 92, PD (n=43) and NPD (n=30) were recruited from the local community. Neurocognitive performance was evaluated using the Stroop and Flanker test on the Trazer, an electronic platform. Results: Older adults with PD demonstrated significantly slower left-side response times across cognitive tasks compared to the NPD group. In the Stroop task using the Trazer, the PD group averaged 2967 ms versus 1970 ms in NPD (p=0.010, Cohen's d=0.682), indicating impaired cognitive control. The Flanker task on the same platform, PD participants averaged 2763 ms compared to 2236 ms (p=0.006, d=0.742), suggesting reduced inhibitory control. Interference-corrected Stroop times were also slower in the PD group (3627 ms vs. 2841 ms; p=0.010, d=0.695), reflecting difficulty managing cognitive interference. These findings highlight clinically meaningful deficits in executive function and processing speed, particularly in the left-side performance, possibly linked to lateralized motor symptoms and right-hemisphere dysfunction in PD. Conclusions: The findings suggest that the Trazer system is a useful tool for clinically administering Stroop and Flanker cognitive tests, and may help detect response inhibition and attention deficits in Parkinson's disease (PD). The results indicate PD-related asymmetrical motor function, particularly left-side movement issues, can impact daily living and quality of life, and may benefit from targeted therapies such as group sessions and balance exercises.

P356: THE ACUTE EFFECTS OF AEROBIC AND ISOMETRIC EXERCISE FOR IMPROVING BLOOD PRESSURE IN HYPERTENSIVE ADULTS

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BACKGROUND: Hypertension (HTN) is one of the most prevalent and modifiable risk factors of developing cardiovascular disease (CVD). Research has shown that 24-hour blood pressure (BP) is a stronger predictor of CVD risk with nighttime BP decrease (dipping) being especially important, thus it is important to identify novel ways to lower BP. Exercise is a well-known method to lower blood pressure, but recently isometric exercise has been shown to lower BP to a similar or greater effect than aerobic exercise therefore the purpose of this

study was to compare the effects of aerobic and isometric exercise on improving 24-hour BP in hypertensive adults. METHODS: 7 participants (age 25-65 y) with a diagnosis of HTN participated in three conditions (non-exercise control, aerobic, isometric). Systolic (SBP) and diastolic blood pressure (DBP) were measured at baseline, and 24-hrs following each condition. RESULTS: Using a one-way ANOVA group differences were observed for 24-hr SBP and DBP ($P < 0.05$) and daytime SBP and DBP ($P < 0.05$). Post-hoc analysis showed that 24-hr SBP and DBP were significantly lower following aerobic compared to control condition ($P < 0.05$), daytime SBP and DBP were lower following aerobic compared to control ($P<0.05$), and DBP was lower in isometric compared to control ($P < 0.05$). No nighttime BP group differences were observed. CONCLUSIONS: These preliminary results demonstrate that a single bout of aerobic exercise can lower SBP and DBP over the course of the day compared to no-exercise, and a single bout of isometric handgrip exercise can lower 24-hr DBP compared to no-exercise. These findings highlight the importance of individualized exercise prescriptions in managing HTN, and the use of isometric exercise as practical alternative to aerobic exercise due to its simplicity and effectiveness warrants further investigation.

P357: ASSESSING PHYSICAL FUNCTION IMPAIRMENTS USING MULTIPLE ASSESSMENTS IN CARDIAC REHABILITATION

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BACKGROUND: Functional assessments can identify areas for improvement, monitor progress, and predict prognosis in cardiac rehabilitation (CR). Despite these benefits, functional assessments are underutilized and adherence to standard testing guidelines is low. In addition, assessments may vary in sensitivity to detect deficits across various functional domains. Thus, a battery of functional assessments may be needed to identify impairments and areas for improvement. **PURPOSE:** The purpose of this study was to evaluate CR patients' physical function using multiple assessments (6-minute walk test [6MWT], gait speed, grip strength, and subjective physical function) to identify how consistently impairments are detected across assessments. **METHODS:** Thirty participants (78±9 yrs) were recruited from an outpatient CR clinic. Physical function assessments consisted of gait speed (4-meter walk), grip strength (Jamar Dynamometer), and 6MWT. The Patient-Reported Outcome Measurement Information System (PROMIS) Physical Function survey measured subjective physical function. Pearson product-moment correlations determined the association between assessment outcomes. A functional impairment was identified using standard criteria for grip strength (women: <18 kg; men: <26 kg), gait speed (≤0.8 m/s), 6MWT (<300 m), and PROMIS physical function (t-score <50). Significance was accepted at $p<.05$. **RESULTS:** All assessment scores were associated with each other (correlation coefficients ranged from .50-.74; $p<.01$). Ten participants (33%) had no impairments across all assessments, and 16 (53%) were classified as impaired based on at least 1 assessment, but not across all 4 assessments. The PROMIS Physical Function categorized 19 (63%) participants as impaired, while the grip strength, gait speed, and 6MWT categorized 5 (17%), 8 (27%), and 11 (37%) participants as impaired, respectively. **CONCLUSIONS:** Although all assessments were correlated, they inconsistently identified impairments. The majority of participants reported functional limitations; however, objective assessments were less sensitive, highlighting the importance of patient-reported outcomes. Findings suggest a comprehensive objective and subjective test battery is important to identify impairments and areas for improvement in CR.

P358: PHYSICIAN EXERCISE GUIDANCE IN GESTATIONAL DIABETES: A SURVEY OF PATIENT EXPERIENCES

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BACKGROUND: Gestational Diabetes Mellitus (GDM) affects ~14% of pregnancies and increases risks for adverse maternal and neonatal outcomes as well as progression to type 2 diabetes. Exercise improves glucose tolerance and may reduce risk; however, little is known about whether physicians provide exercise recommendations to females with GDM or if guidance follows the FITT framework (frequency, intensity, time, type). Prior research indicates only 55% of OB/GYNs agree that promoting exercise in females with GDM is a part of their professional role. Purpose: (1) determine how often physicians recommend exercise; (2) identify barriers to exercise after diagnosis; and (3) examine whether receiving a recommendation is associated with meeting ≥150 min•wk-1 of activity during pregnancy. METHODS: A nationwide electronic survey will be distributed via online platforms to a convenience sample of females with self-reported GDM. Measures include pre-pregnancy and pregnancy activity (FITT, meeting ≥150 min•wk-1,), physician recommendations post-diagnosis, and perceived barriers. Frequencies and percentages will describe physician guidance and common barriers. Chi-square tests will compare rates of meeting guidelines between those who did and did not receive recommendations. Logistic regression will examine this relationship while adjusting for covariates (e.g., age, pre-pregnancy activity). ANTICIPATED RESULTS: It is hypothesized that many females with GDM will report not receiving exercise recommendations. When provided, guidance is expected to lack FITT specificity. Regardless of counseling, participants are anticipated to report common barriers, such as limited time, access, or resources. Findings will highlight gaps in exercise guidance and inform strategies to improve physician counseling and promote activity in females with GDM.

P359: PARKINSON'S DISEASE, FUNCTIONAL FITNESS, AND QUALITY OF LIFE: INSIGHTS FROM THE SENIOR FITNESS TEST

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BACKGROUND: Parkinson's disease (PD) is a progressive neurological disorder that impairs both motor and non-motor function, ultimately reducing independence and quality of life "QoL," including symptoms, such as bradykinesia, tremors, and gait disturbance. Functional supports and improves daily life activities within an aging population. This study explored differences in QoL and functional fitness in older adults with and without PD. whether individuals with PD reported lower QoL than those without PD. **METHODS:** Participants were active, community-dwelling older adults with PD or without PD (NPD group) (n=73; PD=43, 70$\pm$6.89 yo; NPD=30, 71.07$\pm$6.32 yo). The PD group completed the PDQ-39, while the NPD group completed an adapted version of the questionnaire with references to 'Parkinson's Disease' replaced by 'health status' as a comparable measure of QoL. All participants completed the six assessments of the Senior Fitness Test (SFT). Independent samples t-tests, MANOVA, and GLM multivariate models were used to analyze group differences in quality of life, PDQ-39 domains, and functional fitness. **RESULTS:** Significant ($p<0.05$) group differences were observed with QOL with PD reporting lower QOL (M=37.2, SD=7.2) compared with NPD (M=29.4, SD=4.2). Across the QOL domain, several significant differences were noted, those with PD reported higher scores for 'communication', 'cognition', and 'activities of daily living', indicating lower QOL for those domains. Functional performance differences were also observed, with PD demonstrating lower performance in the 8-foot-up-and-go ($p<0.001$) and the two-minute step test ($p=0.015$), than those without PD. **CONCLUSIONS:** Diminished QOL across communication, cognition, and activities of daily living, along with functional performance impairment among those with PD supports the use of speech and occupational therapies, along with functional and cognition training may restore some independence in daily living.

P360: COMPARING GAIT ACTIVITY TOOLS TO ASSESS FALL RISK IN PARKINSON'S DISEASE

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BACKGROUND: Parkinson's Disease (PD) is a neurodegenerative disorder that affects motor function, leading to gait impairments, such as reduced speed, stride variability, gait initiation difficulties, postural instability, and freezing of gait, all of which increase fall risk. Falls are a leading cause of disability and reduced quality of life in Parkinson's disease (PD). Self-reporting tools such as the Simple Physical Activity Questionnaire (SIMPAQ) and fitness trackers provide general activity data but may underestimate impairments. Perceptual measures, including the Falls Perception Questionnaire and the Activities-specific Balance Confidence (ABC) Scale, offer additional insight into how individuals view their fall risk. The purpose of this study is to compare subjective, perceptual, and objective tools to improve fall risk prediction in PD. METHODS: 36 participants will be recruited: 12 PD fallers, 12 PD non-fallers, and 12 age-matched older adults without PD. PD groups will be stratified by fall history and frequency in the past year. Each participant will complete two lab visits separated by seven days of home monitoring. Baseline testing will include SIMPAQ, the Falls Perception Questionnaire, the ABC Scale, and gait analysis on the Protokinetics Movement Analysis Software (PKMAS) system, which will assess steady-state walking, dual-tasking, gait initiation, limits of stability, and quiet standing. Participants will then wear an ActivPAL inclinometer for seven days to record activity, sedentary behavior, and posture transitions while keeping a daily activity journal. The final visit will include a repeat SIMPAQ and retrieval of ActivPAL data. ANTICIPATED RESULTS: PKMAS measures such as stride variability, step length, and gait initiation are expected to differentiate fallers from non-fallers. Dual-tasking is anticipated to exacerbate gait in PD fallers. ActivPAL data is expected to show reduced daily activity in fallers, while perception scores may reveal mismatches between perceived

and actual risk. SIMPAQ is expected to underestimate impairments relative to objective measures.

P361: CARDIOPULMONARY REHABILITATION OUTCOMES IN RURAL VERSUS SEASONAL PATIENTS IN APPALACHIA

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BACKGROUND: Cardiopulmonary rehabilitation (CR) is effective in improving clinical and functional outcomes for patients with cardiovascular disease, but geographic and socioeconomic differences may influence outcomes. In Appalachia, local patients face barriers such as limited access, transportation challenges, and fewer resources. In contrast, seasonal patients often have greater financial means and experience fewer obstacles. The purpose of this study was to compare CR outcomes between local and seasonal patients in Appalachia. METHODS: Data was analyzed from 136 patients pre and post-program who completed CR. Clinical measures included weight (lbs.), body mass index ($kg \cdot m^{-2}$), and resting blood pressure (SBP/DBP, mmHg). Functional outcomes included six-minute walk test (6MWT, m) and metabolic equivalents (METs). Patients were categorized as local or seasonal based on residential status. Paired and Independent t-tests ($p<0.05$) assessed within-group and between-group differences. RESULTS: Both groups demonstrated significant improvements in functional outcomes pre-post program in 6MWT (Local: 389±94 m to 444±94 m; Seasonal: 380±79 m to 426±88 m; $p<0.001$) and METs (Local: 3.5±0.9 to 5.6±7.4; Seasonal: 3.4±1.1 to 4.2±1.5; $p=0.035$) but no significant differences in clinical measures. However, there was no significant difference between Local and Seasonal patients in either clinical or functional measures. Local patients were significantly younger (71±10 vs. 76±13 years, $p=0.01$), had higher resting DBP at baseline (69±10 vs. 64±6 mmHg, $p=0.007$), and completed more sessions on average (Local: 35.5±2.5 sessions; Seasonal: 33.5±4.4 sessions; $p<0.001$). CONCLUSIONS: CR participation resulted in significant improvements in functional capacity in both local and seasonal patients, with no significant differences in clinical or functional outcomes between groups. These findings suggest that a rural CR program is equally effective for diverse patient populations, despite differences in age, baseline DBP, and session attendance. Artificial intelligence (AI) tools were used in the writing of the abstract/presentation.

P362: CARDIORESPIRATORY RESPONSES TO 6MWT IN SENIORS NOT AT RISK AND AT RISK FOR COPD

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BACKGROUND: Cardiovascular system adjustments during exercise are necessary to sustain the redistribution of blood flow and oxygen delivered to meet active skeletal muscle needs. These cardiorespiratory adjustments are important markers of differences in older adults with and without chronic diseases. The purpose of this study was to compare systolic (SBP) and diastolic blood pressure (DBP), exercise heart rate and O_2 saturation (SaO_2) in older participants with and without cardiorespiratory diseases. **METHODS:** Prior to the 6MWT the participants were placed in a non-obstructive (NRISK) or chronic obstructive pulmonary disease risk (COPD - RISK) group using spirometry test results. A sample of 22 participants (12 were in the NRISK and 10 in the RISK) groups completed a six-minute walk test (6MWT). Both groups were evaluated for differences with a t-test for the same variables before and after the 6MWT. Both the NRISH and RISK groups were evaluated for within comparisons before and after 6MWT for differences. **RESULTS:** The means for the NRISK group, Age 72.6 NRISK and 80.4 yrs for RISK; SBP 137.7 NRISK and 136.8 RISK, DBP 97.4 NRISK and 96.7 for RISK at rest. Following exercise, the percent different between the groups was 69.3 for HR, 63.6 for SBP, 65.2 for DBP and 87.3 for SaO_2. The predicted VO_2max for the at-risk participants was 8.6 ml/kg/min, versus the control group having an average predicted VO_2max of 8.1 ml/kg/min. **CONCLUSIONS:** The results indicate that individuals at risk for COPD have cardiorespiratory functions similar to NRISK participations at rest, but are not able to respond to stressful situations, such as exercise, well. However, caution should be used relative to these data due to the small number of participants.

P363: MULTI-WAVEFORM NEUROMUSCULAR ELECTRICAL STIMULATION AS AN EXERCISE ADJUNCT IN TWO CHRONIC STROKE CASE STUDIES

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BACKGROUND: Physical rehabilitation can improve motor and sensory deficits. Yet, 80% of stroke survivors continue to navigate residual impairments. Neuromuscular electrical stimulation, particularly in multi-waveform (MWF-NMES) format, may serve as a potent exercise adjunct to further known adaptations to exercise. We, therefore, examined the effects of exercise and concurrent MWF-NMES in chronic stroke. METHODS: Participants were screened for contraindications, and after providing written and verbal informed consent, participants MC and RS (4 - 10 years post), aged 64 - 75 years, underwent three 14 to 16-week blocks of supervised MWF-NMES (RxBlack, ARPWave, Minneapolis, MN) exercise protocols at 30 - 432 pulses per second (pps) 1x per week, complemented with at-home protocols at 245 pps, 3 to 6 days per week (FlexDoctor, ARPWave Technologies, Minneapolis, MN). RESULTS: We observed improvements in gait velocity ranging from 23% (0.39 m/sec) to 54% (0.07 m/sec). Time to complete the Timed Up and Go (TUG) was reduced by 0.89 to 4.27 sec. Distance covered in the Six Minute Walk Test (6MWT) increased from 7m to 125m. RS exceeded the velocity-adjusted minimal detectable change (MDC) and minimally clinically important difference (MCID) thresholds for improved gait velocity and 6MWT distance. MC reduced TUG time that exceeded MCID. Active dorsiflexion of the paretic ankle increased 9 to 14 degrees beyond MDC, but not the 20 to 28 degree improvements in paretic elbow extension. Center of pressure (COP) path lengths improved by 13% to 15% and posterior limits of stability (LOS) improved by 18 to 48 cm^2 on the paretic side. Both participants reported improved sleep latency and habitual sleep efficiency. RS reported improved perceptions of stroke recovery, as indicated by the Stroke Impact Scale in instrumental/activities of daily living and mobility that exceeded MDC and MCID. MC reported perceived improvements in memory/thinking exceeding the high thresholds for clinically meaningful change. RS also reported reduced depression and anxiety symptom severity that exceeded MCID. CONCLUSIONS: The data support MFW-NMES as a feasible and safe adjunct to exercise in individuals with chronic stroke, and suggest that scaled MFW-NMES trials are warranted.

P364: NEEDS ASSESSMENT TO DEVELOP A CULTURALLY TAILORED INTERVENTION TO REDUCE METS IN HISPANIC ADULTS

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BACKGROUND: Metabolic syndrome (MetS) is a multi-factorial disorder which increases the risk of cardiovascular disease (CVD) and Type II Diabetes Mellitus (T2DM). MetS is more prevalent among certain ethnic groups, with Hispanic showing higher rates compared to non-Hispanic Whites. The Hispanic population often faces barriers including language, unreliable transportation, limited health knowledge, lack of insurance, and differing cultural beliefs. Despite evidence that lifestyle interventions improve cardiometabolic health, culturally tailored strategies remain limited in Hispanic populations. The purpose of the study is to conduct needs assessment to inform the development of a culturally tailored intervention to reduce the risk of MetS within the Hispanic population. METHODS: Hispanic adults (≥18 years) in Alamance County will be recruited through local organizations and healthcare facilities. Phase 1 of the study will include bilingual questionnaires assessing dietary habits, physical activity, quality of life/health and access to resources. ASA24 (Automated Self-Administered 24-Hour Recall) will be used for dietary assessment, IPAQ-SF (International Physical Activity Questionnaire, Short Form) for physical activity, PROMIS Global-10 for quality of life/health, and BRFSS (Behavior Risk Factor Surveillance System) for access to the resources. In addition, 5 focus groups will be conducted (5-6 participants in each group) in-person or virtually. Thematic analysis will identify key behavioral, socio-cultural, and socioeconomic determinants of MetS risk. These findings will inform the design and content of culturally tailored intervention piloted in Phase 2, which will include pre/post assessments of knowledge, attitudes, and intended health behaviors. Data will be analyzed using descriptive statistic and paired t-tests. ANTICIPATED RESULTS: Barriers such as language, transportation, and limited access to resources are expected to contribute to MetS risk. We expect that motivation will play a key role in engagement, influenced by both intrinsic and extrinsic factors. We also anticipate that culturally tailored programs will improve knowledge, attitudes, and health behaviors related to MetS prevention, supporting the need for culturally tailored interventions.

P401: INTERMITTENT PALM COOLING'S IMPACT ON HIGH-INTENSITY INTERVAL TRAINING

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BACKGROUND: High-intensity interval training (HIIT) is a popular exercise modality. Yet an aspect of HIIT that limits its performance is body heat accrual. METHODS: Subjects (n = 45) did two HIIT workouts on a stationary cycle ergometer to assess intermittent palm cooling's influence on this exercise mode. Workouts included a 3-minute warmup immediately followed by three 20-second sprints that were each separated by two minutes of active recovery. Workouts were done either with, or without, palm cooling (PC, no PC) in a randomized order. Per workout, the dependent variables included: palm and tympanic temperatures, thermal flux, heart rate, and peak power expressed as absolute (PP) and relative to body mass (PP/KG) values. Heart rate, thermal flux, palm and tympanic temperatures were each measured before workouts, one minute after each sprint, and at 5-, 10-, 20-, and 30-minutes post-exercise. For the PC workouts, 10.6° C gel packs were inserted into specially fabricated gloves 90 seconds into the warmup as they pedaled. At the start of the PC workout recovery period, the gel packs were removed from the gloves but were reinserted at 20 minutes post-exercise. In contrast, for no PC workouts, subjects wore the gloves, but at no time were gel packs inserted. Dependent variables were assessed with 2-factor ANOVAs, with repeated measures per independent variable. A Bonferroni correction ($\alpha = 0.05/6 = 0.0083$) mitigated the Type I error risk and was based on the number of dependent variables analyzed. Significant dependent variables were assessed with pairwise comparisons to identify the source of the differences. RESULTS: Palm temperature and thermal flux each had significant two-way interactions; the latter dependent variable saw PC > no PC at multiple times during and after workouts. PP and PP/KG each had significant two-way interactions, with PC > no PC for the second and third sprints. CONCLUSIONS: Significant inter-treatment PP and PP/KG differences were ~5% and ~3% higher for the second and third sprints from PC, which likely benefitted from its significantly higher FLX values. Exercise with repetitive bursts of supramaximal activity may benefit from intermittent PC to abate body heat accrual.

P402: MUSCLE-GROUP DIFFERENCES IN NIRS-DERIVED EXERCISE BREAKPOINTS DURING COMBINED UPPER AND LOWER BODY CYCLING

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MUSCLE-GROUP DIFFERENCES IN NIRS-DERIVED EXERCISE BREAKPOINTS DURING COMBINED UPPER AND LOWER BODY CYCLINGJack Livingston, Modesto A. Lebron, Jeffrey R. Stout, and David H. FukudaUniversity of Central FloridaBACKGROUND: Near-infrared spectroscopy (NIRS) provides a safe, non-invasive measure of local muscle oxygenation (SmO_2) and has been used to detect breakpoints in SmO_2 that correspond to established exercise thresholds. Combined upper and lower body cycling offers a unique modality to compare the relative physiological responses of different muscle groups. The purpose of this study is to evaluate the reliability of NIRS-derived SmO_2 breakpoints during graded exercise testing (GXT) on a combined upper- and lower-body air-braked ergometer and to compare breakpoint responses between the vastus lateralis and deltoid. METHODS: Fifteen to twenty recreationally active adults (18-45 years) will complete three laboratory visits: one familiarization and two experimental sessions. During each experimental visit, participants will perform a GXT on a combined upper- and lower-body air-braked ergometer to assess their maximal oxygen uptake (VO_2max). Breath-by-breath gas exchange and SmO_2 (measured continuously at the vastus lateralis and deltoid) will be recorded throughout. SmO_2 breakpoints will be identified using piecewise regression. Reliability will be assessed using intraclass correlation coefficients (ICC) and coefficients of variation (CV). Breakpoint power outputs will also be expressed relative to VO_2max and maximal power to evaluate muscle-group differences. ANTICIPATED RESULTS: We hypothesize that the NIRS-derived breakpoints will demonstrate good reliability (ICC > 0.75, CV < 10%), and that deltoid breakpoints at the deltoid will occur at lower relative intensities than those in the vastus lateralis, indicating an earlier onset of localized deoxygenation in the upper body musculature, likely reflecting its lower oxidative capacity during whole body exercise.Funding: No FundingGenerative AI Statement: Artificial intelligence (AI) tools were not used in the writing of this abstract/presentation.

P403: COLD WATER DISPERSABLE RESVERATROL SUPPLEMENTATION DOES NOT ALTER POWER DECLINE DURING FLYWHEEL SQUAT EXERCISE

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BACKGROUND: Resveratrol, a polyphenol with antioxidant and vasodilatory properties, may enhance vascular function and skeletal muscle energetics, supporting performance during repeated high-intensity exercise. However, low bioavailability at recommended dosages may limit its efficacy. A novel cold water-dispersible formulation reportedly improves absorption, potentially eliciting greater ergogenic benefit than conventional resveratrol. The purpose of this study was to examine the effects of a cold water-dispersible resveratrol (RES) supplement versus placebo (PLA) on fatigue-related power outcomes during repeated bouts of flywheel resistance exercise.
METHODS: Thirteen resistance-trained males (age: 21.0 ± 1.2 y; height: 177.7 ± 6.5 cm; weight: 84.2 ± 10.8 kg) completed a randomized, double-blind, placebo-controlled crossover trial. Participants supplemented for 17 days with either RES (500 mg/day) or PLA, separated by an 18-day washout. On day 14 of each treatment, participants performed a flywheel squat protocol (6 × 10 maximal repetitions at 0.0981 kg·m²) while attached to the device via a waist harness. Repetition- and set-level outcomes included peak concentric and eccentric power, average concentric and eccentric power, and eccentric:concentric repetition-level power ratios. Log-transformed data were analyzed via linear mixed models with fixed effects of condition, set, repetition and their 2-way interactions, along with random intercepts for participants. Significance was set at $p < 0.05$.
RESULTS: Flywheel exercise elicited robust fatigue across repetitions and sets. Peak and average concentric and eccentric power displayed quadratic trajectories, rising across the initial repetitions before declining (all $p < .001$). Set progression was the dominant driver of fatigue, with progressive reductions in absolute power outputs evident by sets 5-6 (all $p < .05$). Condition effects were minimal: PLA was modestly higher for average concentric peak power ($p = .022$), with no other differences observed. Concentric:eccentric ratios did not differ across sets or conditions.
CONCLUSIONS: Repeated flywheel exercise induces consistent within- and across-set fatigue, with no consistent evidence that RES altered the decline in concentric or eccentric power when compared to PLA.

P404: VALIDITY AND RELIABILITY OF SEISMOCARDIOGRAPHY FOR ESTIMATING MAXIMAL OXYGEN UPTAKE COMPARED WITH TREADMILL EXERCISE TESTING

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Background: Maximal oxygen uptake (VO2Max) is widely recognized as a primary indicator of cardiorespiratory fitness and overall health. The gold standard for determining VO2Max is maximal cardiopulmonary exercise testing (CPET) performed on either a treadmill or cycle ergometer. However, CPET requires specialized equipment and maximal physical effort, making it impractical or unsafe for individuals with health limitations. Alternatively, seismocardiography provides an estimate of VO2Max by analyzing chest wall vibrations at rest using a chest-mounted accelerometer. The purpose of this study was to evaluate the reliability and validity of seismocardiography for estimating VO2Max in comparison with treadmill-based CPET. Methods: Participants attended three visits (1 enrollment, 2 testing). The first visit consisted of screening and enrollment, during which the participants were randomized to CPET testing order (treadmill or cycle CPET first). In the second session, participants underwent body composition measurements, followed by seismocardiography and CPET. The final visit included a second seismocardiography estimate followed by the alternate CPET modality. Only data from seismocardiography and the treadmill CPET are included in the present analysis. Results: A total of 22 participants (n=12 men, age=24 ± 5 y, body fat=21.0 ± 8.0%) were included in this preliminary analysis. Seismocardiography significantly overestimated VO2Max with a mean difference of 4.08 mL·kg-1·min-1 (limits of agreement: -7.25 to 15.41 mL·kg-1·min-1). The mean absolute percentage error (MAPE) was 13%. Seismocardiography had a coefficient of variation of 4.53% between repeated tests and a bias of -0.25 mL·kg-1·min-1 (limits of agreement: -6.57 to 6.06 mL·kg-1·min-1) on test-retest. Conclusion: Although seismocardiography overestimated VO2Max compared to treadmill CPET, it demonstrated strong test-retest reliability. These findings suggest that while seismocardiography may have limited accuracy for estimating VO2Max, it may be useful for tracking within-

subject changes over time. Further research in larger samples is needed to confirm these findings and assess clinical utility.

P405: EXAMINING THE RELATIONSHIP BETWEEN ANTHROPOMETRICS ON JUMP AND SPRINT PERFORMANCE IN FEMALE COLLEGIATE LACROSSE ATHLETES

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BACKGROUND: Athletic performance is assessed through power, speed, and force production. Measurement of power can give critical insight into athletic ability, with two common lower-body power measures being the countermovement jump (CMJ) and the broad jump (BJ). These measures coupled with sprint time can assess lower body power production. Results may be varied due to the anthropometric differences in athletes. PURPOSE: This study investigated relationships between anthropometric measures on CMJ, BJ, and sprint times in collegiate club female lacrosse athletes (CCFLA). Height (cm) was determined via stadiometer and weight (kg), body fat percentage (BF%), and lean body mass (kg)(LBM) were determined via SECA Body Composition Analyzer. Jump and sprint tests were determined via a Just Jump Mat. METHODS: Eleven (age: 19.8±1.5 years, height: 166.9±7.3cm, mass: 68.6±18.4kg) CCFLA participated in this study. Anthropometric measurements were recorded prior to jump and sprint testing in a lab-setting. Following a standardized warm-up (SWUP), athletes completed CMJ testing, with the best of three trials recorded. After a SWUP, athletes completed the BJ and sprint tests with the best of three and two trials recorded, respectively. BJ measurements were taken at the rearmost heel upon landing; any extra movement after the landing was considered a miss. A series of Pearson's correlation tests with an alpha level of $p<0.05$ were used to examine the relationships between anthropometrics on jump and sprint tests. RESULTS: Significant relationships occurred between weight on sprint ($r=0.707$, $p=0.008$). Significant relationships also occurred between BF% on CMJ, BJ, and sprint (CMJ: $r=-0.649$, $p=0.015$; BJ: $r=-0.615$, $p=0.022$; Sprint: $r=0.778$, $p=0.002$) respectively. No significant differences were found between height on CMJ and BJ, weight on CMJ and BJ, and LBM on CMJ, BJ, and sprint. CONCLUSION: Body composition significantly influenced performance in colligate club female lacrosse athletes. High body fat percentage was associated with reduced jump performance and negatively affected sprint times. These results suggest excess body fat may influence explosive power and speed.

P406: PRE-EXERCISE CARBOHYDRATE INGESTION AND MUSCLE ENDURANCE

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BACKGROUND: Carbohydrate ingestion prior to prolonged aerobic exercise improves performance and delays fatigue, but less is known about its effects on short-duration muscular endurance tasks. Muscular endurance, defined as the ability to sustain submaximal contractions until fatigue, is important for both athletic performance and daily function. The plank primarily challenges trunk and shoulder stabilizers, while the wall sit loads lower extremity extensors, providing task-specific insight. The purpose of this study was to compare plank and wall sit endurance in fed versus fasted states. **METHODS:** Six recreationally active young adults (3 males, 3 females; 20.3±0.8 yrs; 71.5±11.4 kg; 170.2±6.7 cm) completed two counterbalanced sessions in a randomized crossover design. Participants fasted for at least four hours prior to testing. At the beginning of each visit, participants consumed either a carbohydrate beverage (1 $g \cdot kg^{-1}$ body weight mixed in 12 oz water) or an equal-volume flavored placebo 30 minutes prior to testing. After a standardized warm-up, participants performed a prone plank and a wall sit to volitional fatigue under uniform instructions. Time to fatigue was measured to the nearest 0.1 s. Paired *t*-tests compared fed and fasted conditions. OpenAI's ChatGPT and JuliusAI were used for statistical analysis assistance and text consolidation. **RESULTS:** Plank time was greater in the fed condition compared with fasted (116.1±50.9 vs 106.1±47.1 s, $p=0.046$). Every participant improved plank performance when fed. Wall sit performance did not differ significantly between conditions (96.3±41.3 vs 82.4±41.2 s, $p=0.45$), with mixed individual responses. **CONCLUSIONS:** Carbohydrate ingestion prior to exercise significantly improved plank endurance but not wall sit performance. These preliminary findings suggest that pre-exercise carbohydrate intake may preferentially benefit tasks engaging trunk stabilization compared with lower extremity isometric endurance.

P407: ASSESSMENT IF LIMB ASYMMETRY AND FUNCTIONAL PERFORMANCE IN DIVISION II FEMALE SOCCER PLAYERS

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Background: Knee stability and lower limb strength are components for both performance and injury prevention in soccer. Female soccer players are at increased risk for knee injuries such as anterior cruciate ligament (ACL) tears, which are often associated with strength imbalances and deficits in neuromuscular control. Previous research has shown the non-dominant knee can have greater knee valgus during landing tasks, potentially heightening the risk for ACL injury. The purpose of this study is to compare knee stability between dominant and non-dominant limbs in female collegiate soccer players. **Methods:** At the start of spring season, participants (n=18, age=19±1y, weight= 140.7±22.1kg, height= 1.7±0.1m), first underwent body composition assessment via dual x-ray absorptiometry. The functional movement screening (FMS), Y-Balance test (YBT), and single leg hop (SLH) tests were used to assess limb asymmetry. A composite score <94% for the YBT has been shown to be associated with greater lower extremity injury risk. A single leg countermovement jump (CMJ) and squat jump (SJ) were performed on a force plate (ATMI) to determine peak power, peak force, and jump height from the best of 3 trials on each limb. Limb dominance was determined by the preferred kicking leg. All metrics were analyzed using a paired t-test of dominant vs. non-dominant limb. **Results:** Three of 18 participants (17%) and 4/18 (27%) reported surgical knee injuries on the dominant and non-dominant limbs, respectively. The average composite score for the YBT was (96.2±6.6%) for dominant limb and (96±7.2%) for non-dominant limb. In addition, 6/18 (33%, dominant) and 5/18 (28%, non-dominant) scored less than 94% on the YBT. There was no significant difference between the limbs in SLH (dominant v. non-dominant: 131±14cm vs. 131±12cm, p=.85). Similarly, peak force (1242±249.9N vs. 1225.6±252.7N, p=.33), jump height (13±4 vs. 12±3in), and velocity (2.3±2.8m/s vs. 2.2±2.6m/s, p=.11) did not differ significantly between limbs. **Conclusion:** FMS, YBT, and SLH were similar to previous research in female soccer players. While there were no differences in outcomes between limbs, the YBT may highlight individuals at greater risk of injury. Continuing research on potential limb differences may provide valuable insights for injury prevention.

P408: PHYSICAL ACTIVITY AND PERINATAL MENTAL HEALTH ASSOCIATIONS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF MEASUREMENT METHODS

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Abstract:
BACKGROUND: The perinatal period, spanning pregnancy through the first year postpartum, involves major physical and psychosocial changes that affect maternal health in women. Physical activity (PA) during this time is linked to reduced depression and improved well-being. However, inconsistent measurement of PA intensity within studies limits clear conclusions. Accurate measurement of PA intensity is needed to clarify PA's role in perinatal mental health and for a guide in clinical and public health recommendations.
METHODS: We will search PubMed, SPORTDiscus, CINAHL, and PsycINFO for studies published from 1994 (when the American College of Obstetricians and Gynecologists [ACOG] first endorsed unrestricted exercise during pregnancy) to present. Search terms combine keywords and synonyms for pregnancy, PA intensity, and mental health outcomes using Boolean operators. Two trained reviewers will independently screen data in Covidence. The following data will be extracted from included studies: (1) study name and authors; (2) year of publication; (3) country; (4) population characteristics (e.g., age, sample size); (5) PA intensity measurement methods (e.g., accelerometry); (6) type and name of measurement tool; (7) type and timing of reported outcomes; (8) mental health outcomes; (9) statistical methods and associations.
ANTICIPATED RESULTS: There is currently no consistent method for prescribing or measuring PA intensity during the perinatal period. This review is expected to identify and categorize methods used to measure PA intensity, such as accelerometry, heart rate monitoring, metabolic equivalents (METs), and self-reported perceived exertion, and evaluate how these methods influence the observed associations. We anticipate that studies using objective measures of PA intensity will show stronger and more consistent associations with improved mental health outcomes compared to those relying on subjective measures. Variability in timing and tools used to assess both PA and mental health may further influence the strength of observed relationships. By

addressing a key methodological gap, the findings will guide future research toward more standardized and clinically meaningful measures. These improvements will support the development of effective interventions.

P409: ANALYZING THE IMPACT OF ATHLETIC READINESS ON ATHLETIC PERFORMANCE TESTING FOR DIVISION III COLLEGIATE ATHLETES

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BACKGROUND: Athletic testing and athlete readiness monitoring are essential tools of advanced and professional levels of sports that can be used for player recruitment/development and program evaluation. Vast research highlights the importance of athletic performance testing and how athlete readiness influences performance. However, a preliminary search shows little research integrating athlete readiness in athletic performance testing. The aim of this study is to design and implement an evidence-based standardized testing protocol for athletic programs at North Carolina Wesleyan University and analyze the effect of athlete readiness on athletic testing performance. METHODS: Five tests were chosen for the protocol from existing athlete testing methods and they assessed key performance components: speed, agility, power, and strength. Athletes also completed a readiness questionnaire which assessed sleep, hydration, stage of menstrual cycle and pre- and post- RPE (Rate of Perceived Exertion). The Athlete Sleep Screening Questionnaire was used to create a Sleep Difficulty Score (SDS), where a higher score represents poorer sleep. Pilot data were collected on sixteen members of a NCAA Division III women's basketball team who volunteered to participate in the study (mean ± SD): age (18.9 ± 1.1 yrs); height (1.67 ± 0.07 m); body weight (69.24 ± 13.05 kg); BMI (24.91 ± 4.26 kg • m^{-2}).RESULTS**:** A strong correlation was revealed between SDS and Peak Force ($r=0.78$, $p < 0.05$). Additional correlations included post-RPE and pro-agility ($r=-0.40$), peak force and hydration ($r=-0.35$), post-RPE and single-leg jump ($r=0.40$), and 20-yard dash and post-RPE ($r=-0.40$). These relationships suggested potential but nonsignificant ($p > 0.05$) trends, likely due to the small pilot sample. CONCLUSIONS**:** The finding that force production increases as sleep difficulty increases is the opposite of the expected result, suggesting force and power performance may not be strongly influenced by sleep disturbance. The other trends in the data indicate possible links between RPE, hydration, agility, and jump performance, as well as menstrual cycle and performance. Given the limited sample size of the pilot data, further research and analysis is required to confirm whether readiness has a significant effect on athletic testing performance.

P410: EFFECTS OF CAFFEINE SUPPLEMENTATION ON ANAEROBIC CYCLING IN HIGH AND LOW HABITUAL CAFFEINE USE

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BACKGROUND: Caffeine is one of the most widely used ergogenic aids, blocking adenosine receptors to enhance alertness and delay fatigue. Effects on short-duration anaerobic performance are inconsistent, and habitual caffeine intake may moderate the ergogenic response. The purpose of this study was to evaluate the effects of caffeine supplementation on anaerobic cycling performance and explore differences between low and high habitual consumers. METHODS: Seven recreationally active participants (3 males, 4 females; 19-21 yrs; 71.2±16.6 kg; 171.2±12.7 cm) completed two sessions in a double-blind, randomized crossover design. Habitual intake was assessed with a 7-day caffeine log. In one session participants ingested caffeine (5 mg·kg^{-1} body weight mixed in 8 oz of double-strength Gatorade Zero), and in the other they ingested 8 oz of a different flavor of double-strength Gatorade Zero (placebo). Participants completed three 15-second Wingate cycling tests separated by 2 minutes of rest. HR, peak and mean power (Watts), and RPE were recorded. Paired comparisons tested caffeine vs placebo. Difference scores (caffeine − placebo) were compared between low and high habitual caffeine groups using independent t-tests. OpenAI's ChatGPT and JuliusAI were used for statistical analysis assistance and text consolidation. RESULTS: Across all participants, caffeine did not significantly alter peak power (Δ=−23±86 W, p=0.50), mean power (Δ=−25±72 W, p=0.37), or RPE (Δ=−0.2±0.8, p=0.65). Peak HR tended to be higher with caffeine (Δ=+5±5 bpm, p=0.051), and average HR showed a similar trend (Δ=+7±8 bpm, p=0.07). Responses differed significantly between low and high consumers for both peak power (p=0.041) and mean power (p=0.036). Low consumers (≤107 mg·day^{-1}; n=4) showed small increases in peak (+12±35 W) and mean (+11±27 W) power, while high consumers (>107 mg·day^{-1}; n=3) showed reductions in peak (−68±30 W) and mean (−73±33 W) power. CONCLUSIONS: Caffeine supplementation did not significantly improve anaerobic cycling performance overall, though it tended to elevate HR. Habitual intake influenced ergogenic response: low consumers showed modest gains, while high consumers showed significant decrements. These findings highlight the importance of considering habitual caffeine use with supplementation.

P411: DO TRAINING GOALS MATCH TRAINING LOADS? A PILOT ANALYSIS OF SELF-SELECTED RESISTANCE EXERCISE INTENSITIES

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Background: Exercise intensity is a critical determinant of resistance training outcomes, yet many individuals select loads that may not align with ACSM/NSCA guideline recommendations for strength, hypertrophy, power, or endurance. Understanding the discrepancy between self-selected intensities (SSI) and recommended ranges is important for improving exercise prescription and coaching practices. **Purpose:** This study proposes to examine whether SSI corresponds to guideline-based recommendations and whether differences emerge by sex, age, race/ethnicity, training status, and exercise type (squat, bench press, and deadlift). **Methods:** Participants will complete a demographic and training history questionnaire and identify their primary resistance training goal. They will self-select the weight and repetitions they typically perform for squat, bench press, and deadlift. Actual one-repetition maximums (1RM) will then be determined. SSI will be calculated as a percentage of 1RM, and a match/mismatch variable will be coded based on goal-specific intensity and repetition ranges. **Statistical Analysis:** Descriptive statistics will summarize SSI across goals and exercises. One-sample t-tests or Wilcoxon signed-rank tests will evaluate deviations from guideline midpoints, and equivalence testing will assess alignment with recommended ranges. Between-group differences will be tested using independent t-tests, ANOVA, and chi-square analyses. Logistic regression will explore predictors of guideline adherence, while linear mixed-effects models will account for repeated measures across exercises. Statistical significance will be set at $p < .05$. **Expected Outcomes and Significance:** It is anticipated that participants will frequently select intensities outside of guideline ranges, with systematic differences by sex, training goal, and exercise type. This project will provide insights into real-world training behaviors and inform strategies to improve exercise education and professional guidance in resistance training.

P412: TEST-RETEST RELIABILITY OF THE PHYSICAL WORKING CAPACITY AT THE PAIN INTENSITY THRESHOLD (PWC_{PIT})

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BACKGROUND: The physical working capacity at the pain intensity threshold (PWC_{PIT}) is a submaximal cycling index anchored to muscular pain. The purpose of this study was to quantify the PWC_{PIT} test-retest reliability. METHODS: Twenty-three recreationally active men (21.3 ± 1.8 y) completed two sessions, each with four 8-min constant-load bouts at 60-90% of peak power output (PPO). For each bout, pain ratings were regressed on time to derive a pain-time slope. PWC_{PIT} was the y-intercept from a linear regression of power output (dependent variable) on pain-time slope (independent variable) across workloads. Reliability statistics included ICC(2,1) with 95% CIs, coefficient of variation (CV%), typical error (TE), minimal detectable change at 95% confidence (MDC95), and Bland-Altman analyses. RESULTS: PWC_{PIT} demonstrated excellent relative reliability (ICC = 0.90, 95% CI 0.81-0.95) with CV = 9.6%, TE = 10.07 W, and MDC95 = 27.91 W. Trial means did not differ (paired t-test p = .908). Bland-Altman analysis showed a small bias of 0.35 W with limits of agreement of −27.6 to +28.3 W and no proportional bias (slope = −0.180, p = .069). CONCLUSION: In young men, PWC_{PIT} is highly reproducible with modest absolute error and no proportional bias, supporting its use to monitor change over time. Therefore, for individual interpretation, changes exceeding ~28 W can be considered real at the 95% confidence level based on the MDC95.

P413: EXAMINING RELATIONSHIPS BETWEEN ABSOLUTE STRENGTH ON JUMP AND SPRINT PERFORMANCE IN FEMALE COLLEGIATE LACROSSE ATHLETES

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BACKGROUND: Lacrosse requires adequate performance of skills such as agility, speed, endurance, and power for athletic performance. These skills can be enhanced through the introduction of strength training. Examining relationships between muscular strength on jump and sprint performance, practitioners can identify discrepancies within athlete's sport skill and develop programs aimed to enhance performance. **PURPOSE:** This study examined relationships between absolute strength (AS) on jump and sprint performance in collegiate club female lacrosse athletes (CCFLA) across four testing sessions. AS was determined via three one-repetition maximum (1RM) lifts including bench press (BP), back squat (BS), and sumo deadlift (SDL) (Day 1&3). Jump and sprint tests were determined via a Just Jump Mat (Day 2). **METHODS:** Eleven (age: 19.8±1.5 years, height: 166.9±7.3cm, mass: 68.6±18.4kg) CCFLA were recruited for this study. 1RM testing was split into two sessions separated by 48 hours to ensure adequate recovery between tests (day one: BS and BP, day three: SDL). All athletes completed standardized warmups (SWUP) leading to their 1RM attempts. Athletes completed countermovement jump (CMJ) testing following a SWUP, recording the best of three trials in between 1RM testing sessions (Day 2). Participants later completed broad jump (BJ) testing and 100-yard sprint testing on the field following a SWUP, with the best trial recorded (Day 2). A series of Pearson's correlation tests with an alpha level of $p<0.05$ were used to examine the relationship between absolute strength on jump and sprint tests. **RESULTS:** Significant relationships occurred between BP on CMJ & BJ (CMJ: $r=0.576$, $p<.05$; BJ: $r=0.575$, $p<.05$) respectively. Significant relationships also occurred between SDL on CMJ, BP, & Sprint (CMJ; $r=0.758$, $p<.05$; BJ: $r=0.780$, $p<.05$; Sprint: $r=-0.659$, $p<.05$) respectively. No significant relationships were found between BP on CMJ, BJ, & Sprint ($p>.05$). **CONCLUSION:** Significant relationships between muscular strength outcomes on jump and sprint performance indicates improving muscular strength translates with improvements in jump and sprint performance. This study provides athletic personnel with accounts that can aid in the formation of training programs to improve performance within lacrosse.

P414: THE EFFECTS OF A 10-DAY PRESEASON FOOTBALL CAMP ON ACHILLES TENDON MORPHOLOGY AND FORCE PARAMETERS

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Purpose: To examine the effects of a 10-day preseason football camp on Achilles tendon morphology and ground reaction force parameters of the dominant leg during a single-leg countermovement jump in division III collegiate football players. **Methods**: Nine division III football players (age = 21 ± 1 yrs; height = 177.83 ± 7.67 cm; body mass = 100.52 ± 20.42 kg) participated in this study. Before (PRE) and 26 hours after (POST) a 10-day preseason football training camp, the Achilles tendon cross-sectional area (CSA), thickness (TT), and echo intensity (EI) were measured via ultrasonography. Additionally, the participants completed a series of 2-4 repetitions of single-leg countermovement jumps, with the highest recorded jump used for analysis. Jump height (JH) was measured from a Just Jump mat position over a force platform. Additionally, peak vertical ground reaction force (PVGRF), rate of force development ($\frac{\Delta force}{\Delta time}$) from 0-50 ms ($RFD_{0\text{-}50}$), 0-100 ms ($RFD_{0\text{-}100}$), and 0-200 ms ($RFD_{0\text{-}200}$) were examined during the onset of the push-off phase from force platform. Eight paired samples *t*-tests were performed to examine potential differences in CSA, TT, EI, JH PVGRF, $RFD_{0\text{-}50}$, $RFD_{0\text{-}100}$, and $RFD_{0\text{-}200}$ before and after the 10-day preseason football camp. **Results**: There was no significant change from PRE to POST for CSA, $RFD_{0\text{-}50}$, and $RFD_{0\text{-}100}$ (p = 0.298 - 0.797). However, TT (0.36 ± 0.04 cm vs. 0.41 ± 0.04 cm; p = 0.041) and EI (168.34 ± 9.00 a.u. vs. 174.38 ± 8.21 a.u.; p = 0.011) increased from PRE to POST, respectively. Whereas, JH (31.98 ± 6.17 cm vs. 29.82 ± 6.04 cm; p = 0.003), PVGRF (2157.44 ± 285.03 N vs. 1939.03 ± 407.13 N; p = 0.025), and $RFD_{0\text{-}200}$ (13836.55 ± 1805.96 N/s vs. 11278.50 ± 2700.89 N/s; p = 0.038) decreased from PRE to POST. **Conclusion**: As expected, a 10-day preseason football camp resulted in a reduction in JH, PVGRF, and $RFD_{0\text{-}200}$. Additionally, an increase in TT and EI was exhibited, which could indicate acute inflammation of the Achilles tendon. The findings of this study suggest that despite a 26-hour recovery period, the short-term preseason camp is capable of negatively impacting tendon morphology (+3-14%), jumping performance (-7%), rapid (-18%) and maximal vertical force production (-10%). Longitudinal monitoring is warranted to determine the effects of an entire season on these parameters.

P415: PHYSIOLOGICAL RESPONSES TO 8 WEEKS OF VR BEAT SABER EXERGAMING

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BACKGROUND: Virtual Reality (VR) technology is now commonly used to transform sedentary video games into ones that require participants to be physically active while playing. Thus, when played regularly as a form of exercise, it is possible that VR exergaming can enhance health and fitness. The purpose of this study was to investigate the training effects of 8 weeks of exergaming in college students. METHODS: Using a Meta Quest 2 headset, 9 untrained participants (age 20.3 ± 1.2 yr) played at least 150 min/week of the VR game Beat Saber for 8 weeks. Pre- and post-gaming measurements were conducted for body mass, VO2 max, hand grip strength, push-ups, and side bridge duration. Differences in pre- and post-gaming values were evaluated using paired t-tests, with alpha set at 0.05. RESULTS: After 8 weeks of exergaming, participants increased in pushups (15.2 ± 10.8 vs. 21.0 ± 11.3 for pre- and post-gaming, respectively, p = 0.04) and handgrip strength in the non-dominant hand (25.4 ± 4.7 vs. 28.4 ± 6.9 kg for pre- and post-gaming, respectively, p = 0.02). Body mass remained stable over the exergaming period (76.7 ± 15.4 vs. 77.1 ± 16.1 kg, p = 0.27), as did VO2 max (34.4 ± 6.7 vs. 37.0 ± 8.2, p = 0.16). Also remaining steady were handgrip strength in the dominant hand (28.7 ± 5.2 vs. 30.4 ± 5.2 kg, p = 0.17) and side bridge duration on both sides (right side: 46.1 ± 27.4 vs. 54.7 ± 29.4 sec, p = 0.23; left side: 45.0 ± 24.4 vs. 48.0 ± 25.3 sec, p = 0.67). CONCLUSIONS: Eight weeks of Beat Saber exergaming, which primarily involves the arms, resulted in improved pushups and handgrip strength in the non-dominant hand, indicating that Beat Saber can enhance physical fitness in the upper body. However, body mass, aerobic fitness, and core muscular endurance were not affected. Funded by the Bingham Center for Teaching Excellence, Transylvania University.

P416: BLOOD BIOMARKER PROFILES IN FEMALE RECREATIONAL ENDURANCE ATHLETES WITH HIGHER VS. LOWER BODY FAT

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BACKGROUND: Endurance training promotes cardiometabolic health; however, it is unclear whether female recreational endurance athletes with higher body fat (HBF; ≥30%) demonstrate different blood biomarker profiles compared to lower body fat (LBF; <30%) athletes. This study compared blood cardiometabolic biomarkers (i.e., lipids, glucose, and liver enzyme markers) between HBF and LBF athletes. **METHODS:** Fourteen female recreational endurance athletes (i.e., self-reported; ≥4 days per week for ≥ 1 hour per session) with >8 years of training experience were classified as LBF (n=8, 32.3 ± 8.8 y, 22.7 ± 2.5 kg/m², 23.4 ± 4.5 %BF) or HBF (n=6, 38.7 ± 6.7 y, 24.0 ± 3.2 kg/m², 32.8 ± 2.1 %BF) based on air displacement plethysmography (BodPod). Venous blood samples were analyzed for glucose, HbA1c, triglycerides (TG), total cholesterol (TC), HDL, LDL, VLDL, TC:HDL ratio, non-HDL cholesterol (nHDLc), alanine aminotransferase (ALT), aspartate aminotransferase (AST), and insulin. Group differences were assessed using independent samples t-tests with Cohen's d calculated for effect size (α = 0.05). **RESULTS:** No significant differences ($p > 0.05$) were observed between groups for glucose, insulin, HbA1c, TG, TC, HDL, LDL, VLDL, TC:HDL ratio, nHDLc, ALT, or AST. All values were within clinically normal ranges for both groups. Notably, HbA1c was the only marker with a large effect size (LBF=5.2 ± 0.1 %; HBF=5.0 ± 0.2 %; d = 1.03, p = 0.08). **CONCLUSIONS:** Despite differences in body fat percentages in the LBF and HBF groups, there were no significant differences in blood biomarkers in these groups of female endurance athletes. These findings suggest that long-term endurance training may mitigate adverse metabolic effects commonly associated with higher adiposity in pre-menopausal female endurance athletes.

P417: EFFECTS OF RESISTANCE TRAINING ON FATIGUE LEVELS THROUGHOUT THE MENSTRUAL CYCLE

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BACKGROUND: The menstrual cycle (MC) is a complex process involving hormonal fluctuations that can influence fatigue. This includes mechanisms such as changes in mental health and moods, sleep efficiencies, cognition levels, and overall muscular and exercise performance. Studies observing the impact of the MC on exercise-induced fatigue are minimal. Therefore, this study aims to investigate how fatigue levels differ before and after resistance training (RT), and throughout the MC phases. METHODS: Female collegiate students ages 18-24 years old will complete six RT sessions over a six week period: familiarization, maximal, and four intervention sessions coinciding with each phase of the MC. The familiarization session will include informed consent, screening, Menstrual Health History Questionnaire, body composition assessment via BodPod, and a familiarization protocol on six exercise machines: back extension, leg extension, leg curl, shoulder press, chest press, and leg extension.The maximal session will include a Simple Physical Activity Questionnaire, handgrip strength measurements pre and post RT, and a 1RM RT protocol. Intervention sessions will be performed at 60% of participants 1RM for three sets of ten repetitions on the same six exercises, along with hand grip strength measures pre and post RT. Participants will also complete the Simple Physical Activity Questionnaire, Menstrual Distress Questionnaire, Mood and Feelings Questionnaire, Pittsburgh Sleep Index Quality Questionnaire, and the Fatigue Assessment Scale Questionnaire. Results will be analyzed using repeated measured ANOVA to determine significant differences in fatigue between phases of MC. Exploratory correlation analyses will be performed to assess the impact of body fat percentage on menstrual distress. ANTICIPATED RESULTS: It is anticipated that acute fatigue levels will decrease after RT sessions due to increased heart rate and blood flow, but persist longer in the menstrual and luteal phases compared to the follicular phase. Furthermore, a decline in self-reported measures such as sleep, menstrual distress, fatigue, and moods through the questionnaires is expected during the luteal phase compared to the follicular phase. A negative association is expected between body fat percentage and menstrual distress.

P418: BEYOND THE OPEN DOOR: STUDENT AND FACULTY PERCEPTIONS OF OFFICE HOURS

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BACKGROUND: Office hours are a long-standing tradition in higher education, rooted in the understanding that faculty-student interactions positively impact student success. While most institutions require faculty to hold office hours, they are historically underutilized by students. To inform strategies for enhancing faculty-student interaction, the aim of this study was to identify challenges related to office hours and suggestions to make them more effective for students and faculty. METHODS: Participants were from a large, public, predominantly White institution in the Southeastern United States. Students (N = 151) and faculty (N = 174) completed a survey via Qualtrics. A mixed methods design was used to integrate quantitative responses with thematic analysis of open-ended responses. Qualitative analysis included familiarization of text responses, in vivo coding (Dedoose), and thematic analysis/development. RESULTS: Most students (74%) reported never or rarely attending office hours. Top barriers for students included scheduling conflicts (73%), work or family commitments (37%), and feeling intimidated or uncomfortable (33%). For faculty, top challenges included low student attendance (67%) and scheduling conflicts (29%). Qualitatively, students asked for a greater variety of offerings, including evening hours and virtual options. Faculty also expressed the need for virtual options in addition to digital scheduling. Faculty indicated confusion on how to get students to attend office hours and believed explaining the value and benefits of attending office hours and/or offering class points would encourage greater student attendance. In contrast, students focused on scheduling conflicts as opposed to a lack of incentive to attend. CONCLUSIONS: With scheduling barriers and low attendance, traditional office hours do not meet the needs of students. Changes to this practice are suggested to enhance the quantity and quality of faculty-student interactions.

P419: THE IMPACT OF PALM COOLING ON PHYSIOLOGICAL OUTCOMES DURING RECOVERY IN FIREFIGHTERS

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BACKGROUND: Firefighters often perform strenuous fireground tasks in hot environments. Wearing personal protective equipment (PPE) protects from ambient heat. However, PPE increases thermoregulatory strain by trapping metabolic heat production, reducing evaporative capability, and attenuating heat dissipation via vasodilation. Palm cooling (PC) is a recovery technique utilized to quickly remove heat from the body, which may be useful for firefighters to manage heat stress. However, there is a lack of research on the efficacy of PC among firefighters, limiting its use in field and research settings. Therefore, the purpose of this study is to determine the impact of PC on physiological outcomes during fireground rehabilitation protocols among firefighters.
METHODS: Career firefighters (N=20; Age: 18-45yr) will be recruited to complete 3 sessions of a standardized occupational simulation in indoor ambient conditions while wearing full PPE, including self-contained breathing apparatus, gloves, jacket, helmet, hood, pants, and boots. The occupational tasks will include a stair ascent / descent, equipment carry, hoseline advance, search, and victim rescue. Time of task and course completion will be recorded. The first session will include familiarization of the protocol and equipment, whereas the second and third sessions will include performing the simulation with one of two randomized post-simulation rehabilitation strategies: (1) PC or (2) passive recovery. Physiological outcomes will be recorded before (pre), during, and following 16 min of passive recovery without the turnout coat. Physiological outcomes include heart rate, heart rate variability, respiration rate, skin and tympanic temperature, blood pressure, and blood lactate. Two-way repeated measures ANOVA will be used to evaluate condition (PC, passive recovery) by time (pre, during, recovery) outcomes. The level of significance will be set at $p<0.05$.
ANTICIPATED RESULTS: It is hypothesized that physiological responses will be similar between conditions at pre- and during the simulation, but will be lower following 16 min of recovery in the PC condition compared to passive recovery. Findings from this research will inform the utilization of PC as a method to reduce physiological strain following work performed in PPE.

P420: THE IMPACT OF PALM COOLING ON NEUROMUSCULAR RECOVERY IN FIREFIGHTERS

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BACKGROUND: Firefighters perform physically demanding tasks in personal protective equipment (PPE), which increases body temperature and results in fatigue and increased musculoskeletal injury risk. Specifically, 45% of fireground injuries involve strains, sprains, or muscular pain, with impaired neuromuscular control contributing to this risk. Cooling during rehabilitation may accelerate neuromuscular recovery, thereby lowering injury risk and improving readiness to return to work. Palm cooling (PC) targets arteriovenous anastomoses in the glabrous vessels of the palms, which facilitates rapid heat exchange and may enhance recovery of neuromuscular function. Therefore, the purpose of this study is to examine the impact of PC on neuromuscular outcomes following a simulated fireground work bout. METHODS: A repeated-measures crossover design will be used. Career and volunteer firefighters (N=20, Age: 18-45yr) will be recruited to complete a standardized occupational simulation in indoor ambient conditions while wearing PPE (i.e., self-contained breathing apparatus, helmet, hood, jacket, pants, boots, gloves). Time of task and course completion will be recorded. Neuromuscular function will be assessed in PPE during pre-simulation, immediately post-simulation (0 min), and after 20 min of recovery. Outcomes will include maximal force production and rate of force development via isometric mid-thigh pull, mean velocity via bilateral postural sway with eyes open and closed, and modified Functional Balance Test (mFBT) to assess integrated movement control. Participants will complete 20 min of

recovery using one of two randomized recovery conditions: (1) PC and (2) passive recovery. Two-way repeated measures ANOVA will compare outcomes across conditions (PC, passive recovery) and time (pre, 0 min, 20 min). The level of significance will be set at p<0.05.ANTICIPATED RESULTS: Immediate post-simulation (0 min) neuromuscular decrements are expected to be similar between conditions. By 20 min, PC is anticipated to produce greater recovery in force production, postural sway, and functional balance compared to passive rest. These findings will inform the use of PC in firefighter rehabilitation protocols to reduce subsequent work-related injury, risk and improve occupational readiness.

P421: THE EFFECTS OF COLD IMMERSION ON MOTOR CONSOLIDATION

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BACKGROUND: Memory consolidation (MC) refers to the process of encoding newly acquired information from short to long-term memory. Several physiological mechanisms elicited by exercise have been shown to enhance the encoding of newly learned motor skills. Similar to exercise, cold water immersion (CWI) of at least 14°C (57.2°F), a common recovery tactic following exercise, can elicit the upregulation of similar mechanisms (dopamine, norepinephrine, and epinephrine). However, little research has explored a relationship between CWI and motor MC. Therefore, the purpose of this investigation was to determine the impact of acute head-out CWI (HCWI) on motor MC measured via Esports tracking task (ETT) and to compare the results to an exercise (EXS) and a control (CON) group. **METHODS:** Thirty-nine, right-hand dominant, apparently healthy adults from Western Kentucky University volunteered for this investigation. All participants completed an acquisition test (ETT_{AQ}), followed immediately by their assigned intervention and a retention test (ETT_{24}) 24 hours later. After acquisition, the EXS group performed an 18-minute high-intensity cycling protocol (three 3-minute bouts at 90% Watt max interspersed with 2-minute recoveries at 60% Watt max), the HCWI group immersed in cold water up to the xiphoid process for 10 minutes, and the CON group rested quietly for 15 minutes. Mean ETT scores were analyzed using a three (group) by two (timepoint) mixed-design analysis of variance (ANOVA). **RESULTS:** The ANOVA detected a significant effect of time (F (1,26) = 15.82, p = .001, η^2 = .305) but not for group (F (2,26) = 0.707, p = .500, η^2 = .038) or group by time interaction (F (2,26) = 1.46, p = .247, η^2 = .075). The results of this investigation failed to detect a positive impact of HCWI or EXS on motor MC when compared to the CON group. Our findings contradict previous research demonstrating improvements in motor learning following exercise. **CONCLUSION:** In conclusion, ETT performance changed due to the passage of time and not the attended intervention, suggesting that the potential mechanisms explored for this investigation may be less influential on motor MC than previously suggested. This project was funded by the College of Health and Human Services of Western Kentucky University.

P422: PREDICTING URINE SPECIFIC GRAVITY FROM PAPER AND DIGITIAL URINE COLOR CHARTS IN COLLEGIATE FEMALE ATHLETES

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BACKGROUND: Urine specific gravity (USG) is commonly used to assess hydration status of athletes, but refractometry is often impractical in non-clinical settings. Urine color (Uc), assessed via a paper chart (PUc) or digital chart (DUc), offers a low-cost alternative, though the relationship of these scales to accurately predict USG is less understood. The purpose of this study was to determine the relationship between, and establish regression equations to estimate, USG from PUc and DUc in NCAA DII women's acrobatics and tumbling athletes. **METHODS:** USG was measured for 26 NCAA Division II female athletes (age: 19 ± 1 y). USG was measured by the same researcher using a calibrated, digital refractometer (Atago Pen) in accordance with manufacturer specifications. Uc was assessed using an 8-point paper color chart and a computer-based digital color chart by two separate researchers, who were blinded to the recorded USG and the other's score. DUc and PUc scores were averaged and used for analysis. Spearman-Rho correlations examined relationships between PUc, DUc, and USG. Separate linear regression models were developed to predict USG from PUc and DUc. Significance of relationships was set at $p \leq 0.05$. Data are presented as means ± SD, and 95% CIs are presented for regression equations. **RESULTS:** Significant, strong, positive correlations were found between USG (1.0190 ± 0.0084) and PUc (4.06 ± 2.12; r = 0.91, $p < 0.01$) and DUc (4.08. ± 2.16; r = 0.90, $p < 0.01$). Significant regression equations were found for both PUc (F [1, 24] = 104.12, R^2 = 0.82, $p < 0.01$) and DUc (F [1, 24] = 101.65, R^2 = 0.81, $p < 0.01$). Prediction equations were as follows: USG = 0.004(PUc) + 1.003, 95% CIs: β = 1.000-1.007, PUc = 0.003-0.004; USG = 0.004(DUc) + 1.004, 95% CIs: β = 1.000-1.007, DUc = 0.003-0.004. **CONCLUSIONS:** These data suggest that both PUc and DUc charts can predict USG in the current sample of female athletes. These findings support Uc as a field-friendly hydration assessment tool in athletes with the ability to reasonably predict USG. Future research should validate these equations across diverse sports and hydration states.

P423: THE EFFECT OF NORMOBARIC HYPOXIA ON NON-INVASIVE MEASUREMENT OF SYMPATHETIC AND VAGAL OUTFLOW

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INTRODUCTION: There is limited current research that assesses the relationship between vagal tone and beat-to-beat blood pressure (BTBBP) variability while exercising under normobaric hypoxic (simulated altitude) conditions. The primary purpose of this study is to analyze the effects of normobaric hypoxia on non-invasive HRV and BTBBP. METHODS: Eight (8) females subjects (Ht.: 165.25 cm ±6.17, wt.: 61.6 kg ±6.46) participated in 2 testing sessions. Session 1 consisted of an incremental treadmill exercises was performed to assess maximum aerobic capacity (VO_2max). For session 2, subjects completed 4 separate, 5-minute cycling trials, performed at a different simulated altitude measured in feet above sea level (T2000, T4000, T6000, T8000). Subjects exercised at each level in a random order at 40-60% VO_2 max, with 3 minutes break between levels. Heart rate (HR) HRV, and BTBBP were continously monitored and average values obtained for each level. RESULTS: Differences ($p<0.05$) in HRV in the time domain were found between T 2000 (0.025 ms ± 0.008) and T 6000 (0.015 ms ± 0.007) ($p<0.01$) as well as between T 2000 and T 8000 (0.013 ms ± 0.09) ($p<0.01$). Differences ($p<0.05$) in HRV in the frequency domain (low frequencies/high frequencies) were between T 2000 (0.510 ± 0.180) v. T 6000 (0.601 ± 0.248) and T 8000 (0.746 ± 0.084), as well as between T 4000 (0.543 ± 0.175) and T 6000 and T 8000. No changes in BTBBP were found. CONCLUSION: Higher sympathetic nervous system appears responsible occurs at higher altitudes, even at similar exercise intensities. Wide variations in BTBBOP suggest other peripheral factors play a role in cardiac outflow and vascular resistance.

P424: FOUR WEEKS OF BETAINE SUPPLEMENTATION REDUCES SELECT INFLAMMATORY MARKERS FIREFIGHTERS

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BACKGROUND: Occupational demands and lifestyle factors increase physiological stress and inflammation in firefighters (FF). Living in a chronically stressed and inflamed state has been associated with an increased risk for disease. Betaine (BET) has been proposed to mitigate certain physiological stressors and inflammatory markers in athletic and general populations; however, the effects of chronic betaine supplementation in high-stress occupations, such as FF, remain unknown.**METHODS:** Following a double-blinded, placebo (PLA) controlled, parallel-armed study design, FF (n = 13; 2 females, 11 males) were randomized into the PLA or BET group. Both groups provided baseline saliva samples and were then given 3g of rice flower (PLA) or 3g of trimethylglycine (BET) to take daily for 30 days; follow-up samples were collected after 30 days. Participants then completed a live burn scenario in full turnout gear, climbing four flights of stairs before entering a burn chamber (~500°C ceiling and 204.5 °C floor) and kneeling for 15 minutes. Samples were collected pre-, immediately post-, and 20 minutes post-live burn. Samples were analyzed for the biomarkers C-reactive protein (CRP), uric acid, cortisol, testosterone, interleukin-6 (IL-6), interleukin-8 (IL-8), interleukin-1β (IL-1β), tumor necrosis factor-alpha (TNF-α), and alpha-amylase (α-AMY). **RESULTS:** BET showed a significant change in CRP concentration from baseline (-388.8 pg/mL, p = 0.007) when compared to PLA (434.79 pg/mL, p = 0.48). Absolute decreases in cortisol after 30 days were not significant for BET (-2.97 nmol/L, p = 0.07) or PLA (-0.26 nmol/L, p = 0.86). The testosterone to cortisol ratio was significantly increased in the BET group (BET = 41.2 ± 35.4%, PLA = -13.8 ± 14.5%, p = 0.01). There was no change within or between groups for uric acid after 30 days. There was no difference between groups in IL-6, IL-8, IL-1β, TNF-α, or α-AMY from pre- to post-live burn ($p > 0.05$).**CONCLUSION:** These findings suggest that 30 days of BET supplementation (3g/day) may decrease CRP and increase the testosterone to cortisol ratio in FF. However, there was no benefit of BET supplementation on acute inflammatory markers

resulting from a live burn. **FUNDING:** NOW Foods, Inc. and the National Strength & Conditioning Association.

P425: IMPACT OF TACTICAL BREATHING ON MARKSMANSHIP, DECISION-MAKING, AND HEART RATE VARIABILITY AFTER AEROBIC FATIGUE IN LAW ENFORCEMENT OFFICERS

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BACKGROUND: There is limited research on training interventions that help law enforcement officers (LEOs) manage stress and fatigue. Particularly, the impact of tactical breathing on shooting performance after acute aerobic exercise fatigue remains largely unexplored. PURPOSE: This study aims to evaluate whether tactical breathing improves LEOs' shooting performance and heart rate variability after a maximal exercise task. METHODS: A sample size of 40 participants from a southeastern police department will be split into a breathing intervention group and a control group. Both groups will perform baseline measures of resting heart rate variability and shooting performance, consisting of 5 rounds of shoot/no-shoot training at a paper target. After baseline assessment, the intervention group will receive tactical breathing training. This technique follows a 4,4,4,4 pattern, including a 4-second inhale, 4-second hold, 4 4-second exhale, and a 4-second hold. The LEOs will get training in the technique and be given time to practice before the rower, while the control group will rest for the same duration of time. Next, groups will perform a 500-meter row on an ergometer at maximal effort. Once completed, LEOs will walk approximately 25 yards (~30 s) to the location of shooting performance testing for reassessment. During the walk, the intervention group will be prompted to perform tactical breathing. Following reassessment of shooting performance, follow-up measurement of heart rate and heart rate variability will be performed. ANTICIPATED RESULTS: It is hypothesized that the tactical breathing intervention group, who met the fatigue exertion criteria (80% of their age-predicted maximal heart rate, rate of perceived exertion of ≥6 on the CR-10 Borg Scale), will display greater post-exercise shooting performance than the control group, as well as have a greater HRV at follow-up. Tactical breathing may serve as a practical strategy that LEOs can use to attenuate acute physical fatigue-induced decrements in shooting performance and heart rate variability, which may carry over to enhanced occupational performance and autonomic function in field settings.

P426: UNDERSTANDING BIOGRAPHICAL ASPECTS OF PHYSICAL ACTIVITY AND WELL-BEING IN EXERCISE-BASED REHABILITATION GRADUATE

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BACKGROUND: Exercise-based rehabilitation (EBR; e.g., cardiopulmonary) aim to reduce mortality risk and improve health-related quality of life. However, despite successful EBR completion, many individuals do not maintain desired physical activity habits following graduation of the program. Concerns for continued exercise participation include a patient's biological, psychological and social barriers to exercise. Biographical mapping (bioMAP) is a method that pairs narrative interviewing with a visual drawing activity to stimulate reflection on and understanding of subjective - and often sensitive, yet influential - biopsychosocial experiences across the lifespan. To date, bioMAP has not been applied in clinical populations (e.g., those who have participated in EBR). The purpose of the proposed study is to investigate the biographical experiences regarding exercise and well-being of EBR patients post-program completion. Insights into a patient's life before, during and after EBR can elucidate useful information for practitioners and patients themselves. **METHODS:** The philosophical perspective of this study is relativist in nature. Through purposeful and snowball sampling, consenting post-EBR graduates will be oriented to the purpose of the study and begin by narrating their personal story and developing a graphical representation of their life's timeline by recounting significant anchor points (e.g. high school sports, injury, or heart attack). Next, they will plot and verbally elaborate on thematic curves that represent physical activity-related experiences along the timeline (e.g. exercise volume, enjoyment). The bioMAP sessions will be recorded, transcribed, and then analyzed using reflexive thematic analysis. **ANTICIPATED RESULTS:** Exploring subjective experiences through bioMAP can provide insights into a patient's life and inform further research on how these experiences can influence EBR engagement, retention and future exercise behavior.

P427: CHANGE IN TRAUMA-INFORMED CLIMATE PREDICTS LOWER BURNOUT BUT NOT HIGHER JOB SATISFACTION

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BACKGROUND: Agencies are increasingly adopting in trauma-informed practices to support workforce well-being. However, it remains unclear whether strengthening trauma-informed climate (TIC) primarily reduces strain or also boosts positive outcomes. We tested whether within-person change in TIC relates differently to changes in burnout and job satisfaction.METHODS: County human services employees completed two survey waves. For each participant, Time-2 minus Time-1 change scores were computed for TIC, burnout, and job satisfaction. Primary linear models predicted the follow-up outcome from change in TIC while controlling the baseline level of that outcome. Analyses used outcome-specific paired samples. Alpha was .05; HC3 robust standard errors were examined.RESULTS: Paired observations were n = 70 for the burnout analysis and n = 84 for the satisfaction analysis. Improved TIC was significantly associated with reduced burnout (r = -0.27, p = .023), and this effect held in the adjusted model (robust p = .024, standardized $\beta = -0.13$, $R^2 = .72$). In contrast, change in TIC was unrelated to change in job satisfaction (r = 0.04, p = .709).CONCLUSIONS: In this workforce, improvement in TIC tracked with reduced burnout over time, whereas job satisfaction did not change in tandem. Therefore, improving organizational TIC appears to be a practical lever for mitigating burnout; additional strategies may be required to enhance job satisfaction in public service settings.

P428: DOES MENTAL TOUGHNESS BUFFER WORK DEMANDS FOR BURNOUT AND WORK-INTERFERENCE WITH FAMILY?

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BACKGROUND: While employees are often encouraged to build personal mental toughness (MT), it remains unclear if MT can truly protect them from high work demands. We tested whether MT attenuates the negative association of work demands with two outcomes: burnout and work-family interference (WIF).METHODS: Using data from two survey waves (n = 69), we modeled follow-up burnout and WIF. The models predicted each outcome from its baseline level, work demands, MT, and their interaction (Demands×MT), while adjusting for organizational supports. Predictors were mean-centered to prevent multicollinearity.RESULTS: For both burnout and WIF, the strongest predictor of the follow-up outcome was its baseline level ($p < .001$). The critical Demands×MT interaction was not significant for either burnout ($p = .622$) or WIF ($p = .242$), indicating that MT did not buffer the impact of work demands.CONCLUSIONS: Contrary to the buffering hypothesis, MT did not protect employees from the negative effects of work demands on burnout or WIF in this cohort. Our findings suggest that organizational strategies should focus on managing work demands directly rather than relying solely on the MT of employees.

P429: FOSTERING LOYALTY: SUPERVISOR SUPPORT VERSUS INSTRUMENTAL SUPPORT IN PROSPECTIVE MODELS OF ORGANIZATIONAL COMMITMENT

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BACKGROUND: While both supervisor and instrumental support are presumed to foster organizational commitment, their relative importance is unclear. We prospectively tested the unique effects of supervisor versus instrumental support on follow-up commitment and tested two mechanisms: substitution and thresholding. METHODS: County human services employees completed two surveys. We paired observations and modeled follow-up commitment from baseline commitment, supervisor support, and instrumental support, adjusting for work demands and trauma-informed climate. Primary analyses used ordinary least squares with HC3 robust standard errors. We tested substitution using Support×Instrumental and Support×Demands interactions and evaluated thresholding with restricted cubic splines. A change-on-change model examined whether within-person increases in supports tracked change in commitment. We reported collinearity indices and standardized betas. Alpha was .05

RESULTS: In an analytic of n = 84, and similar to burnout, follow-up commitment was predominantly explained by baseline commitment (b = 0.705, p < .001, β = 0.68). After full adjustment, the unique linear prospective effects of supervisor support (p =.109) and instrumental support (p =.302) were not significant, and there was no evidence of resource substitution. However, a non-linear thresholding effect for supervisor support was detected, indicating a significant U-shaped relationship with commitment (p =.009). CONCLUSIONS: Organizational commitment, like burnout, exhibits high inertia. Our prospective analysis reveals that while supportive environments correlate with commitment, they do not uniquely drive it over time. This finding challenges the assumption that more support always bolsters loyalty. Instead, the relationship appears more complex; commitment may falter at moderate levels of supervisor support, suggesting that both low and very high levels of engagement from a supervisor could be more beneficial than intermediate levels. This indicates that while commitment is a stable attitude, its maintenance is not immune to the specific nature of supervisor interactions.

P430: MONITORING SUBJECTIVE RESOURCES PRECEDING EFFORTS FOR AND RESPONSES TO AUTOREGULATED TRAINING IN COLLEGIATE POWERLIFTERS

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BACKGROUND: Commonly used in athletes, autoregulation of training refers to the self-adjustment in workload and/or repetitions to achieve a coach-selected target rating of perceived exertion. Shifts in an athlete's resources (i.e., psychological and physical assets aiding behavioral self-regulation) likely impact such self-adjustments. Self-monitoring of resources, self-selected workloads, and perceptions of performance (i.e., affective well-being, satisfaction) should provide useful insights on how training is perceived, compared with training goals. Given the numerous types of resources, it is beneficial to determine which resources are most meaningful to individuals, to further optimize what constructs are routinely measured and used in decision-making. To date, little research has focused on person-specific analyses in sport and exercise science. The purpose of the proposed study is to identify personally meaningful resources that relate to training-related behaviors and experiences of collegiate powerlifters undergoing autoregulated training. **METHODS:** Participants will include consenting powerlifters (N=15; 18-23y) from a Southeastern Division II university. The powerlifters will complete event-based ecological momentary assessment procedures across four 2-week bursts. Surveys via weblinks imbedded in smartphones, will capture pre-session perceptions of resources and post-session ratings of affect and satisfaction (visual analog scales). Within-person correlations will be computed to estimate person-specific associations to explore which resources most strongly relate to outcome variables of interest. **ANTICIPATED RESULTS:** Documenting person-specific associations may help identify which resources should be routinely monitored and managed to support autoregulated training with increased precision. Such tailoring may support optimizing training conditions, injury and burnout prevention as well as improving overall athlete performance and well-being.

P431: CONSISTENCY COUNTS: DOSE-RESPONSE ENGAGEMENT EFFECTS IN SENIOR HEALTH CARE LEADERSHIP

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BACKGROUND: Employee engagement, the cognitive, emotional, and behavioral energy employees invest in their work, shapes culture, morale, and employee-related outcomes. For senior health care leaders, engagement is critical yet difficult to foster given taxing schedules and work-related demands. Access to leadership development such as mental toughness (MT) workshops is constrained by limited time and resources. Our prior work showed leaders attending more MT sessions reported higher engagement, underscoring the potential of structured programs. Yet questions remained whether these gains reflected a true causal effect or simply differences in attendance. Addressing this issue is essential for designing programs that meaningfully improve engagement and performance. The purpose of this study was to build on our prior finding that engagement improves with participation in MT workshops by testing whether those gains remain after adjusting for attendance-related bias. **METHODS:** Twelve senior health care leaders from UofL attended six weekly two-hour mental toughness sessions. Engagement and mental toughness were assessed at each session using the Mental Toughness Index (MTI) and Employee Engagement Scale (EES). Stabilized inverse-probability weights were built from pooled logistic models (session, prior engagement, prior MT, baseline), and engagement was regressed on cumulative prior dose, session, and baseline with robust standard errors and alternative weight specifications. **RESULTS:** Each additional prior session was associated with a 1.1-point increase in engagement (95% CI [+0.2, +2.0]; p≈.02). Effects were consistent across weight specifications. Baseline engagement and MT were not associated with attendance (r≈−.03; r≈+.02). **CONCLUSIONS:** After correcting for attendance bias, results showed a clear dose-response, consistent participation predicted stronger engagement. This strengthens causal plausibility and highlights investing in protected time is critical. Enabling leaders full access to training lets health systems unlock performance benefits extending to staff and patient care. Reducing barriers to attendance provides a practical lever for cultivating mentally tough, engaged leaders who sustain organizational effectiveness.

P432: PSYCHOLOGICALLY AROUSING MUSIC AFFECTS NEURAL DRIVE DURING DYNAMIC PRECISION TASKS

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BACKGROUND: Psychological arousal influences sympathetic nervous system activation, which can potentially influence motor unit firing rate and augment neuromuscular activation. This study compared the effects of unfamiliar arousing (UAM) or unfamiliar relaxing music (URM) on electromyographic (EMG) responses during a lower-limb precision task. METHODS: Twenty-nine recreationally trained adults (14 males, 15 females, 22.97 ± 3.65 years) participated and visited the lab three times, once for familiarization and twice for experimental trials. All participants completed a visually guided lower-limb precision task called "Roadway," on an isokinetic dynamometer. The task involved three seconds of knee extension at a rate of 30° per second, an isometric hold for three seconds, and three seconds of knee flexion at a rate of 30° per second. During this task, the visual display had a target line that participants were instructed to trace. Before the task, participants listened to either UAM or URM, which was randomized for each visit. Surface EMG was recorded from the vastus lateralis during the "Roadway" task. EMG amplitude (AMP) and mean power frequency (MPF) were examined for the knee extension, isometric hold, and knee flexion phases. Two-way mixed factorial ANOVAs (music [UAM vs. URM] x sex [males vs. females]) were used to analyze EMG AMP and MPF differences. RESULTS: No significant differences were found in AMP regardless of music selection ($p \geq 0.650$) or sex ($p \geq 0.989$) for all task phases. MPF was significantly greater following UAM compared to URM during knee extension ($p = 0.004$) and knee flexion ($p = 0.018$), regardless of sex. No significant differences were found for the isometric phase for music ($p=0.525$), and no significant differences were found for sex for all task phases for MPF ($p \geq 0.902$). CONCLUSIONS: Psychologically arousing music led to greater MPF, which is thought to represent action potential conduction velocity. Thus, it is possible that during dynamic tasks, arousing music could increase action potential conduction velocity, yielding potential increases in muscle performance. Thus, this study suggests that listening to arousing music may augment neural drive, which may have important practical applications for coaches and practitioners.

P433: ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD) AND RELATIVE ENERGY DEFICIENCY IN SPORT (RED-S) IN ATHLETES

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BACKGROUND: Relative Energy Deficiency in Sport (RED-S) is a physiological syndrome induced by prolonged/severe low energy availability (LEA). The purpose of this study is to determine whether athletes with Attention Deficit Hyperactivity Disorder (ADHD), characterized by symptoms of inattention, hyperactivity, and/or impulsivity, are more likely to develop RED-S compared to their non-ADHD counterparts. METHODS: Eligible participants included collegiate athletes (NCAA-affiliated) who were between the ages of 18-24 years old and currently in the off-season of their primary sport. Data was collected via a cross-sectional, online survey that included the Adult ADHD Self Report Scale for DSM-5 (ASRS-5), the Low Energy Availability for Males/Females Questionnaire (LEAM-Q/LEAF-Q), the Eating Disorder Examination - Short Version (EDE-Q), and the Expanded Exercise Addiction Inventory (EAI-3). Preliminary statistical analysis focused on correlations between all survey instruments. RESULTS: Preliminary findings included 40 participants - 35 females and 5 males. While not statistically significant in females, there was a strong positive correlation between ASRS-5 and LEAM-Q scores in males ($r(3) = .87$, $p < 0.05$). There was also a moderate positive correlation between ASRS-5 and EAI-3 across both sexes ($r(38) = .40$, $p = 0.017$).and a mild positive correlation between LEAF-Q and EAI-3 scores in females ($r(33) = .35$, $p = 0.039$). CONCLUSIONS: The preliminary findings suggest that males with greater ADHD symptomology might be at a greater risk of developing RED-S than their non-ADHD counterparts, however this cannot yet be generalized to females. It also supports previous research reporting greater rates

of exercise addiction in those with ADHD and suggests that low energy availability may be more commonly induced by "overtraining" versus "underfueling" in females.

P434: SLEEP QUALITY AND PERCEIVED STRESS ACROSS YEARS OF SERVICE IN CAREER STRUCTURAL FIREFIGHTERS

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BACKGROUND: The unpredictability and irregular schedules within the fire service can lead to poor sleep quality and result in cognitive impairments, increased feelings of stress, and burnout. Additionally, firefighters (FF) experience significant occupational stressors, with some studies relating experiences of occupational stress to years of service (YoS). Thus, this study aimed to examine the relationship between sleep quality, perceived stress, and YoS in FFs. METHODS: FF (n=61) completed a series of survey assessments, including the Perceived Stress Scale (PSS) and the Pittsburgh Sleep Quality Index (PSQI). Descriptive statistics were calculated and reported as mean ± SD. Fisher's exact tests and Spearman's rank correlations were used to determine relationships between sleep quality, perceived stress, and YoS. RESULTS: FF reported "good" sleep quality (PSQI: 4.59±2.51) and "moderate" perceived stress (PSS: 14.02±6.58). Spearman's rank correlation showed a significant positive monotonic association (rho=0.30, p<0.05), suggesting that higher perceived stress is associated with poorer sleep quality. When PSS scores were categorized into a "low" stress (0-13) and a "moderate-high" stress (14-40) group, and PSQI scores were categorized as "good" (<6) and "poor" (≥6), 3 of 26 (11.5%) in the "low" stress group reported "poor" sleep. In the "moderate-high" stress group, 12 of 32 (37.5%) reported "poor" sleep. Using a Fisher's exact test, this difference suggests that "poor" sleep quality is significantly more common among those with higher perceived stress (p<0.05). There were no significant correlations between YoS and sleep quality (rho=0.15, p=0.26) or perceived stress (rho=0.07, p=0.61). CONCLUSIONS: While occupational stressors within the fire service may not be controllable or eliminated, addressing stress management strategies on- and off-shift may be useful in improving overall sleep quality and overall wellness of FFs, regardless of YoS.

P435: EFFECTS OF NEUROMUSCULAR ELECTRICAL STIMULATION ON FALL RISK AND POSTURAL CONTROL IN DEMENTIA-SUSCEPTIBLE ADULTS

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BACKGROUND: Cognitive decline, prevalent in Alzheimer's disease (AD) and AD-related dementias (ADRD), heightens fall risk. Exercise interventions can reduce fall risk by slowing or delaying cognitive decline. Use of multi-waveform neuromuscular electrical stimulation (NMES) as an exercise adjunct may enhance neuroplasticity in areas associated with memory and cognitive processing. Whether NMES can improve postural control outcomes is not well-documented. Therefore, we will examine the effect of multi-waveform NMES on postural control in adults at risk for ADRD using a repeated-measures, counterbalanced crossover design. **METHODS**: Participants will be recruited from a personal care facility in Southeast Georgia and screened to identify physically inactive individuals without NMES contraindications at risk for ADRD (e.g., family history with apolipoprotein E gene variant). After providing informed consent, participants will undergo the first of two six-week interventions: 1) exercise plus NMES (ExNMES) or 2) volume-equated exercise only (EO) intervention, with a four-week washout period before the second intervention. Changes (Δ) (calculated as post minus pre) in static weight distribution (WD), fall risk, as indicated by center of pressure path lengths, and limits of stability (LOS) will be measured using the portable BTrackS system (Balance Tracking Systems, San Diego, CA). Additionally, Δ time (seconds) to complete the Timed Up and Go (TUG) will be reported. If parametric assumptions are met, separate paired *t*-tests will be used to determine whether a significant mean difference is observed between the interventions' change; α = 0.05. **ANTICIPATED RESULTS**: Improvements in fall risk (as indicated by reduced TUG time, WD symmetry, and greater LOS) are anticipated in ExNMES and EO. ExNMES, however, is expected to yield a greater magnitude of change. **Funding Acknowledgment:** Rockin' Out Alzheimer's Disease Foundation Grant (ID#3915).

P436: ANHEDONIA SYMPTOM SEVERITY INFLUENCES APPROACH-AVOIDANCE CONFLICT INDEPENDENTLY OF PHYSICAL ACTIVITY AND PTSD EFFECTS

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BACKGROUND: Approach-avoidance conflict (AAC) refers to the presence of competing rewarding and threatening contingencies in a situation, and the accompanying behavioral responses (e.g., avoiding a social gathering due to fear of humiliation). Laboratory AAC paradigms consistently reveal avoidance biases reflective of heightened AAC (i.e., greater likelihood of forgoing reward to avoid negative stimuli) among adults experiencing psychiatric symptoms, such as posttraumatic stress disorder (PTSD). We recently reported that physical activity (PA) moderates the relationship between PTSD symptom severity and AAC, as greater PA was associated with attenuated AAC. However, it remains unclear whether this effect is unique to PTSD symptoms or reflects broader internalizing symptoms, such as anhedonia (AD). **METHODS:** We conducted a secondary analysis from 93 adults (61% women, M±SD age=28±9 y) who completed self-report measures of PA, AD, and PTSD. Participants also completed an AAC task, in which each of the 150 trials (divided into five blocks) involved selecting one of three shapes with varying reward and threat probabilities depending on the phase of the task (congruent phase: high reward option was also low threat option; conflict phase: high reward option was also high threat option). Trial-level behavior (points earned) was analyzed using linear mixed-effects models, which included fully interactive predictors for PA, AD, and task components (trial, phase, block), with random intercepts by subject and fully interactive slopes for all task components. The model also controlled for the previously observed phase × PA × PTSD interaction by including the higher order trial × phase × block × PA × PTSD interaction. **RESULTS:** In contrast to the prior PTSD analysis, the phase × PA × AD interaction was non-significant (β=-0.02, 95%CI [-0.16, 0.12], p=0.757). However, there was a significant phase × block × AD interaction (β=-0.31, 95%CI [-0.52, -0.09], p=0.005), such that greater AD was associated with fewer points earned during the first block of conflict phase trials. **CONCLUSIONS:** Adults with greater AD may exhibit phasic reward learning impairments under initial elevated threat conditions. Greater PA did not attenuate AAC in relation to AD, suggesting that previously reported effects may be specific to PTSD symptoms.

P437: IMPACT OF ACL GRAFT TYPE ON ENDURANCE & PEAK STRENGTH RECOVERY TIMELINES

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BACKGROUND:
Recovery of maximal quadriceps and hamstrings strength has been shown to differ between graft types following anterior cruciate ligament injury and reconstruction (ACLR). However, graft-specific differences in muscular endurance remain unexplored, despite the relevance of endurance to athletic performance. Furthermore, graft-specific differences in the recovery timelines of maximal strength and endurance have not been investigated. Understanding graft-specific strength and endurance recovery timelines could provide valuable insight for clinicians by highlighting if one capacity requires greater focus at certain stages of rehabilitation for specific graft types. Therefore, the purpose of this study is to investigate whether recovery of muscular endurance and peak strength differs between graft types.
METHODS:
Participants undergoing ACLR will be recruited and stratified by graft type (bone-patellar tendon-bone, hamstrings tendon, quadriceps tendon, allograft). Peak strength and endurance will be assessed via isokinetic dynamometry for both the quadriceps and hamstrings at 3, 6, 9, 12, 15, 18, and 24 months postoperatively. These assessment timepoints were selected based on evidence that clinically meaningful improvements in muscle strength and endurance typically occur in 3-month increments during rehabilitation, while extending follow-up to 24 months captures the period of heightened risk for secondary ACL injury. Peak strength will be quantified as the highest torque produced during maximal voluntary isometric contractions (MVICs). Muscular endurance will be quantified as the time to task failure (e.g. inability to maintain 25% MVIC ≥ 2 seconds) during a sustained submaximal isometric contraction at 30% of MVIC. Outcomes will include both absolute measures and limb symmetry indices (LSIs) for peak strength and endurance of both muscles. Differences across graft types and timepoints will be analyzed using three-way and two-way mixed ANOVAs for absolute measures and LSIs, respectively ($p < 0.05$).
ANTICIPATED RESULTS:
We expect recovery timelines for peak strength and muscular endurance to vary within and between graft types.

P438: EFFECTS OF VERBAL INSTRUCTION AND CUEING ON JOINT KINEMATICS DURING RECUMBENT STEPPING IN AGING ADULTS

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BACKGROUND: If recumbent stepping (RS) utilizes the neural networks responsible for bipedal gait, research should consider how age-related gait changes may transfer to RS kinematics. We investigated the effect of externally focused verbal instructions and cues (VICs) and exercise strategy (ES) on hip, knee, and ankle kinematics in aging adults. This study had IRB approval, and all participants provided informed consent. **METHODS:** Sixteen adults (69 ± 10 years, 8 females) completed six 1-minute bouts on a NuStep T6 Pro at participants' gait-equated steps per minute at level 3 resistance in randomized order with a full-body exercise strategy (FBES) or legs-only exercise strategy (LOES), with each VIS (push, pull, or no VIC). Kinematic data were captured via Markerless 3D motion capture (Theia 3D, Kingston, Ontario, Canada) and processed with Vicon Nexus 2.16 (Vicon Motion Capture Systems, UK) and Visual 3D using a custom pipeline. Terminal joint position up (TJP_{up}), terminal joint position down (TJP_{down}), and total joint excursion (TJE) [(TJP_{down} - TJP_{up})] were reported. Separate two-way linear mixed model examined TJP_{up}, TJP_{down}, and TJE for ES × VIC interactions, controlling for seat position; α=0.05. **RESULTS**: ES main effects were detected at hip (TJP_{up}, TJE) and knee (TJP_{down}, TJE) (p<0.001) but not ankle (p≤0.05). LOES increased hip TJP_{up} (5°) and knee TJP_{down} (3°), increasing TJE in both joints by 4° compared to FBES (p<0.001). VIC main effects were detected at the hip (TJP_{down}, TJE), knee (TJP_{up}; TJP_{down}, TJE), and ankle (TJP_{up}; TJE) (p<0.05). Push increased TJP_{down} at hip (2°) and knee (3°), increasing TJE by 2° to 3° versus pull (p<0.05). Pull increased ankle TJP_{up} (3°) (p=0.023) and TJE (5°) (p=0.023). **CONCLUSION**: Hip and knee excursion increased during LOES and, separately, with push VICs. Whereas pull increased the relative dorsiflexion and joint excursion at the ankles. These observations equip practitioners to employ RS with greater specificity.

P439: THE EFFECTS OF BAREFOOT VS SHOD RUNNING ON SAGITTAL PLANE KNEE ANGLES IN METHODIST UNIVERSITY GRADUATE STUDENTS

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Background: Research on barefoot vs shod running is important because footwear can alter knee biomechanics, particularly angles of the sagittal plane, which may influence injury risk and performances and help guide injury prevention strategies and evidence-based recommendations for runners. The purpose of this study was to examine differences in joint angles specifically at the knee during barefoot versus shod running. Methods: A convenience sample of 13 graduate students (18-45) who could independently run for at least 10 minutes were recruited to participate in the running conditions both barefoot and shod. Participants completed a 2-minute treadmill warm-up, followed by two randomized 5-minute running trials: one barefoot and one shod, ending with a 2-minute cooldown period. All subjects ran on a Woodway treadmill at a self-selected running speed for both conditions, which was determined by cadence using a metronome at 150 bpm. Kinematic data was collected with a 14-camera Vicon Bonita motion capture system with 41 reflective markers placed on 23 anatomical landmarks of the trunk and lower extremity. Knee kinematics were collected in 30-second intervals. Results: A paired samples t-test revealed no significant difference in peak knee flexion angles between barefoot and shod conditions. For the left leg, barefoot (M = 68.84°, SD = 12.71) and shod (M = 73.37°, SD = 10.24) conditions did not differ significantly, t (12) = -2.07, p = .061. Similarly, for the right leg, barefoot (M = 68.60°, SD = 10.57) and shod (M = 70.86°, SD = 9.85) conditions were not significantly different, t (12) = -1.15, p = .27. Conclusion: Shod vs barefoot running had similar knee flexion angles, showing no significant difference between trials. Shod running may slightly increase peak knee flexion by about 2.5° on the left extremity approaching significance, but overall knee flexion patterns appear similar. It can be postulated that footwear leads to small biomechanical changes in the sagittal plane of the lower extremity during running. Both excessive and limited knee flexion can influence loading at the patella femoral joint and the anterior cruciate ligament, these findings suggest that footwear alone may not substantially change knee injury risk, though movements in the frontal and transverse planes may be impacted.

P440: THE EFFECT OF HAMSTRING FOCUSED REHABILITATION FOLLOWING ACL RECONSTRUCTION

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BACKGROUND: Anterior Cruciate Ligament (ACL) injuries are common injuries for athletes, as approximately 200,000 ACL injuries occur annually. Following surgical intervention, rehabilitation programs are designed to restore range of motion and quadriceps strength. However, re-tear rates remain at about 30% within two years of reconstruction. Current protocols may overlook critical factors in recovery such as the initiation and activation level in the hamstrings muscle group. The hamstrings play a key role in stabilizing the knee and counteracting forces that strain the ACL. At the same time, neuroplastic changes have been shown to affect muscle recruitment patterns of the hamstrings. Understanding the intersection of hamstring activation and neuroplasticity is vital for advancing ACL rehabilitation practices. **METHODS:** The purpose of this proposal is to examine the effect of a hamstring-focused rehabilitation protocol compared to a standard rehabilitation protocol in young athletes following ACL reconstruction with a patellar tendon graft. Twenty athletes (18-25) who are 2 weeks post-ACL reconstruction will be randomly assigned to either standard rehabilitation or a 4-week hamstring-targeted training program in addition to the standard rehabilitation guidelines. Surface electromyography will be used to measure hamstring activation patterns during a drop-jump functional assessment at baseline and post-intervention. A 2 (time) X 2 (group) repeated measures ANOVA will be conducted to measure group differences between the initiation and peak of hamstring activation. **ANTICIPATED RESULTS:** Participants in the hamstring-targeted group will demonstrate earlier hamstring activation onset along with greater amplitude compared to those completing the standard rehabilitation protocol. These improvements are anticipated to translate into better performance on functional tests and a decrease in re-injury rates due to better stability provided by the hamstrings.

P441: ASSESSING KNEE TOTAL JOINT MOMENT IN KNEE OSTEOARTHRITIS PHENOTYPES IN AGING ADULTS

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BACKGROUND: Approximately 17% of the U.S. population, over the age of 45, exhibit knee osteoarthritis (OA). There are two sub-populations of knee OA including those that experienced a knee joint injury that results in post-traumatic OA (PTOA) or those that experience age-related OA (idiopathic; IDIO). The knee loading patterns that distinguish these two OA phenotypes are not well understood. The total joint moment (TJM) may provide a comprehensive assessment of the 3D knee loading patterns experienced by these two knee OA subgroups during walking. The purpose of this study was to assess the effects of knee OA phenotype on the knee TJM in aging adults with and without end-stage knee OA. **METHODS:** Six individuals with PTOA (6F; 60±9.1 yrs; BMI 33±5.6 $kg{\cdot}m^{-2}$) and 6 individuals with IDIO (3F; 66.2±2.0 yrs; BMI 31.8±2.9 $kg{\cdot}m^{-2}$) were tested prior to total knee arthroplasty. Retrospective data from 12 healthy, asymptomatic adults (9F; 57.4±9.6 yrs; BMI 27.0±2.6 $kg{\cdot}m^{-2}$) were used for control data. All participants underwent 3D gait analysis on a dual belt instrumented treadmill at a self-selected speed. TJM was calculated as the square root of the sum of the squared planar internal sagittal, frontal, and transverse plane knee moments across the stance phase. The corresponding sagittal, frontal, and transverse plane moments at the peak TJM in the first (TJM1) and second (TJM2) half of the stance phase were extracted. A repeated-measures ANOVA was used to assess group differences in biomechanical parameters of the dominant (control group) and surgical (OA groups) limb (alpha=0.05). **RESULTS:** Both the PTOA and IDIO walked at slower speeds compared to the controls (p<0.01). There was a main effect of knee OA phenotype on frontal plane TJM (p=0.003). The PTOA group exhibited a significantly lower frontal plane moment at TJM2 compared to controls (p=0.047) and IDIO (p=0.019). **CONCLUSIONS**: The PTOA group may be reducing the frontal plane contributions during TJM2 to compensate for knee pain. Further evaluation of phenotype-based gait mechanics will provide clinicians with the knowledge needed to develop scientifically justified, *OA phenotype specific*, interventions to mitigate knee OA disease progression in the aging population. Research support: NIH (K01-AG073698, UL-TR001998 and TL1-TR001997)

P442: INTRASESSION RELIABILITY OF COUNTERMOVEMENT JUMP STRATEGY METRICS UNDER VARYING INSTRUCTIONS

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BACKGROUND: Verbal instruction can alter countermovement jump (CMJ) strategy, although the intrasession reliability of separate instructions is unexplored. The purpose of this study was to investigate the reliability of countermovement jump (CMJ) strategy metrics when varying instructions. **METHODS:** 12 female collegiate volleyball players (age: 19.3±1.1yrs; height: 178.9±8.6cm; mass: 72.9±11.3kg) performed 9 CMJs (3 per condition) on a force platform (1000Hz) following a dynamic warm-up. Instructions were randomized: (1) "Jump as high as possible," (2) "Jump as fast as possible," and (3) "Jump to the best of your ability." Time to take-off (TTTO), propulsive duration (PD), braking duration (BD), and countermovement depth (CMD) were analyzed. Reliability was assessed through intraclass correlation coefficients (ICC 2,k) and coefficient of variation (CV) for each variable in each condition. ICC values were compared by examining the overlap of 95% confidence intervals. CV values were compared using repeated-measures ANOVA. **RESULTS:** Across conditions, ICCs ranged from acceptable to excellent (0.86 - 0.96). Substantial 95% confidence interval overlap indicated no significant differences in reliability between conditions for all variables. Most CV values were acceptable across all conditions (CV < 10%). However, BD under the neutral instruction (CV = 10.23%) and CMD under the fast instruction (CV = 13.21%) were outside of the acceptable range. PD showed excellent relative reliability under the high and neutral condition, and TTTO displayed similar results under the neutral instruction (CV < 5.0%). CMD showed a significant main effect ($p = 0.021$, $\eta p2 = 0.31$), with fast differing from both high ($p = 0.020$) and neutral instruction ($p = 0.049$). No other significant differences were observed between CV values for TTTO, PD, and BD ($p > 0.16$, $\eta_p^2 = 0.12\text{-}0.18$) **CONCLUSIONS:** Statistically, the neutral instruction elicited the best overall balance of reliability across all metrics. However, each metric elicits an individualized response to instruction, indicating the importance of context when selecting both instructions and metrics. Considering present and previous findings, practitioners should select an instruction that best fits their purpose and remain consistent.

P443: DOES CONTRACTION SPEED DURING MOTOR IMAGERY AFFECT ACUTE CORTICOSPINAL AND MUSCLE FUNCTION RESPONSES?

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BACKGROUND: Motor Imagery (MI) is the internal rehearsal of a movement without corresponding physical output. MI can increase corticospinal excitability and strength, and cortical activity patterns are mediated by specific movement-related parameters such as the imagined agonist muscle, contraction speed, and force level. However, little evidence exists regarding the specificity of neuromuscular responses to MI. This study aimed to determine the acute effects of fast and slow imagined contractions on corticospinal excitability, rate of torque development (RTD), and peak torque (PT). METHODS: Eighteen young (20.3±2.3 yrs), healthy participants completed 4 laboratory visits in a randomized order, including a familiarization session, control, and 2 MI conditions. During each MI condition, participants imagined 2 sets of 25 repetitions of either fast (increase torque as fast as possible) or slow (3 seconds to PT) isometric elbow flexion. To quantify changes in corticospinal excitability, single pulses were delivered over the primary motor cortex using transcranial magnetic stimulation to measure motor-evoked potential (MEP) amplitude of the bicep brachii before and after each set of MI. Rapid, maximal voluntary isometric contractions were completed before set 1 and after set 2 to measure changes in PT, RTD, and rate of electromyography rise. Two-way (condition x time) repeated measures ANOVAs were used to analyze outcomes. RESULTS: MEP amplitude remained unchanged across conditions ($p=0.063$), but the large effect size (partial eta-squared=0.153) was notable. PT remained unchanged ($p=0.232$), but most RTD metrics were reduced similarly between conditions ($p=0.001\text{-}0.038$; 4.4-18.0% decrease). CONCLUSIONS: The present results indicate that an acute session of MI was insufficient to increase neuromuscular outcomes. Reduced RTD in all conditions could be attributed to hypoarousal responses, but it is not clear why RTD was specifically affected. These findings expand on previous work regarding the specificity of MI responses and support optimal application of MI.

P444: UPPER AND LOWER EXTREMITY POWER EFFECTS ON COUNTERMOVEMENT JUMP WITH AND WITHOUT ARM SWING

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BACKGROUND: The countermovement jump (CMJ) is a widely used and well-validated assessment tool for evaluating lower-body power and neuromuscular performance. The inclusion of an arm swing (AS) significantly enhances CMJ performance by contributing additional vertical momentum and mechanical energy. The purpose of this study was to evaluate the contribution of AS to CMJ performance using validated performance and body composition technologies.
METHODS: Fifteen male and fifteen female active adults aged 18 to 25 years reporting no lower or upper extremity injuries within the past six months participated in this research. Upon informed consent, anthropometric measurements and percent fat were measured using bioelectric impedance analysis. Then, participants completed a standardized mobility warm-up before CMJ testing was conducted. Jump height and peak power were measured using a force deck during countermovement jumps under two conditions: with arm swing (AS) and without arm swing (NAS). Upper extremity power was determined by 8 kg medicine ball incline throw distance. Lower extremity power was assessed on a Watt bike with three all-out 6-second efforts.
RESULTS: Independent sample t-test indicated a statistically significant difference between NAS (30.670 ± 10.381 cm) and AS jump height (39.733 ± 20.545 cm, $p = <0.001$). Linear regression analysis indicated med-ball throw ($R^2= 0.072$ $p = 0.015$), jump height ($R^2= 0.169$ $p = 0.024$), and body fat percentage ($R^2= 0.306$ $p = 0.002$) are the greatest predictors of AS CMJ peak power. Fat mass ($R^2= 0.126$ $p = 0.043$) and lean mass ($R^2= 0.128$ $p = 0.035$)are shown to be much more influential factors in AS peak power when compared to NAS peak power (FM $R^2= 0.155$ $p = 0.032$); LM $R^2= 0.182$ $p = 0.042$).
CONCLUSION: Body fat percentage significantly impacts countermovement jump (CMJ) peak power because excess fat increases the body's overall mass that needs to be accelerated, thereby reducing the power-to-weight ratio, while a lower fat percentage enhances lean body mass (muscle), which is directly responsible for generating force and power.

P445: CAFFEINE AND CAFFEINE SENSITIVITY EFFECTS ON STATIC BALANCE IN ADULTS IN A DOUBLE-BLIND PLACEBO-CONTROLLED STUDY

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Background: Balance is essential for daily functioning and is frequently assessed to evaluate neurological health. Caffeine is known to influence performance, and its impact on balance may vary, especially at higher doses. This study aimed to examine the effects of a moderate caffeine dose and perceived caffeine sensitivity on static balance, as assessed by a commonly used diagnostic balance protocol in healthy adults. Methods: The study was approved by the institutional review board and included 77 adults (37 men, 40 women; average age 28.7 ± 12.36 years). Participants completed the Stability Evaluation Test (SET) using the Neurocom Balance Master, under caffeine (200 mg) and placebo conditions, in a double-blind, placebo-controlled, repeated-measures design. Caffeine sensitivity was determined from a self-report questionnaire. Results: Repeated measures ANCOVA revealed no significant differences in postural sway velocity (balance) between caffeine and placebo conditions for the SET ($F = 2.70$, $P = 0.105$; caffeine = 2.47 ± 0.11 deg/s vs. placebo = 2.59 ± 0.13 deg/s). However, systolic blood pressure was significantly elevated in the caffeine condition (121.4 ± 1.8 vs. 118.0 ± 1.6 mmHg, $P < 0.01$). Significant effects were found for postural sway based on surface type ($F = 5.58$, $P = 0.021$; foam = 3.24 ± 0.16 deg/s vs. firm = 1.82 ± 0.09 deg/s) and stance ($F = 5.96$, $P = 0.003$; double-leg = 1.37 ± 0.04 deg/s vs. single-leg = 3.28 ± 0.16 deg/s vs. tandem = 2.94 ± 0.20 deg/s). Age also significantly influenced sway velocity ($F = 12.29$, $P < 0.001$; under 35 years = 2.13 ± 0.11 deg/s vs. over 35 years = 2.93 ± 0.20 deg/s), but there were no significant sex differences. There was significant interaction between caffeine condition and caffeine sensitivity ($F = 4.83$, $P = 0.031$). Conclusions: A 200 mg dose of caffeine does not significantly affect static balance, as measured by the SET in healthy adults. In alignment with previous research, surface, stance and age significantly influence balance and caffeine elevates systolic blood pressure. The significant interaction between caffeine sensitivity and caffeine condition may indicate balance could be compromised in more caffeine sensitive individuals at moderate caffeine doses. Further research with more objective caffeine sensitivity assessments is recommended to evaluate this interaction.

P446: EFFECT OF CARBON FIBER MIDSOLE IN VERTICAL JUMP METRICS

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Introduction:Carbon fiber insoles and plated shoes have been widely promoted as performance enhancers in sprinting and running. However, less is known of the impact on carbon fiber plated shoes relative to vertical jump performance. This study explored the effect of carbon fiber midsoles on performance metrics across four different jump tasks, Approach Jump, Drop Jump (30cm), Countermovement Jump, and Squat Jump. We hypothesized participants' jump performance would improve during reactive jumps in the carbon fiber plated shoes.
Methods:Twelve recreationally active adults (8 male, 4 female; 22.9 ± 2.7 y) completed a standardized dynamic warm up consisting of cycling,dynamic stretches, and a brief familiarization period prior to performing jump tasks. Each participant performed the four jump tasks on force plates while wearing shoes with carbon fiber (CF) and non carbon fiber (NCF) plated midsoles. Jump height (flight time) was calculated for each condition. Ground contact time (GCT) and Reactive Strength Index (RSI) was calculated for drop jump conditions. Paired t-tests (α = 0.05) compared performance variables across footwear.
Results:There was no significant difference in jump height between conditions for any jump type (approach: CF 43.7 ± 10.0 cm vs NCF 43.2 ± 9.0 cm; countermovement : CF 32.1 ± 7.0 vs NCF 33.6 ± 7.3 cm; squat: CF 29.9 ± 4.8 vs NCF 29.5 ± 4.9 cm; drop: CF 27.9 ± 8.2 vs NCF 27.8 ± 7.2 cm). GCT was 15ms faster during Drop Jump with CF (307 ms ± 9) when compared to NCF (322 ms ± 9).
Conclusion:Carbon fiber midsoles had no significant impact in jump height across the four jump tasks in recreationally active participants. The results from this study suggest increased footwear stiffness does not immediately improve vertical jump performance. Further research should explore whether intervention adaptations or elite jump athletes reveal condition specific advantages.

P447: EFFECTS OF DIRECTIONAL COMPRESSION ON TIBIAL INTERNAL ROTATION TRANSVERSE PLANE KINEMATICS

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BACKGROUND: Femoroacetabular Impingement (FAI), a rather common hip condition in which abnormal bone growth within the joint itself induces pain and reduces range of motion, primarily affects those who live an active life. Directional compression shorts serve as a preventative measure to decrease hip impingement by affecting the joint angle of the femoral external rotation. The interconnection between the femur and tibia in relation to FAI is significant as tibial internal rotation modifies lower limb mechanics, intensifies hip adduction, and can contribute to hip impingement. Therefore, this study explored the tibial internal rotation before and after use of directional compression. METHODS: Squat force plate data was collected on 14 participants who provided informed consent to participate in this study. Condition 1 was conducted in regular compression shorts, Condition 2 was while wearing SAFS shorts (directional compression). Using a digital resistance trainer (Vitruvian), participants performed 5 back squats at 20% of bodyweight. A series of repeated measures ANOVAs were utilized to explore the relationship of the transverse plane knee kinematics between shorts. RESULTS: No significant differences in tibial rotation angle were noted: left knee ($p = .654$) or right knee ($p = .359$) between conditions. CONCLUSIONS: Results indicated that directional compression did not meaningfully alter tibial internal rotation kinematics. These findings suggest that the compression force or directional orientation provided by the SAFS shorts was insufficient to mechanically influence tibial rotational during dynamic squat movements. Future research could focus on a testing population of individuals who are not well versed with squat mechanics to avoid habitual alterations of their own biomechanics.

P448: EFFECTS OF LOCAL MUSCLE COOLING ON MOTOR UNIT BEHAVIOR OF THE QUADRICEPS

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BACKGROUND: Cold exposure impairs muscle function by reducing maximal force and increasing stiffness, thereby limiting exercise performance and increasing injury risk. Although whole-body cooling disrupts both central and peripheral mechanisms, local muscle cooling mainly impairs muscle contractile properties (e.g., reduced twitch force, increased twitch contraction time), which may be compensated for by central mechanisms. Prior work in the forearm has shown that local cooling increased the number of active motor units (MUs) and altered the recruitment threshold (RT)-firing rate (FR) relationship, producing a steeper negative slope and higher y-intercept, consistent with earlier MU recruitment and/or higher FR in cooled muscle. However, a subsequent study did not replicate this shift, although it did find that low-threshold MUs were recruited earlier. The purpose of our proposed study is to extend this work by investigating whether similar neural-compensatory patterns occur in the quadriceps during upper-leg cooling. METHODS: We will recruit 24 healthy adults (12 men, 12 women; ages 18-35 years). Each participant will complete two visits. The first will consist of a baseline maximal voluntary contraction (MVC) and familiarization with trapezoidal ramp contractions (TRCs). At the second visit, participants will undergo two temperature conditions (cold and thermoneutral) in a randomized order, separated by 1 h. For the cold condition, the quadriceps will be cooled using an insulated cuff system that circulates ice water (10-15°C) with intermittent compression for 30 min. Each testing session will consist of two MVCs followed by two TRCs at 60% MVC. MU activity will be recorded using high-density surface electromyography to decompose individual MU properties. Primary outcomes are the slope and y-intercept of the RT-FR relationship. Secondary outcomes: number of active MUs, mean RT, mean FR, MVC force, and MU action potential duration and amplitude. Data will be analyzed using repeated measures ANOVA with condition as the within-subject factor and order as the between-subject factor. ANTICIPATED RESULTS: We hypothesize that local cooling will increase the y-intercept and steepen the negative slope of the RT-FR relationship, reflecting earlier recruitment and higher FR of low-threshold MUs.

P449: DOES TREADMILL TYPE EFFECT IMPACT FORCES AND MUSCLE ACTIVITY DURING WALKING?

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BACKGROUND: Non-motorized curved treadmills (nMCT) are becoming more popular in gyms with very little research assessing their utility. The purpose of this research was to discern any differences in the muscle activity (EMG) and impact forces while using a curved treadmill and standard mechanical treadmill (ST). **METHODS:** 12 Young healthy adults (6F, 73.28±13.16kg, 24.17±7.08yrs) were asked to walk on the nMCT and ST at a matched preferred speed for 10-minute iterations, with rest between each trial. While walking, participants' heart rate (HR), Rating of Perceived Exertion (RPE), EMG, as well as ground reaction forces (GRF) were measured and recorded. Data was reduced to one average per variable per participant trial. We averaged EMG and GRF across five strides using the accelerometer embedded in the EMG unit placed over the rectus femoris. A paired t-test was used to assess any differences between conditions. **RESULTS:** Peak Impact force was lower ($p=0.02$) walking on nMCT (1524.38±602.63N) compared to ST (1753.48±634.68N). However, loading rate was not significantly different ($p=0.06$) between nMCT (6070.3±2770.6N/s) and ST (7093.9±3508.6N/s). Muscle activity of the rectus femoris was significantly greater ($p=0.02$) while walking on an nMCT (9.36 ±4.55μV) compared to an ST (5.97 ±3.86μV). Biceps femoris activity was significantly greater ($p=0.03$) while walking on an nMCT (10.68 ±4.18μV) compared to a ST (6.57 ±3.06μV). Rating of Perceived Exertion ($p=0.01$) and HR ($p<0.01$) was significantly higher while walking on a nMCT compared to a ST. No significant differences were noted in stride frequency ($p>0.05$). **CONCLUSION:** Based on these findings, it appears that walking on a curved treadmill reduces peak impact loads while increasing workload of the lower body. If indoor walkers are looking for a harder workout with a lower injury risk, they should opt to walk on a non-motorized curved treadmill compared to a standard treadmill.

P450: GAIT SPEED DECLINES WITH INCREASING METABOLIC SYNDROME RISK IN YOUNG ADULTS

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BACKGROUND: Metabolic syndrome (MetS) is typically diagnosed using a dichotomous criterion (yes/no), but this approach overlooks individuals who, despite not meeting stringent diagnostic thresholds, remain at elevated risk of metabolic complications. Recently, researchers have expressed metabolic health on a continuum using the $MetS_{index,}$ where scores below 0 indicate lower metabolic risk and scores above 0 indicate higher metabolic risk. As MetS becomes more prevalent in young adults, there is a growing need for reliable, noninvasive methods to detect MetS earlier. Previous work has identified gait speed as a potential indicator of worsening metabolic health. This study compared self-selected gait speeds across 3 equally sized groups based on MetS and $MetS_{index}$ classification (all n = 21): G1 (MetS-/ $MetS_{index}$-), G2 (MetS-/ $MetS_{index}$+), G3 (MetS+/ $MetS_{index}$+). METHODS: 63 young adults aged 18-39 years were recruited to complete metabolic and gait analysis. Gait speed was recorded during

a 10-meter walk test at a self-selected pace. One-way ANOVA compared group means for gait speed. Ordinary-least-squares regressions quantified the change in gait speed per unit increase of $MetS_{index}$; one pooled model included $MetS_{index}$, Group, and between-group differences in the gait-speed-$MetS_{index}$ relationship relative to G1 and separate within-group models assessed each group. RESULTS: Gait speed did not differ by group (G1 = 1.20 $m \cdot s^{-1}$, G2 = 1.35 $m \cdot s^{-1}$, G3 = 1.23 $m \cdot s^{-1}$, p = .286). The pooled model was significant (R^2 = .243, p = .006). G2 (MetS-/ $MetS_{index}$+) gait speed decreased by 0.41 $m \cdot s^{-1}$ with each unit increase of $MetS_{index}$ (B = −0.408 ± 0.123 $m \cdot s^{-1}$; R^2 = .366; p = .004). Small and non-significant relationships were observed for G1 and G3. CONCLUSIONS: Gait speed declines meaningfully with increasing $MetS_{index}$ in young adults who do not meet the dichotomous diagnostic standard yet have positive $MetS_{index}$ scores (G2), suggesting that gait speed analysis with $MetS_{index}$ may help identify individuals earlier in the progression of MetS for intervention.

P451: HOW FITNESS AND ACTIVITY INFLUENCE WALKING ENERGY EXPENDITURE ON A COLLEGE CAMPUS

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BACKGROUND: Despite the benefits, college students are not meeting the guidelines for physical activity (PA), which can negatively influence cardiorespiratory fitness (CRF). Students select walking routes that generally promote efficiency and reflect their CRF. These walking patterns have a direct impact on daily energy expenditure (EE). The purpose of this study is to determine how CRF and PA levels influence EE along popular, pre-determined routes across a small college campus. METHODS: We will recruit thirty participants (15 male, 15 female) for this study. Eligible participants will be students aged 18-22 years old, who currently reside on campus and own an apple watch. Participants will be ineligible if they require assistive devices for mobility or are current members of a collegiate varsity sports team. This study will consist of two visits. During visit 1, participants' anthropometric measurements will be recorded, and they will complete the International Physical Activity Questionnaire short form to assess self-reported physical activity levels. Following this, participants will complete the Queen's College Step Test to establish a baseline estimate of CRF. For visit 2, participants will walk at their typical pace along five pre-selected routes between popular buildings on campus, with a five-minute rest period between each route. Participants will be instructed to wear their apple watch and record each walk using the "Outdoor Walk" activity mode. Heart rate, step count, and kcals will be recorded for each route. Participants will be divided into two groups using CRF and PA levels to create a median split. The results will be analyzed using Two Way ANOVA to determine the significant difference of CRF and PA levels on EE across the five selected walking routes. ANTICIPATED RESULTS: We anticipate that students who have higher CRF and PA levels will have a lower EE across each route.

P452: WALKING CADENCE AND RELATIVE INTENSITY IN YOUNG, ACTIVE FEMALE ADULTS

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Prior research has shown that step cadences of about 100 and 130 steps/min correspond to moderate (3 metabolic equivalents [METs]) and vigorous (6 METs) intensity, respectively. These thresholds were primarily established in adults 20 - 60 year. However, limited research has examined how step cadence relates to relative intensity, particularly when cardiorespiratory fitness (VO2max) is known. **PURPOSE**: To examine how various step cadences correspond to relative exercise intensity (% VO2 reserve [%VO2R]) in a group of highly active females. **METHODS**: A total of 8 participants (age 24 ± 1 years, BMI = 24 ± 2) completed a maximal treadmill exercise test to determine VO2max and a submaximal walking trial on a separate day. The walking trial began at a speed of 1.0 miles per hour (mph) and increased by 0.5 mph every 5 minutes until subjects could no longer maintain a walking gait. Current physical activity was assessed via ActivPAL (AP) accelerometer for 4 days, including a weekend day. For the walking trial, step cadence was determined using the AP. Mean steps per minute (SPM) and %VO2R values were determined at each walking speed. **RESULTS**: Mean VO2max was 50 ± 6 mL/kg/min. Peak heart rate was 192 ± 6 bpm. Subjects averaged 9955 ± 3367 steps per day. Average SPM increased from 56 ± 8 at 1.0 mph to 139 ± 4 at 4.5 mph (82 ± 4 at 1.5 mph; 97 ± 5 at 2.0 mph; 107 ± 5 at 2.5 mph; 115 ± 5 at 3.0 mph; 123 ± 5 at 3.5 mph; 131 ± 4 at 4.0 mph). Correspondingly, %VO2R rose from 9 ± 2 at 1.0 mph to 54 ± 10 at 4.5 mph (11 ± 3 at 1.5 mph; 14 ± 4 at 2.0 mph; 19 ± 5 at 2.5 mph; 23 ± 5 at 3.0 mph; 30 ± 5 at 3.5 mph; 40 ± 7 at 4.0 mph). Moderate intensity (40% VO2R) occurred at 131 SPM. 3.0 METs occurred between the walking speeds of 2.0 and 2.5 mph. **CONCLUSION**: In highly active young women, moderate intensity corresponds to approximately 131 SPM, suggesting higher cadences may be required to reach relative intensity thresholds than those reported in the more general adult populations.

P453: SUPPORTING AT RISK ROTC CADETS THROUGH A STRUCTURED WEIGHT MANAGEMENT TRAINING PROGRAM

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BACKGROUND: Maintaining required body weight and waist circumference is critical for Reserve Officer Training Corps (ROTC) cadets to achieve commissioning standards. This pilot study examined the effectiveness of a 12-week, strength coach-led training program implemented three times per week to support at-risk cadets. METHODS: Eleven cadets enrolled, with seven completing all testing and included in the analysis. The intervention emphasized performance and movement quality, with pre- and post-assessments of overall performance (OVR), movement quality, body composition, and grip strength. OVR included the maximal deadlift, standing power throw, hand-release push-up, sprint-drag-carry, plank, and two-mile run. Movement quality was assessed using the Functional Movement Screen (FMS). Paired-samples t-tests ($p < 0.05$) and effect sizes (Cohen's d, Hedges' correction) evaluated change. RESULTS: Significant improvements were observed in OVR (pre: M = 459.0, SD = 60.0; post: M = 474.3, SD = 55.2; t(5) = -3.28, p = 0.022; d = -1.34) and FMS (pre: M = 13.6, SD = 2.7; post: M = 15.6, SD = 2.3; t(4) = -2.61, p = 0.04; d = -1.92). The proportion of cadets achieving passing scores increased from 57% (4 of 7) to 86% (6 of 7). No significant changes were observed in body composition, grip strength, or individual component scores (all $p > 0.05$). CONCLUSIONS: Despite a lack of significant change in body mass and body composition, the program enhanced cadet performance across multiple domains, with gains reflecting balanced capability development rather than isolated improvements. Increased FMS scores suggest better movement quality and reduced injury risk, supporting comprehensive training approaches for functional enhancement in military personnel.

P454: THE RELATIONSHIP AMONG BINGE DRINKING, RESISTANCE TRAINING, AND BODY COMPOSITION IN YOUNG FEMALES

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Background: Binge drinking among U.S. females has declined in the last few years, but remains common, with 20.6% of females 18+ reporting monthly binge drinking in 2023. This may diminish resistance training (RT) benefits. RT enhances fat-free mass (FFM) and reduces fat mass (FM), but whether binge drinking compromises these adaptations in young females is unclear. This purpose of this study was to examine combined effects of RT and binge drinking on body composition, bone health, and muscle quality**. Methods:** Forty-eight females were divided into four groups: sedentary low alcohol (SL, n=12), sedentary binge drinkers (SB, n=12), resistance-trained low alcohol (RTL, n=12), and resistance-trained binge drinkers (RTB, n=12). Sedentary participants reported ≤2 exercise sessions/week for 2 years; RT ≥4 exercise sessions. Low alcohol consumers reported ≤1 drink/week for ≥1 year; binge drinkers ≥4 drinks in 2 h weekly for ≥1 year. Body composition was measured by DEXA, including FM, FFM, body fat %, visceral adipose tissue, bone mineral content (BMC), and bone mineral density (BMD). Muscle quality was assessed by rectus femoris (RF) ultrasonography. **Results:** Overall, RTL had more FFM (48.31 ± 5.81 kg) than SL (38.08 ± 6.59 kg; p=0.005) and SB (40.37 ± 6.05 kg; p=0.037), whereas RTB did not differ. Both RTL (29.28 ± 4.27%) and RTB (29.03 ± 3.67%) had a significantly lower body fat percentage than SL (37.18 ± 5.32%; both $p < 0.001$) and SB (34.83 ± 3.54%; p = 0.016 and p = 0.010, respectively). Lastly, RTB had significantly less visceral adipose tissue mass than SL (188.08 ± 39.43 vs 285.75 ± 157.87; p = 0.031).No group differences appeared in total body, spine, or hip BMD, but RTB had higher hip BMC (33.79 ± 7.89) than SL (26.38 ± 5.70; p=0.027) and SB (26.68 ± 5.10; p=0.037), and higher hip T-scores (0.69 ± 0.65) than SL (-0.26 ± 1.22; p=0.041). RF thickness was similar, though RTB had less subcutaneous fat (0.81 ± 0.19 cm) than SL (1.26 ± 0.35 cm; p=0.009) and SB (1.16 ± 0.34 cm; p=0.032). RTL and RTB both had lower intramuscular fat than SL. **Conclusion:** RT was linked to greater FFM and reduced fat, even in binge drinkers. RTB showed favorable hip BMC outcomes versus sedentary groups and less RF subcutaneous fat, indicating better muscle quality compared to SL and SB. In conclusion, RT may offset some negative effects of binge drinking.

P455: THE ASSOCIATION BETWEEN SEDENTARY BEHAVIOR AND PERCEIVED SOCIAL NORMS AND SOCIAL SUPPORT

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BACKGROUND: Within the socioecological model of health, social norms and social support are factors that can influence engagement in healthy behaviors and ultimately, health outcomes. Sedentary behavior (SB) is associated with adverse cardiometabolic health outcomes. Greater total time sedentary (TST) is associated with poorer cardiometabolic outcomes, while more frequent interruptions to sedentary behavior (SBI) were beneficially associated with adiposity and metabolic outcomes. This proposed study will aim to examine the relationship between TST and SBI as measured via activPAL, as well as SB-related perceptions of social norms and social support as assessed via survey scores. BACKGROUND: Within the socioecological model of health, social norms and social support are factors that can influence engagement in healthy behaviors and ultimately, health outcomes. Sedentary behavior (SB) is associated with adverse cardiometabolic health outcomes. Greater total time sedentary (TST) is associated with poorer cardiometabolic outcomes, while more frequent interruptions to sedentary behavior (SBI) were beneficially associated with adiposity and metabolic outcomes. This proposed study will aim to examine the relationship between TST and SBI as measured via activPAL, as well as SB-related perceptions of social norms and social support as assessed via survey scores. METHODS: College-based young adults (CBYA) will complete two surveys assessing perceived social norms and social support regarding SB, each with three items scored on a five-point Likert scale. Post-visit, participants will wear a thigh-mounted activPAL for seven days to measure SBI (avg. no/day) and TST (avg. min/day). Survey scores will be totaled and used to test for associations with SB outcomes (TST and SBI). Regression models will adjust for a-priori covariates (activPAL wear time, sex, race, age). ANTICIPATED RESULTS: It is hypothesized that social support scores and social norm scores will be positively associated with SBI and negatively associated with TST. FUNDING SOURCE: This research was supported by National Heart, Lung, And Blood Institute of the National Institutes of Health under Award Number R01HL162805.

P456: THE IMPACT OF A PILOT FAMILY PHYSICAL ACTIVITY INTERVENTION ON PARENT SELF-EFFICACY AND PHYSICAL ACTIVITY

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BACKGROUND: Parents experience many physical activity barriers related to familial responsibilities, work demands, costs, and time. Despite the well documented advantages of being physically active, 54% of parents do not reach physical activity (PA) guidelines. The purpose of this pilot study was to examine the impact of a family PA intervention on parent physical activity levels and self-efficacy. METHODS: A sample of 8 parent-preschool child dyads were recruited from Cooperative Extensions offices and Head Start preschools to participate in a 6-week intervention, Families Moving Together, where they received education about family physical activity and co-participated in movement. Parents completed surveys to measure barrier self-efficacy (confidence in their ability to be physically active in the face of challenges) and parent PA levels before and after the 6-week intervention. Pre-post changes in parent self-efficacy and PA across this pilot study were analyzed with Cohen's d effect sizes. RESULTS: There was a moderate increase in parent self-efficacy from pre-intervention (10.38 ±3.62) to post-intervention (12.88 ±3.60) (d = 0.52). Similarly, parent physical activity increased from pre-intervention (41.63 ±21.73) to post-intervention (50.18 ±23.66) (d = 0.45). CONCLUSIONS: These preliminary findings suggest that a family-based PA intervention may have a positive effect on parent physical activity barriers self-efficacy and physical activity levels. Given the small sample size, the observed increase in parent PA barriers self-efficacy and PA levels indicates the potential of a family-based intervention and supports further testing in a larger sample.

P457: BEHAVIOR PERCEPTION AND MOVEMENT BIASES: FINDINGS FROM A COUPLED ACCELEROMETRY AND ECOLOGICAL MOMENTARY ASSESSMENT PROTOCOL

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BACKGROUND: The use of ecological momentary assessment (EMA) prompts to contextualize accelerometer data is a rapidly advancing methodology. However, continued research must investigative the feasibility of its use in populations such as college-based young adults (CBYA). Sources of bias such as coinciding movement during prompts may affect the validity of data collected from protocols coupling data from these sources. This study shares initial findings from a combined EMA and accelerometer protocol in CBYA. **METHODS:** Participants (n=447, age = 20.1yrs [SD: 1.6], 64.7% F) wore a thigh-mounted activPAL for seven consecutive days and received nine EMA prompts across the 24hr day via a mobile app assessing activity type and interpersonal context. One-second epoch data from both sources were time-aligned to characterize behaviors up to five minutes before prompts. Correct perception is expressed as a percentage and defined as time spent engaging in the behavior reported by EMA. Movement was measured via Euclidean Norm Minus One (ENMO). **RESULTS:** Across all EMA prompts a majority of the behaviors measured by the accelerometer are accurately reported by the EMA prompts 86% of the time. When participants specifically reports that they are engaging in sedentary behaviors, accuracy was 91%. Variations in accurate perceptions were observed across interpersonal contexts: Alone (78.4%, 95%CI: [77.4, 79.6]), Friends (71.7, [70.0, 73.5]), Classmates (85.6, [83.3, 87.9]), Family (71.4, [68.0, 74.7]), Significant Other (79.9, [76.9, 82.9]), Co-worker (73.6, [69.1, 78.2]). ENMO was significantly higher in the 5min prior to completed prompts (2.16mg, [2.07, 2.24]) compared to missed prompts (1.91, [1.78, 2.05]). **CONCLUSIONS:** This study supports the feasibility of combining EMA and activPAL data in CBYA. Response rates and accuracy are not undermined by movement-induced bias. Accurate perception of movement behaviors is reliant on the activity and interpersonal context. **FUNDING SOURCE**: This research was supported by National Heart, Lung, And Blood Institute of the National Institutes of Health under Award Number R01HL162805.

P458: AGREEMENT OF ACTIGRAPH AND ACTIVPAL FOR PHYSICAL ACTIVITY AND SEDENTARY TIME IN COLLEGE STUDENTS

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Consumer wearables and fitness trackers are widely used to track physical activity (PA), including step counts. The Physical Activity Guidelines Advisory Committee has emphasized the need for research comparing PA measurement devices to support the development of step-based recommendations. **PURPOSE:** To assess agreement between PA metrics measured by two commonly used accelerometers, the ActiGraph (AG) and the ActivPAL (AP) in a sample of college-aged adults. **METHODS:** A total of 26 college students [18 women, 8 men, aged 18 - 26 years (21 ± 2 years, BMI = 23 ± 3)] wore the AG and AP concurrently for 4 - 7 days . The AG was positioned on the right hip and the AP on the right thigh. Paired sample t-tests, Bland-Altman analyses, mean differences, mean absolute percentage error (MAPE) values, and intraclass correlation coefficients (ICC) were computed for steps, sedentary time and moderate-to-vigorous intensity physical activity (MVPA) minutes per day. **RESULTS:** Step counts were lower with AG (9581 ± 2649) compared to AP (10305 ± 2689, $P < 0.001$), with a mean difference of 724, MAPE of 9.3%, and an ICC of 0.9. Sedentary minutes per day were higher with AG (636 ± 80) compared to AP (572 ± 57, $P = 0.009$), with a mean difference of 64, a MAPE of 12%, and an ICC of 0.3. MVPA was higher with AG (60 ± 21) compared to AP (57 ± 23, $P < 0.001$), with a mean difference of 4, a MAPE of 18%, and an ICC of 0.8. Bland-Altman results for steps ($P <0.001$) and sedentary time ($P <0.001$) were significant, whereas Bland-Altman for MVPA was not ($P = 0.2$). **CONCLUSION:** The AG and AP showed strong agreement for step counts, but agreement was weaker for sedentary time and MVPA. The AG consistently overestimated both metrics, potentially due to movement-based misclassification of posture and activity intensity when worn at the hip. The AP, with continuous wear and posture detection, may provide a stronger reference for evaluating these metrics on college students.

P459: EFFECTS OF CADENCE-CONTROLLED WALKING INTENSITY ON CENTRAL (AORTIC) PRESSURE

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BACKGROUND: Post-exercise hypotension (PEH) is defined as a reduction in blood pressure (BP) following a single bout of exercise. Evidence for intensity-dependent effects is inconsistent, partly due to varied definitions of intensity and limited control for total exercise volume (e.g., MET-min), for both brachial and central (aortic) pressures. This study examined the influence of cadence-controlled walking intensities on central pressures. **METHODS:** Twenty-two

adults (27.7 ± 6.8 y; 50% men; brachial systolic BP/diastolic BP: 123.9±10.4 / 77.1±7.6 mmHg) completed two volume-matched (~90 MET-min) walking bouts in a randomized crossover design: moderate (100 steps/min, 30 min, ~3 METs) and vigorous (130 steps/min, 15 min, ~6 METs). Cadence was self-regulated with smartwatch feedback. Central systolic (cSP), diastolic (cDP), mean arterial pressure (cMAP), and pulse pressure (cPP) were assessed pre- and 30 min post-exercise using an automated cuff-based device. Repeated-measures ANOVAs with Bonferroni correction tested condition and condition*time effects. Change scores (Δ) are reported as mean ± SD. **RESULTS:** PEH was non-significantly observed in cSP following the vigorous condition (Δ = -.18±7.7 mmHg, p=0.91) but not the moderate condition (Δ = 4.5±6.7 mmHg, p<0.01). There was no evidence of PEH effects for cDP or cMAP, however, between-condition contrasts showed higher values following moderate-intensity (ΔcDP = 4.6±5.7 mmHg; ΔcMAP = 3.6±4.9 mmHg; both p<.01) vs. vigorous-intensity (ΔcDP: 2.6±6.1, p=.06; ΔcMAP: 0.41±6.8, p=.78). For cPP, there was a significant condition*time interaction, with similar trends favoring the vigorous condition (Δ = -4.1±4.4 mmHg, p<.001) compared to the moderate condition (Δ = -.50±5.1, p=.49). **CONCLUSION:** Cadence-controlled walking at different intensities failed to elicit significant PEH, however, vigorous-intensity walking elicited lower 30-min post-exercise for central pressures compared to moderate-intensity walking. Consistent with prior work, PEH effects may not be fully captured within a short-term (30-min) recovery window, as hypotensive benefits can persist for up to 24 h. Future studies should explore these intensity-dependent changes in central pressures over a 24-h period.

P460: CHANGES IN PHYSICAL ACTIVITY, SEDENTARY TIME, AND QUALITY OF LIFE OUTCOMES IN BREAST CANCER SURVIVORS

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Purpose: Breast cancer survivors (BCS) often experience ongoing health challenges, and the effects of lifestyle programs on patient-reported outcomes remains unclear. This study examined pre-post changes in wearable-derived activity and PROMIS outcomes following a 6-month program. **Methods:** This cross-sectional sample of BCS (n = 36; mean age = 59.6 ± 7.9) wore Fitbit activity tracker for 6 months to assess estimates of light physical activity (PA), moderate-to-vigorous PA, caloric expenditure, and sedentary time. PROMIS outcomes were used to examine validated questionnaire at baseline and after 6 months. Paired-samples t-tests assessed pre-post differences, with significance set at p < .05. **Results**: Participants showed a significant decrease in caloric expenditure from baseline (M= 2289.90, *SD* = 1986.34) to follow-up (M = 1633.16, *SD* = 375.81), t(35) = 2.04, p = .049, d = 0.34. PROMIS physical function significantly increased from baseline (M = 58.71, SD = 3.91) to follow-up (M = 63.17, SD = 7.34), t(35) = -3.50, p = .001, d = 0.58. No significant changes were observed for PROMIS anxiety, depression, or fatigue. **Conclusions:** BCS' physical function improved over the 6-month program, likely reflecting perceived ability and adaptation, even in the absence of measurable increases in physical activity. In contrast, psychosocial outcomes appeared more resistant, suggesting they may require longer intervention periods or targeted strategies to improve.

P461: UTILIZING ECOLOGICAL MOMENTARY ASSESSMENT TO EXPLORE THE PHYSICAL ACTIVITY INTENTION BEHAVIOR GAP AMONG POSTPARTUM WOMEN

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BACKGROUND: Physical activity (PA) offers health benefits for postpartum women (e.g., cardiometabolic health, sleep quality, and mental well-being). Few postpartum women meet PA recommendations, and participation is especially low among Black and Hispanic women, who face disproportionate risks for adverse maternal outcomes. Limited studies have explored the intention-behavior gap (i.e., when individuals intend to exercise but do not follow through). The purpose of this study is to use the Theory of Planned Behavior (TPB) with ecological momentary assessment (EMA) to examine daily determinants influencing the PA intention-behavior gap among early postpartum Black and Hispanic women. METHODS: Black and Hispanic women aged 18 - 45, between 6 weeks and 12 months postpartum will be recruited for this mixed-methods observational study (anticipated N = 50). Participants will complete a semi-structured Zoom interview exploring TPB constructs. Participants will download the Pathverse app and sync Apple Watch data to collect objective measures of exercise and step counts, distinguishing structured PA from incidental movement. EMA prompts will be delivered daily over 14 days. Morning surveys assess intentions for structured exercise. Afternoon surveys assess contextual challenges and plans to adapt to change. Evening surveys capture actual behavior and affective responses to PA. Data will be analyzed using thematic analysis for qualitative interviews, multilevel modeling for EMA responses, and regression analyses linking psychosocial constructs with wearable-derived activity outcomes. Sensitivity analyses will compare participants with high versus low EMA compliance to assess potential response bias. ANTICIPATED RESULTS: We expect that positive affect, stronger perceived social norms, and higher perceived behavioral control will exert both direct and indirect effects on exercise intention. In turn, daily fluctuations in fatigue, mood, and responsibilities are anticipated to moderate the relationship between intentions and actual behavior. Qualitative findings will support that commonly reported and culturally specific barriers will impact PA intentions and behaviors. Findings will support the development of tailored, culturally relevant interventions to improve postpartum exercise.

P462: PRECISION OF SINGLE AND DUAL TASK MOBILITY MEASURES TO DIFFERENTIATE FALLERS FROM NON-FALLERS.

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BACKGROUND: Falls are a major cause of injury among older adults and are linked to reduced mobility and dual-tasking (i.e., the simultaneous performance of two tasks). Dual-tasking may be more sensitive than single-tasking to mobility deviations, but further research is needed. This study aimed to investigate whether dual-task gait assessments can better discern fallers (F) from non-fallers (NF) than single-task assessments. METHODS: 85 participants aged 65 years and older (Mean=79.8, SD=8.3 years) were recruited from the community and residential care centers. Participants completed a health survey to obtain demographic information and provided their fall history. They completed the Montreal Cognitive Assessment (Mean=24.5, SD=3.0) and mobility tasks, such as the Timed Up and Go (TUG) test and an 8-meter gait test at a usual pace. The dual task versions included counting backward by 3s (TUG) and listing words starting with "S", "F", and "A" (gait). Mobility was measured using APDM inertial sensors and analyzed via Mobility Lab 2. We conducted separate repeated measures analyses of variance for Group (F/NF) x Condition (single-task/dual-task) x Measure (TUG or gait). RESULTS: There was a significant Group x Condition x Measure interaction for TUG parameters [F(3,222)=3.15, p=0.03]. Trends were seen for single task turn angle [t(82)=1.60, p=0.06], single task turn velocity [t(82)=1.50, p=0.07], and dual task turn angle [t(82)=1.50, p=0.07] among F than NF. No significant interaction was found for gait parameters [F(5,400)=1.46, p=0.20]. CONCLUSIONS: Dual tasking was not more sensitive at discerning F from NF than single tasking. TUG duration- a common clinical metric- failed to distinguish F from NF. However, precise sensor movements provided slightly more insight into irregularities in mobility between groups. Our results suggest that inertial sensors may be more effective at detecting mobility impairments in older adults with poor mobility than clinical measures.

P463: FACTORS ASSOCIATED WITH BODY COMPOSITION IN MIDDLE AGED ADULTS FROM YEAR 20 OF THE CORONARY ARTERY RISK DEVELOPMENT IN YOUNG ADULTS STUDY

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BACKGROUND: The Coronary Artery Risk Development in Young Adults (CARDIA) study was initiated in 1985-86 to examine factors that contribute to cardiovascular disease. The purpose of this investigation was to analyze data collected in year 20 of the CARDIA study to identify factors associated with body weight and composition. METHODS: In year 20 of the CARDIA study, participants underwent a series of assessments, including body composition via dual-energy x-ray absorptiometry, and step counts were derived from accelerometers that were carried for at least 7 days. RESULTS: Sample included a total of 1071 participants (age = 45.6 ± 3.4 years; height = 171.0 ± 9.1cm; weight = 81.4 ± 18 kg), 601 females (height: 165.3 ± 6.4 cm; weight: 75.8 ± 17.8 kg; body fat: 34.0 ± 7.1%) and 470 males (height: 178.3 ± 6.3 cm; weight: 88.7 ± 15.5 kg; body fat: 22.8 ± 5.8%). Pearson correlation analysis was performed, and factors demonstrating significant correlations with body fatness were included as potential predictors. Stepwise non-linear regression analysis was performed, and a predictive model for percent body fat (PBF) was developed using sex, height, and average daily step counts expressed relative to fat mass (RelSteps) as inputs. The final model demonstrated good fit (R^2 = 0.82, RMSE = 3.2), indicating that these variables collectively explain a substantial portion of the variance in PBF. CONCLUSION: These findings demonstrate a high predictive power for daily step counts expressed relative to fat mass accurately predicting body fat percentage in middle-aged adults. The regression

model highlights the possibility of integrating step counts as a useful metric to manage weight and body fatness. Artificial intelligence (AI) tools were used in the analysis of data in this abstract.

P464: COMPARISON OF PHYSICAL ACTIVITY ESTIMATION PERFORMANCE BETWEEN WEAR LOCATIONS USING A RANDOM FOREST CLASSIFIER

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BACKGROUND: Currently, there is no consensus on a single wear-site recommendation for predicting activity type and energy expenditure (EE) estimation using wearable devices. Few studies have compared activity classification and EE estimation performance across wear locations using a dataset inclusive of multiple types of activities. The purpose of this analysis was to compare activity classification and EE estimation performance between wrist, hip, and ankle wear locations using a random forest (RF) classifier utilizing a comprehensive dataset. METHODS: Thirty-nine participants (20 males; mean±sd, age: 34.1±13.6 yrs, body mass index: 24.9±3.5 kg/m^2) completed a semi-structured protocol consisting of twenty activities, ranging from sedentary to vigorous intensities. The start and stop times of each activity were annotated in real time. Participants wore a portable indirect calorimeter (Cosmed K5) and five ActiGraph GT9X devices (right/left wrists (RW/LW) and ankles (RA/LA), right hip). Temporal features were calculated from 90Hz triaxial accelerometer data collapsed into 1-sec epochs. A RF for each location was trained on 15-sec sliding, 10-sec overlapping, windows to predict activity type and EE (METs). Estimates were compared to direct observation labeled activities and METs from the K5. Each dataset was split into training (80%) and testing (20%) sets for evaluation. F1-scores and root-mean squared error (RMSE) were used to assess model performance for activity classification and MET estimation, respectively. RESULTS: The right wrist had the highest activity classification (F1-score; 0.64) compared to the other locations (RA: 0.56, LW: 0.54, LA: 0.54, hip: 0.45). The right ankle had the lowest MET estimation error (RMSE; 1.36) compared to the other locations (hip: 1.42, LA: 1.43, LW: 1.44, RW: 1.50). CONCLUSIONS: The right wrist performed best for activity classification while the right ankle performed best for MET estimation. More research should be conducted in varying populations and contexts to determine an optimal single-site wear location, if one exists. FUNDING INFORMATION: This research was supported by the NIH grant 1R01DK129428.

P465: GIRLS GONE STRONG: A SCOPING REVIEW OF RESISTANCE TRAINING IN PHYSICAL EDUCATION

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BACKGROUND: About 15% of adolescent girls meet current physical activity (PA) guidelines (Guthold et al., 2020), with inactivity often persisting into adulthood (Malina, 2001). Resistance training can improve fitness and increase PA (Faigenbaum et al., 2024), yet barriers include limited funding, role models, and curriculum. This scoping review will examine school-based resistance training programs and their impact on physical and psychosocial outcomes in adolescent girls. We aim to identify benefits and barriers of integrating resistance training curriculum to school physical education (PE). METHODS: This study will follow the five-step framework for scoping reviews outlined by Mak and Thomas (2022). The steps include: 1) identify the research question; 2) identify relevant studies; 3) select studies to be included in the review; 4) chart the data; and 5) collate, summarize, and report the results. Studies will be identified through PubMed and by consulting experts in the field to gather resources not found in the online database search. Keywords for the search will include: adolescents, female, girl, strength training, weight training, resistance training, physical fitness, physical activity, self-efficacy, curriculum, physical education, and school. Inclusion criteria contains the following: adolescent girls (age 13 through 18 years); investigated the effects of fitness interventions or fitness curricula, have reportable outcomes; published from 1995-2025; and written in English or translated. Data points from each article will include population and sample size, setting, purpose and measures, intervention, and results. ANTICIPATED RESULTS: It is hypothesized that evidence will support the positive effects resistance training has on adolescent girls, with an increase of muscular fitness, and self-efficacy. Identifying the benefits and barriers to integrating resistance training into PE curriculum will assist more physical educators to create programs that are effective and easily implemented across classroom demographics. AI Statement: Artificial intelligence (AI) tools were used in the writing of the abstract/presentation.

P501: SEX COMPARISONS OF METABOLIC, CARDIOVASCULAR, AND PERCEPTUAL RESPONSES DURING CYCLING AT THE GAS EXCHANGE THRESHOLD

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BACKGROUND: Theoretically, the gas exchange threshold (GET) demarcates the moderate from heavy exercise intensity domains. Exercise at or below the GET should reflect an oxygen consumption (VO_2) steady-state within 3 min, while steady-state is delayed for heavy intensity exercise and is accompanied by a slow component of VO_2 (Δ>200mL O_2). Despite a steady state VO_2, heart rate (HR) and rating of perceived exertion (RPE) may continue to increase across time at fixed power outputs (PO). Recent evidence also suggests there may be sex differences in normalized (% of max) HR and VO_2 responses during sub-maximal constant work rate exercise. This study investigated the potential sex and time dependent metabolic (VO_2), cardiovascular (HR), and perceptual (RPE) responses across a 30-min GET trial. **METHODS:** 12 males (M:23±4y) and 9 females (F:23±3y) completed a cycle ergometry graded exercise test to derive the GET. Linear regression was used to identify the PO associated with the GET ([PGET] M:154±24; F:129±33W). PGET trials were performed for 30-min or until task failure (M-task time [T_{lim}]: 29.77±0.77; F-T_{lim}: 30.00 min). VO_2 (% VO_{2max}), HR (%HR_{max}), and RPE (6-20) were examined every 25% of the task, starting at the initial (0%) time point. The change in VO_2 was calculated from 3-min to T_{lim}. Separate, repeated measures ANOVAs (2[sex] x 5[time]) were used to compare VO_2, HR, and RPE across sex and time ($p<0.05$). **RESULTS:** There were no sex x time interactions (p=0.213-0.405) or main effects for sex (p=0.070-0.883), however, there were main effects for time ($p<0.001$) for VO_2, HR, and RPE. HR (p=<0.001-0.024) and RPE ($p<0.001$) increased across all time points except for 50-75% T_{lim} for HR (p=0.058). There were increases in VO_2 at all time points except from 25-50% (p=1.000), 50-75% (p=0.116), and 75-100% (p=0.615). The change in VO_2, collapsed across sex, from 3-min to task termination demonstrated a slow component (Δ 222±142mL O_2). **CONCLUSIONS**: The presence of a slow component suggested the GET was overestimated and the trial was performed in the heavy domain, but metabolic, cardiovascular, and perceptual responses were not sex dependent. The increases in HR and RPE may reflect the cardiovascular drift and afferent feedback from metabolic perturbations, respectively, that followed a different time course from VO2 during the trial.

P502: COMPARISONS BETWEEN FORCE PLATE AND MARKERLESS CAMERA SYSTEM FOR COUNTERMOVEMENT JUMP METRICS

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BACKGROUND: The purpose of this study was to compare a markerless camera system (MCS) to in-ground force plates (FP) for measuring countermovement jump metrics.METHODS: Participants stood on an in-ground force plate (BMS400600, Advanced Mechanical Technology Inc., Watertown, MA) while the MCS (PERCH, 'Evaluate' Package, Catalyft Labs, Inc., Cambridge, MA) was placed in a standardized location in front of the participant. The participant was instructed to keep their hands on their hips for the duration of the jump. To analyze differences between methods, paired sample t-tests were utilized to compare differences between the FP and MCS. Pearson product moment correlations were also utilized to assess relationships between like variables for the FP and MCS. Alpha levels were set at $p<0.05$.Results: Results of the paired sample t-tests indicated that all measures taken were statistically significant when comparing the MCS and FP ($p<0.01$). Jump height (0.41 vs. 0.47 m), RSImod (0.54 vs. 0.72 au), and TOV (2.83 vs. 2.99 m·s-1) were significantly lower when measured by the FP compared to MCS, whereas TTT was significantly greater when measured by the FP (0.78 ± 0.10 s) compared to MCS (0.67 ± 0.11 s). Results of Pearson's Correlations between FP and MCS for Jump Height, RSImod, TOV, and TTT were .765, .633, .524, and .869 respectively ($p<.01$). These results indicate that, although positively correlated, these devices when compared to one another will produce significantly different measurements when taken simultaneously.Conclusion: Based on the data presented, it would not be advised to compare data collected from force platform systems interchangeably with markerless camera systems that were utilized in this study. Further research should investigate whether other types of jumps or utilizing an implement (barbell or PVC pipe) would allow for more agreeable results when making comparisons.

P503: NO RELATIONSHIP BETWEEN MENSTRUAL SYMPTOM BURDEN &PERCEIVED EXERTION IN ELITE FEMALE SOCCER PLAYERS

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BACKGROUND: Previous literature observed menstrual symptom severity, specifically fatigue, and ratings of perceived exertion (RPE) both increased during luteal phase of the menstrual cycle (MC), in women's professional soccer athletes. However, research on the relationship between daily undesirable symptoms and RPE during a competitive soccer seasonremains limited. The purpose of this study was to examine the relationship between MC daily symptom burden (SB) and RPE in elite female soccer players. **METHODS**: 15 female pre-professional soccer players (age 22.2±1.8) completed daily symptom logs using an online application for MC tracking. RPE was recorded after each training session or match across an 8-week competitive period. SB scores were calculated as the sum of all undesirable symptom severity scores per day, based on Exercise (ex. heavy legs, weak, reduced coordination), Physical (ex. muscle ache, night sweats, bloating, fatigue, nausea, headache, poor concentration, menstrual cramps, and low back pain), and Wellness (anxiety, disturbed sleep, emotional,irritable, decreased motivation, stressed). Symptom severity if selected ranged from 1=low to 3=high. RPE was reported on a scale of 1-10, with 1=rest and 10=maximal effort. A Pearson-product moment correlation was performed to examine the relationship between daily SB and RPE. Statistical significance was set a priori to p=.05. **RESULTS**: No statistically significant correlation was observed between daily SB and RPE scores (r=.054, p=.393). Fatigue (26.5%),disturbed sleep (22.13%), and heavy legs (18.6%) were the most frequently reported symptoms across total entries. **CONCLUSIONS**: Results of this study support fatigue and disturbed sleep as the most reported symptoms but suggest a lack of relationship between daily SB and RPE in elite female soccer athletes. This may suggest that on a daily basis when not accounting for phase-specific symptoms, fluctuations in symptoms did not influence their perceived effort.

P504: A COMPARISON OF $VO_{2\ PEAK}$VALUES BETWEEN SKI AND LEG EROMETRY UTILIZING ABOVE' AVERAGE FIT MALES

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BACKGROUND: The assessment of $VO_{2\ peak}$ values is needed to determine an individual's cardiovascular fitness level. Additionally, it can provide coaches vital information needed to enhance workouts for athletes to increase aerobic performance. There are several common modes to assess VO_{2max} and peak values, with treadmill and cycle ergometry grade exercise test (GXT) being the most prevalent. The Concept2 SkiErg (SE) is a relatively newer mode that can be used for aerobic capacity testing, but prior research has only compared aerobic capacity between the treadmill and the SE. To the best of the researcher's knowledge, there appears to be no prior study that has compared the SE and leg cycle ergometry (LCE). Therefore, the purpose of this study is to assess potential $VO_{2\ peak}$ differences between SE and LCE graded exercise testing sessions. METHODS: Thirty collegiate above averagely fit male participants will be recruited. Fitness status will be classified using the ACSM guidelines. In a counterbalanced order, each participant will complete two different GXTs (1 SE and 1 LCE) with 72 hours of recovery between each session. Heart rate (HR), Ratings of Perceived Exertion (RPE), Respiratory Exchange Ratio (RER), Ventilation (VE), and aerobic capacity (VO_2) values will be recorded for SE and LCE at submaximal and peak levels. The SE and LCE results will be analyzed using ANOVA with an alpha level $\leq$ 0.05. ANTICIPATED RESULTS: It is hypothesized that the SE will yield greater $VO_{2\ peak}$ values than LCE. Should this hold true, perhaps a more standardized SE protocol could be utilized for $VO_{2\ peak}$ assessment.

P505: THE BATTLE OF THE BOTTLES: HYDRATION SYSTEM DESIGN AND FLUID INTAKE IN MILITARY CADETS

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Background: Adequate hydration is essential for individuals entering intense physical and environmental training situations. At Senior Military Colleges, cadets endure high-risk periods for dehydration while performing physical training outdoors. While military guidelines specify fluid intake targets, little is known about how hydration system design influences actual consumption. The purpose of this pilot was to examine differences between water consumption using clear Nalgene water bottles or CamelBak hydration packs. **Methods:** Forty Citadel Success Institute (CSI) participants were voluntarily enrolled. Participants were randomly assigned to one of two hydration groups during a 5-day training period in July, Nalgene bottle or CamelBak backpack. Fluid intake was measured daily before and after activity. Pre- and post-training body mass and urine specific gravity (USG) were collected. Independent and paired *t*-tests evaluated group differences, and Pearson correlations were used to examine associations between hydration markers. **Results:** Across five training days, Nalgene users consumed a daily average of 20.28 oz, compared to 13.37 oz among CamelBak users, a mean difference of 6.91 oz. Although Nalgene users trended toward greater fluid intake and slightly improved hydration status, differences in USG and body mass changes were not statistically significant. Pearson correlations revealed that changes in water weight had a low association with USG (r = -0.28). **Conclusions:** Visual access to fluid levels may offer a simple behavioral advantage in promoting hydration during military training, though physiological benefits were modest in this pilot. More importantly, this study validated the feasibility of large-scale hydration research in cadet training and informed key methodological refinements for larger studies

P506: TEST-RETEST RELIABILITY OF A SELF-PACED TREADMILL PROTOCOL TO ASSESS MAXIMAL OXYGEN CONSUMPTION

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BACKGROUND: Self-paced exercise testing protocols (SPPs) have emerged as a valid alternative to traditional ramp protocols for assessing VO_2max. This study aimed to evaluate the test-retest reliability of a 10-minute treadmill SPP for the assessment of VO_2max. METHODS: Apparently-healthy adults (N=8; 22.9±3.8 yrs; 24.2±2.4 kg/m^2; 50% females) completed 3 SPPs on a treadmill on 3 separate days 48 hours apart following a familiarization visit. The SPP consisted of 5 x 2-min stages (10-min total test time) where the subject self-selected a treadmill speed and grade for each stage to elicit work rates corresponding to the following rating of perceived exertion (RPE) values: 11 (light), 13 (somewhat hard), 15 (hard), 17 (very hard), and 20 (max). Subjects were blinded to the speed and grade chosen during each stage but were allowed to make adjustments during the first 45-sec of each 2-min stage. Oxygen consumption (ParvoMedics TrueOne 2400) was continuously measured during the SPP. Heart rate and RPE values were obtained at the end of each stage. After a 10-min recovery, subjects completed a 4-min VO_2max verification trial. VO_2max was determined as the highest 15-sec averaged value. A one-way repeated measures ANOVA was used to compare VO_2max values across the 3 SPP trials. Intraclass correlation coefficients (ICCs) were also calculated to assess the reliability of the SPP protocol for assessing VO_2max. RESULTS: 95.7% of all verification trials showed less than a 150 mL increase in VO_2, indicating a maximal effort during the SPP trials. VO_2max values (mean±sd) were 44.1±5.0, 44.1±5.3, and 44.3±4.1 mL·kg^{-1}·min^{-1} for trials 1, 2, and 3, respectively. There was no significant difference in VO_2max values across the three SPP trials, $F(2, 14) = 0.075$, $p = 0.928$, $\eta^2 = 0.012$**.** ICC analysis using a two-way mixed-effects model (ICC[3,1], single measures) showed excellent reliability for VO_2max across the three trials, with an ICC of 0.935 (95% CI: 0.78-0.99). Conclusions: In our small sample, the SPP demonstrated excellent test-retest reliability. By allowing participants to regulate their own work rates, SPPs eliminate the need for researchers to estimate starting intensities, stage durations, and workload increments necessary to reliably achieve volitional fatigue within 8-10 minutes.

P507: VALIDITY AND RELIABILITY OF SEISMOCARDIOGRAPHY FOR ESTIMATINGVO2 MAX MAX IN HEALTHY ADULTS

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BACKGROUND: Cardiopulmonary exercise testing (CPET) is considered the gold standard for measuring maximal oxygen uptake (VO2 max), a key measure of cardiorespiratory fitness and strong predictor of all-cause mortality. The physical demands of maximal CPET limit its feasibility for patients with cardiorespiratory impairments. Seismocardiography is a non-invasive technique that analyzes precordial vibrations generated by cardiac activity at rest using a chest-mounted accelerometer. This offers an alternative to CPET for estimating VO2 max for unable to perform maximal exercise. The purpose of this study was to examine the validity and reliability of seismocardiography VO2 max estimates compared with cycle ergometer CPET. METHODS: Healthy adults between the ages of 18-35 completed 3 study visits: (1) screening and enrollment; (2) body composition assessment followed by seismocardiography VO2 max estimation and either treadmill or cycle ergometer CPET; and (3)

another seismocardiography VO2 max estimation followed by alternate CPET. The order of the CPET visits was randomized and only the seismocardiography VO2 max estimations and cycle CPET data were included in this analysis. RESULTS: 22 participants (n=12 men) with a mean (SD) age of 24 (5.4) years and mean (SD) body mass index of 23.44 (3.2) kg/m2 were included in this analysis. We found that the seismocardiography significantly overestimated VO2 max with a mean difference of 11.86 ml/kg/min (limits of agreement: -0.59 to 24.31 ml·/kg-1·min-1). The mean absolute percentage error was 33.99%. Reliability analysis showed an intraclass correlation coefficient [ICC (2,1) of 0.904. CONCLUSION: In this preliminary analysis, seismocardiography significantly overestimated VO2 max when compared with cycle ergometer CPET. However, seismocardiography demonstrated excellent test-retest reliability, suggesting potential utility for tracking within-subject changes in cardiorespiratory fitness. Future studies should expand sample size and investigate technical sources of error for seismocardiography measurements.

P508: DIAPHRAGMATIC BREATHING TRAINING TO IMPROVE ESTIMATED VO2 MAX IN YOUNG VOCAL AND THEATRICAL PERFORMERS

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Background: Vocalists and performers rely on efficient breathing to sustain performance. Diaphragmatic breathing improves lung function and phonation time in singers, but its effect on aerobic fitness remains unclear. This study examines whether a structured diaphragmatic breathing program can improve estimated VO_2 max and related respiratory and vocal outcomes in healthy young performers.
Methods: Thirty participants between the ages of 18 and 35 will be recruited from music and theater programs. Inclusion criteria require good health, recreational or moderate physical activity, and no prior structured diaphragmatic breathing exercise training. Exclusion criteria include smoking, asthma, cardiovascular or chronic pulmonary disease, and high-level athletic training that could confound aerobic results. Participants will be randomly assigned to either: (1) the diaphragmatic breathing exercise group, completing a progressive six-week program with two supervised sessions plus three short home practices each week, (5-15 min/session, advancing in duration and postural complexity), or (2) the wait list control group, which will maintain normal routines, refrain from new breathing exercises, receive weekly check-ins and neutral health handouts (unrelated to respiration or fitness), and begin diaphragmatic breathing exercises only after post-testing. All participants will be asked to maintain their habitual exercise status during the study. Pre- and post-testing will include a submaximal aerobic test, the ACSM-recommended submaximal treadmill walking protocol, VO_2 max, spirometry to assess pulmonary function, and maximum phonation time to assess voice-specific endurance.
Anticipated Results: The diaphragmatic breathing exercise group is expected to show greater improvements in aerobic capacity, pulmonary function, and phonation time compared to the control group. Enhanced breath control may help performers use oxygen more efficiently during exercise and performance. We hypothesize greater improvements in VO_2 max, pulmonary function, and phonation time compared to controls. Improved efficiency may enhance oxygen use in activity and performance.
Funding information: None.Generative AI statement: "Artificial intelligence (AI) tools were used to assist in drafting this abstract."

P509: THE EFFECTS OF THE MENSTRUAL CYCLE PHASES ON UPPER AND LOWER BODY POWER AND ENDURANCE

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BACKGROUND - A normally defined menstrual cycle ranges from 28-35 days and consists of four phases: the menstrual phase, follicular phase, ovulatory phase, and luteal phase. Previous research suggests sports performance is strongest during the follicular phase, when estrogen levels are highest. This study aims to compare the impact of the menstrual cycle phase on upper and lower body power and endurance, while also considering body composition (BC), daily exercise, and pain levels.
METHODS - Nine female participants (21.64 ± 3.32y; 163.34 ± 6.51cm; 71.49 ± 16.50kg) with normal menstrual cycles and no hormonal form of birth control performed weekly testing over 5 weeks. In each session, participants completed a BC test utilizing the BodPod. Participants self reported their daily caloric intake and daily exercise. Current psychological status was measured on a visual analog scale. Participants completed five tests: a jump squat test, grip strength test, medball distance throw, one minute squat test, and YMCA bench press test. Power output was measured for the jump squat. A repeated measures ANOVA statistical test was utilized.
RESULTS - A repeated measures ANOVA with a Greenhouse-Geisser correction does not report statistical significance between weeks according to these measures: weight ($F(1.941,15.525) = 0.654$, $p>0.05$); fat-free mass ($F(1.515,12.116) = 0.277$, $p>0.05$); fat mass ($F(1.787,14.296) = 0.855$, $p>0.05$); body density ($F(2.365,18.921) = 3.730$, $p>0.05$), one minute squat test ($F(2.615,15.689) = 0.481$, $p>0.05$); YMCA bench press test ($F(1.879,11.275) = 1.796$, $p>0.05$); medball distance throw ($F(2.216,17.731) = 0.445$, $p>0.05$); grip strength test ($F(2.081,16.646) = 0.557$, $p>0.05$); and jump squat test ($F(1.554,6.215) = 0.749$, $p>0.05$). A Friedman's Two-Way ANOVA correction determined there was no statistical significance observed for pain levels during the cycle ($X^2(3) = 2.72$, $p=0.44$).
CONCLUSIONS - Although no tests were statistically significant, power and endurance decrements were observed during the luteal phase for our active, pre-menopausal female population. Further research is warranted to examine this phenomenon.

P510: EVALUATING THE PHYSIOLGICAL DEMANDS OF PALEONTOLOGICAL FIELD WORK: A PILOT STUDY

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BACKGROUND: Paleontologist's conduct field work of fluctuating physical demand to collect fossil samples. Field work encompasses a wide range of physical activities, some of which can be extremely demanding in harsh, remote environments. To date, the physiological demands of paleontological field work have not been evaluated. Thus, this study aims to collect pilot data on the average physiological demand of remote paleontological field work in experienced and novice participants. METHODS: Participants were recruited at a previously established dig site in the Hell Creek formation near Jordan, Montana. To account for changes in weather and variance in intensity of required activities, data collection was conducted on 2 randomly selected days of a 7-day excavation. Walking pace, distance, change in altitude, ambient temperature, and heart rate (HR) were continuously monitored via the Polar Vantage V2 exercise watch paired with a Polar H10 chest strap during travel to the site. HR was recorded intermittently throughout the workday due to an inability to wear monitors continuously while excavating. Metabolic equivalent (MET) values were estimated based on heart rate reserve. RESULTS: One experienced (>4y) and one novice (0y) participant volunteered. Both participants were apparently healthy males, aged 32±6y, and reported exercising at moderate intensity for more than 150 minutes/week. The intensity of the work was inversely related to experience level with the 3.2km hike and 152m of elevation change eliciting MET averages of 11.54 and 9.88 into and 13.21 and 10.96 out of the canyon for the novice and experienced respectively. Average MET levels during approximately 8h of excavation at an average temperature of 30.5 degrees Celsius were 4.3 (novice) and 3.05 (experienced).
Conclusions: The physically demanding nature of this work is challenging and even more so for novice participants. Further data is needed to accurately determine physical activity expectations for paleontological field work.

P511: CREATION OF WALL-SQUAT ISOMETRIC ENDURANCE TEST NORMS FOR COLLEGE-AGE STUDENTS

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BACKGROUND: In this study, the isometric wall-squat test for muscular endurance was examined in a large sample of college-age students with the goal of creating percentile norms for this demographic and determining if there were any significant differences between sexes and age sub-groups. METHODS: A large sample size (N=4,434) of men (n=2,310) and women (n=2,124) participants was assessed and met norm-referencing criteria for sample size requirements. Students performed a simple wall-squat test of muscular endurance to volitional fatigue. Wall-squat data were divided by sex and age. Age groups were divided into three different age sub-groups: 18-22, 23-29, 30+ years. Percentiles were then calculated. Descriptive characteristics, including means and standard deviations were computed. Paired t-tests ($p<.05$) were used to compare males and females. Significant differences between the three age groups (18-22, 23-29, 30+ years) were analyzed using a one-way analysis of variance (ANOVA). Upon finding significant F ratios, a Tukey's post-hoc test was used to detect pair-wise differences. RESULTS: Norm-referenced percentile tables for the wall-squat isometric endurance test were calculated for both sex and age. There was a significant ($p<.05$) difference between the average wall-squat of men ($\bar{x}$=74 seconds) versus women ($\bar{x}$=65 seconds). There were no significant differences ($p>.05$) seen between the age sub-groups (18-22, n=1,962; 23-29, n=266; 30+, n=82 years) for men. Significant ($p<.05$), differences were seen between the 18-22 (n=1,935) and 30+ (n=72) year-old age sub-groups for women. CONCLUSIONS:

Significant differences were found between males and females in the wall squat muscular endurance test. While the men showed no significant differences between age groups, there were significant difference found between age groups in women. These percentiles norms will allow wall-squat endurance score comparisons within the general college-aged population.

P512: EFFECTS OF DEHYDRATION AND COGNITIVE FATIGUE ON SIMULATED DRIVING PERFORMANCE IN FEMALES

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BACKGROUND: Dehydration decreases aerobic performance and impairs cognition when individuals lose ≥ 2% body mass. In sports, dehydration results from sweat loss during prolonged exercise, insufficient fluid intake, and heat stress. Limited research has examined these factors within motorsports. Few studies have included female driver athletes, and when included, none investigated dehydration or cognitive fatigue in relation to simulated driving performance. Therefore, the purpose of this study is to investigate the effects of dehydration and cognitive fatigue on simulated driving performance in females. METHODS: In a randomized crossover design, recreationally active females (*n*=20; 18-25 yrs) will complete a VO2peak cycle ergometer trial, two familiarization trials, and three experimental trials. Familiarization will include becoming comfortable with the driving simulator, experimental procedures, and cognitive assessments. Experimental trials will consist of baseline hydration status via urine specific gravity, cognitive assessment, and rate of perceived exertion via OMNI Pictoral Scale. Cognitive assessments will measure reaction time, attention, and decision-making ability. Following, participants will perform a 45 minute baseline drive in a heated environment (35℃) with full racing gear. Driving performance is measured by average lap time, sector time, and number of errors made, including collisions, contact with the wall, and going outside track limits. After, participants will complete either active dehydration, cognitive fatigue, or combined protocol. Active dehydration will require participants to cycle at ~65% of their VO2peak until ~2.5% body mass loss is achieved. Cognitive fatigue will be induced by administering a time load dual back task. A subsequent cognitive assessment will be performed prior to beginning a second 45 minute driving stint. Once completed, a final cognitive assessment and session RPE will be recorded. Separate repeated measures ANOVAs will be used to analyze results. ANTICIPATED RESULTS: We hypothesize the cumulative effects of dehydration and cognitive fatigue will have a significant negative impact when compared to dehydration or cognitive fatigue only.

P513: AGREEMENT BETWEEN ESTIMATED AND MEASURED VELOCITY DURING JAMMER ARM PUNCH PRESSES

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BACKGROUND: Prior research has used a 1.0 m/s velocity test to assess performance. Accurate estimations of movement velocity may improve testing efficiency. Therefore, the purpose of this study was to assess the agreement between the estimated velocity derived from a load-velocity profile (LVP) and the actual measured velocity during jammer arm punch presses (JPP). METHODS: Seventeen resistance-trained participants (22.0 ± 3.0 years, 170.0 ± 7.4 cm, 76.2 ± 11.0 kg) completed 2 visits separated by 48 hours. On visit 1, following an informed consent, participants completed familiarization with JPP. During visit 2, participants completed a LVP assessment typically consisting of 3-5 sets of JPP, each set increasing by approximately 5-10% of the participant's body mass, aiming to identify a velocity range between 1.20-0.80 m/s. All sets consisted of three repetitions with each arm and each set separated by 3 minutes. A linear position transducer was used to measure mean velocity (MV). MV was averaged for each set and arm respectively. A regression equation then allowed for the estimation of the load associated with 1.00 m/s. If estimated loads differed between dominant (DOM) and non-dominant (ND) arms, only the lighter load was used. Participants then completed an additional set of JPP with the associated load to compare estimated and measured MVs. A Bland-Altman analysis, reported as bias with 95% confidence intervals (CI) and limits of agreement (LoA), and paired-samples t-tests were used to analyze agreement between velocities and potential differences. RESULTS: For DOM, estimated and measured MVs were 1.03 ± 0.03 m/s and 1.03 ± 0.06 m/s, respectively. For ND, estimated and measured MVs were 0.99 ± 0.03 m/s and 1.03 ± 0.08 m/s, respectively. MV for DOM (bias=0.001 m/s, 95%CI =−0.024-0.027 m/s, LoA=−0.096-0.098 m/s; t=0.101, *p*=0.921) and ND (bias=−0.028 m/s, 95%CI =−0.064-0.007 m/s, LoA=−0.163-0.106 m/s; t=1.695, *p*=0.109) were not significantly different when comparing estimated and measured velocities. CONCLUSION: LVPs for JPP demonstrate excellent agreement between estimated and measured velocities, with minimal bias and narrow limits of agreement. These findings support the use of LVPs to accurately prescribe loads targeting 1.0 m/s without requiring real-time velocity adjustments.

P514: SIMPLE AND COMPLEX REACTION TASKS FOR DYNAMIC UPPER BODY PRESSING

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BACKGROUND: Dynamic pressing actions are present in various sports and occupational settings and are often accompanied by a cognitive load. Assessing the impact of visual stimuli on movement execution may provide insight into integrated neuromuscular-cognitive performance. Therefore, the purpose of this study is to compare the effects of simple- (ST) and complex-reaction tasks (CT) on dynamic upper body pressing performance. METHODS: Twelve resistance-trained participants (22.5 ± 3.1 years, 168.4 ± 8.2 cm, 77.1 ± 12.7 kg) completed three visits separated by 48 hours. During visit 1, after providing informed consent, participants completed familiarization with unilateral jammer arm presses and reaction tasks. Visual stimuli were delivered via an optical timing system. In the ST, participants were cued in advance which arm to press with. In the CT, participants responded only when two green arrows appeared pointing in the same direction. Participants completed six repetitions per task in randomized order, separated by 30 seconds of rest. During visit 2, a load-velocity profile was established to identify the individualized load corresponding to a mean concentric velocity of 1.0 m/s, which was used for all subsequent reaction tasks. An additional familiarization block was then performed. During visit 3, participants completed an experimental set of the reaction task protocol. Mean velocity, peak velocity, mean power, peak power, step length, and reaction time (RT) were recorded for each repetition. A 2-way (arm × task) repeated-measures ANOVA was used to analyze all dependent variables. RESULTS: No significant arm × task interaction was observed for any dependent variable ($F_{1,44} < 0.656$, $p > 0.422$). A main effect of task was observed for RT ($F_{1,44} = 49.3$, $p < 0.001$, $\eta p2 = 0.528$), with longer reaction times in the CT (1.022 ± 0.256 s) compared to the ST (0.593 ± 0.144 s). No main effects of arm or task were observed for any other dependent variable ($p > 0.05$). CONCLUSION: Increased cognitive demand via a complex visual stimulus significantly delayed RT during dynamic upper-body pressing, with no concomitant changes in movement velocity or power. These findings suggest that participants maintained movement execution quality at the expense of response speed, highlighting a performance trade-off under cognitive load.

P515: DOES BLOOD FLOW RESTRICTION DURING AEROBIC EXERCISE ENHANCE NON-LOCAL MUSCLE FATIGUE?

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BACKGROUND: Non-local muscle fatigue (NLMF) is a reduction in performance of an unexercised limb following fatiguing exercise of different musculature. Given inhibitory feedback via metaboreceptors is thought to be a contributor, exercise involving blood flow restriction (BFR) is useful for studying NLMF. It is also unclear if NLMF affects rapid force production and maximal strength similarly. The purpose of this study was to examine whether BFR during acute aerobic exercise augments NLMF of the elbow flexors. METHODS: Twenty young (18-35 yrs) subjects (11 female) completed a first visit for familiarization and a maximal oxygen uptake test followed by 2 experimental visits. Experimental visits involved aerobic exercise on a treadmill at 50% of maximal oxygen uptake as measured by indirect calorimetry. These visits were identical, except that BFR cuffs were worn on the upper legs during the second visit until volitional fatigue or 15 min was reached. BFR was set to 60% of premeasured arterial occlusion pressure. The third visit was volume matched, based on energy expenditure, to the second visit but without BFR. Perceived pain and discomfort were recorded following both conditions. Before and after each condition, subjects performed rapid, maximum isometric contractions of the elbow flexors with electromyography (EMG) being recorded from the biceps brachii. Peak force (PF), and absolute force as well as rate of force development from contraction onset to 200 ms were recorded. Rate of EMG rise from onset to 50 ms was also obtained. Two-way repeated measures ANOVAs and partial eta-squared effect sizes (ES) were used for analysis. RESULTS: Perceived pain (p=0.009; 1.06 vs. 0.35) and discomfort (p=0.002; 1.24 vs. 0.47) were greater following exercise with BFR. Reductions in PF (p=0.042; ES=0.233) and all rapid force outcomes (p=0.001-0.020;

ES=0.295-0.490) were similar following both conditions. Rate of EMG rise remained unchanged (p=0.206). CONCLUSION: NLMF was not augmented by BFR, given the similar reductions for outcomes between conditions. Notably, based on effect sizes, rapid force production appeared to be more affected than PF. Inclusion of rapid force metrics in future research should improve comprehensive understanding of the neuromuscular impairments and potential functional implications of NLMF.

P516: EXAMINING RELATIONSHIPS BETWEEN RELATIVE STRENGTH ON SPRINT AND JUMP PERFORMANCE IN FEMALE COLLEGIATE LACROSSE ATHLETES

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BACKGROUND: Lacrosse requires sport-specific skills such as speed, agility, and power that can be improved by increasing muscular strength. Identifying aspects of relative strength (RS) on jump and sprint performance can direct practitioners to develop programs specific for an individual. PURPOSE: This study examined relationships between RS of female collegiate club lacrosse athletes (CCFLA) on jump and sprint performance. RS was determined via the athlete's mass (kg) and one-repetition maximums (1RM) in the bench press (BP), back squat (BS), and sumo deadlift (SDL). Jump and sprint performance was measured through countermovement jump (CMJ), broad jump (BJ) and a 100-yard sprint. METHODS: Data was collected on eleven (age: 19.8±1.5 years, height: 166.9±7.3cm, mass: 68.6±18.4kg) female CCFLA. 1RM testing for BP, BS, and SDL was conducted over two separate days to ensure adequate recovery. The first day of testing consisted of BS and BP and the second day was dedicated to SDL. Athletes completed a standardized warmup (SWUP) prior to 1RM testing. Jump testing and sprint testing were conducted on the day between 1RM attempts. Athletes completed a SWUP before attempting three trials of CMJ on a Just Jump Mat. The best of the 3 trials was recorded. BJ and sprint testing was conducted on the turf field during practice later that day. Athletes completed a SWUP and recorded the best of three trials of BJ. Athletes then completed two trials of 100-yard sprints, with the best time documented. A series of Pearson's correlation coefficients were used to analyze the relationships between RS on jump and sprint performance. RESULTS: Significant relationships occurred between BS RS on CMJ, BJ, and sprint (CMJ: r=0.689; BJ: r=0.734; Sprint: r=-0.712) (p<.05), respectively. Significant relationships were observed between BP RS on CMJ, BJ, and sprint (CMJ: r=0.696; BJ: r=0.657; Sprint: r=-0.776) (p<.05), respectively. Significant relationships were observed between SDL RS on CMJ, BJ, and sprint (CMJ: r=0.752; BJ: r=0.719; Sprint: r=-0.788) (p<.05), respectively. CONCLUSION: This study showed significant relationships between RS athletes on their jump and sprint performances. Results of this study suggest improving muscular strength relative to their body mass leads to improvements in jump and sprint performances.

P517: DOES MULTITASKING HELP OR HINDER? EFFECTS OF MUSIC, GAMING, AND VIDEO ON CYCLING PERFORMANCE AND PERCEIVED EXERTION

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Background: Strategies such as listening to music, exergaming, or watching videos are commonly used during exercise to enhance enjoyment or reduce perceived effort. However, little is known about how these conditions differentially influence cycling performance and psychophysiological responses when compared under controlled conditions. **Purpose:** This study will examine the effects of music, an interactive cycling game, and neutral video viewing, relative to a no-stimulus control, on cycling performance, perceived exertion, and physiological responses during a fixed-distance time trial in college students. **Methods:** Twenty apparently healthy undergraduates will complete four randomized, counterbalanced sessions on a stationary cycle ergometer. Each session will involve a 5-km cycling time trial under one of four conditions: (1) music (120-150 BPM), (2) cycling game (standardized virtual course), (3) neutral video (nature scenes, muted), and (4) control (no external stimulus). Primary outcomes will include time to completion, mean power output, and end-exercise ratings of perceived exertion (RPE). Secondary measures will include heart rate responses, pacing variability across 1-km splits, and post-exercise affect. Data will be analyzed using a repeated-measures ANOVA to compare outcomes across the four conditions. Significant effects will be followed by pairwise comparisons using Holm correction. Effect sizes (η^2, Cohen's d) will be reported along with 95% confidence intervals. **Expected Findings:** It is hypothesized that music and the cycling game will improve performance and reduce RPE compared with control, while video distraction may lower RPE without improving performance. **Significance:** This study will provide new evidence on how different external stimuli influence exercise performance and perception, with implications for promoting adherence and enjoyment in fitness and rehabilitation contexts.

P518: ASSESSMENT OF HYDRATION STATUS IN COLLEGIATE VARSITY ESPORTS PLAYERS

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BACKGROUND: Participation in Esports requires strategic and analytical thinking, which relies heavily on players' cognitive performance. Decreases in cognitive performance and moodiness have been reported with a body mass loss as low as 2% and remaining adequately hydrated could be an important factor to consider for Esports players. Therefore, the purpose of this study is to assess the daily hydration status of Esports players. METHODS: Seven University of Mississippi Esports varsity players participated in the study. The first visit participants completed an informed consent document, a fluid intake questionnaire, a thirst visual analog scale, and provided a urine sample. For each subsequent visit participants would provide a urine sample and complete a thirst visual analog scale where 0 was not thirsty at all and 10 was extremely thirsty. To determine hydration status urine specific gravity (USG) was measured utilizing a refractometer. 1.000 - 1.019 was considered hydrated, 1.020 - 1.025 was considered minimally dehydrated, 1.026 - 1.029 was considered moderately dehydrated, and ≥ 1.030 was considered significantly dehydrated. A Pearson r correlation was conducted to determine the relationship between USG, thirst, and daily fluid intake. Significance was declared at $p < 0.05$. RESULTS: The average USG of our participants was 1.026 indicating a moderate level of dehydration. A strong inverse relationship was seen between USG and daily fluid intake ($r = -0.91$; $p = 0.004$). However, no relationship was found between USG and thirst ($r = 0.05$; $p = 0.825$) and a weak inverse relationship was seen between thirst and daily fluid intake ($r = -0.21$; $p = 0.660$). CONCLUSIONS: While the brain is capable of compensating for fluid limitations for short periods of time, it may not be able to sustain the required increased mental effort that esports demand for longer hours. These results indicate that Esports players could be at a disadvantage when it comes to hydration practices and future research is needed to determine the effect of dehydration on gaming performance.

P519: ANKLE DORSIFLEXION DIFFERENCES DUE TO FATIGUE IN MEN'S DIVISION II COLLEGIATE BASKETBALL PLAYERS.

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BACKGROUND: The prevalence of significant time-loss from injuries pertaining to the lower body can be attributed to the fatigue of a long season. Previous research indicates the biomechanics at the ankle joint can lead to increased risk of injury such as anterior cruciate ligament (ACL) tear, Achilles rupture, or patellofemoral tendinopathy. Studies also revealed that the establishment of baseline ankle range-of-motion (ROM) measures can allow the decrease of injury for a team over the course of professional season. Understanding ankle ROM norms can lead to detecting critical injuries and the development of a strength and conditioning plan to help avoid injury. The purpose of this study is to analyze the relationship that fatigue has upon ankle ROM using a static lunge test to record a numerical measure and a practice session to simulate competitive fatigue. METHODS: 20 Male Division II Collegiate Athletes will participate in this study. After their normal stretching routine, participants will be asked to perform a static, weight bearing lunge, also known as a "toe-to-wall" test both before and after a practice session that simulates fatigue. The ankle dorsiflexion measure will be recorded, and changes both before and after the practice session will be identified and analyzed. Results will be analyzed using ANOVA to determine the significance of differences between pre-practice ankle dorsiflexion and post-practice measures. ANTICIPATED RESULTS: It is hypothesized that the ankle dorsiflexion measures of the participants will decrease after a practice session.

P520: DUAL AND SINGLE PLATING YIELD SIMILAR CLINICAL OUTCOMES FOR MIDSHAFT CLAVICLE FRACTURES

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BACKGROUND: Dual-plating techniques have been shown to improve biomechanical stability and reduce hardware complications compared

to single-plating in displaced midshaft clavicle fractures. The purpose of this study was to compare patient-reported outcome measures (PROMs) between single- and dual-plating techniques for midshaft clavicle fractures.
METHODS: A retrospective review was performed on patients who underwent open reduction internal fixation (ORIF) for midshaft clavicle fractures between January 2010 and December 2023. Patients were stratified into three groups: dual-plating, single anterior plating, and single superior plating. PROMs collected included QuickDASH, ASES-Pain, ASES-ADL, ASES-Total, and VAS-Pain. Complications assessed included hardware removal, broken hardware, paresthesia, post-surgical pain, and limited mobility.
RESULTS: A total of 109 patients met the inclusion criteria: 22 underwent dual-plating, 13 underwent single anterior plating, and 74 underwent single superior plating. Mean follow-up was significantly shorter in the dual-plating group (2.89 ± 2.48 years) compared with both single anterior (7.87 ± 4.60 years, p = 0.0003) and single superior groups (7.46 ± 4.02 years, p < 0.0001). No differences were observed between groups with respect to age, sex, BMI, tobacco use, diabetes status, or fracture morphology. PROMs did not significantly differ between groups. Hardware removal was significantly more frequent in the single anterior plating group (38.4%) compared with the single superior plating group (2.7%, p < 0.001). No other complication rates differed between groups.
CONCLUSIONS: Long-term outcomes do not significantly differ between dual- and single-plating techniques for displaced midshaft clavicle fractures. Given comparable PROMs and complication rates, surgeons can feel comfortable selecting plating techniques based on preference and patient-specific factors.

P521: FEASIBILITY OF A DYNAMIC WARM-UP INTERVENTION AMONG FIREFIGHTER RECRUITS

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BACKGROUND: Many career fire departments use recruit academies to provide formal training prior to full duty. Recruit academies target entry-level skills, certifications, and physical training to enable occupational competence. Recruit cohorts are often heterogeneous in age, experience, and physical fitness. Further, no consistent fitness assessments are used to determine minimal competence in the American fire service. This creates novel challenges in injury risk mitigation in firefighter recruit academies. Dynamic warm-up interventions are cited as effective elements in performance and injury prevention programs in physically active populations, but little investigation has included recruit firefighters. This study aims to assess the feasibility of a dynamic warm-up intervention prior to physical training with recruit firefighters and academy cadre.
METHODS: A modified version of Hermen and Smith 2008 dynamic warm-up routine will be implemented with the following 10 exercises each performed for 1 minute: supine lumbar rotation, bend and reach, diagonal lunge and reach, squat and overhead reach, rower, prone row, inch worm walkout with rotation, windmill, power jumps, lateral skater hops. Recruits will be instructed to complete as many quality repetitions as possible within the time to account for heterogenous capability. Intervention fit will be assessed with Acceptability of Intervention Measure (AIM), Intervention Appropriateness Measure (IAM), and Feasibility of Intervention Measure (FIM) from Weiner et al. (2017). Rate of adoption and stakeholder feedback will be assessed at the conclusion of the recruit academy. ANTICIPATED RESULTS: We anticipate an adoption rate of 75% and average AIM, IAM, and FIM scores of 3.5/5. This will be considered the minimum criteria for intervention feasibility, acceptability, and appropriateness. If these minimum criteria are not met, stakeholder feedback will be used to modify the intervention for reassessment of feasibility.

P522: EFFECTS OF ATHLETE TRAINER GENDER CONCORDANCE ON RETURN TO PLAY AND INJURY RESOLUTION OUTCOMES

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Background: Varying factors play a role in outcomes after musculoskeletal (MSK) injury. This study aims to determine if there is a relationship between injury outcomes in High School (HS) athletes and gender concordance with the athletic trainer (ATC).
Methods:7209 HS athletic injuries from 2011-21 in the Steadman Hawkins Sports Medicine ATC network were included. Median time to return to play (RTP) and injury resolution (IR) were determined from the patient record. Correlations with Athlete/ATC gender concordance were assessed using Wilcoxon Rank Sum test. Concussions were assessed as a potential control group, as we hypothesized that the standardized RTP protocol would minimize variation in RTP and IR in concussion, relative to MSK injury. Injuries with immediate RTP or incomplete data were excluded. **Results:**1163 concussions (65% male/35% female) and 6046 MSK injuries (68.7% male/31.3% female) were included from 76 treating ATCs (40.8% male/59.2%female). RTP after concussion was similar for athlete/ATC gender concordance/discordance (median 15d, p=0.26) and IR (discordant 18.5 v concordant 18d, p = 0.65). Female athletes demonstrate a longer time to RTP/IR in agreement with existing literature. Differences in time to RTP for MSK injury were noted with male ATCs returning athletes earlier than female ATCs (male, concordant dyad 5d v discordant 7d, p<0.0001/female, discordant dyad 6d v concordant 8d, P<0.0001). Time to IR for MSK injury was faster with female ATCs in athletes of both genders (male, discordant dyad 19 days v Concordant 24 days p = <0.0001; female, concordant 21d v discordant 28d, P<0.0001). The fastest IR occurred with female ATC-male athlete dyads at 19 days, despite male athlete RTP 2 days earlier by male ATCs (IR=24d). Conclusions**:** Female ATCs report faster IR in HS athletes, despite a later RTP. The significant differences in concordant vs discordant dyads RTP and IR, seem to be driven by ATC gender. Interpretation is limited by potential variation in documentation practices between ATCs. However, IR and RTP is similar for concussion between groups, potentially driven by standardized management. The cause of earlier RTP by male ATCs, and earlier IR by female ATCs is unknown, highlighting a need for further evaluation of factors influencing decision-making.

P523: THE EFFECT OF FATIGUE ON CONTINUAL CPR CHEST COMPRESSION DYANMICS IN CERTIFIED COLLEGE STUDENTS

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BACKGROUND: Modern CPR recommendations suggest performing chest compressions (CC) at a rate of 100- 120 CC per minute, at a depth of 2 to 2.4 in., switching rescuers every 5 cycles (when doing 30 chest compressions per 2 breaths). However, real-world situations may have bouts of CPR last far longer without rest. Rescuer fatigue increases as CPR is performed, leading to poorer technique and compression depth. The purpose of this study was to evaluate how fatigue may affect the quality of CC and overall outcome of quality of CPR performed. METHODS: 14 subjects (age: 20.75 yr ±1.21) with CPR current certification participated in this study. Subjects performed 3 trials on 3 separate days: 1 min. (1MT), 2 min. (2MT and 3 min. (3MT) of continuous CPR. A specialized mannequin (Brayden Pro, AERO, NZ) was used to measure CC, compression depth (CD) and compression location (CL). Heart rate (HR) was measured during all trials. RESULTS: Mean HR increased (p<0.05) in 1MT (PRE: 76.57 b/min ±12.63 v. POST: 100.14 b/min ±18.42). 2MT (84.07 b/min ±16.52 v. POST: 113.43 b/min ±21.657) and 3MT (PRE: 82.437 b/min ± 21.49 v. POST: 112.14 b/min ±26.30). Mean CC was not different across trials (1MT: 107.67±7.51, 2MT: 111.29±9.15, 3MT: 110.43±12.37) Mean CC depth (cm) was not different across trials (1MT: 5.85±0.315, 2MT: 5.82±0.303, 3MT: 5.804±0.330). During the 3MT, 6 out of the 14 subjects did not meet the recommended CC rate of 100-120 and 3 subjects did not meet the recommended depth. CONCLUSION: Some parameters of CPR performance were changed during extended compressions. Further research into actual alterations in cardiac dynamics and resuscitation successfulness is needed.

P524: INSPIRING CHANGE IN THE SURGICAL CARE CONTEXT: PROTOCOL FOR A HUMAN-CENTERED DESIGN STUDY

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Despite significant technological advances in surgical techniques and perioperative care, substantial gaps exist in the delivery of surgical services that stand to negatively impact patient outcomes. Traditional approaches to surgical quality improvement often have focused narrowly on clinical outcomes without comprehensive exploration of the systemic, organizational, and human factors that shape surgical care environments. Human-centered design (HCD) approaches that prioritize the perspectives of surgical teams are essential for addressing multifaceted challenges and supporting sustainable quality improvements in surgical care delivery.
This "inspiration" stage study is guided by the IDEO HCD framework, leveraging individual interviews to gain an understanding of successes and challenges present in the surgery environment before co-designing solutions hand-in-hand with members of the surgical team. We will conduct a series of 30-60 minute semi-structured interviews with N=25 individuals from surgical care teams within the Advocate Health system in Winston Salem, NC. Interview guides will be designed to explore perspectives on factors influencing surgical care delivery, team workflows, patient outcomes, and provider wellbeing. Interviews will be audio-recorded with verbal informed consent and transcribed verbatim. We will follow a phased thematic analysis framework including independent coding of transcripts using Dedoose software, definition of emergent themes, and generation of ideas for potential solutions.

We anticipate themes will relate to barriers associated with technological integration, organizational constraints, and care team training. The resulting data will be invaluable for next-stage HCD research focused on prototyping solutions to the challenges identified, testing their impact, and integrating into the local healthcare system.

P525: SPORT-SPECIFIC BURDEN OF ASTHMA AT UNC: PREVALENCE AND ASTHMATIC EVENTS ACROSS CAROLINA ATHLETICS

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BACKGROUND: Most asthma studies primarily focus on selective cohorts by sport or professional level, leaving gaps at the collegiate levels and among a broad spectrum of sports.This study aimed to quantify the prevalence of asthma among UNC athletes by sport and to assess asthma management and outcomes across teams. METHODS: We conducted a retrospective chart review of student-athletes with asthma seen by UNC Sports Medicine between January 1, 2019, and June 12, 2025. Asthma was defined by preseason physicals or diagnosis at UNC. Data from electronic medical records included sport, asthma events, triggers, and treatment strategies. A total of 99 athletes met the inclusion criteria. Of these, 40 participated in nonendurance sports (golf, field events, diving, baseball, gymnastics, fencing, football, and volleyball), and 59 participated in endurance sports (field hockey, wrestling, lacrosse, basketball, swimming, soccer, tennis, track, and rowing). Fisher's Exact Tests were used to assess differences in inhaled corticosteroid (ICS) treatment initiation, asthma event triggers, and asthma events among athletes with asthma participating in endurance versus non-endurance sports. Statistical significance was defined as $p < 0.05$. RESULTS: Among all athletes on the 2024-2025 athletic roster, 14% had a recorded asthma diagnosis. Of those initially on short-acting β_2-agonist (SABA) therapy or no therapy, 29.8% of endurance athletes and 11.1% of nonendurance athletes escalated to ICS therapy, however, this difference did not reach statistical significance (p=0.059). Asthma related events were reported by 66.1% of endurance and 52.5% of nonendurance athletes, also not statistically significant (p=0.211). Across all athletes with asthma, 71% of events were attributed to upper respiratory infections (URIs). CONCLUSION: Asthma prevalence among UNC athletes (14%) exceeded that of the general population, with similar rates across endurance and non-endurance sports. Although differences did not reach statistical significance, trends suggested that endurance athletes were more frequently transitioned to inhaled corticosteroid therapy compared to their non-endurance counterparts. This escalation in treatment may contribute to the observed similarity in asthma event frequency between groups.

P526: BLINK REFLEX PARAMETERS CORRELATE MODERATELY WITH CONCUSSION SYMPTOM SEVERITY

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Background: Diagnosing sport-related concussion (SRC) remains a clinical decision, with self-reported symptoms serving as the most common tool for diagnosis, prognosis, and medical clearance. However, symptom reporting is subjective and prone to both under- and over-reporting. The blink reflex, an autonomic nervous system response, has been shown to provide an objective measure of SRC. This study aimed to examine the relationship between changes in the blink reflex before and after injury and self-reported SRC symptoms.**Methods:** Thirty-nine athletes (79% male; mean age 20.46 ± 1.5 years; 0.95 ± 1.21 days post-injury) were included over a 3-year period. Athletes underwent baseline blink reflex testing at preseason each year. Following a concussive head injury, athletes were evaluated by an athletic trainer within 2 days, at which time the blink reflex was reassessed. Blink reflex parameters included latency, differential latency, delta 30, excursions, and initial velocity. They also completed the Post-Concussion Symptom Scale, which rates the number and severity of symptoms on a 0-6 Likert scale. **Results:** Total symptom severity and sleep-related symptoms showed a moderate correlation (ρ = 0.40-0.69) with initial velocity and excursions. Affective symptoms correlated moderately with differential latency and delta 30. Sensitivity to light correlated moderately with latency and delta 30. **Conclusions:** The blink reflex is altered following SRC, with specific parameters showing moderate correlations with symptom domains. Objective assessment of primitive neurological reflexes may therefore help corroborate self-reported symptoms.

P527: ASYMMETRICAL DIFFERENCES IN VERTICAL GROUND REACTION FORCES IN NCAA DIVISION III SOCCER ATHLETES

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BACKGROUND: The purpose of this exploratory study was to examine asymmetrical differences in vertical ground reaction force (vGRF) between dominant and nondominant legs during performance tests in NCAA Division III soccer athletes. METHODS: Five males and five females completed a testing session in the Human Performance Laboratory at Methodist University. Testing included a standardized warm-up, and three randomized tasks: countermovement vertical jump (VJ), 5-10-5 shuttle run (SHR), and reactive strength index (RSI). vGRF was collected bilaterally using force plates, and asymmetry indices (ASI) were calculated as percentage differences between legs. Statistical analyses included two-way ANOVA to compare ASI across tasks and between sexes. RESULTS: A two-way ANOVA revealed no significant interaction between test and sex ($F(2,24) = 2.77$, $p = .08$). There was a significant main effect for test ($F(2,24) = 6.9$, $p = .004$), and a main effect for sex ($F(2,24) = 13.13$, $p = .001$). Paired-samples t-tests showed greater asymmetry during the shuttle run (-13.03% ± 20.44%) compared to both the vertical jump (1.97% ± 4.72%; $p = .03$) and RSI (5.17% ± 14.44%, $p = .02$). Independent samples t-test showed greater asymmetry in males (-26.78% ± 17.49%) than females (0.71% ± 12.73%) during the shuttle run ($p = .02$). CONCLUSIONS: Greater bilateral asymmetry was observed during the shuttle run compared to the vertical jump and RSI, suggesting that task-specific demands influence the magnitude of vGRF asymmetries. A directional trend was noted: males tended to favor their non-dominant leg, whereas females tended to favor their dominant leg. These findings highlight the importance of considering both task specificity and sex-based patterns of leg preference when evaluating asymmetry, athletic performance, and potential injury risk in competitive athletes.

P528: TRACKING PITCH HORIZONTAL BREAK OVER A FULL SEASON AS A MEANS OF PREDICTING INJURY RISK IN NCAA D1 BASEBALL PITCHERS

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BACKGROUND: The Ulnar Collateral Ligament (UCL) is a critical ligament in the elbow that plays a key role in stabilizing the elbow joint and plays an essential role in throwing biomechanics. Rates of UCL damage leading to Tommy John surgery continue to be on the rise not only professional baseball players but also in collegiate and youth baseball players. In particular, Major League Baseball has shown a particular interest in developing unique ways to predict and perhaps mitigate the risk of elbow injuries. Recent evidence is beginning to suggest that elevations in arm-side horizontal break on fastballs could be an early indicator of elbow injuries. The purpose of this study will be to track pitch metrics over the span of a full baseball season to see if spikes in arm-side horizontal break could correlate to arm-specific soreness and be predictive of potential elbow injuries in baseball pitchers. METHODS: 21 male baseball pitchers will be recruited for the study (16 RHP, 5 LHP) who are members of a D1 NCAA baseball team. Pitch metrics will be measured each game using TrackMan (Vedbæk, Denmark) and tracked by pitch type for each individual pitcher over the span of an entire season. Variables that will be measured include: pitch release side width, pitch release height, release speed, spin rate, pitch tilt, induced vertical break, induced horizontal break, vertical approach angle, horizontal approach angle, pitch location width, and pitch location height. Arm soreness will be evaluated by clinical professionals on the athletic training staff using standard protocols. A repeated-measures ANOVA and logistical regression will be used to evaluate relationships in the variables measured. ANTICIPATED RESULTS: Our central hypothesis is that spikes in induced horizontal break on fastballs will show a strong relationship to elbow soreness as a season progresses. If this relationship is confirmed, this type of data could be used to be an early predictor and therefore indicator of potential elbow injuries. If a coaching staff and the medical professionals monitoring these athletes are able to catch these issues early enough, it's possible that preventative mechanisms could be put in place to manage this athlete's throwing regimen prior to an injury occurring that requires surgical intervention.

P529: BASELINE MENTAL HEALTH AND ANXIETY IN FIRST-YEAR FEMALE COLLEGE STUDENTS ENROLLED IN A YOGA PROGRAM

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BACKGROUND: The transition from high school to university is a pivotal life stage marked by increased academic, social, and personal demands. Female first-semester college students experience heightened vulnerability to mental health challenges, with elevated anxiety being the most reported. The purpose of this study was to examine baseline mental health in first-year female college students prior to participation in a yoga intervention. **METHODS:** This study assessed baseline mental health levels in female, first-semester college students enrolling in an 8-week yoga intervention. Anxiety was measured using the Hospital Anxiety and Depression Scale (HADS), with additional assessments of resilience (Brief Resilience Scale) and quality of life (SF-12). Participants (N = 15; 18 ± .38 years) were racially and ethnically diverse: 33.33% White or European American, 26.67% Black or African American, 6.67% Middle Eastern or North African, 6.67% Native American, 26.67% Asian, and 13.33% other, with 20% identifying as Hispanic/Latinx. The average BMI was 24.77 ± 2.77 kg/m^2. **RESULTS:** At baseline, participants reported borderline abnormal anxiety on the HADS (M = 8 ± 3.76). Resilience scores were within the normal range (M = 3.61 ± .65), while quality of life scores revealed above-average physical health (M = 54.78 ± 3.80), but slightly below-average mental health (M = 49.65 ± 7.76). These results suggest that first-semester female students may be entering college with elevated anxiety and diminished mental quality of life. **CONCLUSIONS:** Findings demonstrate that anxiety is a pressing concern among first-semester female college students, leading to potential consequences for academic performance, social adjustment, and overall well-being. Elevated anxiety paired with lower mental quality of life underscores the importance of establishing baseline data to guide early intervention strategies. Future research should investigate interventions, such as yoga, on anxiety at a larger to address the widespread prevalence of anxiety among college students.

P530: EXPECTATIONS AND THEIR INFLUENCE ON AFFECTIVE RESPONSES TO RESISTANCE EXERCISE

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BACKGROUND: The affective experience of exercise has been identified as a determinant of exercise participation; however, most research has focused on aerobic exercise (AE). Fewer U.S. adults meet muscle-strengthening compared to AE guidelines, indicating barriers to resistance exercise (RE). The affective expectation model posits that affective responses can be influenced by expectation priming, with research showing that expectations influence anticipated and experienced affect to AE. Affective responses to RE and the impact of expectation priming are poorly understood. This study aims to assess affective responses to acute RE and determine whether they vary as a function of participants' expectations. METHODS: Adults (N=45; ages 19-45) who regularly engage in RE (≥3 months of continuous experience) will be recruited. Visit one will consist of questionnaires, familiarization, and ten-repetition maximum (10-RM) testing for the RE bout (machine chest press, hex-bar deadlifts, lat pulldowns, bicep curls, and triceps extensions). Visit two (≥72 h later) will include a brief 10-min warmup and 30 min of moderate-intensity (70% of 10-RM), full-body RE. Participants will be randomized to one of three groups: negative expectation (NE) priming (e.g., "this workout will leave you fatigued and tired"), positive expectation (PE) priming (e.g., "this workout will make you feel energized"), or control (no priming). Affective valence will be assessed before, during, and immediately after RE using the Feeling Scale. Anticipated and remembered affect will be assessed using a visual analog scale before and 5 min after RE, respectively. Mixed-effects models will test changes in affective valence by group; ANOVAs will test group differences in anticipated and remembered pleasure. ANTICIPATED RESULTS: RE is expected to increase pleasure, with responses moderated by expectation priming. NE priming is hypothesized to blunt affective responses relative to PE priming and control groups.

P531: EFFECT OF AN ACUTE BOUT OF EXERCISE ON COGNITIVE FUNCTIONS IN HEALTHY ADULTS

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BACKGROUND: Acute aerobic exercise can enhance cognitive functions such as short-term memory and cognitive flexibility for up to 20 minutes, which may be partly due to factors such as increased cerebral blood flow. However, effects on other cognitive domains like perceptual-motor and complex attention remain less clear. Therefore, this study examined the effect of acute exercise on complex attention, executive function, learning and memory, and perceptual-motor function. METHODS: Twenty-one participants (47.2% female, age 20.71 ± 1.65 years, BMI 23.19 ± 2.88) completed three testing sessions, a baseline, post-exercise, and 24-hour follow-up. At each, they performed the Color-Word Stroop (inhibition), Digit Span Backward (working memory), Trail Making Test (set shifting), Benton Judgment of Line Orientation (spatial reasoning), and Rey Auditory Verbal Learning Test (immediate recall). Exercise included a 2-min warm-up, then 20 min on a treadmill at 55-65% max heart rate. Heart rate (Polar chest strap), treadmill speed, and perceived exertion (Borg Rating of Perceived Exertion) were recorded every 2 min. RESULTS: A Time x Measure interaction ($F_{2.47, 49.43}$=11.65, p<.001, ηp^2=.368) and main effect of Time ($F_{2.45, 48.97}$=169.98, p<.001) were observed. A post hoc test revealed no significant improvements from pre- to post-exercise. Inhibition (M_1=16.37s, M_3=11.99s, p=.015), and set shifting (M_1=27.82s, M_3=15.50s, p=.009) improved significantly from pre-exercise to post-24hr, with set shifting significantly improving post-exercise to post-24hr (M_2=20.99s, M_3=15.50s, p=.031). Spatial reasoning, working memory, and immediate recall showed no significant changes across sessions (all p>.28). CONCLUSION: Although reliability has been established in these tests, inhibition and set shifting improved pre-exercise to post-24-hr, likely reflecting practice effects rather than acute exercise effects. To accurately determine the effects of an acute exercise, future studies should use other testing measures with greater reliability to reduce learning effects.

P532: PRIORITIZING BURNOUT PREVENTION IN HUMAN SERVICES: QUANTIFYING THE UNIQUE CONTRIBUTIONS OF WORK DEMANDS, ORGANIZATIONAL SUPPORT, MENTAL TOUGHNESS, AND TRAUMA-INFORMED CLIMATE

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BACKGROUND: Burnout is prevalent in human services. Although organizational climate, tangible support, and individual mental toughness (MT) are often cited, their unique contributions are seldom compared head-to-head. This study asked a resource-allocation question: given overlap among predictors, which factors show the strongest unique associations with burnout, and what proportion of explained variance do they account for?**METHODS:** County human services employees provided survey data at two administrations, yielding 192 observations from 97 employees. In a pooled ordinary least squares model, burnout was regressed on composite scores for perceived work demands, instrumental organizational support, MT and trauma-informed climate. We reported standardized coefficients, variance inflation factors, relative importance shares using LMG, and both HC3 and cluster-robust (by person) standard errors.**RESULTS:** The model was significant, $F(4,187) = 55.77$, $p < .001$, explaining 54.4% of burnout variance. Work demands showed the largest unique association with higher burnout ($\beta = 0.38$, $p < .001$). Instrumental support ($\beta = -0.26$, $p = .003$) and MT ($\beta = -0.14$, $p = .008$) were significant protective correlates. The unique association for trauma-informed climate (TIC) was not significant after adjustment ($\beta = -0.17$, $p = .054$). Collinearity was acceptable (VIF range ≈ 1.2-3.3). Relative importance shares were: Demands 34.7%, TIC 28.6%, Instrumental Support 28.2%, MT 8.5%. Separate wave-specific models at each administration yielded the same ordering of predictors.**CONCLUSIONS:** In this cohort, workload is the dominant correlate of burnout, and two levers show independent protective links: instrumental support and MT. Trauma-informed climate aligns with lower burnout in simple correlations, but its unique contribution is attenuated when related supports are considered. Findings support a dual-track prevention strategy that reduces demand load while strengthening concrete supports and skills. Future work should test within-person change and compare unique contributions using relative-importance metrics in longitudinal models.

P533: MORE THAN A GOOD BOSS: INSTRUMENTAL SUPPORT VERSUS SUPERVISOR SUPPORT IN PROSPECTIVE MODELS OF BURNOUT

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BACKGROUND: Efforts to reduce employee burnout often target supervisor behavior; yet, operational resources like adequate tools and

conditions may be more critical. We prospectively compared the unique effects of instrumental support and supervisor support on burnout and tested two mechanisms: substitution and thresholding. METHODS: County human services employees completed two survey waves. We paired observations and modeled follow-up burnout from baseline burnout, instrumental support, and supervisor support, adjusting for demands and trauma-informed climate. Primary analyses used ordinary least squares with HC3 robust standard errors. Substitution was tested with Instrumental×Supervisor and Instrumental×Demands interactions. Thresholding was evaluated with restricted cubic splines for instrumental support. A change-on-change model examined whether within-person increases in supports tracked change in burnout. We reported collinearity indices and standardized betas. Alpha was .05. RESULTS: In analytic of n = 70, follow-up burnout was overwhelmingly predicted by baseline burnout (b = 0.730, p < .001). After adjusting for baseline levels and other covariates, the unique effects of both instrumental support (p = .679) and supervisor support (p = .076) were not statistically significant. Further analyses found no evidence for resource substitution or non-linear thresholding effects. CONCLUSIONS: In this cohort, burnout demonstrated remarkable temporal stability, largely resisting change from either instrumental or supervisor support. This suggests that once burnout becomes established, it may act as a chronic condition. Therefore, organizational efforts must shift from intervention to primary prevention, focusing on identifying at-risk staff and mitigating demands before burnout solidifies.

P534: HOW DEPRESSION AFFECTS RECOVERY TIME IN SPINAL CORD INJURIES

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BACKGROUND: Studies have examined the relationship between spinal cord injuries and the impact of optimism on patients' recovery time. Research on recovery time and progress in patients with spinal cord injuries while battling depression is vast but inconclusive. The basis of this study is to investigate whether patients with spinal cord injuries who are struggling with depression have a slower recovery time and how that may affect their progress to regain possible mobility in Physical Therapy and Occupational Therapy. **METHODS:** Ten patients with spinal cord injuries, five females and five males, will be recruited. Participants will be included based on treatment plans; all must have a similar timeline and therapy layout. A counselor or physician will assess each participant to determine symptoms of depression. All participants will continue to undergo normal physical therapy for their injuries. At study entry and biweekly thereafter, participants will complete the Patient Health Questionnaire-9 (PHQ-9) to assess mental health status. **ANTICIPATED RESULTS:** It is hypothesized that the participants exhibiting continued depressive symptoms over the course of treatment will experience slower progress and be hospitalized longer than the participants without depression symptoms. The participants without depression symptoms will have a quicker discharge date and make more milestone progress than the participants with depression symptoms, who may not reach milestones until a later date.

P535: DO ORGANIZATIONAL VS. PERSONAL RESOURCES BUFFER WORK DEMANDS IN RELATION TO JOB SATISFACTION AMONG COUNTY HUMAN SERVICES EMPLOYEES?

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BACKGROUND: Human services work involves sustained emotional and time pressures, but organizational resources like trauma-informed climate (TIC) and instrumental support may protect job satisfaction. Personal resources such as mental toughness (MT) may also relate to satisfaction. We tested whether TIC and instrumental support attenuate the association between work demands and satisfaction, beyond mental toughness. METHODS: We used averaged survey data from county human services employees (N ≈ 130) to model job satisfaction. A hierarchical linear model first assessed the impact of work demands and MT; then, added TIC and instrumental support to test for unique and buffering effects. RESULTS: While higher demands predicted lower satisfaction initially, this effect disappeared after accounting for organizational resources. Both TIC (b = 0.156, p < .001) and MT (b = 1.098, p = .001) were strong positive predictors of satisfaction. Critically, both climate (p = .023) and instrumental support (p = .029) significantly buffered the negative association between demands and satisfaction. CONCLUSIONS: Mental toughness was positively related to satisfaction, but it was the organizational resources that uniquely protected employees from the strain of high demands. Strengthening TIC and practical support are therefore critical and actionable targets for enhancing workforce well-being.

P536: PHYSICAL ACTIVITY, MENTAL HEALTH, AND ALCOHOL USE IN MEN AND WOMEN: RESULTS FROM SECONDARY ANALYSIS

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BACKGROUND: Alcohol use is influenced by behavioral, psychological, and biological factors. For example, higher levels of physical activity (PA) are often linked to greater alcohol use, with stronger associations typically reported in men. Additionally, greater mental health (MH) disturbances are often associated with greater alcohol use, and some evidence suggests this relationship is stronger in women. However, it remains unclear whether these complex biopsychosocial factors interact to influence alcohol-related outcomes. **METHODS:** We conducted a secondary data analysis from 107 adults (61% women, 54% white; M±SD age=28±9 y) who completed self-report measures of problematic alcohol use (Alcohol Use Disorders Identification Test; AUDIT) and PA (International Physical Activity Questionnaire; IPAQ-SF), along with comprehensive MH assessments (e.g., depression, anxiety) which were used to derive distinct MH profiles via K-means clustering. A robust multiple linear regression examined the full factorial interaction of PA (total MET-mins/wk), MH profiles (cluster groupings), and sex on problematic alcohol use (AUDIT total score), while adjusting for covariates known to influence alcohol use (i.e., age, race, education). **RESULTS:** Participants reported an average of 2584±1948 total MET-min/wk, and 70% of the sample met the aerobic component of the federal PA guidelines. Two distinct MH profiles emerged: Cluster 1 included participants with better overall MH and cluster 2 included those with worse overall MH (between-group Cohen's d range = 1.14 to 2.29 for all MH variables). The model revealed a significant PA × MH × sex interaction ($t(96)=2.56$, $p=0.012$, $R^2_{adj}=0.29$). Simple effects analyses revealed a stronger positive association between PA and problematic alcohol use among men with worse MH compared to men with better MH. In contrast, this pattern was reversed in women: the positive association between PA and problematic alcohol use was stronger among women with better MH compared to those with worse MH. **CONCLUSION:** These findings suggest that the strength of the relationship between PA and problematic alcohol use varies as a function of overall MH and sex. Future studies should examine temporal relationships among these variables in larger samples and incorporate device-based measures of PA.

P537: THE EFFECTS OF THE LEVELS OF PHYSICAL ACTIVITY ON COGNITIVE HEALTH AND PSYCHOLOGICAL SKILLS

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BACKGROUND: Physical inactivity has been consistently impacting health and quality of life worldwide. It has been impairing mental and cognitive health, particularly with an increased risk of cognitive decline, Alzheimer's disease, and Depression. Exercise is becoming recognized as an important factor that can improve cognitive health and serving as a neurogenerative protector. A recent theory "effort minimization in physical activity" proposes that people struggle to adhere to exercise because of a natural tendency to be attracted towards sedentary behavior. The purpose of this study is to examine how different levels of physical activity impact cognitive health and are correlated with the natural attraction towards sedentary behavior. METHODS: One hundred (50 physically active and 50 sedentary) undergraduate students will be recruited (ages 18 - 30). Physical activity levels will be assessed with the International Physical Activity Questionnaire (IPAQ). Working memory capacity will be examined with OSPAN test. Cognitive inhibition and implicit attraction to sedentary behavior will be assessed with go/no-go tests. Levels of physical activity will be correlated with working memory capacity, inhibition/self-control, and attraction towards sedentary behavior. Additionally, we will analyze levels of physical activity with sleep behavior, self-esteem, self-efficacy, and self-concept. Multiple ANOVAs will be utilized to determine statistical difference between levels of physical activity and cognitive health and psychological skills. ANTICIPATED RESULTS: Individuals with higher levels of physical activity are expected to show superior WM capacity; greater self-control; and higher implicit attractiveness towards physical activity.

P538: PHYSICAL ACTIVITY, HORMONAL BIRTH CONTROL, AND EMOTION REGULATION: RESULTS FROM A CROSS-SECTIONAL, SECONDARY ANALYSIS

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BACKGROUND: Greater physical activity (PA) is often associated with an enhanced capacity to regulate emotions in adult women. Similarly, hormonal birth control (HBC) use has been found to influence emotion regulation, although studies report equivocal findings regarding the direction of this relationship. Moreover, it remains unclear whether HBC use modifies the association between PA and emotion regulation. **METHODS**: We conducted a secondary data analysis of a sample of 65 females (89% White; M±SD age = 29 ± 10 y) who completed the Difficulties in Emotion Regulation Scale (DERS), International Physical Activity Questionnaire - Short Form, a Menstrual Cycle Log, and a basic demographic questionnaire. Robust multiple linear regression models were fit to examine the interaction between PA and HBC use on overall and domain-specific emotion regulation difficulties (nonacceptance of emotional response, engaging in goal-directed behavior, impulse control, emotional awareness, access to emotion regulation strategies, and emotional clarity), while adjusting for covariates known to influence emotion regulation (i.e., age, race, education). **RESULTS**: Participants not using HBC reported less PA volume compared to those using HBC (2305 ± 2171 vs 2749 ± 1976 total MET-min/wk, respectively; between-group Cohen's d = -0.21). Regression analyses revealed a significant main effect of PA volume on emotional clarity ($t(58) = 2.29$, $p = 0.025$), indicating a positive association between PA volume and disturbances in emotional clarity, independent of HBC use. All other main effects and interactions for overall and domain specific emotion regulation outcomes were non-significant (all p-values > 0.211). **CONCLUSIONS**: In this sample of highly active young women (on average), those with greater self-reported PA volume were more likely to report experiencing less clarity surrounding their experienced emotions. Use of HBC did not independently influence or moderate relationships between PA and emotion regulation difficulties. Longitudinal studies with larger samples and device-based measures of PA are needed to clarify interactive relationships among PA behaviors, HBC use, and emotion regulation abilities, and to identify potential mechanisms underlying the observed effects.

P539: THE NEURAL CORRELATES OF VISUOMOTOR PERFORMANCE AND RETENTION AFTER ACUTE AEROBIC EXERCISE: A PILOT STUDY

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Acute exercise has been shown to positively influence the learning of new motor skills. Alpha oscillations, brain waves associated with attention and cognitive control are modulated by acute exercise. The purpose of this study is to understand how vigorous exercise changes alpha oscillatory power and its relationship to skill learning and memory. In our preliminary investigation, 9 right-handed healthy young adults (6 females, 25.7±4.5 years, BMI 25.7±5.3) completed three visits. Visit 1 included screening and VO2max testing (30.4 ± 6.5 mL/kg/min). Visits 2 and 3 involved counterbalanced time-matched high-intensity interval exercise or guided meditation sessions. Following each intervention, participants completed an EEG resting measurement, then performed a visuomotor rotation task, where participants adapted their movement to a 45-degree visual offset followed by a retention period where participants recalled their adaptive movement. A linear mixed model examined effects of stage (early learning, late learning, retention) and condition (meditation, exercise) on relative hand angle revealing a significant main effect of stage, ($p=0.01$). Relative angle during early learning was smaller compared to late learning, ($MD=6.82$, $p=0.281$), and retention, ($MD=10.68$, $p=0.038$), indicating that performance improved across the task. No differences were found between conditions. A linear mixed model examined effects of condition and area on average alpha power during the baseline measurement. Results revealed no effect of intervention type on alpha power. As expected, alpha power in the occipital lobe was larger than the frontal lobe ($MD=0.899$, $p<.001$). A linear regression revealed that frontal alpha power predicted relative hand angle during retention, ($R^2 = 0.356$, $p = 0.024$). Specifically, an increase in frontal alpha power was associated with an increase in hand angle during retention. Frontal lobe alpha power predicts motor memory, indicating that a higher power, associated with a reduction of attentional and cognitive resources at rest, might be ideal for the facilitation of learned motor skills. Future studies should examine the role of alpha oscillations on long-term skill retention as this would guide targeted exercise/neurostimulation interventions to optimize rehabilitation and performance.

P540: ELECTROENCEPHALOGRAM (EEG) ASSESSMENT OF COLLEGIATE SOCCER PLAYERS DURING A COMPETITIVE SEASON

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BACKGROUND: Collegiate athletes experience intense cognitive and physical demands between training, competition, and maintenance of academics. Electroencephalographic (EEG) patterns provide insight into how these demands influence brain function, as studies have revealed that athletes exhibit unique brainwave patterns. For example, previous studies have linked reduced alpha activity to a pre-competition cognitive anxiety response, and elevated theta activity to anticipatory states. Despite the evidence that athletes undergo substantial but reversible neuropsychological changes throughout a season, research on these changes is underdeveloped. Thus, this research assesses how the brainwave patterns of women's soccer players undergo adaptive changes throughout a competitive timeframe. Understanding these changes could reveal a multitude of findings, including powerful insights to performance indicators of academics and athletics. METHODS: Included in this study are participants from a National Collegiate Athletic Association (NCAA) Division II women's soccer team who will undergo two evaluations. Participants will complete a baseline and endline assessment both consisting of a brief survey and EEG recording. Taking no longer than 10-15 minutes, data will be collected in a controlled, classroom-like setting. An EEG headband will be positioned across participants' forehead with the rear of the band stretching over the occipital region. This allows for electrodes to identify frontal cortex signals linked to cognitive/emotional states, and occipital signals linked to visual/relaxation states. Altogether, this will make for a full evaluation the alpha, theta, delta, beta, and gamma brainwaves. ANTICIPATED RESULTS: Results and comparative data will be analyzed to determine any shifts in brain activity during the seasonal conditions.

P541: STIMULATION OF PREFRONTAL CORTEX TO ENHANCE GAIT SYMMETRY IN PARKINSON'S DISEASE

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BACKGROUND: Parkinson's disease (PD) is a progressive neurodegenerative disorder characterised by degeneration of sensorimotor areas. The prefrontal cortex (PFC) is responsible for motor planning and plays an important role in complex walking tasks such as split-belt treadmill (SBTM) walking. People with Parkinson's disease (PwPD) exhibit reduced adaptive capabilities during complex walking highlighted by greater step length asymmetry and lower PFC activation compared to healthy older adults. Emerging research suggests stimulation of the PFC may improve adaptive capabilities in PwPD. Transcranial direct current stimulation (tDCS), action observation (AO), and motor imagery (MI) have been shown to increase cortical activity in the PFC. This study aims to investigate the effects of an acute PFC stimulation intervention on step length asymmetry in PwPD. METHODS: A double-blind, randomized, controlled trial design will be implemented. At least thirty PwPD will undergo two SBTM sessions total, one pre and post PFC stimulation intervention. Participants will be randomly assigned to one of three groups: AOActive (Active tDCS stimulation + AO/MI protocol), AOSham (Sham tDCS stimulation + AO/MI protocol), and control (no stimulation + unrelated video). SBTM training will consist of one tied belt and two split belt blocks. A block consists of seven, one and a half minute walking trials. Hemodynamic changes in the PFC will be measured with functional near-infrared spectroscopy (fNIRS). Step length asymmetry will be measured using Vicon motion capture systems. A repeated measures ANOVA will evaluate group (AOActive, AOSham, Control), condition (TB, SB), and interaction effects on PFC activation pre and post intervention. An exploratory correlation analysis will evaluate the association between hemodynamic changes in the PFC and step length asymmetry. ANTICIPATED RESULTS: It is hypothesized that stimulation of the PFC through tDCS and AO/MI will increase cortical activity in the PFC and reduce step length asymmetry. Changes in PFC cortical activity will be greatest in the AOActive group. AOActive also is expected to display greater reductions in step length asymmetry compared to AOSham and Control. Increased PFC activity is expected to correlate with reduced step length asymmetry.

P542: RETURN TO DUTY IN ACTIVE DUTY MILITARY FOLLOWING LUMBAR SPINE SURGERY

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INTRODUCTION: Military medical readiness plays a significant role in global military operations. While the severity of combat-related trauma is evident, musculoskeletal injuries (MSK's), are the largest medical threat to deployment readiness, and accounted for more than 60% of limited duty days in 2019. Across MSK's, the spine (lumbosacral: 30%; cervical: 22%; thoracic: 10%) accounts for 62% of MSKs. In the military population, there is a tremendous economic impact in training, retaining, and deploying a service member. Return-to-duty (RTD) rates and length of time for the treatment protocols for spine surgery vary significantly in published research. Research suggests RTD rates between 3-17 months following elective traditional open lumbar and cervical spine surgery, with a RTD rate of 64% within 1 year. When examining minimally invasive lumbar spine surgery (MIS), 100% of military personal had a RTD within 3-months. Research has yet to examine the impact of MIS of the lumbar spine on the RTD rates of active-duty military. **METHODS:** The current study prospectively examined surgical outcomes, return to duty, and patient-centric outcomes among 172 active duty or reserve military patients who underwent an outpatient minimally invasive (n=86) lumbar spine surgery or an open (n=86) (Laminotomy/Foraminotomy/Decompression) for the treatment of lumbar spinal stenosis. **RESULTS:** Significant reductions in visual analog scale (VAS) of 3.72 and Oswestry disability index (ODI) of 19.22 were observed from preoperative to postoperative time points. 81% of service members RTD in less than 1 month, 12% RTD in 1-2 months and 7% RTD between 2-3 months. There were insignificant differences reported in the open surgery group. **CONCLUSIONS:** MIS has been shown to reduce tissue trauma and patient complications. MIS procedures have resulted in reducing postoperative stress responses and improving the recovery process following surgery. In the active-duty military population this plays an important role in return to duty quickness. Our findings suggest that MIS procedures in an ambulatory surgery center on the lumbar spine result in improved patient outcomes and reduced RTD time in active-duty military personnel.

P543: THE IMPACT OF SHOULDER ROTATION ON FASTBALL VELOCITY AND ELBOW VALGUS TORQUE IN COLLEGIATE PITCHERS

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BACKGROUND: In baseball, pitchers aim to generate maximum pitch velocity to challenge batters. Achieving higher velocity often involves increasing shoulder external rotation (ER), which extends the arm's range of motion and allows for greater acceleration. Recent trends indicate a steady increase in fastball velocities, which has been linked to increased elbow stress and a higher risk of injury. While previous research has shown that shoulder maximum external rotation (MER) is linked to peak elbow valgus torque (pEVT), no research has assessed this through continuous analysis. Therefore, this study aimed to investigate the impact of shoulder rotation on pEVT and fastball velocity during the pitching motion. METHODS: Motion capture data were collected using an 8 camera markerless system (300Hz) on 252 NCAA Division I pitchers (1.89±.06m, 92.38±10.30kg, 90.71±2.73mph). All data were collected during NCAA-sanctioned games. Sidearm pitchers (arm slot≥90) were excluded due to their kinetics being incomparable to overhand pitchers. Kinematic data from each participant were interpolated to 101 data points, from foot contact to ball release (BR), and each participant's trials were averaged. Ball velocity and pEVT were averaged for each participant. Statistical parametric mapping regressions (α=0.05) were performed to assess the influence of shoulder rotation on pEVT and fastball velocity. RESULTS: Greater shoulder ER approaching MER (79.6±2.7%), from 54.72% to 80.41% of the pitching motion, was associated with greater ball velocity (p=0.015 and r^2=0.047). However, greater ER approaching MER and BR, from 44.53% to 80.53% and 90.87% to 100.00%, was associated with lower pEVT (p=0.004 and r^2=0.053). CONCLUSION: Greater shoulder ER before and at MER is associated with greater ball velocity and lower pEVT, yet only a small percentage of variance in pitch velocity and pEVT is explained by shoulder ER during the significant time frames. Additionally, greater shoulder ER leading up to BR is associated with lower pEVT. Since higher pEVT places greater stress on the elbow and increases injury risk, to reduce pEVT while simultaneously maximizing ball velocity, our results suggest that greater MER may be beneficial for pitchers.

P544: EXAMINING RELATIONSHIPS BETWEEN UNILATERAL BROAD JUMP GROUND REACTION FORCES, HIP EXTENSION STRENGTH, AND PITCH VELOCITY

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BACKGROUND: Pitching performance relies on efficient force development (FD) and transfer through the kinetic chain. The kinetic chain incorporates FD from the lower body, then transfers FD superiorly towards the throwing arm. Drive leg isometric hip extension strength (HEX) has been directly linked with increased pitch velocity (PV) in professional and collegiate pitchers. The unilateral broad jump (UBJ) is a movement that utilizes hip extension and explosiveness anteriorly. The ratio of anterior and vertical ground reaction forces (A/VGRF) can be used to assess GRFs during multidirectional movements such as pitching. The purpose of this study is to determine if potential relationships exist between drive leg A/VGRF during the UBJ, HEX, and PV within high school pitchers. METHODS**:** Data from 14 high school males (16.07±1.21yrs, 82.71± 3.09kg, 1.84±0.08m) were retrospectively analyzed. The data analyzed included the following: 2 UBJ A/VGRF, PV from 5 pitches and 2 maximal isometric HEX strength measurements. Pearson correlations were conducted to determine potential relationships between variables. RESULTS: Pearson correlation of UBJ A/VGRF and PV indicated a moderate positive relationship (r=0.34). A moderate negative correlation was observed between UBJ A/VGRF and HEX (r=-0.32). Furthermore, a weak positive correlation was noted between HEX and PV (r=0.06). CONCLUSIONS: These results indicate that UBJ A/VGRF of the drive leg may be associated with increased PV, suggesting that multidirectional FD contributes to throwing performance. A weak correlation between HEX and PV suggests that HEX might be associated with increased PV, but other factors such as rotational strength, arm mechanics and stride length or FD may be more involved. Future pitching analysis could examine the interaction between HEX and stride leg force production to determine how combined lower body FD contributes to PV.

P545: EARLY SEASONAL CHANGES IN VISUOMOTOR REACTION TIME AND TRAINING LOAD IN AMERICAN PROFESSIONAL SOCCER PLAYERS

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BACKGROUND**:** Visuomotor reaction time (VMRT) is essential to soccer, enabling players to quickly process visual information and respond. Delays in VMRT could affect movement execution and performance. While VMRT is known to be influenced by fatigue, limited research has examined how early season training load (TL) impacts VMRT. The purpose of this study was to examine changes in lower extremity VMRT and TL, and the relationship between TL and VMRT in professional soccer players. METHODS**:** 10 male United Soccer League One players (age 27.1±4.3y) were tested once per month over a three-month period (May - July) to assess VMRT. Using the Blaze Pod system, participants used their dominant foot to respond to visual stimuli via lights placed around the feet in a semicircle, completing three 30s trials. For each practice and match, GPS sensors tracked total distance (TD), high metabolic load distance (HMLD), and number of accelerations (Acc) and decelerations (Dec). Variables were averaged weekly. Changes in VMRT and TL were analyzed using separate one-way repeated measures ANOVA. Pearson's product moment correlations examined relationships between variables, with significance set a priori at $p \leq 0.05$ for ANOVA changes and $p < 0.01$ for correlations. RESULTS**:** No significant main effects were found for VMRT (p = 0.13). Significant time main effects were observed for TD, Acc, Dec and HMLD (p <0.001, p = 0.03, p < 0.01, p = 0.003, respectively). No significant relationships between VMRT change scores and TL were observed (p>0.01). CONCLUSIONS**:** TL decreased over time but did not correlate with VMRT, indicating that TL factors alone may not affect visuomotor performance. Individual variability, neuromuscular fatigue, or other unmeasured factors may influence these outcomes. Although not statistically significant, the large observed effect size (η^2 = 0.2) for changes to VMRT may warrant future research with larger samples and more frequent assessment to further explore visuomotor performance.

P546: THE EFFECTS OF REPETITIVE LOADING FREQUENCY ON SMOOTH PURSUIT ACCURACY IN FAST BOAT CREWMEMBERS
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BACKGROUND: Repetitive high and low impact loading may yield significant neurological impairments. Personnel who operate military fast boats are exposed to whole-body impacts that result in said neurological impairment. Currently, no previous research has addressed the neurocognitive outcomes of these whole-body impacts over the course of an underway. Smooth pursuit eye tracking tasks have been used to evaluate neurocognitive function, which may elucidate impairment. Thus, the purpose of this study was to quantify the level of neurological impairment due to varying load frequencies through smooth pursuit accuracy in fast boat crewmembers. METHODS: Four participants (age 28±4.3 years) observed across 3 base locations (1 standard duty with higher-frequency water loading, two tactical/law enforcement with lower-frequency loading) completed two trials each of circular and horizontal smooth pursuit tasks (CSP and HSP) before and after a routine voyage. RMSE of gaze deviation was calculated for each eye, and percent change from pre- to post-trial was averaged across eyes and participants. RESULTS: Percent change from pre- to post-task across participants was 24.1 ± 19% (d = 0.64) for CSP tasks and 32.7 ± 49% (d = 0.39) for HSP tasks. Mean RMSE change across both smooth pursuit tasks was 31.8% for the standard duty participant and 27.2 ± 13.1% for tactical/law enforcement participants. CONCLUSIONS: Differences in daily exposure may impact the ability to perform smooth pursuit tasks. While tactical/law enforcement crewmembers may experience higher magnitude loads at reduced frequencies, standard duty crewmembers may face comparable cumulative loading due to elevated frequencies of exposures. These variations are relevant for understanding mechanisms of neurological dysfunction, and future research should continue to explore these differences.

P547: DOES ECCENTRIC HAMSTRING STRENGTH PREDICT FUNCTIONAL PERFORMANCE IN INDIVIDUALS WITH ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION?
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INTRODUCTION: Anterior cruciate ligament (ACL) tears are common in physically active individuals, with surgical reconstruction (ACLR) often performed to restore stability and facilitate functional recovery. Hamstring tendon autografts are used in about half of surgical cases and often lead to medial hamstring weakness and atrophy. The Nordic hamstring exercise (NHE) preferentially activates the medial hamstrings through eccentric loading and reduces strain risk in uninjured populations. However, the functional implications of eccentric hamstring strength have not been well defined in those with ACLR via hamstring tendon autograft (ACLR-HT). Therefore, our purpose is to examine whether eccentric hamstring strength predicts functional performance in individuals with ACLR-HT. METHODS: This study will follow a cross-sectional design. We will recruit 30 male and female participants with primary unilateral ACLR-HT between 12 and 35 years old who have been cleared for unrestricted physical activity. Testing will commence with a five-minute self-paced warm-up on a stationary bike, followed by assessments beginning with submaximal practice trials. For testing, participants will perform three maximal effort trials of NHE, single leg hop for distance, 5-10-5 shuttle, and 40-yard dash. Bivariate correlation analyses (Pearson's r or Spearman ρ, α=.05) will be used to assess associations between NHE strength outcomes (peak torque [Nm/kg], impulse [N·s/kg]) and maximum single leg hop distance (cm), 5-10-5 and 40-yard dash split and total times (s). ANTICIPATED RESULTS: We hypothesize that greater strength will be associated with longer hop distance, better agility, and faster sprint times. The findings from this proposed study will establish a foundational understanding of the functional impact of eccentric hamstring strength deficits following ACLR and underscore the need to address these impairments clinically to facilitate effective functional progression.

P548: EXAMINING RELATIONSHIPS BETWEEN ARM LENGTH AND SHOULDER FORCE PRODUCTION IN BASEBALL PITCHERS: AN EXPLORATORY ANALYSIS
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BACKGROUND: Glenohumeral joint health and stability are fundamental to baseball throwing mechanics. The shoulder is a primary source of force production (FP) down the upper extremity, utilizing joint actions such as shoulder internal (SIR) and external rotation (SER). Arm length is a measure that may influence force generation due to its role as a lever. Previous studies have examined the relationship between shoulder rotational force and pitch velocity, but not the role of arm length as a contributor to FP. The purpose of this study was to investigate possible relationships between arm length and shoulder FP in baseball pitchers. METHODS: Data from 47 male baseball pitchers (18.87±3.00yrs, 1.83±0.11m, 84.63±12.72kg) were retrospectively analyzed. Arm lengths were obtained via tape measure, and two trials of isometric strength measurements were taken for dominant and non-dominant SIR and SER FP via handheld dynamometer. Pearson correlations were conducted to determine possible relationships between variables. RESULTS: Moderate negative correlations were found between dominant arm length and FP for SIR (r = -.33) and SER (r = -.39). Non-dominant arms found moderate negative correlations between arm length and FP for SIR (r = -.47) and SER (r = -.46). CONCLUSION: These results suggest an inverse relationship between pitcher arm length and isometric glenohumeral FP for dominant and non-dominant arms. Additional shoulder strengthening exercises and preventative measures for pitchers with longer arms could help to mitigate upper extremity injuries and may enhance athletic performance. Future research could investigate shoulder FP differences in pitchers and position players or look further into these relationships within pitching kinematics.

P549: EFFECTS OF PREVIOUS INJURY AND THE NORDIC HAMSTRING EXERCISE ON RATE OF FORCE DEVELOPMENT
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BACKGROUND: Rate of force development (RFD) is critical for sports performance, as many sport skills require high amounts of force to be produced in short periods of time. Previous research shows performing an exercise at greater than 75% of maximal voluntary contraction (MVC) for 5-10 seconds causes an acute increase in motor unit recruitment and neuromuscular activity (post-activation potentiation), which is linked to a transient increase in RFD. The Nordic hamstring (NH) exercise has been shown to produce high levels of muscle activity and high RFD when performed at near-maximal intensities. Therefore, the purpose of this study was to explore the effects of previous injury and the NH exercise during a warmup protocol on RFD in female athletes. METHODS: Four individuals participated in this pilot study. Two participants had a history of lower extremity injury. All participants performed two conditions: a control and intervention warm-up. Each condition included a standardized warm-up, while the intervention condition also included 3 sets of 5 reps of the NH exercise to maximal effort. Three minutes of rest were given between the NH sets. After the warm-up conditions, participants completed 5 squat jumps on a force plate. Intervention and control warm-ups were randomized and performed one week apart. RFD was estimated using peak-RFD and average-RFD measures starting from the minimum force of the unweighted phase of the squat jump (SJ) to the maximum force prior to take off. Only jumps 2 through 4 were included in the analysis to prevent the Hawthorne Effect. RESULTS: A 2 x 2 mixed ANOVA revealed a nearly significant relationship between average-RFD and previous injury, F (4,4) = 7.47, p = 0.05. The results of this pilot study indicate that previously injured participants had greater average-RFD during the concentric phase of a squat jump when compared to the previously uninjured participants. CONCLUSION: This pilot study revealed no acute benefits to RFD after performing NH exercise. Interestingly, differences were found between injury groupings, with greater RFD for the SJ observed in those who had a previous lower extremity injury. This may be due to rigorous rehabilitation protocols; however, further research is needed.

P550: LOWER BODY AGILITY AS A PREDICTOR OF PITCHING PERFORMANCIN AMATUER BASEBALL PITCHERS
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INTRODUCTION: Athletic performance, especially for overhead athletes like baseball pitchers, depends on more than upper body strength—it requires full-body coordination and lower-extremity power. Lower body agility and reaction speed may enhance pitching performance by improving force generation and the balance needed for consistent mechanics and pitch delivery. The purpose of this study was to explore the relationship between lower body agility and specific pitching metrics in amateur baseball pitchers. **METHODS:** Thirty-seven healthy amateur male pitchers completed lower body agility testing on a sensor-based agility board followed by a pitching session of 30 pitches (20 fastballs, 10 breaking balls). Agility testing consisted of a single 2-minute agility rating test on an agility board (Quick Board LLC, Memphis, TN). Pitch metrics were measured via Rapsodo 3.0 and

included Velocity Total Spin, True Spin Rate, Spin Direction, Spin Efficiency, Horizontal Break, Vertical Break, Release Height, Release Side, and Release Extension (Rapsodo Inc., St. Louis, MO). **RESULTS:** Analysis revealed a significant relationship between agility scores and release extension, additionally agility scores and pitch metrics were significantly related. Correlations between agility and ball metrics were strong for velocity (r = 0.778) and spin efficiency (r = 0.732), and moderate for total spin (r = 0.696), true spin rate (r = 0.622), spin direction (r = 0.667), horizontal break (r = 0.634), vertical break (r = 0.688), and release extension (r = 0.641). No statistically significant relationships were found between agility and release height or release side. **CONCLUSIONS**: These findings suggest that improved lower body agility is linked to enhanced balance and control during the pitching motion, particularly in the acceleration phase. Pitchers with higher agility scores demonstrated more efficient pitching mechanics, as reflected in their release extension, while also realizing greater ball flight metrics. Incorporating agility training into pitcher development and evaluation may offer a valuable tool for improving performance.

P551: DEVELOPMENT OF A HAPTIC PEN HAND PRECISION CIRCLE-TRACING ASSESSMENT

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BACKGROUND: Hand precision biomechanical assessments are being developed to help improve the ability to diagnose and monitor hand health in clinical/rehabilitation settings. For this study, we developed a circle-tracing assessment using a haptic pen. An advantage of the haptic pen is that resistive forces can be introduced. It is unclear if resistive forces alter tracing accuracy. **PURPOSE**: The primary purpose was to determine if introducing resistive forces (to the haptic pen) significantly altered circle-tracing accuracy. It was hypothesized that tracing error scores would significantly increase when resistive forces were introduced. The secondary purpose was to determine if there were learning effects across repetitions. **METHODS:** The participants were 18 healthy adults (34.67±15.62 years) who were injury-free (no hand problems). Circles were traced (on a computer monitor) using a 3D Systems Touch X haptic pen. Five consecutive repetitions were completed for each force level (0.0N, 1.2N). Independent t-tests were used to test for significant differences in tracing accuracy (**α**;;=0.05). **RESULTS**: For the force analysis, there was no significant difference (p=0.72) in tracing accuracy for the no force condition (2.24±0.09mm) and 1.2N condition (2.20±0.10mm). For the learning analysis (with no forces), there was no significant difference (p=0.58) in tracing accuracy for repetition 1 (2.16±0.10mm) and repetition 5 (2.03±0.08mm). For the learning analysis (with 1.2N forces), there was no significant difference (p=0.58) in tracing accuracy for repetition 1 (2.22±0.10mm) and repetition 5 (2.31±0.14mm). **CONCLUSION**: For the impact of forces on tracing accuracy, the hypothesis was rejected as participants had no significant difference in tracing accuracy as there were no significant differences (between the no force and 1.2N force conditions). There was no evidence revealed to suggest that learning occurred. This approach may help to improve the ability to 1) diagnose hand problems and 2) monitor rehabilitation.

P552: TOE CLEARANCE OF MOVING OBSTACLES FROM DIFFERENT ANGLES

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BACKGROUND: Obstacle negotiation is a cornerstone of gait and fall-risk research, though most studies rely on stationary obstacles. Limited work has examined obstacle navigation when obstacles move toward the individual. The purpose of this project was to compare the toe clearance of the lead and trail leg over moving obstacles that approached the person from different angles. **METHODS**: Thirty-one healthy, uninjured adults (22.5 ± 3.1 yrs) provided informed consent and took part in this project. Participants walked at a self-selected pace under three obstacle conditions: 1) stationary, 2) moving at a constant velocity perpendicular to the gait path, and 3) moving at a constant velocity directly at the participant. Mixed-effects models were used to account for within-participant correlation across conditions. Statistical significance was set at $p < 0.05$. **RESULTS**: Significant condition effects were observed for both lead toe ($F = 165.3$, $p < 0.001$) and trail toe clearance ($F = 203.7$, $p < 0.001$). For lead toe clearance, participants demonstrated the smallest clearance height during head-on approaches (8.37 ± 0.68 cm), followed by perpendicular (12.52 ± 0.68 cm) and stationary conditions (12.80 ± 0.63 cm). Conversely, trail toe clearance was the smallest during perpendicular approaches (4.88 ± 0.58 cm), followed by stationary (7.91 ± 0.75 cm) and head-on (13.45 ± 0.83 cm). All pairwise comparisons were statistically significant ($p < 0.001$). Furthermore, participants demonstrated the smallest variability while stepping over the stationary object (CV=37.3%), followed by the perpendicular condition (CV=51.8%) and last the head-on condition (CV = 98.2%). **CONCLUSIONS:** Lower toe clearance is evidence that the person is prioritizing getting their foot back on the ground quickly. These findings suggest that head-on moving obstacles may present the greatest threat to safe navigation and may be particularly useful for identifying individuals at elevated fall risk.

P553: CORRELATIONS BETWEEN MAXIMAL WEIGHTLIFTING STRENGTH AND VERTICAL JUMP HEIGHT

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BACKGROUND: Countermovement vertical jumps are commonly used by coaches and trainers as a performance measure to evaluate strength and conditioning adaptations and inform training protocols. Previous research has produced mixed findings regarding the relationship between maximal strength in resistance training exercises and vertical jump performance, with results often varying by population. The aim of this study was to evaluate the correlation of maximal strength in common resistance training exercises with vertical jump height by using a large, publicly available dataset. METHODS: The National Strength and Conditioning Association (NSCA) publishes an annual Strength and Conditioning All-Americans booklet. Data were extracted from 1998-2023 and included maximum squat, bench press, and power clean values, as well as athlete height, weight, and vertical jump height from both high school and college athletes. A Spearman's rank correlation was run to analyze the correlation between normalized vertical jump height (vertical jump height divided by height) and normalized values (maximal lift weight divided by body weight) for maximum squat, bench press, and power clean. RESULTS: Strong positive correlations ($\rho = 0.6$-0.8, $p < 0.001$) were observed across all exercises. Power clean demonstrated the strongest association with vertical jump height ($\rho = 0.714$), followed by bench press ($\rho = 0.674$) and squat ($\rho = 0.644$). CONCLUSION: Power clean and squat exercises have very similar motions to a vertical jump in the lower extremity, which has expectedly led to a strong correlation to vertical jump height. Interestingly, the strong association with bench press suggests that whole-body strength and general athleticism may also play a critical role in jump performance. Future research should investigate the influence of whole body versus specialized strength on performance metrics such as the vertical jump.

P554: FIT TO SERVE, FIT TO STAY: PHYSICAL AND MOTOR PREDICTORS OF DISCIPLINARY RETENTION IN MILITARY CADETS

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Background: While physical fitness and grit have traditionally served as primary predictors of cadet retention at military institutions, the complex interplay among cadet conduct, disciplinary infractions, motor competence, and physical fitness metrics remains insufficiently understood. This study draws on established psychological domains (e.g., cognitive planning, autonomy-disruptive) to investigate the nuanced relationships between various categories of cadet infractions and objective measures of physical performance, with the aim of deepening insight into patterns of attrition and disciplinary outcomes. Methods: Cadets (N=5824) from 2019-2023 were analyzed. Physical fitness was assessed using the Citadel Physical Fitness Test (CPFT):1.5-mile run, hand-release push-ups, and plank. Several measures of motor competence were evaluated, including supine-to-stand, hop speed, and throw-catch. Institutional conduct data were categorized into eight psychological domains. A multi-method quantitative approach included t-tests, rank-biserial correlations, FDR corrections, and ROC analyses to identify attrition risk cut-points. Logistic regression evaluated combined thresholds. Results: ROC analysis showed several performance cut-points predictive of cadet attrition rates. Meeting CPFT≥209 was associated with nearly half the attrition risk compared to those below the threshold (7.1% vs 14.4%, AUC=0.68). Additional predicting cutoffs included BMI≤22.64 (4.9% vs. 14.1%, AUC=0.59), ball control test ≥29.0 (6.7% vs. 15.5%, AUC=0.61), standing long jump ≥195.5 cm (9.5% vs. 14.5%, AUC=0.55), and grip strength ≥108.4 kg (7.1% vs. 12.9%, AUC=0.55). Conclusions: Cognitive planning infractions were the most common, while autonomy-disruptive infractions remained consistently high. Though disciplinary records alone did not predict retention, non-graduating cadets had lower CPFT and motor competence scores.

Meeting combined fitness thresholds reduced attrition risk from ~15% to 3-6%.

P555: COMPARATIVE EXERCISE DEMANDS OF EXOSKELETON-ASSISTED WALKING AND HAND-CYCLING IN SPINAL CORD INJURY

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BACKGROUND: After rehabilitation from a spinal cord injury (SCI), individuals are encouraged to stay active to reduce secondary complications such as rapid bone and muscle mass loss. While adaptive sports allow individuals with SCI to participate in exercise, several exercise methods are not sufficient to reduce bone and muscle loss because they do not incorporate weight-bearing. Powered exoskeletons have recently been introduced as a weight-bearing exercise tool, yet its relative effectiveness in promoting endurance, strength, and energy efficiency has not been established. Therefore, the purpose of this study is to determine the efficacy of an exoskeleton device, compared to a traditional form of exercise, by comparing muscle activation patterns and energy expenditure. **METHODS:** Twelve participants will be recruited who have a SCI of C7 or lower and have been using a powered exoskeleton device for at least 6 months. Participants will complete two sessions consisting of either a 30-min exoskeleton walking protocol around a 50-m track or 30-min of handcycling on a stationary indoor-cycling roller. Surface electromyography of abdominal, paraspinal and upper arm muscle groups as well as energy expenditure using a portable metabolic system will be recorded. Independent-sample t-test will be used to compare group differences on these outcomes ($\alpha = 0.05$). **ANTICIPATED RESULTS:** We hypothesize that exoskeleton-assisted walking will show higher activation in upper-body muscles, as the device requires greater trunk rotation and arm support for balance. In contrast, hand-cycling is expected to result in higher overall energy expenditure, as exoskeleton walking occurs at a set device-controlled speed that may reduce metabolic demand. Findings are expected to help determine training targets for individuals with SCI and provide suggestions for exercise methods to reduce SCI secondary complications.

P556: THE MEDIATING ROLE OF PLASMA RENIN AND ALDOSTERONE ACTIVITY ON ARTERIAL STIFFNESS IN SEDENTARY ADULTS

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BACKGROUND: Americans reportedly engage in 8 h of daily sedentary behavior (SB), a multifaceted contributor to cardiovascular disease. Public health guidance promotes SB interruption (SBI) strategies but are limited in clarity and biological support. Renin-angiotensin-aldosterone system (RAAS) activation advances arterial stiffness (AS), potentially mediated by elevated aldosterone (ALD) and renin. However, it is unclear how SBI may impact this mechanistic relationship. PURPOSE: To explore the impact of practical SBI implementation on AS mitigation and mechanistic mediators' plasma renin activity (PRA) and ALD in healthy, inactive, sedentary adults. METHODS: This preliminary analysis included 20 adults (80% F, age: 45±7y, BMI: 27.6±5.2kg•m-2) who underwent 4 visits comprised of 4 h of uninterrupted (CON) or interrupted (standing, STAND; walking, WALK; combination, MIXED) sitting bouts. After 20 min of semi-recumbent rest, carotid-femoral pulse wave velocity (cfPWV) was collected via cuff-based oscillometry, followed by blood samples before and after each condition, with linear mixed models and mediation analyses used to assess condition-specific responses in cfPWV, PRA, and ALD ($p \leq 0.05$). RESULTS: SBI resulted in nonsignificant time-by-condition interactions for cfPWV (p=0.869; R2m: 0.008) , PRA (p=0.841; R2m: 0.086), and ALD (p=0.747; R2m: 0.051) relative to CON. PRA (β: -0.014±0.023ng•mL-1•hr-1, 95%CI [-0.059-0.031], p=0.542) nor ALD (β: -0.014±0.035ng•dL-1, 95%CI [-0.082-0.054], p=0.685) mediated the indirect SBI-cfPWV association, contributing to 10% and 84% of the total effect, respectively. However, both PRA (β=0.127±0.033ng•mL-1•hr-1, 95%CI [0.062-0.193], p<0.001 and ALD (β=0.027±0.004ng•dL-1, 95%CI [0.019-0.034], p<0.001) predicted cfPWV. CONCLUSIONS: Biological predictability was suggested with increased PRA and ALD corresponding to cfPWV increases of 0.1m•s-1 and 0.9m•s-1, respectively; implying RAAS involvement in early AS presentation with a 1.0 m•s-1 increase in cfPWV considered clinically significant. Evidence of SBI-induced AS mitigation was not observed, potentially due to a lack of statistical power as indicated by low marginal R2. Future work should explore how AS mitigation is impacted by SBI adaptation while maintaining feasible implementation.

P557: THE RELATIONSHIP BETWEEN SLEEP AND COGNITION IN OLDER ADULTS WITH IMPAIRED MOBILITY

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BACKGROUND: Poor sleep patterns can lead to cognitive decline, increasing fall risk among older adults. Despite the impact of sleep quality and cognitive function on fall risk, the specific relationship between these factors is not well understood. This study examined the relationship between sleep and cognition in older adults with impaired mobility. METHODS: The study recruited n=64 older adults with self-reported impaired mobility, aged 65 and older. Participants (n=64; Age: 79.2 years, Montreal Cognitive Assessment (MoCA) =24.7, 57.81% Female) underwent the following cognitive assessments: the MoCA, a screening tool used to assess global cognition, the Rey Auditory Verbal Learning Test (RAVL), a test used to assess verbal memory, learning, and retention through a five-trial word recall task, the Digit Symbol Substitution Test (DSST), an assessment used to evaluate complex attention, processing speed, and cognitive flexibility and the Trail Making Tests (TMT) a test used to assess attention, cognitive flexibility, and executive functioning. They wore an Axivity monitor on their non-dominant ankle for 7 days to track sleep parameters. Separate linear regressions were performed for variability in sleep, the time awake after sleep onset as the dependent variable, and the MoCA, TMT Trail B-A, DSST, RVLT Trial 5, and RVLT Trial 8 as the independent variables. In all regressions, we controlled living settings (residential care or community-dwelling). RESULTS: Worse set-shifting as measured by the Trail B-A [β=0.41, CI: 0.01,0.80, p=0.04; R=0.25, p=0.01] predicted greater variability in sleep. Slower processing speed as measured by the DSST [β=-0.28, CI:-0.56, -0.01, p=0.04; R=0.22, p=0.02], as well as a trend for worse Trail [β=0.05, CI:-0.006, 0.11, p=0.08], predicted greater time awake after sleep onset. CONCLUSION: These findings underscore the importance of executive function and processing speed in maintaining stable sleep patterns among older adults with impaired mobility. Addressing cognitive impairment and sleep disruptions through targeted interventions may reduce fall risk and improve quality of life among older adults with poor mobility.

P558: SYMPATHORENAL CONTRIBUTIONS UNDERLYING THE PROPOSED CARDIOVASCULAR BENEFITS OF SEDENTARY BEHAVIOR INTERRUPTION

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BACKGROUND: Only 24% of U.S. adults meet federal physical activity guidelines, yet public health recommendations remain limited. Prolonged sedentary behavior (SB), an understudied contributor to cardiovascular disease, elicits a sympathorenal response, promoting arterial stiffness (AS). Evidence suggests SB interruptions (SBI) benefit arterial elasticity; however, the biological plausibility of daily SBI implementation is unclear. Therefore, we hypothesized that SBI participation would attenuate sympathorenal activation, resulting in successful AS mitigation. **METHODS:** 23 adults (78%F, age: 43±8y, BMI: 27.9±5.1kg•m^{-2}) were included in this preliminary analysis composed of 4 visits where 4 hours of uninterrupted (CON) or interrupted (standing, STAND; walking, WALK; combination, MIXED) sitting bouts were completed. After 20 min of semi-recumbent rest, carotid-femoral pulse wave velocity (cfPWV) was assessed via cuff-based oscillometry, followed by blood sample collection before and after each condition. Linear mixed models and mediation analyses were used to investigate SBI-specific responses in cfPWV, plasma renin activity (PRA), and epinephrine (EPI), $p \leq 0.05$. **RESULTS:** Nonsignificant time-by-condition interactions were observed for cfPWV (p=0.629), PRA (p=0.879), and EPI (p=0.550) between SBI and CON. Indirect SBI-cfPWV mediation was not observed for EPI (β: 3.58e^{-4}±7.78e^{-4}pg•mL-1, 95%CI [-0.001-0.002], p=0.646) or PRA (β: -0.019±0.022ng•mL^{-1}•hr^{-1}, 95%CI [-0.062-0.023], p=0.366), contributing to 0.7% and 36.9% of the total effect, respectively. EPI was unrelated to cfPWV (β=3.58e^{-4}±7.78e^{-4}pg•mL-1, p=0.646), whereas PRA (β=0.123±0.032ng•mL^{-1}•hr^{-1}, 95%CI [0.060-0.186], p<0.001) was positively associated with cfPWV prediction. **DISCUSSION:** Contrary to our hypothesis, sympathorenal activation did not differ between SBI and CON, with cfPWV similarities observed across conditions. Biological plausibility between PRA and cfPWV

prediction was apparent, where a 1 ng•mL^{-1}•hr^{-1} increase in PRA corresponded to a 0.12 m•s^{-1} increase in cfPWV, suggesting PRA may mediate early AS presentation, as a 1.0 m•s^{-1} increase in cfPWV is clinically significant. Future investigations should explore how adaptations in SBI implementation may impact this mechanistic association.

P559: STEP COUNTS AS A PREDICTOR OF BODY COMPOSITION IN ADULTS

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BACKGROUND: Current research lacks consensus on the relationship between step count relative to fat mass and body composition. The purpose of this study is to identify factors related to body composition, including common markers of physical activity. METHODS: Following a 10-12 hour fast, participants underwent baseline body composition assessments via bioelectrical impedance analysis and dual-energy x-ray absorptiometry (DEXA) scan for 4-compartment analysis. Participants were provided with pedometers (Realalt, London, UK) and instructed to carry them during all waking hours for four weeks. Step counts were concealed to minimize bias. RESULTS: A total of 53 participants (42 females, age = 37.4 ± 12.5 years, weight = 73.8 ± 17.5 kg, height = 162.9 ± 6.5 cm, body composition = 38.8 ± 7.9% fat, and 11 males, age = 43.5 ± 12.6 years, weight = 75.5 ± 16.5 kg, height = 171.7 ± 7.3 cm, body composition = 29.1 ± 6.7% fat) completed the study protocol. Pearson correlation analysis was performed, and factors demonstrating significant correlations with body fatness were included as potential predictors. Stepwise non-linear regression analysis was performed, and a predictive model for percent body fat (PBF) was developed using sex, height, and average daily step counts expressed relative to fat mass (RelSteps) as inputs. The final model demonstrated good fit (R^2 = 0.63, RMSE = 5.2), indicating that these variables collectively explain a substantial portion of the variance in PBF in adults under 60 years old. CONCLUSION: These findings demonstrate a strong association between RelSteps and body fatness, and the resulting non-linear regression model explains ~ 63% of the variation in PBF in a diverse sample of men and women under the age of 60 years. The regression model highlights the possibility of integrating step counts as a useful metric to manage weight and body fatness in adults.

P560: BEHAVIOR CHANGE AND CARDIOVASCULAR HEALTH STUDY

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Obesity and cardiovascular risk remain prevalent, while few brief interventions leverage health awareness to drive behavior change. This study tests whether a 4-week feedback-based program improves physical activity and dietary behaviors, and whether the experimental group shows physiological gains relative to its own baseline.METHODS — Adults (18-65) with obesity (>25% fat men; >30% fat women) will be recruited in Gwinnett County. After consent, participants complete baseline surveys (demographics, diet, physical activity, health perception, and transtheoretical model stage). Participants are randomized 1:1 to a Behavior Change group (BC) or Minimal-Contact Control (MC). BC receives baseline physiological testing (anthropometrics, BP and resting HR, finger-stick lipids and glucose, DXA body fat and BMD, and a modified Bruce VO_2max test) plus personalized feedback, guided activity goals, and mindful-eating strategies. MC completes surveys only and receives no testing or feedback during the study. At 4 weeks, both groups repeat the surveys; only BC repeats the physiological tests. Primary outcomes are changes in weekly physical activity, diet quality, and stage of change. Secondary outcomes (BC only) are changes in lipids, glucose, BP, body fat percentage, BMD, and VO_2max. Analyses use ANCOVA for between-group behavioral outcomes (adjusted for baseline) and paired tests for BC physiological changes. ANTICIPATED RESULTS — Relative to MC, BC is expected to report greater increases in physical activity and diet quality and more advancement in stage of change. Within BC, we anticipate improvements from baseline in LDL, HDL, triglycerides, glucose, BP, and body fat percentage, with modest or no short-term changes in BMD, and a measurable increase in VO_2max over 4 weeks.

P561: IMPACT OF LEG POSITION ON ARTERIAL STIFFNESS FOLLOWING PROLONGED SITTING

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BACKGROUND: Carotid-femoral pulse wave velocity (cfPWV) is a measure of arterial stiffness and predictor of cardiovascular disease. Prolonged sitting, a common form of sedentary behavior (SB), places the lower limbs under high gravitational strain and reduces skeletal muscle pump activity, resulting in venous pooling (VP). Consequently, this may cause an acute increase in cfPWV. Guidelines for cfPWV measurement require supine positioning, which, after prolonged sitting, may attenuate VP and underestimate the true impact of SB on cfPWV. This study examined whether maintaining 90° knee flexion versus extension after prolonged sitting differentially impacts cfPWV. **METHODS:** Participants (n=21, 28.5 years ± 9.1; 59% female, BMI: 26.7 ± 5.5kg•m^{-2}) completed two conditions in a randomized cross-over trial: control (legs extended for post-sitting cfPWV assessment), or experimental (90° knee flexion during post-sitting cfPWV assessment). VP was evaluated via calf circumference and near-infrared spectroscopy, and cfPWV was measured via the Sphygmocor XCEL. Baseline cfPWV was recorded in triplicate in both postures, with order randomized per participant but consistent across visits. Participants sat uninterrupted for 3 hours followed by a 10-minute supine rest in the condition-specific posture. Post-sitting cfPWV was recorded in only that posture. Linear mixed models were used to compare cfPWV responses between conditions. **RESULTS:** Calf circumference (Δ = 0.99 ± 0.09 cm, [95% CI: 0.801, 1.18], p < 0.001, d = 1.64), and total hemoglobin (tHb) (Δ = 18.4 ± 2.1 μM, [95% CI: 14.1, 22.7], p < 0.001, d = 1.41) increased during sitting. After adjusting for baseline, sequence, and order effects, post-sitting cfPWV was higher in the extended leg posture (0.21 m/s [95% CI: -0.391, -0.026], p = 0.034, d = -0.51). **CONCLUSION:** Calf circumference and tHb indicated VP during sitting, but contrary to our expectations, cfPWV was higher with legs extended versus flexed. Standard supine, extended-leg measurements appear unlikely to underestimate cfPWV responses to prolonged sitting. Moreover, while our results indicate that VP occurred, its contribution to central arterial stiffness remains unclear. Future research should continue to assess cfPWV responses to prolonged sitting in a supine posture with legs extended.

P562: ASSOCIATIONS BETWEEN SLEEP PATTERNS AND BLOOD PRESSURE IN COLLEGE STUDENTS

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BACKGROUND: Elevated blood pressure (BP) is a risk factor for cardiovascular disease. High and Low sleep durations and poor sleep efficiency are linked to elevated BP in older adults and adolescents. However, this relationship remains unclear in college-based young adults (CBYA), a population characterized by poor sleep habits. Therefore, this cross-sectional study aimed to examine the link between sleep duration, sleep efficiency, and BP in CBYA. METHODS: Participants (N= 456, mean [SD] age= 20 [2] y, 65% Female, 64% White) attended a laboratory visit where systolic (SBP) and diastolic (DBP) BP were measured in triplicate using the VICORDER® device. Sleep duration and efficiency were monitored post-visit for seven days using the SleepScore Max device. Due to the absence of CBYA-specific standard clinical cut points, sleep duration and efficiency were categorized using the following 25th and 75th percentiles: Low (<5.4 hr•day^{-1}), Moderate (5.4-7.1 hr•day^{-1} [reference]), and High (>7.1 hr•day^{-1}) for sleep duration; Low (<81.8%), Moderate (81.8-91.0%), and High (>91.0% [reference]) for sleep efficiency. Linear regression models adjusted for covariates (race, sex, moderate-to-vigorous physical activity, total body fat %, head of household occupation, and tobacco and alcohol use) were used to evaluate associations (p≤0.05). RESULTS: Average SBP was 122.0 (8.7) mmHg, DBP was 60.4 (7.0) mmHg, sleep duration was 6.2 (1.3) hr•day^{-1}, and sleep efficiency was 85.8 (7.2) %. Compared to Moderate, neither Low (p=0.882) nor High (p=0.897) sleep duration was associated with SBP. Relative to Moderate, Low sleep duration had significantly higher DBP (β=3.10 [0.90] mmHg, p<0.001), while High sleep duration was unrelated (p=0.156). Relative to High, neither Low (p=0.643, p=0.908) nor Moderate (p=0.53, p=0.439) sleep efficiency was associated with differences in SBP or DBP, respectively. CONCLUSIONS: Our initial findings suggest CBYA who participated in low sleep duration had, on average, a 3.1 mmHg higher DBP compared to those with adequate sleep. Although notable, this isolated outcome does not illustrate an increase in risk for future cardiovascular disease development. Ongoing analyses will further explore the relation between sleep-related habits and blood pressure over a one-year period in CBYA.

P563: STEP COUNTS AS A PREDICTOR OF KEY MARKERS OF METABOLIC HEALTH IN ADULTS

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BACKGROUND: In the past 50 years, rates of obesity among adults have more than tripled, corresponding to an increase in the prevalence of cardiometabolic disorders. The purpose of this study was to identify factors associated with cardiometabolic risk (CMR) factors, and to develop regression models that may partially predict key CMR outcomes. METHODS: Fasted participants underwent body composition assessments via bioelectrical impedance analysis and dual-energy x-ray absorptiometry for 4-compartment analysis. Participants were provided pedometers (Realalt, London, UK) and instructed to carry them during all waking hours, continuing normal daily behaviors, for four weeks. Step counts were concealed to minimize bias. Resting heart rate (RHR) and blood pressure were measured using an Omron HEM-907XL monitor. Fasting finger-stick blood samples were collected and analyzed for common markers of CMR. RESULTS: A total of 53 participants (42 females: age 37.4 ± 12.5 years, height 162.9 ± 6.5 cm, weight 73.8 ± 17.5 kg; 11 males: age 43.5 ± 12.6 years, height 171.7 ± 7.3 cm, weight 75.5 ± 16.5 kg) completed the study. Pearson correlation analysis was used to identify potential predictors of CMR outcomes. Stepwise non-linear regression models were fit using sex, height, and average daily step counts relative to fat mass (RelSteps) as independent variables to predict the natural log of the quantitative insulin sensitivity check index (lnQUICKI; $R^2 = 0.34$, RMSE = 0.07) and the natural log of the total cholesterol to HDL ratio (lnRATIO; $R^2 = 0.21$, RMSE = 0.14). Additionally, linear regression yielded a model for RHR using the aforementioned predictors ($R^2 = 0.32$, SEE = 9.3). CONCLUSIONS: These findings demonstrate that regression analysis including RelSteps as a predictor yielded models predictive of key CMR outcomes, and highlights the potential of using this marker of physical activity as a tool for improving CMR management.

P564: PERCEIVED BURDEN OF ECOLOGICAL MOMENTARY ASSESSMENT FOR SEDENTARY BEHAVIOR IN ADULTS: A QUALITATIVE FEASIBILITY STUDY

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Background: Sedentary Behavior (SB) is a multi-dimensional, contextually dependent contributor to cardiovascular disease risk. Ecological Momentary Assessment (EMA) can be used to capture contexts of real time SB; however, the number of daily prompts that effectively capture the SB response while remaining acceptable to participants is unclear. Therefore, this study explored the acceptability and perceived burden of SB-related EMA implementation, to inform protocols for future research.
Methods: Twenty-seven healthy, middle-aged adults (42±8 years, 78% female) completed 8 days of EMA, with 16 prompts/day delivered via a mobile app during waking hours. Each prompt delivery was scheduled randomly within the first 30 minutes of each hour. Compliance was defined as completing the prompt within 30 minutes of receipt, with mean response rates calculated accordingly. Participants were monetarily compensated based on their response rates. Post-monitoring, a subset of participants was randomly selected and invited to participate in a 45-minute virtual, individual interview to explore experiences and perceived burden of the EMA protocol. Interviews were transcribed and analyzed using thematic analysis. Participants who completed the first monitoring period were invited to return for a second period.
Results: The mean EMA response rate in the first monitoring period was 92.1% (3,183/3,456 prompts), and the retention rate of participants who returned for a second period was 82%. From the interviews, participants said 16 prompts/day felt excessive for daily life. They shared that prompts near bedtime were considered intrusive. The biggest challenge of the 16 prompts/day was trying not to miss any prompts (e.g., due to being in a meeting). This caused stress while anticipating prompts and following those missed. Their suggestions included limiting the number of prompts to 12 a day to be reasonable.
Conclusion: High compliance rates are attainable with intensive prompting and a compensation protocol, despite participants perceiving 16 prompts/day as burdensome. However, these perceptions should be taken into consideration in future research by comparing the degree that a lesser number of prompts/day reflect actual SB patterns while being mindful of participant burden to maximize acceptability and compliance.

P565: RUNNING TOWARDS REMISSION: INFLUENCE OF EXERCISE ON GUT INTEGRITY AND INFLAMMATORY BOWEL DISEASE SEVERITY

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BACKGROUND: Inflammatory bowel disease (IBD) is a chronic condition where the immune system attacks the gut, causing inflammation, damage, and impaired quality of life. Current treatments may help manage symptoms but are expensive, have side effects, and often fail to address the underlying cause(s) of the condition. Exercise is known to improve overall health and reduce inflammation, but its potential to protect the gut and improve recovery in IBD is not yet clear. The purpose of this study is to assess if voluntary exercise influences IBD progression and gut barrier integrity. METHODS: Using a well-established preclinical mouse model, moderate IBD will be induced by ingestion of 3% dextran sulfate sodium (DSS; dissolved in drinking water) for 7 days. Young C57BL/6 mice (3-4 mo old) will be randomly assigned to one of four experimental groups (n=6-8 per group): (a) control (water only, no IBD) + sedentary, (b) control + exercise, (c) DSS (IBD) + sedentary, or (d) DSS + exercise. Mice in the exercise groups will be provided a running wheel in their cage to perform voluntary wheel running exercise for 14 days, while mice in the sedentary groups will have a locked wheel. DSS water will be refreshed every 2 days and water consumption monitored daily by weighing bottles. Assessments for IBD include daily monitoring of body mass, food and water consumption, and general well-being, as well as post-mortem evaluation of colonic tissues for severity of inflammation and gut barrier integrity. Statistical significance in outcome variables will be evaluated using a two-way ANOVA ($p \leq 0.05$), followed by Fisher's LSD post-hoc analyses. ANTICIPATED RESULTS: We hypothesize that exercise will create a protective effect from IBD, including slowed disease progression and improved gut barrier integrity, compared to sedentary conditions. Ultimately, this research may support exercise as a safe and affordable intervention to improve outcomes for people with IBD.

P601: THE EFFECTS OF WEIGHTED VEST WALKING ON EXERCISE INTENSITY AND POST-EXERCISE OXYGEN CONSUMPTION

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BACKGROUND: While changes in mechanical properties as a result of increased force on the muscular environment have been previously studied, less is understood regarding the implications of hypergravity on exercise intensity and excess post-exercise oxygen consumption (EPOC) during and following aerobic exercise. The purpose of this study is to investigate the impact of wearing a vest weighted on exercise intensity and EPOC during walking and recovery. METHODS: Seven recreationally active adults (age 25 ± 7.74 years, VO2 max 44.18 ± 10.49 ml/kg/min, body fat 24.93 ± 8.76 %) completed a baseline session and two experimental trials. During the first experimental trial, participants walked for 40 minutes at 40-50% VO2max. Participants completed an identical exercise trial while wearing a weighted vest loaded with 10% bodyweight. Heart rate (HR), rating of perceived exertion (RPE), VO2, %VO2R, and respiratory exchange ratio (RER) were measured intermittently during exercise. Resting Energy Expenditure (REE) and EPOC were measured for 30 minutes before and immediately following exercise, respectively. Separate, dependent-samples t-tests were performed to evaluate differences between the conditions, and alpha was set at 0.05. RESULTS: Average VO2 (BW= 21.6; WV= 23.1 ml/kg/min), VO2 reserve (BW= 45.1; WV= 49.0 %), RPE (BW= 10.4; WV= 12.0), and HR (BW= 127; WV= 138 bpm) were significantly ($p < 0.05$) increased under the weighted vest condition. There were no significant differences in EPOC or substrate utilization between the trials ($p > 0.05$). CONCLUSIONS: Walking at 40-50% VO2R while carrying a load equal to 10% of body weight was associated with significant increases in perceived exertion and exercise intensity. There were no significant increases in EPOC in the 30-minute window following exercise, indicating that wearing a weighted vest during moderate-intensity aerobic exercise is not associated with increased energy expenditure in the post-exercise period.

P602: TRACKING COUNTERMOVEMENT JUMP ASYMMETRIES OVER A FULL SEASON BETWEEN RIGHT- AND LEFT-HANDED NCAA D1 BASEBALL PITCHERS

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BACKGROUND: Imbalances in lower body strength can potentially increase the risk of injury as well as hampering athletic performance. The purpose of this study was to track countermovement jump variables over the span of a full baseball season and see if there were discrepancies over time as well as between right- (RHP) and left-handed (LHP) baseball pitchers. METHODS: 11 male baseball pitchers participated in the study (8 RHP, 3 LHP) who were members of a D1 NCAA baseball team. Countermovement jump (CMJ) variables were measured using a VALD Force Deck Dual Force Plate System (Brisbane, AUS) and were tracked weekly beginning with a pre-season baseline measure over a 3-month time period for 14 total time-points. Each participant completed three repetitions of a countermovement jump following a standard warm-up as part of their normal prescribed strength and conditioning regimen. A 2x14 (group x time) repeated-measures ANOVA was used to evaluate differences in the proposed outcomes. RESULTS: 10 participants completed the study (8 RHP, 2 LHP). There were no significant differences across time for any of the variables (countermovement depth, p = .529; concentric mean force, p = .702; eccentric mean force, p = .825; eccentric rate of force development, p = .223; takeoff peak force, p = .223; reactive strength index, p = .356; jump height, p = .978; peak landing force asymmetry, p = .248; eccentric force asymmetry, p = .228; concentric force asymmetry, p = .169) nor were there any significant group x time interactions (countermovement depth, p = .992; concentric mean force, p = .779; eccentric mean force, p = .605; eccentric rate of force development, p = .423; takeoff peak force, p = .773; reactive strength index, p = .315; jump height, p = .988; peak landing force asymmetry, p = .184; eccentric force asymmetry, p = .686; concentric force asymmetry, p = .815) CONCLUSIONS: Based on these preliminary results, it does not appear that handedness impacts lower body force production asymmetries. Future studies should attempt to recruit a greater number of left-handed pitchers with this particular team having a wide disparity in right vs. left-handed pitchers in order to confirm the lack of a relationship. This particular study does confirm the ease and feasibility of tracking these metrics and could be useful as a tracking tool for baseball players.

P603: PERCEPTUALLY-REGULATED TREADMILL INTENSITY IN 30^{o}C VS. 20^{o}C

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BACKGROUND: While heart rate is influenced by environmental conditions (e.g. extreme heat), impact on perceptual responses is equivocal. Because intensity is often regulated via perceived exertion, it is important to clarify environmental impact on RPE production. Therefore, this study compared perceptually-based intensity regulation in warm vs. cool environments. METHODS: Individuals (n = 12) of varying aerobic fitness (VO_2 max 39.8.0 ± 6.3 ml/kg/min) completed a VO_2 max trial and four treadmill sessions in a randomized crossover design. On separate days, participants completed two sessions in a warm temperature (30 ^{o}C, HT) and two in a cool temperature (20 ^{o}C, CL). Each participant produced RPE 4 (30 min) followed by RPE 7 (30-min) in a separate session. Velocity (m/min^{-1}), HR, and VO_2, were assessed each minute. RESULTS: Separate 2 (intensity) x 2 (temperature) RM-ANOVAs revealed a significant main effect for intensity but not for temperature or intensity x temperature interaction. A one tailed, paired t-test revealed no significant difference for HR, VO_2, or velocity between temperatures for RPE 4, nor for HR and VO_2 at RPE7. However, for RPE 7, selected velocity was significantly slower for HT (129 ± 32m/min) vs. CL (136 ± 31m/min, p = 0.01). Additionally, follow up test revealed significance when comparing measures between RPE 4 vs. 7 for both CL (142 ± 24 vs. 166 ± 22 bpm, 22.6 ± 7.6 vs. 28.2 ± 7.9ml/kg/min, 107 ± 57 vs. 136 ± 31m/min) and HT (149 ± 28 vs. 167 ± 21 bpm, 21.8 ± 7.8 vs. 28.8 ± 8.5ml/kg/min, 110 ± 31 vs. 129 ± 32m/min). CONCLUSION: A warmer environment leads to down regulation of self-selected treadmill velocity when intensity is perceptually regulated. This occurred only in higher (RPE 7) and not lower (RPE 4) intensities. Therefore, environment is important to consider when using the RPE-production paradigm for exercise prescription.

P604: ASSESSING THE CORRELATION BETWEEN MAXIMAL OXYGEN UPTAKE, BODY COMPOSITION, AND ONSET OF HYPOXEMIA

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BACKGROUND: Hypoxemia is simply defined as low oxygen levels in the blood which negatively impacts cognitive function. Typically, this is a problem for individuals at a minimum of 10,000 feet above sea level. Therefore, it is important to understand what factors delay the onset of hypoxemia. Current literature supports the idea that improved cardiovascular fitness limits the cognitive impairment caused by hypoxic factors. However, the relationship between body composition and the onset of hypoxemia is yet to be examined. Therefore, the purpose of this study is to evaluate the impact of body composition and maximal oxygen uptake (VO_2 max) on the onset of hypoxemia. METHODS: For this study, Air Force ROTC members at Liberty University will be utilized. Each subject will be assessed on body composition, maximal oxygen uptake capacity, and risk for hypoxemia. Body composition will be measured utilizing the DEXA scan. Additionally, the maximal oxygen uptake is measured using a Parvomedics trueone 2400 metabolic measurement system. Subjects will be at rest in the altitude chamber, set at a hypoxic pressure equivalent to 18,000 feet. During which, blood oxygen saturation levels and heart rate will be tracked using a pulse oximeter and chest worn heartrate monitor. When the subject's blood oxygen saturation reaches 90%, the subject will be removed from the chamber. At this point, the time spent in the chamber will be recorded. A Pearson correlation between both the VO_2 max value and time spent in the altitude chamber will be performed. A separate Pearson correlation will be conducted between body composition and time spent in the altitude chamber. ANTICIPATED RESULTS: It is hypothesized that both lean body mass and higher VO_2 max values will have a positive impact on the time until hypoxemia occurs.

P605: DEVELOPING A SKILL-BASED PUTTING ACCURACY ASSESSMENT

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BACKGROUND: Putting in golf requires significant precision and fine motor control. Established indicators such as handicap scores and strokes gained quantify performance in competition, but there is a need for a controlled, laboratory-based assessment of putting skill. This study aimed to validate a skill-based putting assessment capable of quantifying putting performance in an isolated environment. METHODS: Twenty amateur golfers (handicap 12.2 ± 5.6) completed a demographic questionnaire and the Samn-Perelli fatigue scale before testing. Participants performed 10 warm-up putts followed by 24 randomized putts from 3, 6, 9, and 13 feet. Performance was measured using the Putting Skill Score (PSS), which combines putt success, proximity to the hole, and weighted scoring of putt difficulty. RESULTS: A multiple linear regression examined whether handicap predicted PSS while controlling for fatigue. The overall model was significant, $F(2,14) = 13.96$, $p = 0.001$, explaining 62% of the variance (adjusted $R^2 = 0.62$). Handicap was a significant positive predictor of PSS ($B = 0.8$, $p = 0.001$), indicating that lower handicaps were associated with better putting performance. CONCLUSION: This study concludes that handicap is a valid predictor of putting accuracy. Furthermore, the PSS demonstrates strong construct validity, with handicap significantly predicting test performance and explaining 62% of variance, supporting its use as a controlled, lab-based measure of golf putting skill. Artificial intelligence (AI) tools were used in the collection and analysis of data, writing of the abstract/presentation, and production of images or graphical elements of this abstract/presentation.

P606: IDENTIFYING BASELINE PHYSICAL AND COGNITIVE CHARACTERISTICS THAT PREDICT BALANCE DEFICITS AMONG YOUNGER ADULTS

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BACKGROUND: Predicting fall-risk is important to identify individuals who may benefit from targeted interventions to reduce injury. Previous research has mainly focused on identifying fall-risk among older adults, but there may be earlier markers of balance deficits in young adults. Additionally, these markers may differ based on an individual's physical fitness, cognitive ability, and balance which could tailor personalized balance training targets. The purpose of this study was to investigate whether baseline physical and cognitive characteristics in younger adults could predict balance deficits. METHODS: Eleven young participants (ages 16 - 33, 5 females) with no major musculoskeletal disorders performed a series of clinical and biomechanical assessments. Clinical tests consisted of strength, coordination, and

fall-risk assessments including the Star-excursion balance test (SEBT), the Timed-up-and-go (TUG), Lower Extremity Motor Coordination Test (LEMOCOT), Four Square Step Test (FSST), and MiniBESTest. Biomechanical measures included joint kinematics and minimum toe clearance (MTC) during a 5-min walking trial. Correlations between baseline and balance measures were determined as well as descriptive analysis of how results differed between physical activity levels. RESULTS: In this exploratory study, we found a negative correlation between SEBT test and MTC ($r^2 = 0.73$) demonstrating that individuals with higher SEBT scores had lower MTC values. All other clinical measures demonstrated weak correlations with MTC ($r^2 < 0.50$). Descriptive analysis demonstrated that with increasing physical fitness levels, performance on the FSST and TUG clinical tests improved. CONCLUSIONS: Findings from this work support ongoing work to determine whether baseline characteristics such as strength assessments, physical activity level, balance performance could be used to predict fall-risk, even in younger adults and to motivate future improvements in evaluating fall risk.

P607: DEVELOPMENT AND VALIDATION OF A NORMATIVE DATA SET FOR FITLIGHT COGNITIVE PROTOCOLS

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BACKGROUND: The use of cognitive training systems has become increasingly common in the field of mental performance across a wide variety of populations and settings, including athletic, rehabilitation, and tactical environments. However, limited research exists on the cognitive processes these systems impact and how users, clinicians or coaches should interpret or compare performance outcomes. The purpose of this study is to develop a normative data set on a diverse population performing several common exercises from the FitLight Training© system. Additionally, the study aims to compare performance outcomes to validated surveys that assess the cognitive processes believed to be engaged during the training. METHODS: We will recruit a diverse group of 500 participants ranging from 19 to 100 years old, with a variety of occupations, fitness levels, and health conditions. Each participant will complete one 30-minute visit, which consists of four FitLight© exercise protocols (Simon Says, Matched Pairs, Near Far, and the Peripheral Test), a demographic form, the General Self-Efficacy survey (GSE-10), and the National Aeronautics and Space Administration Task Load Index (NASA-TLX). Results will be analyzed using a multiple linear regression model to measure the relationship between average response times, number of correct responses, demographic values, and psychometric values collected via the three surveys. Pearson's correlation coefficient will be used to understand the relationship between training system performance and each of the psychometric or demographic factors. ANTICIPATED RESULTS: We hypothesize that participants with higher survey scores for self-efficacy will exhibit faster response times for the four protocols assessed. We also predict that individuals who believe mental training will increase perceptions of cognitive load will score higher on the NASA-TLX questionnaire. We theorize that those with higher perceptions of mental training will report higher levels of situational motivation. We anticipate seeing significant trends in age for all performance variables.

P608: DOES A RELATIONSHIP EXIST BETWEEN PEAK TORQUE AND THE LANDING ERROR SCORING SYSTEM

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BACKGROUND: Among females, anterior cruciate ligament (ACL) injuries are a common and debilitating condition. The Landing Error Scoring System (LESS) is a validated and low-cost field test which evaluates landing mechanics and identifies those at risk of ACL injury. Isokinetic testing has been used for assessing modifiable ACL risk factors. The purpose of this study was to determine if a relationship exists between peak isokinetic force and LESS scores in healthy, active females with no history of knee injury. METHODS: 19 Females (18-30 years) with a history of resistance training at least three days per week were recruited. Participants completed health history and informed consent (IRB approved). The study consisted of a familiarization day where participants' height and weight were assessed. Then participants completed a five-minute cycle ergometer warm up. Kinematic markers were placed on the knee, ankle and hip. Participants then completed three trials of the LESS, where they jumped from a 30cm box to force plates positioned a distance of one-half of their height. Upon landing, they immediately performed a maximal vertical jump. Cameras were placed 3 meters anterior and lateral the landing zone for analysis. Participants then completed an isokinetic test of both knees, concentric in flexion and extension, five repetitions at 60 and ten repetitions at 180 degrees per second, beginning of the dominant leg. Participants returned for testing using identical methods for familiarization no less than 48 hours after familiarization. RESULTS: No significant relationships were found between peak torque and LESS scores, but a significant moderate relationship was found between LESS score and time to peak torque (665.26msec±239.68, r=.497, p=.030). CONCLUSIONS: These data suggest that landing mechanics are not related to peak isokinetic torque but may be influenced by the speed at which peak torque is realized.

P609: PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION VERSUS STATIC STRETCHING ON HAMSTRING FLEXIBILITY IN WOMEN'S COLLEGIATE VOLLEYBALL ATHLETES

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BACKGROUND: Volleyball requires repetitive squatting, lunging, and jumping, which place the hamstrings in high demand. Proper stretching may improve available range of motion at the knee and hip by reducing hamstring tightness. The purpose of this study was to evaluate the effects of proprioceptive neuromuscular facilitation (PNF) versus static stretching on hamstring flexibility in women's collegiate volleyball athletes. METHODS: 20 female NAIA volleyball athletes aged 18-25y participated in the study, with 10 assigned to static stretching and 10 assigned to PNF. Participants met with the investigator once a week for six weeks. Premeasures included the assessment of knee extension (KE) and hip flexion (HF) with no prior stretching. KE for hamstring flexibility was assessed using the Active Knee Extension test, and HF for hamstring flexibility was assessed using a straight leg raise with extended knee. Range of motion was measured using the Output Sports IMU sensor (Output Sports, Dublin, Ireland) placed at mid-shank for KE and mid-thigh for HF. Static stretching included an isometric hold at end range in the same positions used for range of motion testing, for 3 sets of 30 seconds. A contract-relax method involving a 10s hamstring contraction and 6s relaxation with static hold was used for PNF stretching using the same positions as range of motion testing. Post-stretching measures were collected immediately following stretching. Separate two-way repeated measures ANOVA with between group factor (static vs PNF) were used to assess main effects for session time (pre and post), and total time (week 1 vs week 6). Due to small sample size and multiple tests, statistical significance was set a priori to $p<.0125$. RESULTS: Statistically significant main effect for total time HF for the left (W1=93.67±3.2°, W6=103.4± 3.1°, p=.005) and right limb (W1=94.87±3.2°, W6=104.15± 2.4°, p=.006) was observed. No other differences met statistical significance ($p>.0125$). CONCLUSION: Both static and PNF stretching modes may improve HF range of motion over time in volleyball athletes. Incorporating these stretches even once per week may reduce hamstring tightness over time.

P610: EFFECTS OF CAFFEINE WITHDRAWAL ON BENCH PRESS PERFORMANCE METRICS IN HABITUAL CONSUMERS

Austin T. Massengale, Ray Davis, Brady Watson, Sydney Miller, Matthew Barenie. *University of South Alabama, Mobile, AL.*

Background: With increasing popularity of caffeinated energy drinks and supplements among recreational resistance-trained and athletic populations, an investigation was conducted into the effects of caffeine withdrawal on resistance training performance metrics. Methods: Seventeen resistance-trained individuals (8 males, 9 females, 22±3 years) completed four visits. On the first visit a single repetition maximum (1RM) for the barbell bench press was conducted. On the subsequent three visits, participants completed a workout consisting of 3 sets at 80% of the previously determined 1RM to volitional failure. Each visit was preceded by 48 hours of caffeine withdrawal. The three randomized conditions consisted of placebo(maltodextrin), a 5 mg/kg dosage (363±133 mg), or a caffeine dosage based on their reported habitual consumption (208±64 mg) mixed with isocaloric water flavoring for blinding. A linear transducer attached to the barbell assessed average concentric velocity (ACV)(m/s), percent drop off (%DO), and total repetitions across all three sets (set 1 = s1). %DO was determined by calculating percent change from [(fastest rep-last rep)/fastest rep]. A repeated-measures ANOVA was conducted, with Tukey-corrected post hoc tests, and significance was accepted at $p\leq.05$. Results: No significant main effect of caffeine condition was recorded concerning ACV (p=.296), %DO (p=.954), or total repetitions (p=.866). A significant main effect was observed for set across all three outcome measures: ACV ($p<.001$), %DO (p=.003), and total repetitions ($p<.001$). Post hoc analysis for ACV indicated that set (s1) (.262±.055) was faster than s2(.233±.051) and s3(.236±.057). %DO increased from s1(20.1±38.2) to s3(39.8±40.2) with no changes from s1 to s2(25.4±27). Conclusions: No significant effects were seen across the three conditions, indicating that caffeine

consumption post a 48-hour withdrawal period was unable to attenuate performance decrements across the bench press sets.

P611: THE EFFECTS OF MENSTRUAL PHASE ON THERMOREGULATION IN EUMENORRHEIC WOMEN DURING HEATED EXERCISE

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BACKGROUND: Basal body temperature (BBT) changes throughout the menstrual cycle (MC) in eumenorrheic women due to fluctuations in hormones. During the follicular phase, BBT stays relatively normal (35.5-36.6℃), but during the luteal phase, it rises (0.3-0.7°C) due to ovulation and plateaus until menses. Eumenorrheic females must be aware of potential effects of thermal and physiological strain, and prepare for exercise accordingly. However, there is limited research that explores the role of MC on thermoregulation in heated exercise, and those findings are conflicting. The purpose of this research study is to further investigate the interaction between heated exercise and MC on thermoregulation. METHODS: Thirty eumenorrheic females who are not on hormonal contraceptive (IUD, implant, pill) or have a copper IUD and experience a regular menstrual cycle (21-35 days, 3-7 days of menses) will be recruited. Participants must be considered "recreationally active," where they exercise 3-5 times/week for a total of 150-300 minutes/week. The first trial will be a VO_2 max test during menses under "normal," room temperature conditions. The second and third trials will be an exercise test under heated conditions (33°-35°C) during menses and ovulation; the participant will run at 60-70% of their VO2 max for 35 minutes to adequately experience thermal and physiological strain. First, we will record baseline urine specific gravity (USG) to ensure hydration levels. We then record baseline body weight (kg), heart rate, metabolic data, internal core temperature, blood lactate, and blood pressure. Every five minutes, we will record heart rate, internal core temperature, rate of perceived exertion (RPE), and blood lactate. After the test ends, we will record ending body weight (kg; for water loss), heart rate, session RPE, internal core temperature, blood lactate, and blood pressure. ANTICIPATED RESULTS: It is hypothesized that lactate levels will not be changed, but sweat rate, thermal strain, heart rate, core temperature, RPE, and blood pressure will increase during heated exercise in the luteal phase.This research is funded by the UNA Student Research Grant program.

P612: WHAT COUNTS AS A FRACTIONAL SET? AN ACUTE COMPARISON ACROSS UPPER BODY EXERCISES

Devon Stoffel, Tahran Gotla, Keith Walpole, Brady Watson, Neil Schwarz, Ryan Colquhoun. *University of South Alabama, Mobile, AL.*

BACKGROUND: The purpose of this study was to examine the difference in single-joint (SJ) and multi-joint (MJ) upper body exercise on maximal voluntary isometric contraction (MVIC) with 10 sets of repetitions (reps) to failure. **METHODS**: Twenty-six (15 M/11 F) resistance-trained, habitual caffeine consumers completed two sessions. During the first session, participant's arms were randomized to either unilateral SJ (triceps extension (TE)) or MJ (overhead press (OHP)) exercises and their 1 and estimated 10RM (e10RM) were assessed for each exercise. The second session consisted of 10 sets to concentric muscle failure with their previously established e10RM for each exercise with the same arms as the first visit. MVIC strength of the elbow extensors was measured prior to and following every two sets during the second visit. Each participant received a standardized dose (3 mg*kg-1) of caffeine prior to each session. **RESULTS**: There was no significant exercise (TE/OHP) × time (Pre/S2/S4/S6/S8/S10) × sex (M/F) interaction effect for MVIC ($p=0.226$); there was a significant time × sex interaction effect ($p=0.029$). Post-hoc analysis indicated MVIC strength was significantly lower at S10 (0.785±0.13) when compared to S2 (0.820±0.12; $p<0.001$), S6 (0.827±0.13; $p=0.002$), and S8 ($p=0.033$) in males when collapsed across exercise. There was no significant difference in MVIC in females across any timepoints ($p=0.220$-0.999). There was a main effect in exercise ($p=0.028$). Post-hoc analyses indicated OHP was greater than TE for MVIC ($p=0.028$) when collapsed across sex and time. There were no significant interaction effects for reps ($p=0.118$-0.259); there were significant main effects for exercise ($p=0.017$), time ($p=0.001$), and sex ($p=0.001$). Post-hoc analyses indicated females completed more reps when compared to men (M: 12.6±1.6, F: 15.3±2.3; $p=0.001$) when collapsed across exercises and time. More reps were completed during TE compared to OHP (TE: 14.9, ± 3.5 reps; OHP: 13.1±2.2 reps; $p=0.017$) when collapsed across time and sex. Additionally, the amount of reps completed significantly differed across S2 through S8 time points (S2: 20.5±3.2 reps; S4:14.3±2.5 reps; S6:12.9 ±2.4 reps; S8: 11.5 ±2.1 reps; $p<0.001$). **CONCLUSIONS**: Both biological sex and exercise appear to alter the fatigue response of the elbow extensors.

P613: THE EFFECT OF AMBIENT LIGHT COLOR ON STRENGTH, REACTION TIME AND HEART RATE IN ACTIVE COLLEGE-AGED MALES AND FEMALES

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BACKGROUND: Research has indicated that altering the color in the environmental lighting can significantly impact exercise due to related physiological responses. Exposure to blue light has been associated with an increase in heart rate, improved grip strength, and enhanced reaction time. While green light was found to decrease heart rate and initiate more calming effects on the body. The purpose of this study is to investigate how various environmental light colors, specifically blue, green and white (natural) light, affect strength, heart rate, and reaction time in active college-aged participants. METHODS: Male and female participants(N=9) (18-25 years) were recruited, completed informed consent and health history documents. After an equipment familiarization day, participants returned to the lab no sooner than 24 hours for testing. Participants completed counterbalanced trials under three light conditions, white (natural), blue and green. They completed a five-minute cycle ergometer warm up followed by four maximal attempts with an isometric mid-thigh pull positioned over force plates, with one-minute rest interval between repetitions. Next, they completed three, one-minute reaction time trials using a Dynavision D2, with a one-minute rest between trials. The D2 is a 4x4 foot height adjustable board with lit buttons. Heart rate was recorded for all trials. RESULTS: An ANOVA was used to compare heart rate, peak force and reaction time when under white, blue and green light colors. No significant differences were found across lighting conditions in heart rate(103.44bpm±10.1, $p=.637$), peak isometric force (1575.44N±767.127, $p=.996$) or average reaction time (.71±.057, $p=.812$). CONCLUSION: These data suggest that light color does not influence peak isometric force or reaction time in college aged participants.

P614: KINETIC COMPARISON OF THREE GRIP CONDITIONS DURING ISOMETRIC MID THIGH PULL

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BACKGROUND: Hand grip is a limiting factor in performing maximal deadlifts; lifting straps can increase peak force production in an isometric mid thigh pull (IMTP). The purpose of the current study was to compare 3 grip conditions and their force characteristics during an IMTP. The grips used were bare hands (BH), conventional Rogue lifting straps (RS), and unconventional Versa Gripps (VG). METHODS: Eighteen adults were recruited (22.4 ± 3.2 yrs, 78.8 ± 21.4 kg). Participants were instructed on how to complete a barbell IMTP using established standards. A practice attempt was provided for each grip condition. Participants performed 2 trials with 1 minute of rest between trials for each condition and 2 minutes of rest between conditions in a counterbalanced fashion. They were instructed to push into the ground as they pulled the bar straight up as hard as possible until told to stop (approx. 5 s). Vald Performance ForceDecks were used to collect bilateral ground reaction force, from which total peak force normalized to body mass, peak force asymmetry, impulse during the first 200-ms window normalized to body mass, and impulse asymmetry were obtained for all trials. Data from the trials with the largest peak force for each grip condition were statistically analyzed in SPSS using repeated measures Friedman ANOVA by Ranks tests ($\alpha = .05$). Post-hoc Wilcoxon Signed Ranks Tests with Bonferroni correction were carried out when necessary to determine specific differences. RESULTS: A significant effect of grip condition was observed for peak force only ($\chi2\ (2) = 19.111$, $p < .001$), with pairwise comparisons revealing lower outcomes for BH (mdn = 27.57 N/kg) than RS (mdn = 28.73 N/kg) ($Z = -.889$, $p = .023$) and VG (mdn = 30.80 N/kg) ($Z = -1.444$, $p = <.001$). CONCLUSIONS: Greater peak forces are generated when using RS and VG compared to BH. Future research should investigate whether similar performance benefits exist when using these grip conditions during isotonic exercises.

P615: EFFECTS OF PRE-EXERCISE SAUNA ON POWER AND RATE OF FATIGUE

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BACKGROUND: Pre-exercise heat exposure has been proposed as a strategy to enhance athletic performance; however, most sauna-related research has focused on post-exercise recovery. Limited evidence exists on whether brief sauna use prior to training can enhance performance outcomes. A short, five-minute dry sauna session at 180-185°F may elevate core and muscle temperature,

improve blood flow, and increase neural activation, thereby priming both neuromuscular and cardiovascular systems for activity. The purpose of this study is to examine the effects of short-term sauna exposure before exercise on acute power performance.**METHODS:** A within-subjects crossover design will be employed. Thirty recreationally active participants will complete three visits. During the first visit, one-repetition maximum (1RM) tests for squat, deadlift, and bench press will be conducted, along with familiarization to countermovement jump (CMJ) testing. The second and third visits will involve measuring barbell velocity via linear transducer during squat, deadlift, and bench press performed at 70% 1RM. CMJ performance (three trials) will also be assessed. Prior to testing, participants will either (a) spend five minutes in a heated sauna pod (180-185°F) or (b) complete a control condition involving five minutes seated in an unheated sauna pod. All trials will be preceded by a standardized warm-up.**ANTICIPATED RESULTS:** It is hypothesized that pre-exercise sauna exposure will enhance barbell velocity and CMJ performance. If effective, short-term sauna exposure may offer athletes and coaches a practical, time-efficient strategy to optimize readiness and acute performance. **Grant funding:** A grant application will be submitted to the Graduate School at Western Kentucky University. **Generative AI Statement:** Artificial intelligence (AI) tools were used in the writing of the abstract/presentation.

P616: SEX DIFFERENCES IN KNEE EXTENSION FORCE AND MUSCLE SWELLING FOLLOWING 85% BACK SQUAT TO FAILURE

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BACKGROUND: The purpose of this investigation was to investigate sex-differences in muscle strength, fatigue, and muscle swelling following a set of back squats to failure at 85% of their one-repetition maximum (1RM). METHODS: 23 resistance-trained males (n=12) and females (n=11) completed a single session where they completed 1RM back squat, rested for 5 minutes, and then completed a set at 85% 1RM until failure. Maximal voluntary isometric contraction (MVIC) strength of the knee extensors and muscle thickness (MT) of the vastus lateralis (VL) and rectus femoris (RF) via ultrasound were assessed prior to 1RM testing (PRE) and after the set to failure (POST). For MVIC testing, subjects were seated in a leg extension with their dominant leg fixed to a load cell. Ultrasound images were taken and images were blinded by a separate investigator.MT was measured using ImageJ. Mean concentric velocity was measured via a linear position transducer for all repetitions and velocity loss (VL) was measured as the % decline in velocity between the fastest repetition and the last repetition. Repetitions completed and VL between males and females was assessed using an independent samples t-test.A time (PRE/POST) × sex (M/F) repeated measures ANOVA was run to examine changes in MVIC, while a time (PRE/POST) × sex (M/F) × muscle (VL/RF) was used to examine MT. RESULTS: There were no significant sex-differences in repetitions completed (M: 5.4±2.3 reps vs. F: 5.2±1.3 reps; p=0.255) or VL (M: -36.7±15.4% vs. F: -38.3±15.4%; p=0.863). For MVIC strength, there was no interaction effect (p=0.502) or main effect for time (p=0.217). However, there was a main effect for sex (p<0.001), whereby males had greater MVIC strength than females when collapsed across time (M: 76.4±11.5 kg vs. F: 53.3±17.8 kg; p<0.001). There were no interaction effects for MT (p=0.479-0.875); however, there were main effects for time (p<0.001) and sex (p<0.001), whereby MT was significantly greater at POST when compared to PRE (POST: 2.79±0.32 cm vs. PRE: 2.68±0.35 cm; p<0.001) when collapsed across sex and muscle. When collapsed across muscle and time males exhibited significantly greater MT than females when collapsed across muscle and time (M: 2.96±0.27 cm vs. F: 2.49±0.19 cm; p<0.001). CONCLUSION: A set at 85% to failure increased muscle thickness regardless of sex or muscle.

P617: GLOVE UP OR LACE UP? INDIVIDUAL DIFFERENCES IN AFFECT AND ENJOYMENT DURING JOGGING VS VIRTUAL REALITY BOXING.

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BACKGROUND: Individuals vary in both their preference for and tolerance of exercise intensity. These traits have been shown to influence self-selected intensity and the ability to sustain effort beyond the ventilatory threshold during aerobic exercise. Yet, the application of this framework to virtual reality exercise has not been explored. The purpose of this study was to examine the extent to which preference [P] for and tolerance [T] of exercise [PRETIE-Q] explain and predict post-exercise enjoyment [PACES] and in-task affective valence [FS] during and following a single bout of moderate-intensity continuous treadmill jogging [JOG] and virtual reality boxing [BOX]. **METHODS:** Participants [N= 20, 12 males; age (M ± SD); 26.1 ± 7.2 yrs; BMI (M ± SD); 26.4 ± 5.8] completed a single bout of JOG and BOX. Each condition lasted 30-min, with a 5-min warm-up, 20-min active exercise, and 5-min cool-down. During JOG, a moderate intensity was imposed by manipulating speed and grade, while participants were asked to do their best during BOX. Participants completed the PRETIE-Q before, FS measures every 3.5 minutes during, and PACES immediately after each condition. **RESULTS:** Hierarchical regression indicated that T explained 15.4% and 3.1% unique variance in PACES following BOX and JOG respectively, while P explained 4.1% and 14.1% unique variance in PACES following BOX and JOG respectively. Additionally, T explained 42.1% unique variance in FS experienced during BOX [$F_{change}(1,18) = 13.11$, $\beta = 0.649$, $P=0.002$], while P failed to explain any variance. Finally, T explained 26.5% unique variance in FS experienced during JOG [$F_{change}(1,18) = 6.50$, $\beta = 0.515$, $P=0.02$], with P explaining only 5.3% variance. **CONCLUSIONS:** These results indicate that traditional and virtual exercise modalities may engage different individual difference factors, emphasizing the distinct roles of P and T in shaping exercise experiences. This observation is particularly important given that the JOG condition involved an imposed intensity, whereas the BOX condition allowed for a more self-selected level of exertion. These findings highlight the importance of considering these traits when designing exercise interventions.

P618: EFFECTS OF EXERCISE AND NEUROMUSCULAR STIMULATION ON NEUROPLASTICITY AND INFLAMMATION IN THOSE WITH DEMENTIA RISK

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Background: More than 130,000 Georgians are estimated to have Alzheimer's disease and related dementias (ADRD). Exercise's mitigation of ADRD's pathological features may occur through the disruption of processes that degrade neurons and the induction of neuroplastic changes through the release of myokines that stimulate neuroprotective mechanisms, enhance perfusion, regulate acetylcholine levels, and modulate inflammation. Multi-waveform neuromuscular electrical stimulation (NMES) can separately upregulate brain-derived neurotrophic factor (BDNF) to counter the impediment of inter-neuronal communication imposed by tau proteins and amyloid plaques. Combining exercise with NMES may, therefore, elicit clinically meaningful improvements in cognitive processes and reduce the risk of ADRD. The purpose of this study is to investigate the effects of a combined exercise and NMES intervention on neural plasticity and inflammation in those at risk for ADRD. **Methods:** Participants will be screened for inclusion by identifying those who do not meet ACSM recommendations for physical activity and are at risk for ADRD due to family history and carry a variant of the apolipoprotein E (APOE) gene. Using a repeated-measures, counterbalanced, crossover design, participants will undergo either: 1) six weeks of a combined exercise and multi-waveform NMES (ExNMES) intervention or 2) six weeks of a volume-equated exercise-only (EO) intervention, followed by a 4-week washout period before participating in the second intervention. Changes (calculated post-minus pre-intervention) in saliva-derived BDNF and C-reactive protein (CRP), obtained by blood prick, will be compared between ExNMES and EO interventions using separate paired *t*-tests. Changes in the Montreal Cognitive Assessment (MoCA) Total Score will be compared with the non-parametric Brunner-Munzel test. Alphas will be set at $\alpha = 0.05$. **Anticipated results**: We anticipate that ExNMES will significantly increase saliva BDNF, reduce CRP, and improve the MoCA total score to a greater extent than observed with EO, with implications to guide future exercise interventions in those at risk for ADRD. **Funding Acknowledgment:** Rockin' Out Alzheimer's Disease Foundation Grant (ID#3915)

P619: EXPLORING RELATEDNESS, DEPRESSION, AND SUPPORT VALUATIONS IN A PARKINSON'S DISEASE SUPPORT GROUP

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BACKGROUND: Relatedness, a basic psychological need of Self-Determination Theory (SDT), drives motivation and emotional well-being. It is especially critical in support group settings, where interpersonal connection and shared experience are central. Individuals with Parkinson's disease (PD) often experience a loss of personal agency and experience reduced social participation, which reflects a thwarting of the basic psychological needs. Although researchers have applied SDT across health contexts, including chronic illness and rehabilitation, few have examined how support groups foster relatedness among individuals with PD. This study investigated the psychosocial impact of a PD support group that offered multidimensional support via group exercises, informational speakers, and the company of those with shared experiences. We examined how

feelings of relatedness among group members related to depression, disease severity, and perceived value of support types. METHODS: Eleven adults with PD, who attended at least one local PD support group meeting in the past year, participated in the study. Each completed a survey assessing relatedness, depression, disease severity, as well as a question assessing which type of support (i.e., information, social, exercise) they valued most. RESULTS: All participants reported high levels of relatedness (M = 44.1, SD = 7.9). On average, participants reported normal depression levels (M = 3.1, SD = 2.5). Information was the most highly valued type of support (n = 8), followed by social support (n = 3). Although not statistically significant, the relationship between relatedness and support valuation showed a trend toward significance ($F(1,9) = 4.84$, $p = .055$), with higher relatedness reported by those who valued social support most (M = 51.3, SD = 5.5) compared to informational support (M = 41.4, SD = 7.0). CONCLUSIONS: These findings suggest that social support may play a key role in fostering feelings of relatedness among individuals in a PD support group, despite informational support being more often valued. Further clarification on how different support types contribute to feelings of relatedness may help optimize support group designs. Future research should explore these dynamics in larger samples to strengthen generalizability.

P620: IDENTIFIED REGULATION ALTERS RESPONSES TO VELOCITY BASED FEEDBACK TO COUNTERMOVEMENT JUMPS

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BACKGROUND: Identified regulation is when an athlete is motivated to adopt a behavior because they recognize that it will benefit development. Along with intrinsic, extrinsic, and introjected motivation, identified regulation may alter an athlete's response to cues or feedback. The purpose of this study is to see how different motivation styles influence countermovement jumps where specific social feedback in the form of leaderboards is present. **METHODS**: 31 collegiate athletes were given the Exercise Self-Regulation Questionnaire (SRQ-E). The SRQ-E had subscales for intrinsic motivation (INM), identified regulation (IDR), introjected regulation (INR), and external regulation (EXR). After the survey, athletes were asked to countermovement jump on a uniaxial force plate according to 3 different feedback systems, with 3 jumps per trial. The trials were: 1.) control (CON): athletes were told to jump as high as they can, 2.) velocity (VEL): athletes were told to jump as high and fast as possible, then shown a leaderboard for propulsive velocity, and 3.) force (FOR): athletes were told to jump as high and forcefully as possible, then shown a leaderboard for propulsive force. The SRQ-E subscales were divided into high and low groups using the median value, before running a repeated measures ANOVA. **RESULTS**: No significant effect of the subscales INM, INR, or EXR were found ($p > 0.05$). For IDR, significant interaction effects between trial and identified regulation were found for jump height, countermovement depth, propulsive phase, and time to takeoff ($p = 0.005$, $p < 0.001$, $p = 0.047$, $p = 0.002$, and $p = 0.017$; respectively). Pairwise comparisons showed that countermovement depth in the VEL trial was lower in the low IDR than the high (-0.26 ± 0.02 vs. -0.20 ± 0.02, $p = 0.025$). Both the time of propulsive phase and time to takeoff were shorter in the high IDR than the low in the VEL trial (0.20 ± 0.01 vs. 0.25 ± 0.01, $p = 0.003$, 0.73 ± 0.03 vs. 0.58 ± 0.03, $p < 0.001$; respectively). Within the high IDR group only, jump height for VEL was lower than both CON and FOR ($p = 0.030$, $p = 0.018$; respectively). **CONCLUSION:** Identified regulation altered responses to velocity-based cues and feedback. This may have been due to higher IDR individuals testing different kinetic strategies to elicit higher velocities, even at the risk of worse performance.

P621: EMOTIONAL READINESS FOR RETURN TO SPORT FOLLOWING LOWER EXTREMITY INJURY IN DIVISION III ATHLETES

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BACKGROUND: Psychological components of rehabilitation have been understudied in athletes' return to sport (RTS) after injury. The fear of re-injury in athletes decreases their willingness to participate in their sport, and emotional readiness is a critical but under-explored factor in Division III athletes' RTS. The purpose of this study addresses the emotional challenges athletes face after receiving physical therapy. This descriptive study analyzed the impact of rehabilitation in Division III collegiate athletes, specifically examining whether physical therapy improved emotional readiness for return to sport. METHODS: 26 Division III collegiate athletes completed the Emotional Readiness Return to sport (ERRS) survey, a 26-item questionnaire to quantify athletes' perception of physical therapy and its role with the RTS process. The primary outcome was the perceived significance of physical therapy in promoting emotional readiness and confidence in returning to sport following a lower extremity injury. RESULTS: Athletes (48%) expressed trust in physical therapy, with findings demonstrating consistency in RTS readiness attributed to their providers, reflected in moderate agreement across communication and treatment related question items in the ERRS. Athletes (77%) were also more confident and emotionally prepared following physical therapy, showing a positive psychological impact in RTS. However, responses varied in relation to fear of re-injury, highlighting ongoing challenges in psychological recovery despite rehabilitation. CONCLUSION: This study suggests that physical therapy plays a meaningful role in supporting Division III athletes' emotional readiness for RTS. Future research is warranted to expand these findings and explore their generalizability.

P622: EXERCISE AND NEUROMUSCULAR ELECTRICAL STIMULATION IN DEMENTIA: EFFECTS ON INFLAMMATION, SLEEP, PHYSICAL ACTIVITY, AND BEHAVIOR

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BACKGROUND: The prevalence of Alzheimer's Disease Related Dementias (ADRD) is projected to rise by ~46% in the next decade. Chronic inflammation may increase the risk of ADRD by disrupting the circadian rhythm and hypothalamic function, which can cascade in affecting sleep, physical activity, and behavior. Exercise and multi-waveform neuromuscular electrical stimulation (NMES) may modulate inflammation, but the transfer of the proposed anti-inflammatory effect to improved sleep and physical activity levels is not sufficiently documented. This study will, therefore, examine whether exercise combined with concurrent NMES can attenuate inflammation and improve sleep and physical activity in adults at risk for ADRD using a repeated-measure, counterbalanced, crossover design. **METHODS:** Participants will be recruited from a local personal care facility and screened to identify physically inactive individuals without NMES contraindications at risk for ADRD (e.g., family history with apolipoprotein E gene variant). After providing informed consent, participants will undergo either a six-week combined exercise and NMES (ExNMES) or a volume-equivalent exercise-only (EO) intervention, followed by a 4-week washout period, before completing the second six-week intervention. Changes (Δ) (calculated as post minus pre-intervention) average daily steps and finger-prick-derived C-reactive Protein (CRP) levels will be calculated and compared between ExNMES and EO with separate paired t-tests; $\alpha = 0.05$. Changes in the Behavioral Pathology in Alzheimer's Disease Rating Scale (BEHAVE-AD) Total Severity Score and the Pittsburgh Sleep Quality Inventory (PSQI) Global Score will be analyzed using Brunner-Munzel tests; $\alpha = 0.05$. **ANTICIPATED RESULTS:** ExNMES is expected to reduce CRP, increase average steps/day, and significantly improve BEHAVE-AD Total and PSQI Global Scores greater than the effects of EO only. **Funding Acknowledgment:** Rockin' Out Alzheimer's Disease Foundation Grant (ID#3915).

P623: HEADS UP, MEN'S SOCCER. NO, NOT ABOUT CONCUSSIONS BUT ABOUT HANDGRIP STRENGTH

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BACKGROUND: Handgrip strength has been proposed and shown to be a biomarker of health and longevity. Many Division II teams regularly train and depend on handgrip strength but little information is reported in men's soccer. Because soccer players (excluding goalies) are penalized for using their hands it has been proposed that many participants do not train specifically for upper body strength and have low hand grip strength. The purpose of this study is to report pre-season data on several health biomarkers and give each individual immediate feedback about his results. A secondary purpose of this study is to educate the participants about the importance of handgrip strength as it relates to overall health and performance. METHODS: A sample of 24 participants (age 20.4) was recruited for the men's soccer team at a Division II university. BMI, Body Fat, Blood Pressure, resting heart rate, back flexibility, bicep strength and hand grip strength were all assessed and each person was given his results (including normative data) immediately. Each was counseled individually by an ACSM certified exercise physiologist on the importance of handgrip strength. Participants were given instruction how to improve their handgrip strength and specific exercises to perform that they could easily perform alone or in their training facility. RESULTS: 67% of the participants had healthy weight BMI's. 100% had healthy resting heart rates for their age. 83% of participants had normal blood pressure. 97% of the players had body fat percentages below 10% body fat. 23% of the participants (needs

work) in back flexibility. 46% of the group were in the 25th percentile in bicep strength. 92% of the players were in the 10th percentile of their age group and gender in hand grip strength. CONCLUSIONS: As expected the participants had very low handgrip strength in the age group norms comparison. This suggests much work needs to be done educating this population of athletes about the importance of handgrip strength and its related long-term relationship to longevity and fewer health disparities.

P624: UNDERSTANDING SELF-EFFICACY, PERCEIVED STRESS, AND PHYSICAL ACTIVITY IN PHYSICAL FUNCTION AMONG WOMEN WITH BREAST CANCER

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Background: Breast Cancer (BC) is the most common cancer diagnosis among women, with advances in detection and treatment leading to a growing population of survivors. BC survivors typically undergo aggressive treatment therapies associated with long-term survival, but consequently, reduced physical function. Previous studies highlight self-efficacy as a key psychological mechanism positively influencing functional outcomes in aging populations, with a few studies highlighting the indirect role of self-efficacy in improving pain and quality of life in the context of BC. Emerging evidence also indicates that perceived psychosocial stress (PSS) is not only common during cancer treatment but is associated with worse function. Additionally, physical activity mitigates treatment-related side effects and may help maintain physical function. The purpose of this study is to examine the roles of self-efficacy and PSS as mediators and baseline physical activity as a moderator in the relationship between cancer treatment and physical function among BC survivors. **Methods:** Understanding and Predicting BC Events after Treatment (UPBEAT) was a prospective cohort study of 258 patients with early-stage (I-III) BC treated with chemotherapy, aromatase inhibitors, and/or radiation (or some combination) and 145 controls. Measures of Expanded Short Physical Performance Battery (SPPB), 6-minute walk, Shoulder Range of Motion, Grip Strength, Walking Self-Efficacy Scale, Cohen's Perceived Stress Scale, and Godin Leisure-Time Exercise Questionnaire (LTEQ) were collected at baseline, 3-month, and 12-month follow-up. **Anticipated Results:** BC survivors with higher self-efficacy and lower PSS at 3 months and/or considered "physically active" at baseline are expected to experience less functional loss at 12 months. These insights may inform the development of more effective interventions to optimize therapeutic outcomes within this population.

P625: AFFECTIVE TRAITS MODERATE ACUTE EXERCISE EFFECTS ON INHIBITORY CONTROL AND P3 ERP

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BACKGROUND: Acute exercise has been shown to enhance inhibitory control and brain mechanisms of event-related potentials (ERPs) including the P3 component. Yet, the moderating influence of affective traits, including positive affect (PA), on these outcomes remains unexplored. The purpose of this study is to explore the moderating effects of PA on inhibitory control and P3 following self-selected, moderate-intensity acute exercise in college age young adults. METHODS: Utilizing a within-subjects cross-over repeated measures design, undergraduate students (n = 76; female n = 51) completed two laboratory sessions including an exercise session and sedentary control session on separate days. The exercise session included 20-minutes of self-selected treadmill running. The sedentary control session including 20-minutes of studying for class. Pre- and post-session assessments included inhibitory control (flanker task) while electroencephalography (EEG) was recorded. PA was used to categorize participants into higher (HPA; n = 40) and lower (LPA; n = 36) positive affect groups. RESULTS: In the LPA group, exercise (compared to sedentary control) reduced flanker interference (exercise: 7.5 ± 5.5%; control: 10.2 ± 9.2%) and decreased P3 amplitude (exercise: 2.9 ± 2.7 μV; control: 3.7 ± 2.9 μV). No changes were observed for the HPA group following exercise. CONCLUSION: These findings suggest that PA moderates intra-individual respond to acute exercise, such that individuals with lower PA showed improved behavioral performance accompanied by reduced P3 amplitude. Collectively, this work underscores the importance of PA in exercise-cognition research and highlights the potential to tailor exercise interventions to individual affective traits to optimize cognitive and neural outcomes for those who need it most.

P626: POSSIBLE MOLECULAR MECHANISMS OF ACUTE ENDURANCE EXERCISE-INDUCED ORTHOSTATIC HYPOTENSION MITIGATION IN MPTP-INDUCED MOUSE MODEL OF PARKINSON'S DISEASE

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BACKGROUND: Sporadic Parkinson's disease (sPD), a progressive neurodegenerative disorder, accounts for about 85% of Parkinson's cases. Many sPD patients experience orthostatic hypotension (OH), characterized by diminished norepinephrine (NE) production. Endurance exercise (EXE) has been reported to enhance autonomic function and NE sensitivity, suggesting its potential to alleviate OH. However, the underlying molecular mechanisms remain unclear. The present study investigated the molecular effects of EXE on sPD-induced OH in an MPTP-induced mouse model of sPD to address this knowledge gap.**METHODS**: Male C57BL/6J mice (8 weeks old) were randomly allocated to three groups: Control (CON), MPTP-treated (MPTP), and MPTP-treated with endurance exercise (ME). The MPTP and ME groups received intraperitoneal injections of 25 mg/kg MPTP once a week for five consecutive weeks. The ME group additionally completed 60 minutes of treadmill running at 15 m/min, five days per week, for five weeks. **RESULTS:** The MPTP group showed significantly reduced motor functions, assessed by wire hanging, rotarod, and nest building, and lower levels of dopamine beta-hydroxylase (DBH), a marker of impaired NE synthesis, in the left ventricle tissues compared to the control (CON). Contrarily, the ME group improved motor abilities and restored DBH levels. An autophagy marker, LC3-II, decreased, while p62, BNIP3, and LAMP2 remained unchanged. Additionally, mitochondrial function improved in the ME group, shown by higher mitochondrial complex II activity and Fis1 levels, reflecting enhanced mitochondrial dynamics and quality control. Although oxidative stress markers MnSOD and PRXIII increased in both MPTP and ME groups compared to CON, indicating a compensatory response to MPTP-induced oxidative stress, GPX4 levels rose significantly only in the ME group, emphasizing EXE's role in strengthening defenses against lipid peroxidation. **CONCLUSION**: This study provides the first evidence that endurance exercise ameliorates orthostatic hypotension in an MPTP-induced Parkinson's disease model by preserving DBH levels and enhancing mitochondrial function. These findings position EXE as a promising therapeutic strategy for mitigating MPTP-related cardiac impairments and, potentially, OH in sPD patients.

P627: DOES SELLF-EFFICACY CHANGE OVER THE COURSE OF A THERAPY PLAN

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BACKGROUND: This study examined the potential changes in self-efficacy (SE) over the course of a therapy plan. **METHODS:** Twenty-nine participants, (M-age=56 ±21.9), were prescribed a PT or OT therapy plan by their physician. Participants were given a pre-self-efficacy questionnaire measuring their ability to continuously perform activities of daily living (ADLs) (e.g. walking, chores around the house, hobbies) over time (i.e., time intervals of 5- 40- minutes). Upon completing their prescribed therapy plan, participants were administered the same survey. A series of paired sample t-tests was used to analyze difference in pre and post self-efficacy across the time intervals in men, women, age (<55 and >56), and total number of sessions (<8 and >9). In addition, differences were also analyzed between gender, age group and number of sessions. **RESULTS:** The differences, ($p<.05$) , observed in this study are as follows: <55 age group were found at the 15-minute time and beyond (15min-84±21.3 vs 92.3±15.7) (20min-80±27.3 vs 89.2±24.6) (25min-66.1±28.6vs 86.9±27.8) (30min-61.9±28.3 vs 85± 27.6) (35min-55.3±28.2 vs 83.4± 28.5) (40min-49.6±28 vs 80.3±30.1). The same result was found in the total number of sessions (i.e., <8 sessions) (15min-84.6±27.2 vs 93.46±19.3) (20min-77.3±21.8 vs 90±16.03) (25min-67±25.6vs 87.3±20.5) (30min-61.7±24.9 vs 84.3± 22.4) (35min-57±26.03 vs 81.67± 24.9) (40min-54±25.5 vs 77.3±28.3). Males showed significant ($p<.05$) increases in self-efficacy across all time intervals (5-min-85.38±18.980 vs 95.38 ±11.266) (10min-80.77±13 21.394 vs 94.62±11.983) (15min-75.38± 27.873 vs 93.85±13.253) (20min-66.15±25.993 vs 86.15±18.046) (25min-57.69±26.427 vs 83.08±23.939) (30min-49.62±27.269 vs 78.85±23.288) (35min-45.00±27.839 vs 75.77±24.987) (40min-41.15±30.967 vs 72.31±26.741). Whereas female differences ($p.<.05$) were observed at the 25-minute mark and beyond (25min-63.1± 30.7 vs 79.3±29.7) (30min-58.7±27.7 vs 75.6± 30.3) (35min-53.4±29.3 vs 71.2± 32.8) (40min-48.1±29.7 vs 65.9±35.8). **CONCLUSION:** Such findings may have important implications on the role of a therapist relating to

patients' goals and compliance that will ultimately impact patient independence.

P628: WHAT DOES IT MEAN TO MATTER IN SPORT?
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BACKGROUND: Psychological mattering is the perception of being valued by others and contributing meaningfully (Rosenberg & McCullough, 1981). It is context-specific, meaning the ways in which individuals feel valued and able to contribute can vary across settings. Higher levels of mattering are associated with stronger self-concept and positive mental health (Flett, 2018). Sport offers a particularly unique context for studying mattering because the interactions between athletes, coaches, and teammates are meaningful, goal-oriented, and highly interdependent, influencing psychological outcomes such as self-esteem and mental health (Eime et al., 2013; Vella, 2019). To date, little research has examined how mattering is experienced in sport or how coaches foster environments where athletes feel valued, potentially contributing to the expected psychosocial outcomes. This study explores athletes' perceptions of mattering in sport and coaches' roles in creating environments where athletes feel valued. METHODS: Coaches and current or recent athletes (ages 18+) will complete a brief Qualtrics demographics survey and a 60-minute semi-structured Zoom interview. Transcripts will be analyzed using Braun and Clarke's (2016) thematic analysis, integrating deductive coding from mattering literature with inductive coding for sport-specific insights. ANTICIPATED RESULTS: Athletes may describe how feeling valued by coaches and teammates shapes their self-view, performance, and mental health. Coaches may share strategies and examples that they believe foster mattering. Both groups may offer stories highlighting how mattering in sport mirrors other contexts yet is shaped by the unique dynamics of sport-centered relationships. These findings will inform practices to create environments where athletes feel recognized, supported, and integral to their teams. GRANT/FUNDING INFORMATION: Funding provided by Auburn University Undergraduate Research Fellowship Program.

P629: VERBAL INSTRUCTIONS AND INTRA-EXERCISE CUES AFFECT RECUMBENT STEPPING ELECTROMYOGRAPHY IN MIDDLE-AGED TO OLDER ADULTS
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BACKGROUND: Seated exercise offers an aging exerciser the option to increase pace and/or step against resistance without the potential fall risk often associated with bipedal exercises. Despite its purported utility, research examining the effects of verbal instructions and cues (VICs) on recumbent exercise is not well documented. Therefore, we examined the effects of VICs on lower extremity electromyography (EMG) in aging adults using a commercial recumbent stepper. METHODS: After providing informed consent, 16 adults (8 females; 69 ± 10 years) performed six 1-minute bouts on a NuStep T6 Pro at the participant's normal gait pace equated to steps per minute with level 3 resistance in randomized order with a full-body or legs-only exercise strategy (ES), each with push, pull, or no VIC conditions. EMG was bilaterally recorded from the rectus femoris (RF), biceps femoris (BF), tibialis anterior (TA), and medial gastrocnemius (MG). All EMG values were normalized to each participant's maximum voluntary contractions (%MVC). We used separate two-way linear mixed models to examine the muscle's mean EMG (mEMG) for interactions between ES and VIC; α= 0.05. RESULTS: Main effects of VIC were observed across all muscles ($p_s \leq .019$). A main effect of ES was only observed for the RF (p = 0.032). Pull increased RF (+1.91 to 2.60 %MVC) and TA (+12.80 to 13.40 %MVC) mEMG over Push and No-VIC (p_s < 0.001). Whereas Pull reduced MG mEMG (-2.97 to -1.82 %MVC) compared to No-VIC and Push ($p_s \leq .046$). Push and No-VIC increased MG mEMG compared to Pull ($p_s \leq .046$). Push also increased BF mEMG (+1.04 %MVC) more than No-VIC (p = 0.016), but Push did not elicit greater mEMG than Pull (p = 0.789). CONCLUSION: Pull increased TA and RF mEMG but reduced MG mEMG. Push and No-VIC increased MG mEMG, but Push resulted in greater BF mEMG compared to No-VIC. These observations suggest that preemptive instructions and congruent cues influence recumbent stepping muscle recruitment in aging adults, with implications for optimizing muscle recruitment in middle-aged to older populations.

P630: BIOMECHANICAL DIFFERENCES PRE AND POST "SHUTDOWN" PERIOD IN HIGH-LEVEL COLLEGIATE PITCHERS
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BACKGROUND: Baseball is a sport with a wide range of training styles and ideas that vary greatly from one another. A large amount of research has been completed that focused on continuous training protocols, as well as overthrowing and its consequences on youth pitchers. The consensus of those prior studies is that overtraining in youth and continuous throwing programs has increased the risk of injury amongst pitchers. As a result of those prior studies, break periods for throwing have been suggested that last around two months. However, a major issue is that collegiate pitchers will have multiple periods throughout the year where they do not have as much access to their high-end training facilities, which results in coaches not consistently tracking their athletes over these periods. Unfortunately, regarding this scenario, to the best of the researcher's knowledge there has been no prior research that has directly assessed this. Therefore, the purpose of this study is to evaluate the athletes' biomechanical parameters during the course of one of these "shutdown" periods. This will help identify predictive injury markers and performance metrics during motion. METHODS: Fifteen to twenty NCAA D1 collegiate pitchers will be tested. Each pitcher will throw a short, high-intensity bullpen while wearing motion capture markers and being recorded by infrared motion capture cameras. Subjects will do this once as close to the beginning of the shutdown period as possible, and again at the end of the shutdown period. Independent paired sample t-tests will be used to assess the differences between the shutdown period metrics within subjects, and significant differences will occur with an alpha level of 0.05. ANTICIPATED RESULTS: It is hypothesized that there will be a difference in biomechanical parameters related to performance, and performance parameters will be significantly lowered after the shutdown period.

P631: THE EFFECTS OF BETTERGUARDS ANKLE BRACES ON COUNTERMOVEMENT JUMP PERFORMANCE
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Background: Ankle sprains are a common musculoskeletal injury and can lead to performance decrements and the development of chronic ankle instability (CAI). Betterguards™ (BG) are a new ankle brace that can potentially increase stability while preventing performance deficits. Since countermovement jumps (CMJ) are commonly used to measure performance, the purpose of this study was to examine the impact of BG and CAI on CMJ performance. **Methods:** Thirty participants (15 male, 15 female) completed the Cumberland Ankle Instability Tool (CAIT) and were placed into 3 groups (healthy with no history of ankle sprain (H), ankle sprain copers (C), and CAI). Participants completed two separate sessions in each condition (BG and no brace (NB)), assigned in a counterbalanced order, and performed three CMJs. The best CMJ from each condition was used in the statistical analysis. Four 3 (group) x 2 (condition) ANOVAs with repeated measures were conducted to assess potential differences in jump height (JH, cm), takeoff vertical velocity (TVV, m/s), peak power (PP, W), and work per repetition (WPR, J). An alpha level of $p<0.05$ was set for all analyses. **Results:** A significant interaction between condition and group was observed for PP (F=3.654; p=0.039), where the C group produced the greatest amount of PP in the NB condition, while the other groups produced similar amounts of PP in both the BG and NB conditions. Furthermore, there was a significant main effect for condition for PP (F=6.714; p=0.015), with the NB condition producing more PP. Significant main effects were also observed for JH (F=6.431; p=0.017), with the NB condition producing a greater JH; TVV (F=7.822; p=0.009), with takeoff velocity being higher for the NB condition, and WPR (F=6.579; p=0.016), with the NB condition producing more WPR. **Conclusions:** In the current study, Betterguards™ ankle braces led to decreases in performance metrics for the CMJ, which could lead to performance deficits in sport, potentially due to range of motion differences or compression from the brace. The goal of ankle bracing is to provide increased stability without negatively impacting performance, highlighting the need to better understand if bracing techniques improve or decrease athletic performance. Thus, more research is needed to examine the potential implications of these findings.

P632: THE EFFECTS OF THE PHASES OF THE MENSTRUAL CYCLE ON LIFTING MECHANICS AND INJURY RISK
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INTRODUCTION: Occupational injuries occur frequently and are often associated with the potential to develop into more severe chronic injuries. Musculoskeletal injuries are the leading cause of time lost from work in the health care. The unique breakdown of female workers in this sector suggests there may be unique factors that need to be accounted for when considering injury prevention. Few studies have assessed sex disparities in healthcare-related occupational injuries,

however, when assessing injury risk in other occupational settings studies have suggested consistently higher injury risks for women when compared to men. Understanding the cause behind the discrepancies could be critical to mitigating the injury rate differences. There are a few proposed explanations for the differences in injury rates. These include biomechanical differences such as higher loads that may result from lifting mechanics, ligamentous laxity resulting in lower joint stability, or potentially the strength demands of the tasks. The purpose of this study was to examine the implications of hormonal fluctuations across the menstrual cycle on lifting mechanics and injury risk. METHODS: Twenty-six eumenorrheic females [Age: 20.24 years ± 2.21; Height: 164.26 ± 7.11cm; Mass: 82.65 ± 14.65] completed the study in its entirety. Saliva samples were completed at each visit, and urinary testing was completed prior to visits 2 and 5 to analyze to confirm ovulation. The Noraxon Human Factors and Ergonomics software was used for the lifting assessments at each visit. Linear mixed effects models were conducted to examine the effects of menstrual cycle phase (Follicular, Ovulation, and Luteal), cycle (Cycle 1 vs. Cycle 2), and their interaction on the NIOSH parameters. RESULTS: The LMM revealed a significant phase effect on composite lifting index and lifting index at the origin for the 35lbs condition when comparing the follicular and luteal phase (β =-0.171, p=0.0029), CONCLUSIONS: The results of the study do not suggest a consistent phase effect of lifting injury risk. The increase in occupational risk observed at heavier loads could be task dependent. The underlying mechanism for the observed discrepancies requires further investigation.

P633: REACTIVE STRENGTHINDEXPREDICTSSELF-REPORTEDKNEE FUNCTION AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Individuals with anterior cruciate ligament reconstruction (ACLR) who return to sport demonstrate higher self-reported knee function than those who do not. Quadriceps isometric peak torque (QPT) after ACLR is predictive of self-reported knee function. However, QPT is a gross measure of neuromuscular function and may not reflect performance during sport-specific tasks. Reactive strength index (RSI), a measure of plyometric ability, is critical for deceleration and force production during athletic movements and may be a better predictor of self-reported knee function post-ACLR compared to QPT. **Purpos**e: To assess if RSI is predictive of self-reported knee function at 6 months post-ACLR when patients generally transition from rehabilitation to sport-related activity. **Methods**: Thirty-four individuals with ACLR (38 % female, 6.04±0.29 months post-ACLR) performed 5 drop vertical jumps (DVJ) from a 30-cm box positioned half the participant's height away from 2 embedded force plates while kinematic and kinetic data were collected using 3D motion capture. Jump height was calculated as JH=velocity at takeoff^2/2g. RSI (m/s) was calculated by dividing jump height (m) by ground contact time (s). QPT was collected using a multimodal dynamometer during 3 maximal voluntary isometric contractions. QPT was normalized to bodyweight (Nm/kg) and averaged across trials. Linear regression was used to evaluate whether RSI and PT could predict self-reported knee function (International Knee Documentation Committee Subjective Knee Evaluation form (IKDC)) *a priori* =0.05. **Results**: RSI explained 28.4% of the variance in IKDC (β=23.694, p=0.002). Adding QPT did not improve model fit (R^2 =0.285, ΔR^2 =0.000915, p =0.843). **Conclusions**: RSI may help to directly explain deficits in self-reported knee function post-ACLR and indirectly influence return to sport rates. Historically, self-reported knee function, quadriceps strength and a battery of single-leg hop tests have been used to inform return to sport decisions. The results of this study suggest the RSI is a valuable outcome to incorporate into return to sport testing to identify potential deficits in plyometric ability.

P634: BEYOND THE FASTBALL: TRACKING SHOULDER ADAPTATIONS WITH THE ASH TEST IN COLLEGIATE PITCHERS

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BACKGROUND: The Athletic Shoulder (ASH) test, performed in the I, Y, and T positions, has been proposed as a reliable assessment of shoulder function, but data in collegiate pitchers remain limited. This study evaluated pre- to post-season changes in Division II pitchers using force platform measures. **METHODS:** Six Division II starting pitchers (age: 21.83 ± 1.72 yr; height: 186.17 ± 8.04 cm; mass: 91.43 ± 13.82 kg) completed the ASH test pre- and post-season. Peak vertical force (PVF), rate of force development (RFD), and impulse (200 ms) were measured bilaterally in all three positions using VALD force decks. Linear mixed models (time, arm; random factor: subject) tested main effects, and Cohen's *d* quantified pre-post changes. Statistical analyses were performed using Jamovi (version 2.6.26). **RESULTS:** No significant main effects were detected for PVF (p = 0.69), RFD (p = 0.96), or impulse (p = 0.25). Descriptively, PVF was stable across positions, with a moderate increase in the non-dominant T position (d = +0.54). RFD showed negligible changes (all $|d| < 0.5$). Impulse demonstrated the most notable adaptations, with moderate-to-large increases in the dominant arm (I: d = +0.59; Y: d = +0.81; T: d = +0.72) and smaller increases in the non-dominant arm (d = 0.30-0.41). **CONCLUSION:** Although statistical significance was not reached, effect sizes indicated consistent improvements in impulse, particularly in the dominant arm. Practically, these findings suggest that over the course of a collegiate season, pitchers may maintain or slightly enhance their ability to generate rapid isometric force despite high throwing volumes. Increases in impulse may reflect neuromuscular adaptations to repeated loading, even without large strength gains. From a monitoring perspective, the ASH test offers a low-fatigue, position-specific tool for tracking shoulder health and readiness, with impulse emerging as the most sensitive indicator of within-season adaptation.

P635: WHICH SQUAT FIRES MUSCLES MOST? A PILOT STUDY OF ELECTOMYOGRAPHICAL ANALYSIS COMPARING THREE SQUAT STYLES

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Background: Squats are routinely included in strengthening programs to enhance athletes' performance and reduce the risk of injury. A squat requires a stable core and a coordinated effort from lower extremity muscles. The purpose of this pilot study was to determine the differences in lower limb muscle activation patterns during three squat variations, the back squat (BS), goblet squat (GS), and suitcase squat (SS), between subjects. Methods: 11 recreationally trained power athletes (6 females, 5 males; age 27.2 ± 2.6 years) with a minimum of two years of strength training experience, performed three different squat variations. A surface electromyography wireless system (Delsys Trigno™) recorded muscle activation of the dominant leg: gluteus maximus, biceps femoris, semitendinosus, rectus femoris, vastus lateralis, and vastus medialis. The load was standardized to approximately 30% of each subject's body weight. Statistical analyses included one-way ANOVAs to compare differences in peak muscle activation (%MVIC) for each muscle between the squats (BS, GS, SS). Results: A one-way repeated-measures ANOVA found that the rectus femoris peak muscle activation differed significantly across squat conditions, F(2,6) = 5.54, p=0.02. Post hoc comparisons indicated that rectus femoris activation was significantly greater in the BS (302.88% MVIC ± 113.61) compared to both the SS (208.56% MVIC ± 91.96, p = 0.006) and the goblet (194.74% MVIC ± 100.38, p = 0.04). No other significant differences were observed (p > .05). Conclusion: Power athletes had significantly greater rectus femoris activation with the BS compared to GS and SS. This is contrary to the expectation that front-loaded squats would have an increased rectus femoris activation compared to back-loaded squats. Given the small sample size, low standardized load, and importance of hip and trunk angle with muscle activation, these results should be interpreted with caution. Future research should be done with higher loads.

P636: INFLUENCE OF VIRTUAL REALITY HEIGHT EXPOSURE ON ANTICIPATORY POSTURAL ADJUSTMENTS DURING BALANCE BEAM WALKING

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APAs are critical for maintaining stability and preventing falls, particularly in tasks requiring precise coordination, such as walking on elevated surfaces. By bridging the gap between research and application, this study aims to enhance both our scientific knowledge and the quality of care for older individuals seeking to regain confidence and functional ability, with the ultimate goal of reducing fear-related limitations after a fall, as fear of falling can itself increase the likelihood of subsequent falls. The purpose of this study is to identify how perceived height impacts Anticipatory Postural Adjustments (APAs) and motor control, offering valuable insights into the neural and biomechanical adaptations that occur in height-related exposures.
We will recruit 25 participants between the ages of 18-30. Participants will have no previous TBI or lower extremity deformities/injuries. Electrodes will be placed on the participants' right and left lateral belly of the gastrocnemius muscle, lower rectus abdominis, and lower and upper erector spinae muscles. Following, they will be asked to complete two virtual reality (VR) height trials: one from a road-level perspective (baseline) and one from a high-rise building perspective. Both trials consist of walking on rectangular virtual pathways in which

muscle activity will be recorded through EMGs, and postural control (movement accuracy) will be assessed within the VR environment. EMG data will be processed using a custom Matlab script, and repeated measures ANOVA will be used to examine differences between trials.Based on preliminary findings, the activation of anticipatory postural adjustment muscles is higher during the virtual reality height exposure segment. A magnitude of 19.01 μV in the upper erector spinae muscle and increased knee angle flexion were present.

P637: ACUTE DYNAMIC EXERCISE ALTERS MECHANICAL OUTPUT BUT NOT NEURAL EXCITABILITY OR INHIBITION

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PURPOSE: To examine the effects of acute dynamic exercise on corticospinal excitability, intracortical inhibition, peripheral excitability, and maximal and twitch strength. **METHODS:** Eleven resistance-trained males (age = 24 ± 4 yrs) performed maximal voluntary contractions (MVCs) of the knee extensors on a dynamometer before (PRE), immediately after (POST), and 5 minutes after ($POST_{5MIN}$) a fatiguing protocol. The fatiguing protocol consisted of 3 sets (S#) of isokinetic knee extensions to failure with 5 min of rest after each set. At PRE, at rest after S1-3, and $POST_{5MIN}$, motor evoked potential (MEP) and short-interval intracortical inhibition (SICI) amplitude and twitch torque (TT) were recorded and measured during single and paired-pulse transcranial magnetic stimulation over the motor cortex area, respectively. Muscle compound action potential (M-Wave) amplitude and TT were measured from magnetic stimulation over the femoral nerve. MEP, SICI, and M-Wave amplitudes were recorded via surface electromyography over the vastus lateralis and normalized to PRE. A 1-way repeated measures (RM) ANOVA (time [PRE, POST, $POST_{5MIN}$]) was used for MVC. A 1-way RM ANOVA (time [S1, S2, S3]) was used for time to task failure (TTF). Six separate 1-way RM ANOVAs (time [PRE, S1, S2, S3, $POST_{5MIN}$]) were used for MEP, SICI, M-Wave amplitude size and TT. **RESULTS:** For MVC, there was a 1-way interaction (time; $p < 0.001$). MVC at PRE was > POST ($p < 0.001$) & $POST_{5MIN}$ ($p = 0.017$). For TTF, a 1-way interaction was observed (time; $p = 0.021$). TTF for S1 > S3 ($p = 0.006$). For MEP, SICI, and M-Wave amplitude, there was no 1-way interaction (time; $p = 0.083$ - 0.263). For MEP_{TT}, $SICI_{TT}$, and $M\text{-}Wave_{TT}$, a 1-way interaction was observed (time; $p < 0.001$-0.012). For MEP_{TT}, PRE > S2 & S3 (p = 0.010 - 0.036) and $POST_{5MIN}$ > S2 & S3 (p = 0.026 - 0.042). For $SICI_{TT}$, PRE > S1 & S2 & S3 (p = 0.003 - 0.023). For $M\text{-}Wave_{TT}$, PRE > S2 & S3 (p = 0.004 - 0.017), S1 > S2 & S3 (p = 0.003 - 0.015), S2 > S3 (p = 0.042). **CONCLUSION:** Despite a decrease in MVC and TTF, corticospinal excitability, intracortical inhibition, and peripheral excitability did not alter from baseline. However, twitch torque from magnetic stimulations at all sites was reduced primarily after S2 and S3, likely indicating that mechanical output, rather than neural, was affected by the continuation of acute dynamic fatiguing exercise.

P638: CO-CONTRACTION OF BICEPS AND TRICEPS DURING OVERHEAD LACROSSE SHOT

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BACKGROUND: Co-contraction (CC) is a neuromuscular mechanism that protects a joint when a joint is unstable. While CC typically occurs during activities where a person is novice or unfamiliar with an activity, for the overhand lacrosse shot, CC of the biceps and triceps increases the stability and accuracy of movements in the elbow. CC can increase risk of injury, but the risk lowers in this motor skill with greater stability of the joint. This facilitates transfer of power from the overhand movement to the ball release. However, it is unknown how CC during a lacrosse shot is affected when an injury has occurred. Therefore, the purpose of this study was to examine the relationship between previous injury, previous surgery, position played, and years played with a CC index of the biceps and triceps in a dominant hand overhand lacrosse shot with a non-angled offset lacrosse stick head. METHODS: Nine NCAA Division II women's lacrosse players (age 21.62 ± 1.64 years) participated in this study. Initially, participants completed a health history questionnaire to determine their injury history, surgery history, position and years played. Electromyography sensors were then placed on the dominant side triceps and biceps to measure CC during an overhand lacrosse shot. Each participant completed a three-minute wallball warm-up and three warm up shots prior to data collection. Five maximal effort overhand shots performed with the dominant hand were collected with only trials two through four analyzed to control the Hawthorne Effect. CC index was recorded as the ratio of biceps activity to the combined activity of the biceps and triceps during the overhead lacrosse shot. RESULTS: There was no significant correlation between the CC index and previous injury (r(9) = -0.54, p =0.127), previous surgery (r(9) = 0.40, p = 0.287), position played (r(9) = -0.04, p = 0.914), or years played (r(9) = -0.31, p = 0.425). CONCLUSIONS: While our results indicate no significant correlation with CC around the elbow and previous injury, previous surgery, position played, or years played, additional investigation into the kinematics of an overhand lacrosse shot and muscle activation patterns of shoulder girdle musculature is warranted to determine if previously injured athletes alter their mechanics to compensate and impact their neuromuscular efficiency.

P639: ASSESSING DIFFERENCES IN THE USE OF THE WINDUP AND STRETCH IN COLLEGIATE BASEBALL PITCHERS

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BACKGROUND: Use of both the wind up and the stretch are common in baseball. The windup is typically used with no runners on base, and the stretch is used when runners are on base. Therefore, the purpose of this study was to examine biomechanical differences in Division I baseball pitchers when pitching out of the wind up and the stretch. METHODS: Eleven NCAA Division I male baseball pitchers were tested during three offseason simulated games with all data being collected in the bullpen. Only data from fastballs were analyzed. Trials were recorded using a 7 camera markerless motion capture system at 60 Hz. Biomechanical variables were assessed using the baseball project automation framework (Qualisys Track Manager version 2025.1). The biomechanical variables assessed were stride length (SL) (% body height), hip to shoulder separation at foot strike (HSS) (°), shoulder maximal external rotation (MER) (°), and shoulder internal rotation angular velocity (SIR) (°/s). Paired samples t-test were used to assess differences in pitches thrown from the windup and stretch. An alpha level of 0.05 was used in all analysis. Cohen's d effect sizes were also calculated for each variable of interest, with moderate effect sizes shown at 0.60. RESULTS: There were no statistically significant differences found between groups for any variables of interest (SL: 86.43 ± 1.22 vs. 87.17 ± 0.94, p = 0.12, d = -0.49) (HSS: 20.4 ± 2.76 vs. 19.54 ± 4.01, p = 0.34, d = 0.29) (MER: 180.54 ± 1.17 vs. 180.07 ± 1.28, p = 0.192, d = 0.40) (SIR: 2990.30 ± 91.76 vs. 2943.71 ± 83.65, p = 0.10, d = 0.517). CONCLUSIONS: Lack of significant differences suggests that pitching set up preference may not affect the mechanics of a pitcher, allowing a preferred set up dependent upon the scenario of the game or comfortability of the pitcher. As pitching mechanics are highly individualized, the use of single-subject analysis to examine possible differences between the windup and stretch starting positions could provide a greater benefit.

P640: ESTIMATING TIBIAL STRENGTH AT COMMON BONE STRESS INJURY SITES IN FEMALE ATHLETES

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BACKGROUND: Finite Element Analysis (FEA) integrates bone geometry, density, and load response, offering stronger fracture prediction than conventional measures. This study developed a CT-based, subject-specific FEA workflow to assess regional tibial strength and failure risk in female athletes with varying aerobic fitness who are at risk for bones stress injury. METHODS: 23 females were grouped as low (n=11) or high fitness (n=12) based on a 2-mile run test. CT scans of the lower leg were obtained, and regional FE models were generated from 10 mm image stacks at the proximal 1/3, midshaft, and distal 1/3 of the tibia using 10-node tetrahedral elements. CT-derived, density-based isotropic elastoplastic material properties were applied, and 1% axial strain simulated compressive loading. Nonlinear simulations estimated tibial stiffness, peak stress, and fatigue life. Generalized Estimating Equations examined the effects of region and fitness, covarying for mass and height. RESULTS: Stiffness was highest at the midshaft (600±15 KN/mm) exceeding proximal (572±15) and distal (507±13) regions (p<.01). Maximum von Mises stress also differed by region, with lower stress at the midshaft (255±5 MPa) vs distal (268±6; p<.01) tibia. Greater stiffness was observed in the high (587±14 KN/mm) vs low fitness group (531±23; p=.04). Fatigue life did not differ by region or fitness. CONCLUSION: Stiffer bone deforms less, distributes load more, and reduces stress.

The midshaft outperformed the distal tibia, with greater stiffness and lower stress, likely due to thicker cortical bone. The distal tibia consistently demonstrated mechanical vulnerability, aligning with its high injury incidence. Region-specific biomechanical analysis can reveal site-specific bone adaptations related to fitness, informing preconditioning strategies to reduce injury risk in female athletes. FUNDING: Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. (AWD-21-0355). The opinions and assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the U.S. Army, the U.S. Department of Defense, or The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc. This paper has been approved for public release with unlimited distribution.

P641: AUDIO VERSUS VISUAL UNANTICIPATED STIMULI ON GROUND REACTION FORCE IN RUN TO CUT

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BACKGROUND: Anterior cruciate ligament (ACL) injuries are one of the most common knee injuries incurred during sport participation with almost 250,000 yearly occurrences in the United States. Despite such high prevalence, mechanisms that cause the injury are still unclear. This poses a quandary as implications from ACL injuries can be both costly and time consuming. Non-contact ACL injuries account for 70% of those occurring in sport, specifically during movement that involves rapid loading of the lower extremities and quick changes in direction (i.e. run-to-cut maneuver). Cutting maneuvers have been found to elicit knee joint loading and kinematic changes that increase load on the ACL. Furthermore, increased ground reaction forces (GRFs) about the knee joint are associated with ACL injury. During sporting events, audio and/or visual stimulus are encountered by athletes as they change direction. By determining if GRF differences exist when presented an audio or visual stimulus, researchers can offer guidance to better prevent and rehabilitate ACL injuries. METHODS: Participants (18-35 years, absent of lower extremity injury, meeting physical activity guidelines set forth by the ACSM) will come to the biomechanics lab and participated in 20 successful trials of a run-to-cut maneuver: 5 each of an unanticipated cue of Visual Left/Right or Audio "Left"/"Right." The order of stimuli presentation will be randomized. ANTICIPATED RESULTS: Results will provide direction for future research and rehabilitation/training programs. The temporal difference between audio and visual reaction times may influence the timing and mechanics of change of direction tasks, potentially affecting GRF generation. Should GRFs differ greatly between auditory and visual stimuli, prevention and rehabilitation tactics for ACL injuries can include training exercises recreating "riskier" maneuvers to prepare athletes for sport.

P642: EFFECT OF BLOOD FLOW RESTRICTION ON NEUROMUSCULAR FUNCTION DURING HIGH- AND LOW-INTENSITY ISOMETRIC CONTRACTIONS

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BACKGROUND: The purpose of this study was to examine the effect of blood flow restriction (BFR) in comparison to traditional resistance exercise (TREx) on surface EMG parameters during high- and low-intensity isometric contractions in young adults. **METHODS:** Twenty-eight (15M/13F) healthy, resistance-trained adults (age: 22±3 yr) completed bilateral isometric elbow flexion exercise with and without BFR at 80% arterial occlusion pressure. Participants were seated on a preacher curl bench while holding a straight curl bar fixed to a load cell with the elbow flexed at 90°. EMG sensors were secured over each bicep brachii muscle and maximal voluntary isometric contraction (MVIC) strength was assessed. Following a brief rest, participants completed time-matched (i.e., 30s) isometric ramp protocols at 30 and 80% MVIC with BFR or with TREx. The order of conditions was randomized for each participant, and a 5-minute rest was given between conditions. Each ramp consisted of a 10%/MVIC/s ramp to the target force level, a plateau at the target force (80%: 6s.; 30%: 18s.), and a 10%/MVIC ramp back to baseline. Separate intensity (30/80%) × condition (BFR/TREx) × sex (M/F) repeated measures ANOVAs were used to examine EMG median power frequency (MDF) and root mean square (RMS) during the plateau of each contraction during each condition. **RESULTS:** There were no significant three-way interactions (p=0.236-0.296); however, there was a significant condition × sex interaction effect for MDF (p=0.049). Post-hoc analysis indicated that MDF was greater during BFR but not TREx in males (BFR: 100.5±9.3Hz vs. TREx: 93.4±14.5Hz; p=0.040), but not in females (BFR:87.8±18.5Hz vs. TREx:87.7±18.3Hz; p=0.999).There were no two-way interactions for EMG RMS (p=0.191-0.705); however, there was a main effect for intensity (p<0.001), such that RMS was greater at 80% MVIC when compared to 30% MVIC (80%: 0.276±0.150 mV vs. 30%: 0.101±0.051 mV; p<0.001), when collapsed across sex and condition. **CONCLUSIONS:** These data suggest that contraction intensity is the primary driver of increases in muscle excitation, independent of BFR. Interestingly, when compared to TREx, BFR altered MDF independent of contraction intensity, but only in males. Future research is needed to further understand the underlying mechanisms associated with these responses.

P643: DIFFERENCES IN CORTICAL ACTIVITY IN U.S. COASTGUARD MEMBERS FOLLOWING FAST BOAT EXPOSURE

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BACKGROUND: United States Coast Guard service members frequently operate fast boats, exposing them to repetitive sub-concussive impacts, potentially increasing their risk of neurological injuries. Postural control deficits have been associated with cognitive damage after acute TBI. Although repetitive loading may not produce traditional concussive symptomatology, it does not preclude the development of long-term neurological deficits. To further examine these effects, sensory perturbations are often used to challenge static postural control, while cortical activity provides an important index of the higher-order cognitive processes required to maintain balance. Thus, this study examined the cortical response, via EEG, to sensory perturbations before and after fast boat exposure in Coast Guard members. METHODS: Eight healthy Coast Guard members (62% male, 30.25 years ± 3.99 years, 170.49 cm ± 7.73 cm, and 74.03 ± 13.43) completed virtual reality-induced balance tests pre-post fast boat exposure with a 24-channel EEG. Pre-post differences in beta band relative power were analyzed for the Left Motor ROI (C3 and CP5) and the Right Motor ROI (C4 and CP6), as these regions are commonly associated with balance and postural control. Statistical significance of pre-post changes was assessed using paired-samples t-tests. RESULTS: Paired-samples t-tests indicated no significant pre-post differences in relative beta band frequencies for the Left Motor ROI, t(7) = -0.47, p = .65, or for the Right Motor ROI, t(7) = -0.49, p = .64. CONCLUSIONS: Findings indicate that beta activity remained largely stable from pre- to post-fast boat exposure. In contrast, prior work shows that as balance tasks become more challenging, theta activity in the parietal and frontal lobes increase. Thus, relative theta power may serve as a more sensitive index of the cognitive processes underlying balance control than relative beta power.

P644: FLEXING THE BRAIN: INVESTIGATING MUSCLE HEALTH AND COGNITIVE FUNCTION IN COLLEGE-AGED WOMEN

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BACKGROUND: This study examines the relationship between muscle mass and cognitive function in college-aged women. The project focuses on understanding the impact of physical activity and muscle health on cognitive function. Given the pivotal transition from high school to college, this study seeks to examine how variations in muscle mass may influence cognitive performance in young women. The project will be conducted using a cross-sectional study design. By examining the association between muscle mass and cognitive function, this study aims to provide insights into the potential cognitive benefits of maintaining muscle health in college students. METHODS: Muscle strength will be assessed via upper and lower body one-repetition maximum testing (1-RM) on the chest press and leg press, respectively. Body composition (skeletal muscle mass, fat mass, body water) will be measured via bioelectric impedance analysis using the Technogym Checkup machine. Peak force and power in the lower limb muscles (quadriceps and hamstrings) will be obtained via an isokinetic Biodex machine. Cognitive performance will be obtained through several tasks, including the Trail Making Test, Digit Span (Forward and Backward), and the Flanker Task. Saliva samples will be collected via the passive drool technique to evaluate concentrations of IL-6, BDNF, and IGF-1. Participants are also provided with three dietary logs and asked to record their food intake for two weekdays and one weekend. One-way ANOVAs will be used to analyze the data. ANTICIPATED RESULTS: It is expected that individuals with higher muscle mass and greater muscle strength will perform better on cognitive tasks compared to those with lower muscle mass. The findings of this research may inform strategies for promoting both physical and cognitive well-being in this population, with implications for academic success and overall quality of life.

P645: IMPACT OF GELATIN SUPPLEMENTATION ON INDICES OF SKELETAL MUSCLE RECOVERY: A PILOT STUDY

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BACKGROUND: While exercise is a potent stimulus for skeletal muscle health, strenuous exercise can result in muscle damage, characterized by soreness and impaired muscle function. Collagen supplementation has garnered attention as a means to improve muscle recovery and health. The impact of gelatin, a cost-effective and commercially available form of collagen supplementation, on muscle recovery following strenuous exercise is unknown. The purpose of this study is to test the efficacy of gelatin supplementation on indices of skeletal muscle recovery following eccentric exercise. **METHODS**: Using a double-blind, placebo-controlled, randomized trial, participants (25.9 ± 4.6 yrs; 11 M, 11 F) received either gelatin (GEL,15g collagen) or placebo (PLA, agar) twice daily throughout the study. Participants performed 150 maximal eccentric unilateral knee extensions. Measures of muscle soreness (MS), peak isokinetic (PKT180, PKT60) and isometric torque (PMT) occurred prior to- (PRE), 24h, 72h, and 168h post-exercise. Circulating markers of collagen breakdown (Hydroxyproline, Hyp) and type 1 collagen synthesis (Procollagen type 1 Intact N-Terminal Propeptide, P1NP) were assessed via venous blood samples at PRE, 24h, 72h, and 168h. **RESULTS**: Static, concentric, and eccentric MS were increased (P<0.05) in both groups at 24h and 72h. Compared to PLA, participants who received GEL reported lower (P<0.05) concentric and static MS at 24h (PLA: 58.5 ± 20.7 mm; GEL: 41.9 ± 11.6 mm) and 168h (PLA: 9.0 ± 10.4 mm; GEL: 1.3 ± 1.6 mm), respectively. PKT60 was reduced (P< 0.05) in both groups 24h (PLA: 67.0 ± 18.9 %, GEL: 74.8 ± 15.8 %) and 72h (PLA: 72.1 ± 23.6 %; GEL: 86.9 ± 10.0 %). PKT180 was reduced (P<0.05) in both groups at 24h (PLA: 80.4 ± 18.7 %, GEL: 87.3 ± 9.3 %), but only PLA at 72h (PLA: 77.6 ± 20.2 %). PMT was reduced (P<0.05) 24h only in PLA (PLA: 75.6 ± 23.5 %). In PLA, Hyp was increased (P<0.05) 24h (117.0 ± 14.3 %), 72h (130.6 ± 21.4 %), and 168h (122.0 ± 17.9 %). However, in GEL, Hyp was increased (P<0.05) only at 72h (115.9 ± 12.6 %). **CONCLUSION**: These data suggest GEL may alleviate exercise-induced muscle soreness and expedite the recovery of contractile function following eccentric exercise. Further research is needed to assess the underlying mechanisms through which GEL impacts skeletal muscle recovery.

P646: EXPLORATION OF CADAVERIC VARIATIONS IN POSTURAL SPINAL CURVATURES

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BACKGROUND: The human spine is naturally curved, forming mild arcs that are essential for balance, flexibility, and shock absorption. These curvatures, known as the cervical and lumbar lordosis, and thoracic kyphosis, are foundational to upright posture and normal movement and are widely illustrated and quantified in anatomical textbooks. However, the extent to which these standardized depictions reflect the true variability of spinal curvature in the human population remains unclear. In recent years, research has recognized the prevalence of postural variants derived from muscular imbalances, poor posture, and prolonged sedentary behavior. Lack of knowledge on the differences between traditional textbook anatomy and widely accepted normal variations in structure can lead to improper treatment strategies and unnecessary patient concern. This research project will investigate the anatomical variability of spinal curvatures in preserved human specimens compared to traditionally accepted spinal curves and angles depicted in textbooks. The study aims to determine whether textbook representations accurately reflect the range of natural spinal alignment found in the population. METHODS: Using 2 adult human donors, researchers will utilize detailed dissection, anatomical landmark palpation, and angular measurements to determine sagittal and coronal spinal curvatures. The study will also critically evaluate the validity of different measurement techniques on cadavers, identifying best practices for anatomical education. This study will highlight the importance of incorporating anatomical variation into clinical training and textbook revisions. ANTICIPATED RESULTS: It is hypothesized that we will measure variations in spinal curvature that will differ from common textbook measurements and characteristics.

P647: EFFECTS OF FASTED VERSUS FED-STATES ON BIOELECTRICAL IMPEDANCE ANALYSIS METRICS AND MUSCLE MORPHOLOGY VIA ULTRASONOGRAPHY

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PURPOSE: To examine the impact of performing bioelectrical impedance analysis (BIA) and skeletal muscle ultrasound assessments (US) in either a fasted or fed state. **METHODS:** Thirteen healthy resistance-trained males (age = 21 ± 3 yrs; body mass = 82.79 ± 8.16 kg) visited the laboratory twice, six hours apart on the same day. For their first visit, participants arrived having fasted overnight from all food and fluids (>8 hrs) and completed a BIA assessment using an InBody 570, followed by US imaging of the vastus lateralis (VL) and pectoralis major (PM). After baseline measures were completed (PRE), participants consumed a standardized meal, were given 30 minutes to digest, then completed a post 30 minutes ($POST_{30MIN}$) BIA and US scan. Participants were allowed to resume their normal daily activities, including food consumption and exercise, but returned no earlier than 6 hours for their second visit ($POST_{6HRS}$)to complete their last BIA and US scans. The variables obtained from the BIA were body mass (BM), fat free mass (FFM), total body water (TBW), intracellular water (ICW) and extracellular water (ECW). Variables measured by ultrasound were muscle cross-sectional area (mCSA), subcutaneous fat (sFAT) and echo intensity (EI). Eleven separate 1-way repeated measures ANOVAs (time [PRE vs. POST30MIN vs. POST6hrs]) were performed for BM, SMM, TBW, ICW, ECW, and mCSA, sFAT, and EI of the VL and PM. **RESULTS:** There were no 1-way interactions (time) in either the VL or PM for mCSA, EI or SFAT (p = 0.091 - 0.666). There were significant 1-way interactions (time) for BM, SMM, TBW, ICW, and ECW (p < 0.001 - 0.021). BM increased from PRE to $POST_{30MIN}$ (p < 0.001). For SMM, TBW, and ICW, $POST_{6HRS}$ was greater than $POST_{30MIN}$ (p = 0.005 - 0.043). Additionally, ECW at $POST_{6HRS}$ was greater than PRE (p = 0.042) and $POST_{30MIN}$ (p = 0.005). **CONCLUSIONS:** Despite changes in BM from PRE to $POST_{30MIN}$ and BIA metrics from $POST_{30MIN}$ to $POST_{6HRS}$, mCSA and EI of the VL and PM in trained males does not appear to differ between standardized to unstandardized pretesting conditions. Thus, US imaging can be performed without a potential concern for fed-state or time of day. Despite statistically significant differences being found in BIA metrics, the relative differences were <1%, which could be seen as negligible depending on the context in which the test is being applied.

P648: EFFECTS OF ELECTROLYTE SUPPLEMENTATION ON DELAYED-ONSET MUSCLE SORENESS

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BACKGROUND: Delayed-onset muscle soreness (DOMS) develops 24-72 h after unaccustomed exercise and is linked to muscle damage, inflammation, and reduced function. Recovery strategies often emphasize protein or carbohydrate intake, while electrolytes receive less attention despite roles in hydration, nerve conduction, and muscle contraction. This study examined whether electrolyte supplementation reduces soreness and alters pain sensitivity compared with placebo.METHODS: Six recreationally active young adults (2 males, 4 females; 20.5±0.9 yrs; 65.7±14.2 kg; 169.5±7.1 cm) completed two lab sessions in a double-blind, randomized design. At visit 1, participants consumed either an electrolyte beverage (sodium, potassium, magnesium) or a flavored placebo 30 min before exercise. They then performed a standardized eccentric quadriceps protocol to induce soreness in the dominant leg. Pressure pain threshold (PPT, N) of the quadriceps was assessed with a handheld algometer, and soreness was rated on a 10-cm visual analog scale (VAS) before and 36-48 h post-exercise. The primary outcome was interlimb PPT difference (dominant − non-dominant); change scores were calculated as post − baseline. Mann-Whitney U tested group differences; effect sizes were calculated with Cohen's d. OpenAI's ChatGPT and JuliusAI assisted with statistical analysis and text consolidation.RESULTS: Change in interlimb PPT difference did not differ significantly (p=0.20). The mean difference favored electrolytes (+25.8 N), with a large effect (Cohen's d=1.52). All control participants worsened (−13.6±10.5 N), while two of three electrolyte participants improved (+12.2±21.6 N). Soreness was modestly lower with electrolytes (VAS 0-4.2) than control (VAS 0-6.5), though not significant.CONCLUSIONS: Electrolyte supplementation did not significantly alter pain thresholds, but results consistently favored electrolytes, with improved interlimb PPT differences and modestly lower soreness. These preliminary findings, supported by a large effect size, suggest electrolytes may provide a protective effect following eccentric exercise.

P649: THE RELATIONSHIP BETWEEN THIGH MUSCLE DENSITY AND CARDIORESPIRATORY FITNESS IN CAREER FIREFIGHTERS

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BACKGROUND**:** Firefighters perform critical emergency services to their communities. Cardiorespiratory fitness (CRF) is an important predictor of overall health, injury risk, and occupational performance in

firefighters. Previous studies have noted muscle quality impacts lower body strength and power. However, future work is needed to explore its impact on CRF in firefighters. METHODS**:** Thirty-three career firefighters (3 women; age=34.5±8.8yrs; stature=1.77±.08m; weight=92.4±20.1 kg; BMI= 29.3±5.0 kg/m^2) participated in a single testing session. Participants were free of neuromuscular, cardiovascular, or metabolic diseases, and were instructed to refrain from caffeine and tobacco for 12 hours and vigorous lower body exercise for 48 hours. Following an 8-hour fast, stature and body mass were measured using a calibrated stadiometer and scale. Dominant thigh muscle density (MD), a proxy for muscle quality, was measured using peripheral quantitative computed tomography (pQCT) at 50% femoral length. Skeletal MD (mg/cm^3) was quantified using an automated convex polygon method in ImageJ. Firefighter CRF was determined during a graded exercise test on a cycle ergometer to assess peak oxygen consumption (VO_2peak). After a two-minute warmup at 50 watts (W), workload increased by 1 W every 3 seconds until exhaustion, with respiratory gases measured continuously via open-circuit spirometry. VO_2peak was determined as the highest 5-second average. Pearson's correlations were used to examine the relationship between MD and CRF, with additional partial correlations controlling for age and sex. An alpha level of ≤ 0.05 was set to determine statistical significance. RESULTS**:** Greater thigh MD (80.16 ± 2.32 mg/cm^3) was related to higher relative VO_2peak (34.49 ± 6.82 mL/kg/min) prior to (r=0.530, P=0.002) and after controlling for age and sex (r=0.515, P=0.003). CONCLUSIONS: Muscle density demonstrates a moderate, positive relationship with CRF in career firefighters. It is possible that less dense muscle is associated with greater lipid infiltration which may reduce muscle oxidative capacity and subsequent CRF. Further studies are needed to determine if MD impacts performance during critical firefighter tasks.

P650: POST EXERCISE SKELETAL MUSCLE MYOSIN HEAVY CHAIN FRAGMENTATION MAY BE LINKED TO INFLAMMATION AND REMODELING

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BACKGROUND: The purpose of this exploratory investigation was to determine if acute post-exercise skeletal muscle myosin heavy chain fragmentation ($MyHC_{frag}$) coincides with alterations in molecular chaperones and proteolytic enzymes, select markers of mTORC1 signaling, and/or specific gene expression signatures. METHODS: Untrained males (n=10, 23±2 years) and females (n=10, 23±3 years) completed a bout of combined endurance and resistance exercise. Vastus lateralis muscle biopsies were taken before, 3-hours, and 24-hours post-exercise. Tissue was fractioned into myofibrillar (MF) and sarcoplasmic protein (SP) fractions for protein analysis. Differential RNA expression (DRE) from those who experienced high- and low-$MyHC_{frag}$ post-exercise was also analyzed via bulk RNA sequencing. RESULTS: $MyHC_{frag}$ increased 24-hours post-exercise, albeit only 4 of 20 chaperone and proteolytic markers were concomitantly altered and none significantly correlated with 24-hour post-exercise $MyHC_{frag}$. Given these null findings, we explored six participants who experienced the most post-exercise $MyHC_{frag}$ versus six who experienced the least $MyHC_{frag}$ with the intent of examining if post-exercise gene signatures or signaling differed. Although mTORC1 signaling markers were similar, 799 DE transcripts were identified 24-hours post-exercise. Pathway analysis on DE differences indicated that nine of the top 10 pathways enriched in high-$MyHC_{frag}$ participants were related to inflammation. High $MyHC_{frag}$ participants also presented an upregulation in extracellular matrix remodeling genes at the 24-hour post-exercise timepoint (i.e., MMPs, as well as ADAMST and SERPIN family genes). CONCLUSIONS: Post-exercise $MyHC_{frag}$ is associated with an upregulation in inflammatory and tissue remodeling genes, and longer-term studies are needed to determine if these acute outcomes align with unique adaptive responses.

P651: ACUTE MUSCULAR RESPONSES TO DYNAMIC CO-CONTRACTION EXERCISE COMPARED TO TRADITIONAL RESISTANCE EXERCISE

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Background: Reports have noted 24.2% of adults met 2018 guidelines for muscle-strengthening exercise, this suggests that traditional resistance training (TRAD) may be unsuitable, potentially due to access to facilities and equipment. A potential alternative could be performing dynamic co-contraction (DCC), which involves continuous maximal contractions of agonist and antagonist muscle groups through a full range of motion without an external load. Due to the subjectivity and potential variability of individual force production of DCC, the purpose of this study is to compare the acute effects of DCC, TRAD, and passive movement on muscular outcomes and local tissue oxygenation. **Methods:** Using a within-subject design, 20 participants (18-35 years old) will have exercise and recovery responses under 3 conditions. Visit 1 includes one repetition max (1-RM) testing of the elbow flexors and familiarization of exercise and testing protocols. For visits 2-4, participants will be randomly assigned to one of three exercise conditions: TRAD, DCC, or passive movement. Before and 0-, 5-, and 10-min post exercise, measures will include a maximal voluntary isometric contraction (MVIC) of the elbow flexors, muscle activation via surface electromyography, muscle thickness via ultrasound, and local tissue oxygenation via near infrared spectroscopy. Following pre-exercise measures, participants will perform the exercise intervention consisting of 4 sets of 20 repetitions for elbow flexion following a cadence. TRAD will be performed with 60% 1-RM. DCC will include instructions to contract maximally through a full range of motion with agonist and antagonist muscle groups. Passive movement will include a full range of motion without external resistance or maximal contraction. Participants will receive continuous biofeedback. Muscle fatigue responses will be monitored by changes in MVIC strength, swelling will be examined via changes in muscle thickness and local tissue oxygenation will be averaged across sets. Two-way Bayesian repeated measures ANOVAs will be used to compare outcomes across time and between conditions. **Anticipated Results:** We expect muscular responses, such as muscle fatigue and muscle swelling, to be similar between DCC and TRAD, however tissue oxygen saturation will be lower during TRAD.

P652: DEVELOPMENT AND EVALUATION OF A CULTURALLY-AFFIRMING HEALTH PROMOTION PROGRAM FOR BLACK/AFRICAN-AMERICAN GIRLS WITH OBESITY

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BACKGROUND: Black/African-American (Black/AA) girls experience disproportionately high levels of obesity, underscoring the need for early and unique interventions. Healthy Eating and Active Living (HEAL) programs that utilize play-based technology while being culturally affirming, socially supportive, and leveraging parasocial interactions are innovative possibilities. The purpose of this study is to develop and evaluate a HEAL intervention for 20 Black/AA girls aged 4-8 and their primary caregiver. This culturally affirming, socially supportive intervention leverages the parasocial relationship between the participant girl and Imani, an interactive smart doll informed by formative assessment focus groups (FGs) with Black/AA girls. **METHODS**: A community advisory board of 6 Black/AA girls and their primary caregiver dyads (child age=5.2±1.1 years; BMI percentile=96±3.1) participated in two focus groups. Social Cognitive Theory guided FGs to identify potential HEAL intervention strategies and preferences for Imani alongside a multimedia app platform. **RESULTS**: The girls designed Imani to reflect themselves with curly hair in ponytails, medium brown skin, and colorful clothing. A multimedia app platform featuring five episodes and daily HEAL messages was developed. The episodes follow the adventures of Imani as she travels to different states in search of and to stop the Sugar Fairy, who is replacing healthy foods with sugary sweets. Imani's traveling bus is powered through physical activity that the participating girl is encouraged to join. The girl-caregiver dyads are prompted to set daily HEAL goals during the two-week intervention. **CONCLUSIONS**: A socially supportive HEAL intervention that nurtures the parasocial relationship between Black/AA girls and a culturally-affirming and interactive smart doll has promise to improve HEAL behaviors.

P653: STEPPING UP: EVALUATION OF ENERGY EXPENDITURE DURING AND AFTER TWO DIFFERENT STAIR CLIMBING STRATEGIES

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BACKGROUND: Sedentary lifestyles have been linked to chronic health issues, including cardiovascular disease, obesity, type 2 diabetes, and certain cancers. Increased daily physical activity (PA), particularly non-exercise activity thermogenesis (NEAT), has become a focus for improving public health and increasing total daily energy expenditure (TDEE). Therefore, this study seeks to investigate energy expenditure (EE) during 2 modes of stair ascension, along with the associated post-

stair ascension EE, to quantify the contribution of stair use to TDEE. METHODS: Apparently healthy adults (N=20, 23.0±4.3 yrs, 25.0±5.0 kg/m^2, 50% female) completed three trials: a 4-floor ascension via elevator (control trial; EL), followed by ascending 4 flights of stairs 1-step at a time (1S) and 4 flights of stairs 2-steps at time (2S) in random order with 10-min of seated rest following each trial. Oxygen consumption was assessed throughout each trial using a portable metabolic analyzer (K5, Cosmed USA Inc.) to determine EE (kcal/min) during both the stair ascension period and during the subsequent 10-min rest period. RESULTS: A one-way repeated measures ANOVA was utilized to compare mean EE both during and 10-min after each ascension condition. As expected, EE during both the 1S and 2S stair ascension periods were significantly higher ($p<0.001$) than EL, but there was no significant difference in EE between the 1S vs. 2S stair ascension periods ($p=0.230$). Significant differences were, however, observed in EE during the 10-min post-stair ascension period with greater EE ($p<0.001$) following the 2S trial (28.16±5.70 kcals) compared to the 1S trial (25.53±5.23 kcals). This led to a significantly higher ($p<0.001$) total EE (ascension plus 10 min post-trial) for the 2S trial (43.12±8.60 kcals) compared to the 1S trial (41.25±8.19 kcals). CONCLUSION. Ascending the stairs resulted in a doubling of EE compared to the EL trial when combining the ascension period and the 10-min post-ascension period. Additionally, ascending the stairs 2-steps at a time resulted in a 4.5% increase in EE compared to 1-step at a time. Individuals seeking to increase TDEE should be encouraged to utilize stairs instead of an elevator whenever possible and should consider taking 2-steps at a time during stair ascension to maximize EE.

P654: ABSTRACT WITHDRAWN

P655: COMPARING SELF-REPORT AND OBJECTIVE MEASURES OF PHYSICAL ACTIVITY AND DOG WALKING AMONG DOG OWNERS

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Introduction: Dog ownership is prevalent in the US with ~ 50% households owning a dog. Dog owners tend to be more active than non-dog owners; interestingly, many of these studies rely on self-report measures. The current study is a secondary data analysis from an Ecological Momentary Assessment (EMA) study that explored movement behaviors among dog owners. The purpose was to compare self-reported and objectively measured physical activity (PA), as well as self-reported and EMA-reported dog walking, among dog owners.**Methods:** Adult dog owners who were a primary caregiver of their dog were recruited via social media. Prior to the 10-day observation study, dog owners completed a baseline survey and self-reported PA METs via the IPAQ Short Form. Additionally, they answered questions about how often they engaged in dog walking (mins/week). During the observation period, dog owners wore PA monitors (activPAL) to estimate PA METs and answered smartphone prompts 5x/day reporting dog walking mins. Paired t-tests were used to examine whether the mean self-reported values differed from objective or EMA measurement. All analyses were conducted in R with statistical significance of $p<0.05$.**Results:** A total of 46 dog owners (87% female, 91% White, 34.58 ± 8.34 years old) participated. Dog owners averaged 384.1±143 mins/day of total PA, 47.1±36.7 mins/day of MVPA, and 30.5±28.0 mins/day of EMA-reported dog walking. Self-reported dog walking was higher than EMA-reported dog walking (mean difference = 4.24 mins; 95% CI: 3.96 to 4.52; $p<0.0001$). Conversely, self-reported PA via the IPAQ underestimated activity compared with objective measured activPAL data (mean difference = -25.92 mins; 95% CI: -28.40 to -23.44; $p<0.0001$).**Conclusions:** Findings suggest that dog owners overestimate their dog walking activity and underestimate their overall PA when relying on self-report measures. These discrepancies underscore the importance of using real-time and device-based methods to assess movement behaviors among dog owners. However, given that the current sample was highly active, the differences observed between self-reported and objectively measured activity may be influenced by the duration and intensity of their activity. Future research should examine whether similar patterns emerge in less active dog-owning populations.

P656: EFFECTS OF INTERRUPTING PROLONGED SITTING ON ARTERIAL STIFFNESS AND GLUCOSE-INSULIN RESPONSES IN MIDDLE-AGED ADULTS

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BACKGROUND: Sedentary behavior (SB) increases cardiovascular disease risk through acute vascular stiffness and metabolic dysregulation. Hyperinsulinemia and poor glycemic control compromise vascular elasticity by promoting oxidative stress, inflammation, and endothelial dysfunction. Government guidance promotes physically active lifestyles, but it is unclear how SB interruptions (SBI) should be deployed throughout the day. Therefore, we aimed to assess how SBI may mitigate arterial stiffness and its postprandial regulation of insulin (INS) and glucose (GLU). **METHODS:** This preliminary analysis included 23 healthy participants (74% F, age: 45±7y, BMI: 27.8±5.2kg•m^{-2}). Across 4 visits, participants completed 4 hours of SB (CON) or SBI (standing, STAND; walking, WALK; combination, MIXED). Participants consumed a standardized meal upon arrival, then laid semi-recumbent for 20 minutes. Carotid-femoral pulse wave velocity (cfPWV) was assessed via Vicorder, followed by blood sample collection before and after each condition. Linear mixed models were used with mediation analyses to assess condition-specific responses ($p\leq0.05$). **RESULTS**: Compared to CON, SBI produced a significant time-by-condition interaction for GLU ($p=0.017$), with nonsignificant results reported for cfPWV ($p=0.429$; R^2m: 0.048), and INS ($p=0.305$; R^2m: 0.018). Neither INS (β = -0.004 ± 0.009pmol•L^{-1}, 95%CI [-0.022-0.014], p=0.643) nor GLU (β = -0.006 ± 0.009mg•dL^{-1}, 95%CI [-0.017-0.019], p=0.466) indirectly mediated the SBI-cfPWV association, contributing to 42% and 4% of the total effect, respectively. INS was inversely related to cfPWV (β=-0.005 ± 0.003pmol•L^{-1}, p=0.053), but did not reach significance, whereas GLU was unrelated (β=0.007 ± 0.004mg•dL^{-1}, p=0.084). **CONCLUSIONS:** SBI did not differentially alter the postprandial glucose-insulin response nor mitigate acute arterial stiffening. A significant time-by-condition effect was observed for GLU but appeared to be driven by a ~10 mg•dL^{-1} higher baseline in WALK, suggesting no true intervention response. An SBI intensity threshold may need to be surpassed to elicit benefits in arterial elasticity and their metabolic regulation. Future research should examine how SBI intensity can be enhanced while remaining feasible for real-world application.

P657: INFLUENCE OF OBESITY ON SATISFACTION WITH LIFE AND PERCEIVED STRESS IN MARCHING BAND MEMBERS

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BACKGROUND: Marching band (MB) is a social and physically demanding co-curricular activity that requires members to march and be physically active for extended periods of time with musical instruments. While the demands of MB are physically taxing and potentially stressful, maintaining a healthy body weight may attenuate any potential negative consequences (i.e., physical and psychological consequences) MB members feel. Previous research has indicated that excess weight results in more stress and lower life satisfaction outcomes, however, it is unknown if this relationship is present in MB members. The purpose of this study was to investigate whether body fat percentage (BF%) or body mass index (BMI) influenced perceived stress, or life satisfaction in MB members. **METHODS:** MB members (n=47, 53% male), completed the Satisfaction with Life Survey (SWLS) and the Perceived Stress Scale (PSS) electronically via Qualtrics. Researchers measured height and weight to calculate BMI (kg/m²). ActiGraph accelerometers measured weekly moderate and vigorous physical activity (MVPA). Accelerometers were worn on the hip for one week and used to describe physical activity of MB members. The InBody 370 bio-electrical impedance was used to measure BF%. Separate linear regression analyses examined if BMI or BF% influenced PSS or SWLS. **RESULTS:** Mean SWLS and PSS scores were 25.32 ± 5.00 and 27.87 ± 2.45, respectively. Mean BF% was 25.46 ± 10.99. Mean BMI was 26.60 ± 5.69. Mean MVPA was 111.33 ± 24.07 minutes per week. BMI had no significant relationship on either life satisfaction (R^2= -0.015, F= 0.282, p= 0.598) or perceived stress (R^2= -0.021, F= 0.019, p= 0.890). Similarly, BF% had no significant influence on life satisfaction (R^2= 0.019, F= 1.869, p= 0.178) or perceived stress (R^2= -0.022, F< 0.001, p=0 .988). **CONCLUSIONS:** MB members did not exhibit poorer stress or life satisfaction scores despite having higher BMI or BF%. The social environment or regular physical activity MB members perform may help protect against increased stress or life dissatisfaction. Overall, these findings suggest that the unique social and physical activity that MB members participate could play a role in reducing feelings of stress and life dissatisfaction.

P658: RESTORE THE GUT: IMPACT OF EXERCISE ON GUT MICROBIOME REHABILITATION AFTER ANTIBIOTICS
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BACKGROUND: Antibiotics are among the top prescribed medications worldwide. Oral antibiotic treatment (ABX) is also among one of the top contributors of gut dysbiosis since beneficial bacteria that reside within the digestive tract are also depleted by ABX use. Approximately 1 in 5 patients will experience digestive upset as a result of ABX prescription. Overall host health and wellness is largely correlated with the composition and functional state of the gut microbiota. Despite gut upset being such a common side effect of ABX use, treatment options are limited. Exercise modulates the composition of the gut microbiome, independently of diet. Athletes have been shown to have more resilient and diverse microbiomes, compared to sedentary individuals, and even 1-2 weeks of regular exercise has been shown to shift the composition of the gut microbiome in some studies. This study aims to evaluate the therapeutic potential of voluntary exercise in restoring the composition of the gut after ABX treatment. METHODS: Young (3-4 month old) C57BL/6 female mice will be randomly assigned to one of four experimental groups (n=6-8 per group): (a) control (water only, no ABX) + sedentary, (b) control + exercise, (c) ABX + sedentary, or (d) ABX + exercise. Mice in the ABX groups will be given a 10-day course of ABX (2.0 mg/mL Tetracycline + 0.5 mg/mL Streptomycin) provided in drinking water. Mice in the exercise groups will be provided a running wheel in their cage to perform voluntary exercise for 14 days after the ABX treatment, while mice in the sedentary groups will have a locked wheel. ABX water will be refreshed every 2 days and water consumption monitored daily by weighing bottles. Fecal samples will be collected before and after ABX treatment, and again at the end of the 14-day exercise period. Bacterial DNA will be isolated from fecal samples and next-generation sequencing will be performed. Statistical significance in outcome variables will be evaluated using a repeated measures three-way ANOVA ($p \leq 0.05$), followed by Fisher's LSD post-hoc analyses. ANTICIPATED RESULTS: I hypothesize that voluntary exercise will increase both the composition and abundance of bacterial communities in mice after antibiotic treatment, compared to sedentary mice.

P659: EFFECTS OF BINGE DRINKING ON MUSCULAR POWER AND ENDURANCE IN RESISTANCE-TRAINED AND SEDENTARY YOUNG ADULT FEMALES
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Background: Resistance training (RT) improves muscular strength, power, and endurance, whereas binge drinking is linked with impaired neuromuscular performance and recovery. The 2024 National Survey on Drug use and Health (NSDUH) reported 26.9% of young adult females engage in binge drinking, yet it's effects on RT performance remain unstudied. The purpose of this study was to examine the impact of habitual binge drinking on physical performance outcomes in young adult females with or without RT experience.**Methods:** Forty-eight females were classified as either sedentary low alcohol (SL; n=12), sedentary binge drinkers (SB; n=12), resistance trained low alcohol (RTL; n=12), and resistance trained binge drinkers (RTB; n=12). RT participants trained ≥4 days/week for ≥2 years; sedentary participants trained ≤2 days/week for ≥2 years. Binge drinkers were defined as having ≥1 binge/week for ≥1 year; low alcohol drinkers were defined as having consumed ≤1/week for ≥1 year. Participants arrived at the testing facility after an 8-hour fast and were given a standardized protein shake 30 minutes before undergoing performance tests, such as chair stand peak power (CSPP), vertical jump (CMJ), squat jump (SJ), broad jump (SBJ), knee extensor torque (KET), grip strength (HGS), and push-ups (PU) to failure. Alcohol use was assessed through weekly binge frequency, total consumption, CAGE scores, and cumulative binge history.**Results:** RTL showed the highest CSPP (772 ± 231 W), significantly greater than SL (565 ± 82 W; p = 0.037). CMJ was higher in RTL (38 ± 9 cm) vs. SL and SB (p = 0.010, 0.002), and in RTB (37 ± 6 cm) vs. SB (p = 0.014). SJ was greater in RTL (33 ± 9 cm) and RTB (33 ± 5 cm) than SB (p = 0.017, 0.028). RTB had a longer SBJ (181 ± 15 cm) than SL (145 ± 23 cm) and SB (149 ± 28 cm; p = 0.008, 0.026). RTL (23 ± 9) and RTB (24 ± 11) completed more PU than SL (7 ± 8) and SB (7 ± 7; $p < 0.01$). No significant differences were found in KET (RTL: 170 ± 33 Nm; RTB: 159 ± 43; SL: 130 ± 36; SB: 141 ± 40; p = 0.060) or HGS (RTL: 31 ± 5 kg; RTB: 29 ± 4; SL: 28 ± 4; SB: 26 ± 5; p = 0.073).**Conclusion:** Chronic binge drinking did not impair physical performance in RT young adult females. RT improved muscular power and endurance, indicating a protective effect against binge drinking in young adult females.This study was supported by funding from the FSU Institute of Sports Sciences & Medicine.

P660: IS FMS SCREENING EFFECTIVE AT IDENTITFYING ACUTE/CHRONIC JOINT PAIN IN OTHERWISE HEALTHY PEOPLE?
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BACKGROUND: Poor joint health is a common issue among the older population since older adults often experience muscle weakness and joint stiffness due to degenerative characteristics that accompany increased age. However, joint health issues are becoming more prevalent in the traditional college age population (i.e., 18 to 24 years). This may be due to the poor posture of college students while they partake in sedentary activities such as sitting in classes and studying for prolonged periods of time. College students may also be experiencing joint health issues from physical inactivity brought on by everyday life stressors. As a result, poor joint health may lead to decreased mobility and stability in the movements of otherwise healthy college age students, thus hindering their quality of life. METHODS: University officials will send out a researcher-developed Joint Health Survey for Higher Education to all currently enrolled students at a multi-campus regional university in the southeastern United States. The survey conclusion will invite respondents to schedule with the researcher to complete the following Functional Movement Screens (FMS): active straight leg raise (ASLR), shoulder mobility, ankle mobility, trunk stability, deep squat, and deep squat version 2. These screens will assess the functionality of the participants' movement patterns to determine if they display any dysfunction. Results will be analyzed using a logistic regression model to determine if FMS scores are a significant predictor of joint pain. ANTICIPATED RESULTS: Based on prior research on the joint health of otherwise healthy college age students, it is hypothesized that the participants who display limited mobility and stability in their movement patterns will also report joint health issues not stemming from a prior medical diagnosis.

P661: RESILIENCE IS INVERSELY ASSOCIATED WITH ADIPOSITY IN FEMALE COLLEGE STUDENTS
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BACKGROUND: Psychological resilience is the process and outcome of successfully adapting to difficult or challenging life experiences. Although greater resilience is generally linked to better mental health outcomes (i.e., reduced psychopathology), it also appears to be associated with elevated obesity risk. However, further research is needed to fill the gap in understanding the association between psychological constructs (i.e., resilience) and physical health. **PURPOSE:** The aim of this secondary analysis was to examine associations between Resilience (RES), Academic Level (AL), Sedentary Behavior (SED), and Adiposity (%Fat) in a sample of female college students. **METHODS:** Participants (n=54, 21±4 years, 75.9% White) were assessed between 2022 and 2023. RES was measured using the Brief Resilience Score Questionnaire. AL was categorized as freshman, sophomore, junior, senior, or graduate student. SED was measured using the short form of the International Physical Activity Questionnaire. %Fat was assessed via underwater weighing. Spearman's rho was used to examine bivariate relationships, and multiple linear regression was used to examine the independent associations between RES, AL, SED and %Fat. **RESULTS:** A weak inverse association was observed between RES and %Fat (rho=-0.33, p=0.01), however, SED (rho=0.05, p=0.74) and AL (rho=-0.16, p=0.27) were not associated with %Fat. After controlling for SED and AL, RES was a significant predictor for %Fat (β=-0.44, 95% CI [-10.05, -2.29], p=0.003). Neither SED (β=0.04, 95% CI [-0.01, 0.02], p=0.77) nor AL (β=0.17, 95% CI [-0.71, 2.73], p=0.24) were significant predictors of %Fat. RES independently accounted for 19.2% of the variance in %Fat after SED and AL were controlled for. **CONCLUSION:** These results indicate that RES may serve as a novel predictor of adiposity beyond traditional demographic and behavioral factors in young adult women. Future research should incorporate comprehensive assessments of demographic and behavioral covariates known to influence adiposity (e.g., diet, race, socioeconomic status, sleep) along with device-based measures of SED and physical activity.

P662: STEP COUNTS IN THE PREDICTION OF CARDIOMETABOLIC RISK IN MIDDLE-AGED ADULTS
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BACKGROUND: The progressive rise in body fatness in U.S. adults is coincident with increases in cardiometabolic risk (CMR), like dyslipidemia and insulin sensitivity. The purpose of this study was to analyze a subset of participants in year 20 of the Coronary Artery Risk Development in Young Adults (CARDIA) database to identify factors associated with key markers of CMR, and to develop regression models to predict CMR outcomes. METHODS: Data from year 20 of the publicly available CARDIA study were obtained. Participants included 1,071 adults (mean age 45.6± 3.4 years, 55% females) who had body composition determined via dual-energy X-ray absorptiometry, and recorded step counts by carrying accelerometers for at least 7 days. Participants also provide blood samples for assessment of common markers of CMR. RESULTS:
Pearson correlation analysis showed that sex, height, and average daily step counts expressed relative to fat mass (RelSteps) were identified as being significantly correlated with several key markers of CMR: total cholesterol: HDL ratio (RATIO), triglyceride-glucose index (TYG), and Quantitative Insulin Sensitivity Check Index (QUICKI). Stepwise non-linear regression analysis resulted in models that predicted those three CMR outcomes significantly. The model predicting natural log of RATIO yielded an R^2 of 0.27 with an RMSE of 0.27: the natural log of QUICKI was predicted with an R^2 of 0.27 with an RMSE of 0.24, and the natural log of TYG was predicted with an R^2 of 0.19 with an RMSE of 0.06. CONCLUSIONS: This analysis illustrates a demographic overview of middle-aged adults from the CARDIA dataset. Findings demonstrate sex, height, and RelSteps to be significant predictors of key markers of CMR. The strength of the models highlights the possibility of utilizing RelSteps to improve CMR in middle-aged adults.

P663: A MIXED-METHODS EXPLORATION OF THE ROLE OF PREGNANCY PLANNING ON MATERNAL PHYSICAL ACTIVITY BEHAVIORS

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Background: Research suggests that pregnancy planning may be associated with an individual's decisions surrounding health behaviors. However, previous studies have not considered physical activity (PA) as a distinct health behavior that may be linked to pregnancy planning status. Therefore, this study aims to explore individuals in varied pregnancy planning stages (planned, unplanned, and ambivalent) and their PA behaviors. **Methods:** Thirteen pregnant individuals (ages 18-40 years, ≥16 weeks gestation), located in the southeastern region of the U.S., participated in the study. Quantitative survey data included demographics, pregnancy planning (London Measure of Unplanned Pregnancy [LMUP]), and maternal PA behaviors (Pregnancy Physical Activity Questionnaire [PPAQ]). Qualitative data included semi-structured, one-on-one interviews via Zoom. Quantitative tests included the nonparametric Mann-Whitney U and Spearman ($p \leq 0.05$). Quantitative and qualitative data were analyzed separately and integrated using a convergent parallel mixed-methods approach. **Results:** PPAQ results showed no differences in estimated MET-hours/week (overall and by domain) by LMUP category (divided into planned and ambivalent). No participants were identified in the unplanned category. Six themes emerged from the qualitative data including pregnancy experience, PA education received from providers, PA during the current pregnancy, pregnancy-related barriers to PA, advice to other pregnant individuals, and support needs/future directions. Collectively, results revealed variations in pregnancy planning experiences but did not identify differences in PA (MET-hours/week) by LMUP category. **Conclusion:** Although quantitative results related to PA and pregnancy planning were not significant in this small sample, combined data indicated within individual inconsistencies in how they identified their pregnancy planning status. These findings could inform PA recommendations for prenatal fitness and may suggest a need for refinement of pregnancy planning assessment tools.
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P664: REDUCING FEAR OF FALLING AMONG OLDER ADULTS WITH OSTEOPOROSIS

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BACKGROUND: Falls among older adults are a leading cause of injury and death. Approximately 25% of older adults report falling in the past year. While many factors increase fall risk, one of the most impactful is the fear of falling (FoF). Osteoporosis is also associated with increased fall risk and previous research has found older adults with osteoporosis report higher levels of FoF compared to those without osteoporosis. A Matter of Balance (MOB) is an 8-session evidence-based intervention designed to decrease FoF in older adults. The intervention combines cognitive restructuring activities with low intensity exercises to improve participant's confidence to manage fall risk. The purpose of this study was to examine changes in FoF after participation in MOB and compare measures between participants who reported having osteoporosis (Osteo) to those who did not (Not-osteo). METHODS: Pre and post surveys, including a 4-point response scale question measuring FoF, were collected from a sample of 481 MOB participants 60 years of age and older. Significant changes and differences in FoF were determined using paired and independent t-tests. RESULTS: Participant's average age was 77.2 years and 78.6% were female. Approximately 25% of participants reported having osteoporosis or low bone mass. Overall mean FoF scores significantly decreased from 2.46 (sd=.87) at baseline to 2.17 (sd= .81) at post intervention ($t=6.09$, $df=306$, $p< .001$). Mean FoF scores were significantly higher at baseline for the Osteo group (2.69, sd= .856) compared to the Not-osteo group (2.36, sd= .83) ($t= -3.65$, $df=456$, $p< .001$). Significant differences in FoF scores, however, did not persist at post intervention between the Osteo group (2.33, sd= .81) and Not-osteo group (2.13, sd= .81) ($t= -1.94$, $df=317$, $p= .053$). CONCLUSIONS: These findings suggest that the MOB program can have a positive impact on FoF among all participants and particularly reduce the gap in scores among higher risk participants such as those with osteoporosis who are likely to start the program with higher levels of fear. Study funded by an Administration for Community Living grant.

P665: BIUXX

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Background: This exploratory sequential mixed-methods study examined the application of a patient-centered co-innovation framework to evaluate a web-based tele-exercise program for people with multiple sclerosis (MS). **Methods:** Focus groups were used to identify needs and preferences, which informed a subsequent 6-week pilot intervention. Eligible participants were adults with MS who participated in either the focus groups (n = 16) or the pilot testing (n = 15 across two waves). Conducted in an ambulatory rehabilitation clinic with home-based, on-demand delivery, that included three weekly sessions (~20-45 minutes) delivered via instructional videos aligned with evidence-based guidelines for aerobic and resistance exercise, with modifications for varying mobility levels, and supplemented by weekly 20-minute one-on-one virtual coaching over the 6-week tele-exercise program. Focus-group themes explored barriers and preferences, feasibility and adherence, and safety. Mobility outcomes for the pilot included the Six-Minute Walk Test [6MWT], Five Times Sit-to-Stand [5xSTS], Timed Up and Go [TUG], Timed 25-Foot Walk [T25FW] and post-intervention user experience surveys. **Results:** Focus groups identified actionable needs spanning exercise type, instructional style, safety cues, modification options, scheduling/accountability, and delivery preferences; these directly informed program design. No adverse events occurred in pilot testing, adherence to assigned sessions averaged 75±11% in Wave 1 and 56±11% in Wave 2. Among participants who completed ≥1 session, adherence was 93.8±12.5% and 75.8±30.4%, respectively. Mobility improved from baseline: 6MWT +20.4% (+57.3 m), $p=0.001$; 5xSTS −16.6% (−3.54 s), $p=0.042$; TUG −14.9% (−2.19 s), $p=0.048$; T25FW −9.1% (−0.59 s), $p=0.365$. Several participants exceeded established MCIDs (6MWT n=8; 5xSTS n=2; TUG n=2). User-experience ratings indicated high usability and convenience. **Conclusions:** A co-innovation process that centers around lived experiences yielded an inclusive, evidence-aligned tele-exercise program that was feasible and safe, with preliminary signals of functional benefit. Findings support further evaluation in larger, diverse cohorts and the exploration of social/support features to enhance engagement.