AMERICAN COLLEGE of SPORTS MEDICINE®

Southeast Chapter

2022 Annual Meeting

50th Anniversary Celebration

Program

Conference Information

Schedule and Presentation Listing

Abstracts

February 17-19, 2022

Welcome to the 2022 Annual Meeting!

We are pleased to welcome you to our 50th Annual Meeting! At a time when many events have been postponed, cancelled, or conducted virtually, we are grateful that we are able to meet in person this year. We are thankful to our members for registering for the meeting, submitting their research, and volunteering to help organize the conference. Most of all, we appreciate your patience as we implemented our COVID-19 precautions so we can gather safely.

Since this is our 50th Anniversary Annual Meeting we have planned special sessions and events to recognize the Southeast ACSM members who were instrumental in starting our chapter and establishing the annual meeting. Many of our invited speakers will talk about their experience with the chapter and there is a new SEACSM history category in the Student Bowl.

In addition to looking back at our past, the program includes tutorials, symposia, and oral and poster presentations highlighting cutting-edge research. We are featuring our best and brightest student researchers and leaders in the Student Award Poster Competition and the Leadership and Diversity Training Program. We are also electing new Executive Board members who will help lead us in the upcoming years.

The conference consists of over 400 presentations including the Keynote Address, Andrew Kozar ACSM Presidential Address, Clinical Crossover Lecture, Basic Science Lecture, Henry J. Montoye Award Lecture, Luncheon Lecture, and the Sports Medicine Physician Track program. The schedule also includes two Preconference sessions, the Student Award Poster competition, Emily Haymes Mentoring Breakfast, two special interest group meetings, Student Bowl, and Graduate Program Fair. The Exhibit Hall and Student Help Desk will be open throughout the meeting.

We also have our social on Thursday evening after the Keynote Address, because most of us are also here to see old colleagues and friends and make new connections. We hope you will enjoy that aspect of the meeting as much as we will.

Wishing you a successful meeting,

The SEACSM Executive Board

Celebrating 50 Years of Growth!

The past 50 years have been marked by significant growth in our chapter and attendance at our Annual Meeting. There were 58 attendees at the first meeting of what would become the Southeast ACSM chapter in Gatlinburg, TN in 1973. For the first decade, Annual Meetings had between 20–30 presentations.

The 2022 Annual Meeting has over 400 presentations including 6 invited speakers, 2 preconference sessions, 15 tutorials, 15 symposiums, 40 oral presentations, 24 thematic posters, 260 poster presentations, and 10 lectures and 9 case presentations in the Sports Medicine Physician Track program. We are expecting close to 1,000 attendees this year, which is consistent with the past several years. Our largest meeting was in Chattanooga in 2018 with 1,211 attendees! Our attendance is typically 60–70% students, many of whom are making their first professional presentations.

About the Annual Meeting

SEACSM Annual Meeting Objectives

At the conclusion of the meeting, participants should be able to:

- Understand the biological, biomechanical, and psychological bases for the changes that occur during and following exercise in both normal and pathological states
- Identify new approaches to problems in exercise science and sports medicine through interaction among scientists and clinicians
- Recognize contemporary controversial issues related to sports medicine and exercise science
- Examine state-of-the-art and innovative basic science, applied science, and clinical information which will increase their knowledge of exercise, fitness, health, physical performance and sports medicine

Continuing Education Credits

SEACSM is an approved provider for Continuing Education Credits (CECs) through ACSM. The 2022 Annual Meeting is approved for 18 CECs. ACSM members who register for the meeting automatically receive the pre-approved CECs, which are posted online to ACSM accounts 4–6 weeks after the meeting.

COVID-19 Precautions

SEACSM is committed to holding a safe in-person meeting February 17–19, 2022 in Greenville SC. In addition to following hotel, local, state, and CDC recommendations we are also adopting best practices to reduce and mitigate the risk of COVID-19 transmission developed and strongly recommended to regional chapters by National ACSM for meetings, conferences, and events.

All attendees, including participants, speakers, exhibitors, and guests, at the 2022 Southeast ACSM Annual Meeting are required to:

1. Submit proof that they are fully vaccinated, as that term is defined by the Centers for Disease Control and Prevention (CDC) at the time of the meeting,

or

2. Submit proof of a negative COVID test taken not more than 72 hours prior to the start of the meeting.

In addition, all attendees must wear face masks/coverings (preferably double-ply or N-95 quality) at all times in meeting rooms, poster sessions, and other venues. An exception will be made for speakers in oral presentation sessions who may remove their mask while presenting.

Thank you for your patience and for helping us gather safely at our 50th Anniversary Annual Meeting.

2022 Annual Meeting Planning Committee

The Annual Meeting is planned by the SEACSM Executive Board:

Matt Green, *President*. University of North Alabama, jmgreen@una.edu

John Petrella, *Past President*. Samford University, jkpetrel@samford.edu

Danielle Wadsworth, *President-Elect*. Auburn University, wadswdd@auburn.edu

Eric Plaisance, *At-Large Member*. University of Alabama-Birmingham, plaisep@uab.edu

Kim Reich, *At-Large Member*. High Point University, kreich@highpoint.edu

Bhibha Das, *At-Large Member*. East Carolina University, dasb@ecu.edu

Nicole Rendos, *At-Large Member*. Emory University, nrendos@emory.edu

Dulce Gomez, *Student Representative*, Auburn University, dhg0008@auburn.edu

Katie Spring, *Student Representative*. Auburn University, kzw0076@auburn.edu

Brent Messick, *Clinical Representative*. Atrium Health Musculoskeletal, brent.messick@atriumhealth.org

Carolynn Berry, *Executive Director*. Winston-Salem State University, berryc@wssu.edu

Michael Berry, *Exhibits, Sponsorships and Fund Raising*. Wake Forest University, berry@wfu.edu

Kevin McCully, *Representative to ACSM*. University of Georgia, mccully@uga.edu

Brian Parr, *Communication Director*. University of South Carolina Aiken, brianp@usca.edu

2022 Annual Meeting Abstract Reviewers

All abstracts submitted for the 2022 Annual Meeting were reviewed to make sure they meet our high standards for research quality. The abstract review process was coordinated by Nicole Rendos, SEACSM Executive Board member with assistance from Ryan Colquhoun. We will issue a call for volunteers next fall if you are interested in helping to review abstracts for the 2023 meeting.

Thank you to the volunteers who helped develop the program by reviewing abstracts:

Kirk Abraham, Angela Anderson, Ashley Artese, Susan Arthur, J.P. Barfield, Becki Battista, Christian Behrens, Alicia Bryan, Bob Buresh, Jennifer Caputo, Jason Casey, Lisa Colvin, Ashlee Davis, Greggory Davis, Paul Donahue, Kate Early, Elizabeth Easley, David Edwards,Liz Edwards, David Elmer, Ciaran Fairman, Gene Fitzhugh, Jessica Fleming, Tania Flink, David Fukuda, Michael Green, Gregory Grosicki, Justin Guilkey, Garrett Hester, Simon Higgins, Geoffrey Hudson, Ray Jones, Rebecca Kappus, Joshua Keller, Zachary Kerr, Kurt Kornatz, Mark Loftin, Jeremiah Lukers, Hayley MacDonald, Joseph Marino, Chad Markert, Ashley Marshall, Mallory Marshall, Kelly Massey, Shannon Mathis, Stephanie McCoy, Jessica McNeil, Mary Pat Meaney, Andrew Moore, Cody Morris, Jacob Mota, Jessica Mutchler, Vicki Nelson, Gregory Palevo, Zacharias Papadakis, Jeffrey Parr, Traci Parry, Karissa Peyer, Lisa Powell, Leryn Reynolds, Bryan Riemann, Kathleen Roberts, Matthew Rogatzki, Shuichi Sato, Paula Seffens, Andy Shanely, Jeffrey Simpson, Chad Smith, Joshua Sparks, Andreas Stamatis, Jonathon Stickford, Matt Stock, Whitley Stone, Richard Storie, Thea Lananh Swenson, Bryan Taylor, Danilo Tolusso, Lindsay Toth, Hunter Waldman, Charles Webb, Heather Webb, Paul Whitehead, Samuel Wilson, Kimbo Yee, Emily Zumbro.

50 Years of Southeast ACSM Meetings

Oh, the places we've gone! As we celebrate our 50th Annual Meeting in our most frequent destination (Greenville), let's take a look at where we have been over the years. Where was your first SEACSM Annual Meeting? Your first presentation? How many of these meetings have you been to?

1st	**1973** Gatlinburg, TN
2nd	**1974** Atlanta, GA
3rd	**1975** Charlottesville, VA
4th	**1976** Murfreesboro, TN
5th	**1977** Lexington, KY
6th	**1978** Columbia, SC
7th	**1979** Atlanta, GA
8th	**1980** Charlotte, NC
9th	**1981** Charleston, SC
10th	**1982** Blacksburg, VA
11th	**1983** Gainesville, FL
12th	**1984** Auburn, AL
13th	**1985** Boone, NC
14th	**1986** Athens, GA
15th	**1987** Charleston, SC
16th	**1988** Winston-Salem, NC
17th	**1989** Atlanta, GA
18th	**1990** Columbia, SC
19th	**1991** Louisville, KY
20th	**1992** Auburn, AL
21st	**1993** Norfolk, VA
22nd	**1994** Greensboro, NC
23rd	**1995** Lexington, KY
24th	**1996** Chattanooga, TN
25th	**1997** Atlanta, GA
26th	**1998** Destin, FL
27th	**1999** Norfolk, VA
28th	**1999** Charlotte, NC
29th	**2001** Columbia, SC
30th	**2002** Atlanta, GA
31st	**2003** Atlanta, GA
32nd	**2004** Atlanta, GA
33rd	**2005** Charlotte, NC
34th	**2006** Charlotte, NC
35th	**2007** Charlotte, NC
36th	**2008** Birmingham, AL
37th	**2009** Birmingham, AL
38th	**2010** Greenville, SC
39th	**2011** Greenville, SC
40th	**2012** Jacksonville, FL
41st	**2013** Greenville, SC
42nd	**2014** Greenville, SC (Cancelled)
43rd	**2015** Jacksonville, FL
44th	**2016** Greenville, SC
45th	**2017** Greenville, SC
46th	**2018** Chattanooga, TN
47th	**2019** Greenville, SC
48th	**2020** Jacksonville, FL
49th	**2021** Virtual meeting
50th	**2022** Greenville, SC

SEACSM Executive Board Elections

The Annual Meeting is the time when we elect new members to the SEACSM Executive Board. This year we will be selecting a President-Elect, a Representative to ACSM, two At-Large Members, and one Student Representative. You will have a chance to meet the candidates at the meeting and you can learn more about them at the Elections website. Go to www.seacsm.org —> Annual Meeting —> Elections.

Elections are now electronic! A QR code will be available during the meeting and you can vote directly from your mobile device.

Candidates for President-Elect

Alicia T. Bryan, PhD, FACSM
Columbus State University

Jonathan E. Wingo, PhD, FACSM
University of Alabama

Candidates for Representative to ACSM

Peter W. Grandjean, PhD, FACSM
University of Mississippi

Lynn Panton, PhD, FACSM
Florida State University

Candidates for At-Large Member

Gordon Fisher, PhD, FACSM
University of Alabama at Birmingham

Trent A. Hargens, PhD, FACSM
James Madison University

Mallory Marshall, PhD
Samford University

Paul N. Whitehead, PhD
University of Alabama Huntsville

Candidates for Student Representative

Lauren C. Bates
Doctoral Student
University of North Carolina at Chapel Hill

Alyssa Parten
Doctoral Student
University of North Alabama

Featured Events at the 2022 Annual Meeting

Preconference Sessions

Start your Annual Meeting experience with two Preconference sessions on Thursday Feb. 17 at 2:00 and 3:00 pm. The first is Navigating the Annual Meeting, which is geared for students and first time attendees—but everyone is welcome. The second is the Rapid Research Race, our take on the Three-Minute Thesis. Watch SEACSM professionals and graduate students compete in these short, high-energy presentations.

Invited Speakers

The Annual Meeting includes several invited lectures. Be sure to take advantage of these opportunities to hear from experts in our region and beyond. As part of our 50th Anniversary celebration, many of these lectures will focus on SEACSM history, research, and leadership.

Keynote Address
Thursday Feb. 17, 7:30 pm
Edward Howley, PhD, FACSM

Andrew Kozar ACSM President Address
Friday Feb. 18, 10:00 am
Bruce Gladden, PhD, FACSM

Clinical Crossover Lecture
Friday Feb. 18, 11:10 am
William Kraus, MD, FACSM

Basic Science Lecture
Friday Feb. 18, 1:15 pm
Karyn Esser, PhD, FACSM

Henry J. Montoye Award Lecture
Saturday Feb. 19, 11:00 am
Laurie Wideman, PhD, FACSM

Luncheon Lecture
Saturday Feb. 19, 12:00 pm
Scott Powers, PhD, FACSM

SEACSM Social

Take advantage of this chance to see old colleagues and friends and make new connections. Join us after the Keynote Address on Thursday Feb. 17 at 9:00 pm on the Main Street Patio (Rain location: Teal)

Emily Haymes Mentoring Breakfast

This annual event is an opportunity for professionals and students to network, provide a support system for career advancement, and promote leadership opportunities in ACSM. Join us on Friday Feb. 18 at 6:45 am for a chance to connect, learn, and start your day with a delicious meal! You must have preregistered to attend the breakfast.

Luncheon and Lecture

End the Annual Meeting on Saturday Feb. 19 at 12:00 pm with lunch, awards and honors, and a guest speaker. Students who presented in the Student Award Poster session or participated in the Leadership and Diversity Training Program will be recognized. This is also when new board members are announced and the new President-elect starts the process of planning the 2023 Annual Meeting. You must have preregistered to attend the lunch.

Special Events for Students at the 2022 Annual Meeting

Student Award Poster Competition

See some of our region's best and brightest students share their research in this session on Thursday Feb. 17 at 4:00 pm. Finalists selected from applicants in the undergraduate, masters, and doctoral awards categories will present in this poster session. A team of judges will select the winners in each category. The top graduate poster (masters or doctoral) to compete in the ACSM Presidential Cup at the 2023 ACSM Annual Meeting. The top chapter award winners will also present at the national meeting.

Leadership and Diversity Training Program

The SEACSM Leadership and Diversity Training Program (LDTP) encourages student members from minority groups underrepresented in the sciences to participate in activities that will lead to successful mentored experiences at the Annual Meeting, enhanced pathways to degree completion and career opportunities, and increased SEACSM and ACSM service. Congratulate the award winners when you see them at the meeting and consider applying for the program yourself next year.

Student Bowl

The Undergraduate Student Bowl is back for the 2022 SEACSM Annual Meeting! We are looking forward to coming together for this fun Jeopardy-style team competition testing exercise science knowledge. Join us on Friday Feb. 18 at 4:45 pm to cheer on your school's team!

Graduate Program Fair

This annual event is an excellent opportunity for students to learn about graduate programs in our region. This is your chance to make connections with faculty and student representatives to help you in the process of continuing your education. The Graduate Program Fair is on Friday Feb. 18 at 6:30 pm.

Sponsors and Exhibitors

SEACSM thanks our supporters and exhibitors for their ongoing support of the chapter. You can learn more about products, services, and academic programs from our supporters at the Exhibit Hall which is open throughout the meeting.

SEACSM Board Elections

New Executive Board members are elected during our annual meeting. Make sure to meet the candidates for President-Elect, Members-at-Large, and Student Representatives at the meeting. Instructions for voting using our online platform will be provided at the meeting.

Graduate Program Fair and Exhibit Hall

Graduate Program Fair

The **Graduate Program Fair** is on **Friday Feb. 18** at **6:30 pm**. This annual event is an excellent opportunity for students to learn about graduate programs in our region. This is your chance to make connections with faculty and student representatives to help you in the process of continuing your education. The Graduate school fair is coordinated by Michael Berry, SEACSM Executive Board member.

The 2022 Graduate Program Fair is sponsored by the **University of West Florida**.

2022 Graduate Program Fair Participants

Appalachian State University
East Carolina University
Florida Atlantic University
Florida Gulf Coast University
Florida State University
Gannon University
Georgia Southern University
Georgia State University
Jacksonville University
James Madison University
Kennesaw State University
LIFE University
Mercer University
Mississippi State University
Parker University
Piedmont University
Troy University
University of Alabama
University of Alabama at Birmingham
University of Louisiana at Lafayette
University of Mississippi
University of North Florida
University of North Georgia
University of Tennessee-Knoxville
University of West Alabama
Wake Forest University
Winthrop University

Supporters and Exhibitors

Southeast ACSM thanks our supporters and exhibitors for their ongoing support of the chapter. Companies and institutions interested in sponsorship or exhibiting should contact Michael Berry, SEACSM Executive Board Exhibits, Sponsorships and Fund Raising Chair.

2022 Program Supporters

The Southeast ACSM chapter gratefully acknowledges program support from:

Kennesaw State University
Supporter of the Student Bowl

University of West Florida
Supporter of the Graduate Fair

Hologic
Bronze Level Supporter

Parker University
Bronze Level Supporter

American College of Sports Medicine
Supporter

Gatorade Sports Science Institute
Supporter

2022 Exhibitors

Visit our exhibitors to learn more about their products and programs. The Exhibit Hall is located in the Prefunction Area and is open throughout the conference.

COSMED
The Dairy Alliance
Gannon University
Logan University
Medi Lazer
Mercer University
Palmer College of Chiropractic
Piedmont University
XSENSOR

Student Award Poster Competition

Student Research Awards

Southeast ACSM is proud to highlight and reward outstanding research conducted by students at our annual meeting. The **Student Award Poster Competition** is on **Thursday, Feb. 17** from **4:00–6:00 pm** in **Studio 220.**

Finalists selected from applicants in the undergraduate, masters, and doctoral awards categories will present in this poster session. A team of judges will select the winners in each category. The award winners will be announced at the conference award ceremony and all finalists are expected to attend. SEACSM presents an award to the top three winners in each category.

SEACSM will select the top graduate poster (masters or doctoral) to compete in the ACSM Presidential Cup at the 2022 ACSM Annual Meeting. The top chapter award winners will also present at the national meeting. SEACSM will select our top graduate poster based upon finalist presentations in the masters and doctoral categories from our 2022 meeting.

Previous Student Research Award Winners

1991 Paul Davis
1992 Brian Hinson
1993 Steve Bailey
1994 David Criswell
1995 Marian Kohut
1996 Marvin Rainwater
1997 Kathryn Gracey
1998 Heather Vincent
1999 Christopher Hewitt
2000 Katherine Brittingham
2001 Jamie Golden
2002 Joseph M. McClung
2003 Mahmoud Alomari
2004 Elizabeth Murphy
2005 Martin Carmichael
2006 Heather Webb
2007 Dawn Hayes-D, Seam Courtney-M/U
2008 Mary Beth Brown-Doc, Jacqueline Del Giorno- M/U
2009 Daniel Credeur-D, Ashley Williams-M/U
2010 Robert Bowen-D, Emily Main- M/U
2011 Benjamin Gordon-D, Graham McGinnis-M, Derrick Thomas & Kara Hardin-U
2012 Bradley Gordon-D, Brittany Collins-M, Timothy Brady-U
2013 Melissa Puppa-D, W.M. Southern-M, Kojo Thompson-U
2014 Graham McGinnis-D, W. Michael Southern-M, Rebecca Dale-U
2015 Justin Hardee-D, Jordan Lee-M, Arun Maharaj-U
2016 Melissa Erickson-D, Ashton Celec-M, Caroline Hubbard-U
2017 T. Bradley Willingham-D, Natalie Eichner-M, Christine L. Seltman-U
2018 Paul Roberson-D, Cassie Williamson-M, Gabrielle Gilmer-U
2019 Ashley Artese-D, Dulce Gomez-M, Lauren Bates-U
2020 Emily Heiston-D, Emily Colster-M, Nathan Stewart-U
2021 Emily Grammer-D, Jillian Poles-M,

Student Award Poster Reviewers and Judges

Reviewers: Susan Arthur, Chris Ballmann, Becki Battista, Courteney Benjamin, Andy Bosak, Liz Edwards, Gordon Fisher, Trent Hargens, Alan Jung, Amy Knab, Mark Loftin, Mallory Marshall, Kelley Massey, Shannon Mathis, cody Morris, Lynn Panton, Karissa Peyer, Rebecca Rogers, Jonathan Ruiz-Ramie, Mark Schafer, Ronald Snarr, Jeremy Steeves, Erica Taylor, Michael Webster, Paul Whitehead, Johnathan Wingo, Janet Wojcik, Kein Zwetsloot

Judges: Lauren Bates, Alicia Bryan, Gordon Fisher, Peter Grandjean, Trent Hargens, Mallory Marshall, Lynn Panton, Alyssa Parten, Paul Whitehead, Jonathan Wingo

Leadership and Diversity Training Program

The SEACSM Leadership and Diversity Training Program (LDTP) encourages student members from minority groups underrepresented in the sciences to participate in activities that will lead to successful mentored experiences at the Annual Meeting, enhanced pathways to degree completion and career opportunities, and increased SEACSM and ACSM service.

LDTP recipients will be matched with a professional SEACSM member who will assist the student with setting goals, preparing for attending the Annual Meeting, providing active mentorship at the meeting to connect the student with potential academic, research, and service opportunities, and guide the student through next steps to achieve their educational/professional goals after the meeting. Students in the LDTP program have gone on to be successful graduate students, professionals, and leaders. Some have become LDTP mentors themselves!

LDTP award winners receive a travel stipend to participate in the Annual Meeting. Congratulate the award winners when you see them at the meeting and consider applying for the program yourself next year.

The 2022 LDTP students and mentors are:

Student	Mentor
Sydney Jones *Tuskegee University*	**TJ Exford** *North Carolina A&T State University*
David Diaz *Florida Atlantic University*	**Jonathon Ruiz-Ramie** *Augusta University*
Alexis Dicks *University of South Carolina Aiken*	**Alicia Bryan** *Columbus State University*
Kayla Brown *North Carolina A&T State University*	**Karissa Peyer** *University of Tennessee Chattanooga*

Student Bowl

The 2022 Student Bowl

The Undergraduate Student Bowl is back for the 2022 SEACSM Annual Meeting! We are looking forward to coming together for this fun Jeopardy-style team competition testing exercise science knowledge. Join us on **Friday Feb. 18** at **4:45–6:15 pm** in **Regency Ballroom A & B & C** to cheer on your school's team! Kentucky University.

The winning team will have the opportunity to represent Southeast ACSM at the National ACSM Student Bowl at the 2022 ACSM Annual Meeting in San Diego!

2022 Student Bowl Participants

Anderson University
Bellarmine University
Coastal Carolina University
East Carolina University
Elon University
Florida Gulf Coast University
Florida State University
Georgia College
Georgia Southern University
James Madison University
Kennesaw State University
Methodist University
Mississippi College
Montreat College
North Carolina Wesleyan College
Roanoke College
Salisbury University
Samford University
South Alabama
Troy University
Truett McConnell University
University of Alabama
University of Alabama at Birmingham
University of Mississippi
University of Montevallo
University of North Florida
University of South Carolina
University of South Carolina Aiken
University of South Carolina Upstate
Virginia Tech
Wake Forest University
Western Kentucky University

Student Bowl Committee

The Student Bowl is organized by Executive Board members **Kim Reich** and **Bhibha Das**. They are assisted by a committee that develops questions and makes sure the event runs smoothly.

Liz Edwards (chair), *James Madison University*

Zac Domire, *East Carolina University*

Ginny Frederick, *Mercer University*

Erik Hanson, *University of North Carolina, Chapel Hill*

Mallory Marshall, *Samford University*

Student Bowl Emcee and Judges

The host and emcee for the 2022 Student Bowl is **Judith Flohr**, *James Madison University*.

The Student Bowl is supervised by a panel of SEACSM celebrity judges:

Karyn Esser, *University of Florida*

Bruce Gladden, *Auburn University*

Edward Howley, *University of Tennessee, Knoxville*

Scott Powers, *University of Florida*

Laurie Wideman, *University of North Carolina, Greensboro*

Opening Remarks and Keynote Address

Keynote Address
Thursday, February 17 | 7:30–9:00 pm | Regency Ballroom A & B

PHYSICAL ACTIVITY AND FITNESS GUIDELINES: CHANGES OVER THE PAST 50 YEARS
Edward Howley, FACSM. *University of Tennessee, Knoxville, TN.*

This is the "official" start of the 2022 Annual Meeting. We will begin with announcements from SEACSM President Matt Green. He will conduct any SEACSM business that must be brought before the membership. He will also introduce the candidates for Executive Board positions and explain the online voting process.

The Keynote Address is one of six invited lectures at the SEACSM Annual Meeting. Previous speakers represent renowned researchers, practitioners, educators, and leaders. That tradition is continued this year with our Keynote speaker, Edward T. Howley, PhD, FACSM.

Meet the Speaker: Edward Howley, PhD, FACSM

Ed Howley received his B.S. degree from Manhattan College and his M.S. and Ph.D. degrees from The University of Wisconsin, Madison. He then completed a one-year post-doctoral appointment at Penn State University and was hired in 1970 as a faculty member at the University of Tennessee, Knoxville (UTK). Ed taught classes in exercise physiology and in fitness testing and prescription, and co-authored textbooks in both areas. He retired in 2007 and holds the rank of professor emeritus.

Ed served as a member of the Science Board of the President's Council on Physical Fitness and Sports. In addition, he served on the Physical Activity Guidelines Advisory Committee that provided a report for use by the U. S. Department of Health and Human Services to write the 2008 Physical Activity Guidelines for Americans.

Most of Ed's volunteer efforts have been with the American College of Sports Medicine (ACSM). He was actively involved in the development of certification programs, and served as President in 2002-03. He served as Editor-in-Chief of ACSM's Health & Fitness Journal and as chair of the program planning committee for the annual ACSM Health & Fitness Summit meeting. In 2007 Ed was recognized for his contributions with the ACSM Citation Award.

Ed likes to golf, ride his bike, travel, and help with his grandchildren.

Previous Keynote Speakers

2021 Douglas Casa
2020 Jim Pivarnik
2019 Barry Braun
2018 Tim Lightfoot
2017 Barry Franklin
2016 William Kraemer
2015 Patty Freedson
2013 Molly Bray
2012 Russell Pate
2011 Scott Powers
2010 Frank Booth
2009 Reed Humphrey
2008 Paul Ridker
2007 Timothy Lohman
2006 Frank Hu
2005 James Hagberg
2004 Harold Kohl
2003 Claude Bouchard
2002 William Dietz
2001 Chris Carmichael
2000 Barbara Sternfeld
1999 Maria Fiatarone Singh
1998 Sanders Williams
1997 Carl Casperson
1996 Stan Lindstedt
1995 Paul Thompson
1994 David Lamb
1993 Steven Blair
1992 Claude Bouchard
1991 William Haskell
1990 Eric Newsholme
1989 Barbara Drinkwater
1988 David Costill
1985 Carl Gisolfi
1984 Michael Pollock
1983 Leonard Hayflack
1977 Wendell Stainsby

Emily Haymes Mentoring Breakfast

The 2022 Mentoring Breakfast Event

Emily Haymes Mentoring Breakfast will be held on **Friday, February 18** at **6:45–7:45 am** in the **Teal room**. Please note that preregistration was required for this event. This year the event is dedicated to engaging with other students and professionals in table discussions. We will also recognize the inaugural winner of the Southeast ACSM Emily M. Haymes Mentoring Award: Mark Schafer, PhD.

Meet the 2022 Emily M. Haymes Mentoring Award Winner: Mark Schafer, PhD.

I am currently an Associate Professor and Program Coordinator of Exercise Science in the School of Kinesiology, Recreation and Sport at Western Kentucky University (WKU). I received a Bachelor of Science in Sport Science (1996) and a Master's degree with an emphasis in Sport Physiology and Adult Fitness (1997) from Ohio University. I spent the next seven years (1997 – 2004) working as an ACSM CEP, Clinical Exercise Physiologist in cardiopulmonary rehabilitation, and went on to earn a Ph.D. in Exercise Physiology (2007) from the University of Pittsburgh. Since beginning my career at WKU in 2008, I have been extremely fortunate to have many meaningful interactions with highly motivated and collegial faculty and outstanding students. I have enjoyed opportunities to collaborate with colleagues and students on multiple research projects, as well as serve on many committees and student organizations. However, I am most proud of the significant achievements of the students throughout my time advising and teaching courses in the Exercise Science (BS) and Kinesiology (MS) programs.

Attending the SEACSM Conference over the past decade, I engaged in collaborative presentations with my colleagues and served as a faculty mentor for student abstract presentations. A highlight of attending SEACSM is the opportunity to engage with the WKU undergraduate and graduate students who presented, attended sessions, participated in the Quiz Bowl, and attended the graduate student fair. I believe these experiences play an important role in student engagement and development of future professionals.

2022 Mentoring Breakfast Committee

Leanna Ross, PhD (Chair)
Duke University

Lee Franco, PhD
Virginia Commonwealth University

Erica Taylor, PhD, FACSM
Columbus State University

Liz Edwards, PhD, FACSM
James Madison University

Judith Flohr PhD, FACSM
James Madison University

Danielle Wadsworth, PhD, FACSM
Auburn University

Katherine Collins, PhD
Duke University

Jonathan Ruiz-Ramie, PhD
Augusta University

Trudy Moore-Harrison, PhD
University of North Carolina-Charlotte

Becka Kappus, PhD
Appalachian State University

Erin Kishman
University of South Carolina

Jordan Taylor
University of Memphis

Emily Haymes Mentoring Breakfast

Previously known as the SEACSM Women's Breakfast, this annual event was originally conceived by Drs. Emily M. Haymes, Barbara Ainsworth, Mindy Millard Stafford, and Diane Ward. The first Breakfast was held in 1993. The original goals of the Breakfast were to provide a venue/event for women scholars and students that would advance their leadership skills, a support system (network) that would help women become productive scholars and achieve Fellowship status in ACSM, advancement opportunities for members' careers, and a forum to honor women of SEACSM and ACSM. The consequences of the Breakfast for SEACSM and ACSM include 28 women on the SEACSM Executive Board and 11 women Presidents of SEACSM, including seven who also served as President or on the Board of Trustees for ACSM

In 2015, the SEACSM Executive Board and membership recognized that the Chapter should provide an activity/event that would continue to foster the development of women, however, as both men and women at all levels of their careers need or could benefit from mentoring, the annual event evolved to become the Mentoring Breakfast. In 2018, the Breakfast was officially named the Emily M. Haymes Mentoring Breakfast, in recognition of her significant impact as a founder of the Breakfast, her tireless efforts as a mentor, and her service and support of SEACSM and ACSM.

About Emily M. Haymes, PhD, FACSM

Dr. Haymes completed her Bachelor of Arts (Mathematics and Physical Education; 1961) from Drury University, her master's degree (Physical Education; 1962) from Florida State University, and her doctoral degree from Penn State University (Exercise Physiology; 1973). Dr. Haymes was an Assistant Professor at the University of Colorado Boulder from 1974-1979, and then served as a faculty member of the Department of Nutrition, Food and Exercise Sciences for 30 years (1979-2009) at Florida State University where she is Professor Emerita. Prior to her retirement, she chaired 26 doctoral dissertation committees, 15 master's thesis committees (Florida State University) and was a member of an additional 28 dissertation committees. During her tenure at University of Colorado Boulder, she chaired 10 master's thesis committees Her scholarly contributions include over 100 manuscripts and nearly 2500 citations. Dr. Haymes was the first woman to be elected to the SEACSM Executive Board (1984-1986); she served as SEACSM President (1989-1990), a Trustee on the ACSM Board of Trustees (1989-1992,1993-1995), and Vice President of ACSM 1993-1995. The contributions that Dr. Haymes made to the discipline of Exercise Science, ACSM and especially SEACSM are noteworthy. Perhaps of greater value and significance are the countless hours and "ATP" (energy) she devoted to advancing the careers of her students and colleagues.

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Andrew Kozar ACSM Presidential Address

Andrew Kozar ACSM Presidential Address
Friday, February 18 | 10:00–11:00 am | Regency Ballroom A & B

A PERSONAL HISTORY OF SOUTHEAST ACSM
L. Bruce Gladden, FACSM. *Auburn University, Auburn, AL.*

The Presidential address has been part of our program for over 20 years. In 2011, the SEACSM Executive Board chose to name the annual Presidential lecture in honor of our first President, Dr. Andy Kozar. Dr. Kozar was a long-time faculty member at the University of Tennessee. He was among the group of ACSM members whose strong belief in the importance of founding a regional chapter in the southeast led to the first meeting in Gatlinburg, TN in 1973. Dr. Kozar viewed the annual meeting as a critically important opportunity in the professional development of students, and he was among the loudest voices in making sure that meetings were student-friendly.

In most years the speaker is the current ACSM President, many of whom have ties to the southeast region. The 2022 ACSM president, L. Bruce Gladden, PhD, FACSM, is no exception. An active member of Southeast ACSM throughout his career, Dr. Gladden served as SEACSM President in 1997.

Previous Presidential Address Speakers

2021 NiCole Keith
2020 William Kraus
2019 Kathryn Schmitz
2018 Walter Thompson
2017 Catrine Tudor-Locke
2016 Manish Gupta
2015 William Dexter
2013 Janet Walberg Rankin
2012 Barbara Ainsworth
2011 Thomas Best
2010 Jim Pivarnik
2009 Mindy Millard-Stafford
2008 Robert Sallis
2007 J. Larry Durstine
2006 Carl Foster
2005 W. Larry Kenney
2004 Linda Pescatello
2003 Edward Howley
2002 Angela Smith
2001 Priscilla Clarkson
2000 Paul Thompson
1999 Barry Franklin

Meet the Speaker: L. Bruce Gladden, PhD, FACSM

Dr. L. Bruce Gladden is a Distinguished Professor in the School of Kinesiology at Auburn University. He is the author or co-author of 100+ refereed research articles, book chapters, and reviews. His h-index is 46, and his work has been cited more than 7,700 times. He is known nationally and internationally for his research on the role of lactate in metabolism and activation of mitochondrial metabolism in skeletal muscle (oxygen uptake kinetics). He received the American College of Sports Medicine's (ACSM) Citation Award in 2015, the American Physiological Society's (APS) Environmental and Exercise Physiology (EEP) Section's Honor Award for 2020, and he served two terms (2014-2022) as Editor-in-Chief of Medicine & Science in Sports & Exercise. He is currently President of ACSM, and has served as Southeast ACSM President, and been recognized as the Southeast ACSM Montoye Scholar, and SEACSM Service Awardee. He has also served as Chair of the EEP section of APS. He was presented the Auburn University Creative Research and Scholarship Award in 2020. His professional home began in, and remains, the Southeast American College of Sports Medicine.

Clinical Crossover Lecture

Clinical Crossover Lecture
Friday, February 18 | 11:10 am–12:00 pm | Regency Ballroom A & B

PHYSICAL ACTIVITY AND HEALTH: FROM INTEGRATED PHYSIOLOGY TO PUBLIC HEALTH: CHALLENGES, CAVEATS, AND UNANSWERED QUESTIONS
William Kraus, FACSM. *Duke University, Durham, NC.*

The Clinical Crossover Lecture is an opportunity to have a speaker with a background in clinical sports medicine address the SEACSM audience. It also serves as the first event in the Clinical Track, renamed the Sports Medicine Physician Track in 2021, program. The Sports Medicine Physician Track Program is open to all SEACSM Annual Meeting attendees.

The 2022 Clinical Crossover Lecture speaker, William Kraus, MD, FACSM, addressed our meeting most recently in 2020 as the ACSM President.

Previous Clinical Crossover Lecture Speakers

2021 Dermot Phelan
2020 Tom Best
2019 Robert Sallis
2018 Elizabeth Joy
2017 Bert Fields
2016 Pierre Rouzier

Meet the Speaker: William Kraus, MD, FACSM

Bill Kraus is a physician scientist and integrative physiologist; he has spent his scientific and clinical career devoted to the study and implementation of physical activity and exercise for health and its curative potential. Dr. Kraus' clinical focus is cardiovascular prevention with a focus on lifestyle modification, cardiac rehabilitation and sports cardiology. He graduated from Harvard University in 1977 with a degree in Astronomy and Astrophysics. After two years of teaching high school, he matriculated with his new wife to Duke University whether they attended Medical School together. He has never left Duke. He has been the Medical Director of Duke Cardiac Rehabilitation since 1994 and served as the Director of Duke's Center for Living, an outpatient lifestyle prevention center in the latter part of the 20th century. He currently runs a cardiovascular prevention clinic focusing on combining lifestyle and medical interventions to address issues associated with cardiometabolic risk; a sports cardiology clinic focusing on mature athletes; and a lifestyle program for retiring and transitioning competitive athletes. He served on the 2008 and 2018 US Physical Activity Guidelines Advisory Committees.

Growth of the Sports Medicine Physician Track

Clinical sports medicine sessions have long been an important part of the SEACSM Annual Meeting program. The Sports Medicine Physician track has grown from a few lectures and case presentations on the schedule to a two-day dedicated program with over 20 talks from experts and case studies from sports medicine residents and fellows.

Basic Science Lecture

Basic Science Lecture
Friday, February 18 | 1:15–2:15 pm | Regency Ballroom A & B

CIRCADIAN RHYTHMS AND CLOCKS: EXERCISE PERFORMANCE AND ADAPTATIONS
Karyn Esser, FACSM. *University of Florida, Gainesville, FL*.

The Basic Science lecture features renowned scientists who share foundational research in their area of expertise. This a chance to learn about current research and how it applies to exercise science.

Meet the Speaker: Karyn Esser, PhD, FACSM

Dr. Esser is Professor of Physiology and Functional Genomics and Associate Director of the Myology Institute at the University of Florida. Her lab has been working in the area of skeletal muscle adaptation with an initial focus on understanding the molecular mechanisms that underly skeletal muscle adaptation to exercise. However, about 20 yrs ago, her lab "accidentally" discovered that genes important for circadian rhythms were also at work in skeletal muscle. Since then, Dr. Esser's lab has pioneered research on the role of circadian rhythms and the molecular clock mechanism in skeletal muscle. Her lab has demonstrated that the muscle circadian clock is necessary for maintaining healthy metabolism and muscle strength. Her lab is currently focused on; 1) experiments to define the molecular network downstream of the clock that modulates muscle health. 2) learning how age changes the clock function in skeletal muscle and other tissues; and 3) learning how exercise works with the circadian clock to help promote tissue and systemic health.

Previous Basic Science Lecture Speakers

2021 John Quindry
2020 Stella Volpe
2019 Andrew Galpin
2018 Michael Reid
2017 Marcus Bamman
2016 Lawrence Weiss
2015 Karyn Esser
2013 Douglas Seals
2012 Scott Trappe
2011 Jeff Lichtman
2010 Michael Delp
2009 Darrell Neufer
2008 Anne McTiernan
2007 Scott Powers
2006 James Hagberg
2005 Steven Kleeberger
2004 John Ivy
2003 Vincent Caiozzo
2002 Michael Hogan
2001 Larry Kenney
2000 Ronald Terjung
1999 John Ivy
1998 Charlotte Tate
1997 Steven Segal
1996 David Wasserman
1995 Bruce Gladden
1994 Gary Dudley
1993 Timothy White

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Henry J. Montoye Scholar Award Lecture

Henry J. Montoye Scholar Award Lecture
Saturday, February 19 | 11:00 am–12:00 pm | Regency Ballroom C

PAYING IT FORWARD: THE LIFEBLOOD OF SCIENCE
Laurie Wideman, FACSM. *University of North Carolina Greensboro, Greensboro, NC*

The Scholar Award was instituted to honor and recognize outstanding contributions to the body of knowledge related to medicine and science in sports and exercise. It was named for Henry J. Montoye in 1997 to recognize his contributions as a scholar and his dedication to founding the Southeast ACSM chapter.

Previous Scholar Award recipients are accomplished researchers, mentors, and leaders in Southeast ACSM. The 2022 Scholar Award recipient, Laurie Wideman, PhD, FACSM, shares these same qualities.

Meet the Speaker: Laurie Wideman, PhD, FACSM

Laurie Wideman, Ph.D., is the Safrit-Ennis Distinguished Professor in the Department of Kinesiology at UNC Greensboro. Dr. Wideman has a BSc. in Biology from the University of Waterloo, an MS in Exercise Physiology from Ball State University, and a Ph.D. in Exercise Physiology from the University of Virginia.

The overarching focus of Dr. Wideman's research is the interplay between exercise, disease, and injury with the endocrine system. Under this umbrella, she has focused on; 1) exercise-induced alterations in the hypothalamic-pituitary-adrenal (HPA) axis—specifically growth hormone (GH) and cortisol, 2) cardiometabolic (hormones & cytokines) risk factor development across the lifespan and in different populations, including the utility of heart rate variability (HRV) as a non-invasive indicator of endocrine influences and 3) sex-specific hormonal influences in injury and disease. Dr. Wideman is passionate about mentoring young scientists and has provided research-related mentoring to undergraduate MARC scholars, graduate students, post-doctoral fellows, and junior faculty. Dr. Wideman is currently the IRB Chair, and regularly teaches curriculum for the responsible conduct of research (RCR) training at UNC Greensboro.

Previous Scholar Award Speakers

2021 Peter Brubaker
2020 Ed Acevedo
2019 Allan Goldfarb
2018 Janet Walberg Rankin
2017 Dixie Thompson
2016 Michael Berry
2015 Arthur Weltman
2013 Dianne Ward
2012 Gordon Warren
2011 Steven Blair
2010 Timothy Lightfoot
2009 Kevin McCully
2008 J. Larry Durstine
2007 David Bassett, Jr.
2006 David Nieman
2005 Emily Haymes
2004 Rod Dishman
2003 Robert McMurray
2002 J. Mark Davis
2001 Barbara Ainsworth
2000 Bruce Gladden
1999 Steve Messier
1998 Ed Howley
1997 Henry Montoye
1996 Mel Williams
1995 Scott Powers
1994 Kirk Cureton
1993 Michael Pollock
1992 Robert Armstrong
1991 Wendell Stainsby
1990 Russ Pate
1989 Hugh Welch

Luncheon and Lecture

End the Annual Meeting at the **Luncheon and Lecture** on **Saturday Feb. 19 at 12:00 pm** in **Regency Ballroom A & B** with lunch, awards and honors, and a guest speaker. Please note that preregistration was required for this event.

Awards will be given for the top three undergraduate, masters, and doctoral presentations in the Student Award Poster session. Students who participated in the Leadership and Diversity Training Program will be recognized. The SEACSM Service Award will also be presented in this session.

This is also when newly elected board members are announced and the new President-elect starts the process of planning the 2023 Annual Meeting.

Speakers at the Luncheon Lecture are accomplished scholars and leaders in southeast and national ACSM. Like many other speakers at this annual meeting, Dr. Powers is focusing on SEACSM history.

SEACSM PROUD: HISTORY OF ACSM MEMBERS LEADING THE WAY
Scott Powers, FACSM. *Stetson University, DeLand, FL.*

Meet the Speaker: Scott Powers, PhD, FACSM

Scott K. Powers is a Distinguished Scholar within the Health Sciences Department at Stetson University. His research has concentrated upon the effects of both exercise and prolonged inactivity on redox signaling and gene expression within cardiac and skeletal muscles. During the past 40+ years his investigative work has been funded by a variety of granting agencies including the National Institutes of Health, American Heart Association, and American Lung Association. Collectively, Dr. Powers' research has resulted in more than 260 peer-reviewed publications that are widely cited in the literature.

Previous Luncheon Speakers

2020 Karin Pfeiffer
2019 Micheal Delp
2018 Sofiya Alhassan
2017 Peter Wagner
2016 Mark Nash
2015 Jeffery Woods
2013 Michael Joyner
2012 Kevin Guskiewicz
2011 Brent Ruby
2010 Nicolaas Pronk
2009 Stella Volpe
2008 Lawrence Armstrong
2007 Jim Palwelczyk
2006 Mark Fenton
2005 Laurie Goodyear
2004 Paul Ribisl
2003 Al Ernst
2002 Wayne Sotile
2001 Craig Horswill
2000 David Costill
1999 David Costill
1998 Priscilla Clarkson
1997 Martin Collis
1996 Mel Williams
1995 Wayne Sotile
1994 Liz Applegate
1993 Laverne Woods
1992 Martin Collis
1991 Jack Wilmore
1990 Ethan Nadel
1989 Charles Dillman
1988 William Castelli
1985 George Pfeiffer
1984 Peter Van Handle
1983 Jimmy Carnes
1977 Wendell Stainsby

Sports Medicine Physician Track Program

Program Description

The Sports Medicine Physician Track Program this year is focused on extreme sports. These sports are becoming more mainstream, and it is important that sports medicine physicians become familiar with their associated injuries. We are honored to have nationally recognized speakers and fellowship Program Directors in the field of Sports Medicine. Sports Medicine cases will also be presented by residents and sports medicine fellows with the best case presentation receiving recognition and a monetary reward. The Sports Medicine Physician Track Program is open to all SEACSM Annual Meeting attendees.

The **Sports Medicine Physician Track Program** begins on **Friday, Feb. 18** from **12:30–6:00 pm** and continues on **Saturday, Feb. 19** from **7:30 am – 1:00 pm**. All session will be held in the **Redbud** room.

We will also be hosting an informal meet and greet for medical students interested in sports medicine. This will take place the morning of Friday, February 18th starting at 9:00 am in the conference room (Redbud).

Accreditation/Continuing Medical Education

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Medical Association of Georgia though the joint providership of The Hawkins Foundation and the Southeast Chapter of the American College of Sports Medicine.

The Hawkins Foundation designates this live activity for a maximum of 9.0 AMA PRA Category 1 Credits.™ Physicians should claim only the credit commensurate with the extent of their participation in the activity. The Hawkins Foundation is accredited by the Medical Association of Georgia to provide continuing medical education for physicians.

At the conclusion of this educational activity, participants should be able to:

1. Understand the unique features and rules of some common extreme sports
2. Quickly recognize different injury patterns as they pertain to each sport.
3. Confidently manage associated injuries and return to sport.
4. Better understand how physical activity contributes to a healthy lifestyle.

Sports Medicine Physician Track Officers

Brent Messick, MD, FACSM
SEACSM Executive Board Clinical Representative

Ryan Draper, DO
Chair, Physician Track Meeting

Leonardo Oliveira, MD
Vice Chair, Physician Track Meeting

Clinical Case Reviewers

Ken Barnes, MD, FACSM
Miami University

Brent Messick, MD, FACSM
Atrium Health Musculoskeletal Institute

Ryan Draper, DO
Cone Health Sports Medicine Center

Sports Medicine Physician Track Program

Introduction to Extreme Sports and Their Associated Injuries

All sessions in Redbud.

Friday, Feb. 18

Friday Morning: Informal meet and greet with medical students

12:30 Welcome and Announcements
Ryan Draper, DO. *Cone Health, Greensboro, NC.*

12:45 Rocks, Rolls, and Falls; Lacs, Strains, Drums, and Squirts- Another Day in the Boat
Keith Anderson, MD. *Novant, Charlotte, NC.*

1:15 Mountain Medicine
Kim Kaiser, MD. *University of Kentucky, Lexington, KY.*

1:45 Skate or Die!! Skateboarding and Sports Medicine
David Price, MD. *Atrium Health, Charlotte, NC.*

2:20 Discussion

2:25 Break

Fellow Case Presentations- Session #1
2:40 Fellow Case #1
2:55 Fellow Case #2
3:10 Fellow Case #3

3:30 Common Skiing and Snowboarding Injuries
Jason Folk, MD. *Prisma Health, Greenville, SC.*

4:00 Ultramarathon: A Physician's Perspective
Brent Messick, MD. *Atrium Health, Concord, NC.*

4:30 Discussion

4:35 Break

4:55 Physical Activity and Health: From Integrated Physiology to Public Health: Challenges, Caveats, and Unanswered Questions
William Kraus, MD *Duke University, Durham, NC*

5:55 Discussion

Saturday, Feb. 19

7:30 Welcome and Announcements
Ryan Draper, DO. *Cone Health, Greensboro, NC.*

7:45 Parkour, Parkour!
Andrew Gregory, MD. *Vanderbilt University, Nashville, TN.*

8:15 What a Sports Doc Should Know on BMX and Mountain Biking
Leonardo Oliveira, MD. *Cleveland Clinic, Jacksonville, FL.*

8:45 Surfing and Paddle Board Injuries
John Batson, MD. *Low Country Spine and Sport, Hilton Head, SC.*

9:15 Discussion

9:25 Break

Fellow Case Presentations- Session #2
9:40 Fellow Case #4
9:55 Fellow Case #5
10:10 Fellow Case #6

10:25 Coming to Grips with Rock Climbing Injuries
Shane Hudnall, MD. *Cone Health, Greensboro, NC.*

10:55 Discussion

11:25 Break

Fellow Case Presentations- Session #3
11:50 Fellow Case #7
12:05 Fellow Case #8
12:20 Fellow Case #9

12:35 Voting for Best Case Presentation

12:45 Closing Remarks

12:55 Adjourn

Schedule

Thursday, Feb. 17

11:00 am–1:00 pm	**Executive Board Meeting**	*Boardroom*
12:00–6:00 pm	**Registration and Student Help Desk**	*Lobby*
1:00–2:00 pm	**AV Team Meeting**	*Redbud*
2:00–6:00 pm	**Exhibits**	*Prefunction Area*
2:00–2:50 pm	**Preconference Session 1 (PC1)**	*Regency Ballroom C*
3:00–3:50 pm	**Preconference Session 2 (PC2)**	*Regency Ballroom C*
4:00–4:50 pm	**Symposium (S1)**	*Regency Ballroom C*
4:00–4:50 pm	**Symposium (S2)**	*Regency Ballroom D & E*
4:00–4:50 pm	**Tutorial (T1)**	*Regency Ballroom G*
4:00–4:50 pm	**Tutorial (T2)**	*Regency Ballroom H*
4:00–6:00 pm	**Oral Presentation Session 1 (O1–O8)**	*Regency Ballroom F*
4:00–5:30 pm	**Thematic Poster Session 1 (TP1–TP6)**	*Think Tank*
4:00–6:00 pm	**Student Award Poster Competition**	*Studio 220*
4:00–5:30 pm	**Poster Presentation Session 1 (P1–P37)**	*Studio 220*
5:00–5:50 pm	**Symposium (S3)**	*Regency Ballroom C*
5:00–5:50 pm	**Symposium (S4)**	*Regency Ballroom H*
5:00–5:50 pm	**Tutorial (T3)**	*Regency Ballroom D & E*
5:00–5:50 pm	**Tutorial (T4)**	*Regency Ballroom G*
7:30–9:00 pm	**Opening Remarks and Keynote Address**	*Regency Ballroom A & B*
9:00–10:30 pm	**SEACSM Social**	*Teal*

Schedule

Friday, Feb. 18 Morning

6:45–7:45 am	**Emily Haymes Mentoring Breakfast**	*Teal*
8:00 am–5:00 pm	**Registration and Student Help Desk**	*Lobby*
8:00 am–6:00 pm	**Exhibits**	*Prefunction Area*
8:00–8:50 am	**Symposium (S5)**	*Regency Ballroom C*
8:00–8:50 am	**Symposium (S6)**	*Regency Ballroom G*
8:00–8:50 am	**Tutorial (T5)**	*Regency Ballroom D & E*
8:00–8:50 am	**Tutorial (T6)**	*Regency Ballroom H*
8:00–10:00 am	**Oral Presentation Session 2 (O9–O16)**	*Regency Ballroom F*
8:00–9:30 am	**Thematic Poster Session 2 (TP7–TP12)**	*Think Tank*
8:00–9:30 am	**Poster Presentation Session 2 (P38–P93)**	*Studio 220*
9:00–9:50 am	**Symposium (S7)**	*Regency Ballroom C*
9:00–9:50 am	**Symposium (S8)**	*Regency Ballroom G*
9:00–9:50 am	**Tutorial (T7)**	*Regency Ballroom D & E*
9:00–9:50 am	**Tutorial (T8)**	*Regency Ballroom H*
10:00–11:00 am	**Andrew Kozar ACSM Presidential Address**	*Regency Ballroom A & B*
11:10 am–12:00 pm	**Clinical Crossover Lecture**	*Regency Ballroom A & B*

Schedule

Friday, Feb. 18 Afternoon

12:00–1:00 pm	**Past Presidents Lunch**	*Teal*
12:30–1:15 pm	**Minority Health Research Interest Group Meeting**	*Regency Ballroom C*
12:30–1:15 pm	**Biomechanics Interest Group Meeting**	*Regency Ballroom D & E*
12:30–6:00 pm	**Sports Medicine Physician Track Sessions**	*Redbud*
1:15–2:15 pm	**Basic Science Lecture**	*Regency Ballroom A & B*
2:30–3:20 pm	**Symposium (S9)**	*Regency Ballroom H*
2:30–3:20 pm	**Symposium (S10)**	*Regency Ballroom D & E*
2:30–3:20 pm	**Tutorial (T9)**	*Regency Ballroom G*
2:30–4:30 pm	**Oral Presentation Session 3 (O17–O24)**	*Regency Ballroom F*
2:30–4:00 pm	**Thematic Poster Session 3 (TP13–TP18)**	*Think Tank*
2:30–4:00 pm	**Poster Presentation Session 3 (P94–P155)**	*Studio 220*
3:30–4:20 pm	**Symposium (S11)**	*Regency Ballroom H*
3:30–4:20 pm	**Symposium (S12)**	*Regency Ballroom D & E*
3:30–4:20 pm	**Tutorial (T10)**	*Regency Ballroom G*
4:45–6:15 pm	**Student Bowl**	*Regency Ballroom A & B & C*
6:30–7:30 pm	**Graduate Program Fair**	*Teal*

Schedule

Saturday, Feb. 19

6:30–7:30 am	**SEACSM Run**	*Lobby*
7:30 am–1:00 pm	**Sports Medicine Physician Track Sessions**	*Redbud*
8:00 am–12:00 pm	**Registration and Student Help Desk**	*Lobby*
8:00 am–1:00 pm	**Exhibits**	*Prefunction Area*
8:00–8:50 am	**Symposium (S13)**	*Regency Ballroom C*
8:00–8:50 am	**Tutorial (T11)**	*Regency Ballroom G*
8:00–8:50 am	**Tutorial (T12)**	*Regency Ballroom H*
8:00–10:00 am	**Oral Presentation Session 4 (O25–O32)**	*Regency Ballroom D & E*
8:00–10:00 am	**Oral Presentation Session 5 (O33–O40)**	*Regency Ballroom F*
8:00–9:30 am	**Thematic Poster Session 4 (TP19–TP24)**	*Think Tank*
8:00–9:30 am	**Poster Presentation Session 4 (P156–P210)**	*Studio 220*
9:00–9:50 am	**Symposium (S14)**	*Regency Ballroom G*
9:00–9:50 am	**Tutorial (T13)**	*Regency Ballroom H*
9:00–9:50 am	**Tutorial (T15)**	*Regency Ballroom C*
9:30–11:00 am	**Poster Presentation Session 2 (P211–P260)**	*Studio 220*
10:00–10:50 am	**Symposium (S15)**	*Regency Ballroom G*
10:00–10:50 am	**Tutorial (T14)**	*Regency Ballroom H*
11:00 am–12:00 pm	**Henry J. Montoye Award Lecture**	*Regency Ballroom C*
12:00–2:00 pm	**SEACSM Luncheon and Lecture**	*Regency Ballroom A & B*
2:00–3:30 pm	**Executive Board Meeting**	*Boardroom*

2022 SEACSM Annual Meeting | Program At-A-Glance

THURSDAY, FEB. 17

Room	Lobby & Prefunction Area	Redbud	Teal	Studio 220	Think Tank	Regency Ballroom A & B	Regency Ballroom C	Regency Ballroom D & E	Regency Ballroom F	Regency Ballroom G	Regency Ballroom H
11:00 AM											
11:30 AM											
12:00 PM	Exhibits 2:00–6:00										
12:30 PM											
1:00 PM		AV Team Mtg 1:00–2:00									
1:30 PM	Registration and Student Help Desk 12:00–6:00										
2:00 PM							PC1 2:00–2:50				
2:30 PM											
3:00 PM							PC2 3:00–3:50				
3:30 PM											
4:00 PM				P1–P37 4:00–5:30 Student Award Posters 4:00–6:00	TP1–TP6 4:00–5:30		S1 4:00–4:50	S2 4:00–4:50	O1–O8 4:00–6:00	T1 4:00–4:50	T2 4:00–4:50
4:30 PM											
5:00 PM							S3 5:00–5:50	T3 5:00–5:50		T4 5:00–5:50	S4 5:00–5:50
5:30 PM											
6:00 PM											
6:30 PM											
7:00 PM											
7:30 PM						Keynote Address 7:30–9:00					
8:00 PM											
8:30 PM											
9:00 PM			SEACSM Social 9:00–10:30								
9:30 PM											
10:00 PM											
10:30 PM											

FRIDAY, FEB. 18

Room	Lobby & Prefunction Area	Redbud	Teal	Studio 220	Think Tank	Regency Ballroom A & B	Regency Ballroom C	Regency Ballroom D & E	Regency Ballroom F	Regency Ballroom G	Regency Ballroom H
6:30 AM			Mentoring Breakfast 6:45–7:45								
7:00 AM											
7:30 AM											
8:00 AM	Exhibits 8:00–6:00			P38–P93 8:00–9:30	TP7–TP12 8:00–9:30		S5 8:00–8:50	T5 8:00–8:50	O9–O16 8:00–10:00	S6 8:00–8:50	T6 8:00–8:50
8:30 AM											
9:00 AM							S7 9:00–9:50	T7 9:00–9:50		S8 9:00–9:50	T8 9:00–9:50
9:30 AM	Registration and Student Help Desk 8:00–5:00										
10:00 AM						ACSM President 10:00–11:00					
10:30 AM											
11:00 AM						Clinical Crossover 11:10–12:00					
11:30 AM											
12:00 PM			Past Pres Lunch 12:00–1:00								
12:30 PM		Sports Medicine Physician Track Program 12:30–6:00					Min Hlth Res IG 12:30–1:15	Biomechanics IG 12:30–1:15			
1:00 PM						Basic Science 1:15–2:15					
1:30 PM											
2:00 PM											
2:30 PM				P94–P155 2:30–4:00	TP13–TP18 2:30–4:00			S10 2:30–3:20	O17–O24 2:30–4:30	T9 2:30–3:20	S9 2:30–3:20
3:00 PM											
3:30 PM								S12 3:30–4:20		T10 3:30–4:20	S11 3:30–4:20
4:00 PM											
4:30 PM						Student Bowl 4:45–6:15	Student Bowl 4:45–6:15				
5:00 PM											
5:30 PM											
6:00 PM											
6:30 PM			Grad Program Fair 6:30–7:30								
7:00 PM											
7:30 PM											
8:00 PM											

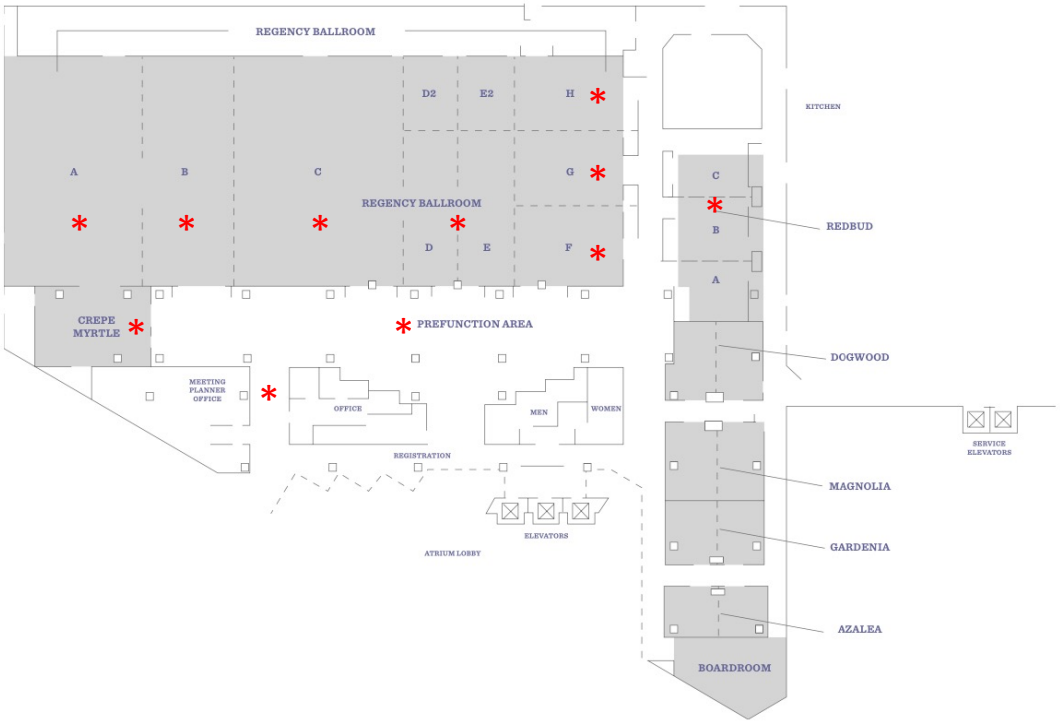
SATURDAY, FEB. 19

Room	Lobby & Prefunction Area	Redbud	Teal	Studio 220	Think Tank	Regency Ballroom A & B	Regency Ballroom C	Regency Ballroom D & E	Regency Ballroom F	Regency Ballroom G	Regency Ballroom H
6:30 AM	SEACSM Run 6:30–7:30										
7:00 AM											
7:30 AM		Sports Medicine Physician Track Program 7:30–1:00									
8:00 AM	Exhibits 8:00–1:00			P156–P210 8:00–9:30	TP19–TP24 8:00–9:30		S13 8:00–8:50	O25–O32 8:00–10:00	O33–O40 8:00–10:00	T11 8:00–8:50	T12 8:00–8:50
8:30 AM											
9:00 AM							T15 9:00–9:50			S14 9:00–9:50	T13 9:00–9:50
9:30 AM	Registration and Student Help Desk 8:00–12:00			P211–P260 9:30–11:00							
10:00 AM										S15 10:00–10:50	T14 10:00–10:50
10:30 AM											
11:00 AM							Montoye Lecture 11:00–12:00				
11:30 AM											
12:00 PM						Luncheon and Lecture 12:00–2:00					
12:30 PM											
1:00 PM											
1:30 PM											
2:00 PM											
2:30 PM											
3:00 PM											

Presentation types: O = oral free communication | P = poster free communication | PC = preconference session | S = symposium | T = tutorial | TP = thematic poster

HYATT REGENCY GREENVILLE

FLOOR PLANS
First Floor



FLOOR PLANS
Second Floor

Presentation Listing

Thursday, February 17, 2022

2:00–2:50 PM **PRECONFERENCE SESSION 1** ***Regency Ballroom C***

Chair: JohnEric Smith, *Mississippi State University*

PC1: NAVIGATING SEACSM AND BEYOND
JohnEric W. Smith[1], Dulce H. Gomez[2], Katherine E. Spring[2]. *[1]Mississippi State University, Starkville, MS. [2]Auburn University, Auburn, AL.*

3:00–3:50 PM **PRECONFERENCE SESSION 2** ***Regency Ballroom C***

Chair: B. Sue Graves, *Florida Atlantic University*

PC2: RAPID RESEARCH RACE
B. Sue Graves, FACSM[1], Samuel L. Buckner[2], Katherine E. Spring[3], Dulce H. Gomez[3]. *[1]Florida Atlantic University, Boca Raton, FL. [2]University of South Florida, Tampa, FL. [3]Auburn University, Auburn, AL.*

4:00–4:50 PM **SYMPOSIUM 1** ***Regency Ballroom C***

Chair: Chris Ballman, *Samford University*

S1: AN OPEN FORUM ON DIMENSIONS OF DIVERSITY IN KINESIOLOGY
T J Exford[1], Charles Burrage[2], Marc Cook[1], Sasha McBurse[3], Michelle Vaughn[4]. *[1]North Carolina Agricultural and Technical State University, Greensboro, NC. [2]University of North Georgia, Dahlonega, GA. [3]University of West Georgia, Carrollton, GA. [4]Kutztown University of Pennsylvania, Kutztown, PA.*

4:00–4:50 PM **SYMPOSIUM 2** ***Regency Ballroom D & E***

Chair: Michael Berry, *Wake Forest University*

S2: LOW ENERGY AVAILABILITY (LEA) AND HYPERTENSION IN DIVISION I COLLEGIATE ATHLETES
Troy M. Purdom. *North Carolina Agricultural and Technical State University, Greensboro, NC.*

4:00–4:50 PM **TUTORIAL 1** ***Regency Ballroom G***

Chair: Kevin Zwetsloot, *Appalachian State University*

T1: WORKING WITH TACTICAL ATHLETES: TIPS, TRICKS, AND LESSONS LEARNED
Carly Beck[1], Marissa Villafuerte-Brooks[2], Shelby Harbison[1], Tamerah Hunt, FACSM[1], Richard Westrick[3]. *[1]Georgia Southern University, Statesboro, GA. [2]Optim Health, Statesboro, GA. [3]United States Army Research Institute of Environmental Medicine, Natick, MA.*

4:00–4:50 PM **TUTORIAL 2** ***Regency Ballroom H***

Chair: Zack Papapdakis, *Barry University*

T2: HOW TO FORMULATE RELEVANT RESEARCH QUESTIONS THAT HAVE AN IMPACT
Leanna M. Ross[1], Katherine A. Collins1, Brittany S. Pope[2], J. Larry Durstine, FACSM[2], William E. Kraus, FACSM[1]. *[1]Duke University School of Medicine, Durham, NC. [2]University of South Carolina, Columbia, SC.*

Thursday, February 17, 2022

4:00–6:00 PM ORAL PRESENTATION SESSION 1 (O1–O8) ***Regency Ballroom F***

Chair: John Garner, *Troy University*

O1: THE EFFECTS OF A MORNING RESISTANCE TRAINING SESSION ON SAME DAY AFTERNOON COUNTERMOVEMENT JUMP PERFORMANCE
Matthew J. Johnson, George J. Davies, Bryan L. Riemann. *Georgia Southern University, Savannah, GA.*

O2: INCREASED MASS INFLUENCES BRAKING AND PROPULSION IN BIPEDAL HOPPING
Amanda Ransom, Blake Justice, Matthew Condo, Matthew Foreman, John Fox. *Methodist University, Fayetteville, NC.*

O3: ANKLE KINEMATICS IN NEW AND OLD CHEERLEADER FOOTWEAR DURING AN INVERSION ANKLE SPRAIN PERTURBATION
Samuel J. Wilson[1], Abigail Johnson[2], Jessica Mutchler[1], Diego Castro-Diaz[1], Li Li, FACSM[1], Barry Munkasy[1]. *[1]Georgia Southern University, Statesboro, GA. [2]University of Florida, Gainesville, FL.*

O4: UTILIZING COUNTERMOVEMENT JUMPS AS A MEASURE OF MATCH PREPAREDNESS IN NCAA DIVISION I WOMEN'S SOCCER
Silvio Polly da Costa Valladao, Thomas L. Andre, Julia Phillips. *University of Mississippi, Oxford, MS.*

O5: NEURAL CORRELATES OF LOWER EXTREMITY INTERLIMB COORDINATION DURING A NOVEL MULTI-JOINT BILATERAL LEG PRESS
Alexis B. Slutsky-Ganesh[1], Manish Anand[1], Jed A. Diekfuss[1], Dustin R. Grooms[2], Gregory D. Myer[1]. *[1]Emory University, Atlanta, GA. [2]Ohio University, Athens, OH.*

O6: THE WALLS ARE CLOSING IN: POSTURAL RESPONSES TO A VIRTUAL CLAUSTROPHOBIC SIMULATION
Sachini N K Kodithuwakku Arachchige[1], Harish Chander[1], Hannah Freeman[1], Christopher Hill[2], Christopher Hudson[1], Alana Turner[1], Adam Jones[1], Adam Knight[1]. *[1]Mississippi State University, Starkville, MS. [2]Northern Illinois University, DeKalb, IL.*

O7: SENSORY ORGANIZATION TEST CONDITIONS INFLUENCE POSTURAL STRATEGY RATHER THAN FOOTWEAR OR WORKLOAD
Alana Joy Turner[1], Harish Chander[1], Sachini N.K. Kodithuwakku Arachchige[1], Adam Knight[1], Chip Wade[2], John C. Garner[3]. *[1]Mississippi State University, Mississippi State, MS. [2]Auburn University, Auburn, AL. [3]Troy University, Troy, AL.*

O8: BASEBALL PITCHING UPPER TORSO ROTATION DURING THE ARM-ACCELERATION PHASE: IMPACT ON OVERALL BIOMECHANICS
Jeffrey T. Wight[1,2], Brittany Dowling[3], Christopher J. Rodriguez[1], George G.A. Pujalte, FACSM[2]. *[1]-Jacksonville University, -Jacksonville, FL. [2]Mayo Clinic, -Jacksonville, FL. [3]Midwest Orthopaedics at Rush, Oak Brook, IL.*

4:00–5:30 PM THEMATIC POSTER SESSION 1 (TP1-TP6) ***Think Tank***

Chair: Tom Andre, *University of Mississippi*

TP1: COMPARISION OF CENTRAL HEMODYNAMICS, ARTERIAL STIFFNESS, AND CARDIO-AUTONOMIC INDICES BETWEEN HEALTHY YOUNG MALES AND FEMALES
Brett L. Cross, Meral N. Culver, Nate K. McMillan, Andrew A. Flatt, Gregory J. Grosicki. *Georgia Southern University (Armstrong), Savannah, GA.*

Thursday, February 17, 2022

4:00–5:30 PM THEMATIC POSTER SESSION 1 (TP1-TP6) *Think Tank*

TP2: GENES RELATED TO MITOCHONDRIAL HEALTH IN MYOBLASTS ARE NEGATIVELY IMPACTED WITH AGE BUT MAY BE RESCUED WITH EXERCISE-ASSOCIATED PATHWAY STIMULATION DURING EARLY MYOGENESIS
Emily L. Zumbro[1], Anthony A. Duplanty[2], Ryan A. Gordon[3], Gena D. Guerin[4], Matthew L. Sokoloski[2], Monique J. LeMieux[2], Vic Ben-Ezra[2], Kyle Biggerstaff[2]. *[1]University of Alabama at Birmingham, Birmingham, AL. [2]Texas Woman's University, Denton, TX. [3]Drury University, Springfield, MO. [4]Penn State Harrisburg, Harrisburg, PA.*

TP3: THE EFFECTS OF VENOUS POOLING DURING PROLONGED SITTING ON CENTRAL ARTERIAL STIFFNESS
Melanie Sophia Semcesen, Alex Pomeroy, Katie Stanford, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

TP4: ADJUSTING FOR EXERCISE INTENSITY ATTENUATES SEX DIFFERENCES IN BLOOD PRESSURE DURING EXERCISE IN HEALTHY ADULTS
McKenna A. Tharpe[1], Joseph C. Watso[2,3], Matthew C. Babcock[4,3], Michael Brian[5,3], Braxton A. Linder[1], Kamila U. Pollin[6,3], Zach J. Hutchison[1], Alex M. Barnett[1], William Farquhar, FACSM[3], Austin T. Robinson[1,3]. *[1]Auburn University, Auburn, AL. [2]University of Texas Southwest Medical Center, Dallas, TX. [3]University of Delaware, Newark, DE. [4]University of Colorado Denver, Aurora, CO. [5]University of New Hampshire, Durham, NH. [6]Veteran Affairs Medical Center, Washington, DC.*

TP5: TIME COURSE OF CHANGE IN MACRO- AND MICRO-VASCULAR FUNCTION WITH BLOOD FLOW RESTRICTED RESISTANCE TRAINING
Madeline L. Rheault[1], Masahiro Horiuchi[2], Lee Stoner, FACSM[1], Jillian Poles[1]. *[1]University of North Carolina, Chapel Hill, NC. [2]Mount Fuji Research Institute, Fujiyoshida, Japan.*

TP6: ARTERIAL STIFFNESS RESPONSES TO A SHORT DURATION, HIGH-INTENSITY SIMULATED FIRE ATTACK IN MALE CAREER FIREFIGHTERS
Tom Nagel[1], Bridget Melton[1], Wesley T. Blumenburg[2], Brett L. Cross[2], Greg J. Grosicki[2]. *[1]Georgia Southern University, Statesboro, GA. [2]Georgia Southern University, Savannah, GA.*

4:00–6:00 PM STUDENT AWARD POSTER COMPETITION (D1–D8, M1–M8, U1–U8) *Studio 220*

Chair: John Petrella, *Samford University*

D1: EVALUATING THE ACCURACY AND PRECISION OF COMMERCIALLY AVAILABLE ACTIVITY TRACKERS IN SCHOOL-AGED CHILDREN
Alex Atwood[1], Hassan-Galaydh Farah[2], Michael Teater[2], Julia Brisbane[2], Robin Queen, FACSM[2], Stephanie DeLuca[3]. *[1]Virginia Tech Carilion, Roanoke, VA. [2]Virginia Tech, Blacksburg, VA. [3]Fralin Biomedical Research Institute, Roanoke, VA.*

D2: IMPACT OF CREATINE MONOHYDRATE SUPPLEMENTATION ON MACROVASCULAR ENDOTHELIAL FUNCTION IN OLDER ADULTS
Holly Elizabeth Clarke[1], Michael J. Ormsbee, FACSM[1,2], Neda S. Akhavan[1], Taylor A. Behl[1], Diana L. Williams[1], Cesar A. Meza[1], Do-Houn Kim[1,3], Robert C. Hickner, FACSM[1,2]. *[1]Florida State University, Tallahassee, FL. [2]University of KwaZulu-Natal, KwaZulu-Natal. [3]Albany State University, Albany, GA.*

D3: EFFECT OF INORGANIC NITRATE ON MAX VOLUNTARY CONTRACTION AND ISOKINETIC TORQUE ACROSS THE MENSTRUAL CYCLE
Austin C. Hogwood[1], Joaquin Ortiz de Zevallos Muñoz[1], Ka'eo Kruse[1], Jeison DeGuzman[1], Meredith Buckley[1], Arthur Weltman, FACSM[1,2], Jason Allen, FACSM[1,2]. *[1]University of Virginia, Charlottesville, VA. [2]University of Virginia School of Medicine, Charlottesville, VA.*

Thursday, February 17, 2022

4:00–6:00 PM STUDENT AWARD POSTER COMPETITION (D1–D8, M1–M8, U1–U8) *Studio 220*

D4: EXERCISE TRAINING-INDUCED CHANGES IN LIPID TRAITS ARE ASSOCIATED WITH CHANGES IN CIRCULATING PROTEINS AND METABOLITES
Jacob L. Barber[1], Guoshuai Cai[1], Jeremy M. Robbins[2], Prashant Rao[2], Michael Mi[2], Sujoy Ghosh[3], Clary Clish[4], Dan H. Katz[2], Robert E. Gerszten[2], Claude Bouchard, FACSM[5], Mark A. Sarzynski, FACSM[1]. *[1]University of South Carolina, Columbia, SC. [2]Beth Israel Deaconess Medical Center, Boston, MA. [3]Duke-NUS Medical School, Singapore. [4]Broad Institute of Harvard and MIT, Cambridge, MA. [5]Pennington Biomedical Research Center, Baton Rouge, LA.*

D5: EXERCISE TRAINING SLOWS DOWN PROTEOMIC AGE ACCELERATION IN MIDDLE-AGED TO OLDER ADULTS- HERITAGE FAMILY STUDY
Prausn Kumar Dev[1], Jacob L. Barbar[1], Guoshuai Cai[1], Jeremy M. Robbins[2], Prashant Rao[2], Michael Mi[2], Sujoy Ghosh[3,4], Clary Clish[5], Daniel H. Katz[2], Robert E. Gerszten[2], Claude Bouchard, FACSM[4], Mark A. Sarzynski, FACSM[1]. *[1]University of South Carolina, Columbia, SC. [2]Beth Israel Deaconess Medical Center, Boston, MA. [3]Duke-National University of Singapore Medical School, Singapore. [4]Pennington Biomedical Research Center, Baton Rouge, LA. [5]Broad Institute of Harvard and MIT, Cambridge, MA.*

D6: 24-HOUR ACTIVITY BEAHVIORS ARE ASSOCIATED WITH COVID-19 PREVALENCE
Patricia Pagan Lassalle, Lauren C. Bates, Peter Halpin, Zachary Y. Kerr, Erik D. Hanson, FACSM, Michelle L. Meyer, Lee Stoner, FACSM. *The University of North Carolina at Chapel Hill, Chapel Hill, NC.*

D7: STRETCHING WITH ANKLE DORSIFLEXION SPLINT IMPROVES MICROVASCULAR REACTIVITY IN PERIPHERAL ARTERY DISEASE PATIENTS
Matthew Martenson[1], Judy Muller-Delp[1], Jacob Caldwell[2], Lawrence Kaelin[3], Albert Hakaim[4], Lynn Panton, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]University of Wisconsin La Crosse, La Crosse, WI. [3]Vascular Surgery Associates, Tallahassee, FL. [4]Mayo Clinic, Jacksonville, FL.*

D8: THE EFFECT OF MENSTRUAL CYCLE PHASE ON BLOOD LACTATE DURING HIGH-INTENSITY INTERVAL EXERCISE.
Alyssa Olenick, Regis Person, Nathan Jenkins. *University of Georgia, Athens, GA.*

M1: ASTAXANTHIN REDUCES EXERCISING HEART RATE BY 7% IN OVERWEIGHT INDIVIDUALS
Alissa Wika[1], Kyle Reason[1], James Green, FACSM[1], Lauren Killen[1], Matthew McAllister[2], Hunter Waldman[1]. *[1]University of North Alabama, Florence, AL. [2]Texas State University, San Marcos, TX.*

M2: PILOT STUDY: IMPACT OF 2.4-KG PROXIMAL EXTERNAL LOADING ON 15-KM RUN PERFORMANCE IN COLLEGIATE CROSS-COUNTRY RUNNERS
Eric K. O'Neal[1], Savanna Knight[1], Tate Dean[2], Bandar Alghamdi[1], Brett Davis[2], Lauren Killen[1], Hunter Waldman[1], Eric K. O'Neal[1]. *[1]University of North Alabama, Florence, AL. [2]Auburn University Montgomery, Montgomery, AL.*

M3: THE IMPACT OF RACE AND ETHNIC IDENTITY ON BODY DISSATISFACTION IN COLLEGE AGE FEMALES
Monica R. Dunn, Bhibha M. Das, FACSM. *East Carolina University, Greenville, NC.*

M4: EFFECTS OF LOW INTENSITY TREADMILL EXERCISE ON MUSCLE WASTING IN THE MALE TUMOR BEARING MOUSE
Louisa Tichy, Jason T. Brantley, Traci L. Parry. *University of North Carolina at Greensboro, Greensboro, NC.*

Thursday, February 17, 2022

4:00–6:00 PM STUDENT AWARD POSTER COMPETITION (D1–D8, M1–M8, U1–U8) *Studio 220*

M5: THE EFFECTS OF WEIGHT LOSS AND AEROBIC EXERCISE ON 10-YEAR AND LIFETIME ASCVD RISK
Tyler Brown[1], Emily Grammer[2], Taylor Brown[1], Josh McGee[1], Marie Clunan[1], Anna Huff[1], Briceida Osborne[1], Laura Matarese[1], Walter Pories[1], Joseph Houmard[1], Robert Carels[1], Damon Swift[2]. *[1]East Carolina University, Greenville, NC. [2]University of Virginia, Charlottesville, VA.*

M6: ASSOCIATIONS BETWEEN CHANGES IN PLASMA PROTEINS AND BODY COMPOSITION TRAITS IN RESPONSE TO ENDURANCE TRAINING
William A. Clarkson[1], Jacob L. Barber[1], Jeremy M. Robbins[2], Prashant Rao[2], Michael Mi[2], Prasun K. Dev[1], Sujoy Ghosh[3,4], Clary Clish[5], Daniel H. Katz[2], Robert E. Gerszten[2], Claude Bouchard, FACSM[4], Mark A. Sarzynski, FACSM[1]. *[1]University of South Carolina, Columbia, SC. [2]Beth Israel Deaconess Medical Center, Boston, MA. [3]Duke-National University of Singapore Medical School, Singapore. [4]Pennington Biomedical Research Center, Baton Rouge, LA. [5]Broad Institute of Harvard and MIT, Cambridge, MA.*

M7: LOW-INTENSITY CONTRACTIONS CAUSE GREATER REDUCTIONS IN QUADRICEPS MUSCULAR STRENGTH AND MUSCLE EXCITATION
Katie G. Kennedy, Ryan J. Colquhoun, Sydnie R. Fleming, Kaitlyn F. Overstreet, Keelan I. Stricklin, Christian T. Macarilla, Abby E. Turnbow. *University of South Alabama, Mobile, AL.*

M8: THE ROLE OF VENOUS BLOOD POOLING DURING PROLONGED SITTING ON CEREBRAL BLOOD FLOW
Alex N. Pomeroy, Katie Stanford, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

U1: PHYSICAL ACTIVITY DURING AND AFTER THE COVID-19 STAY-AT-HOME ORDERS IN ACTIVE OLDER ADULTS
Maria Elaine Damewood[1], Savannah Faith Clark[1], Ashley L. Artese[2]. *[1]Roanoke College, Salem, VA. [2]Duke University, Durham, NC.*

U2: WEAK RELATIONSHIPS BETWEEN VASCULAR AND COGNITIVE FUNCTION DESPITE SEX DIFFERENCES IN YOUNG ADULTS
Miranda K. Traylor, Rachel I. Feldman, Kaitlyn F. Overstreet, Benjamin D. Hill, Amy R. Nelson, Joshua L. Keller. *University of South Alabama, Mobile, AL.*

U3: SLEEP AND DEPRESSIVE SYMPTOMS AFTER SPORT-RELATED CONCUSSION
Megan A. Mackey, Savannah Chenault, Hayleigh Heckman, Emily Ketchum, Meir Magal, FACSM, Kelly Bly, Shannon K. Crowley. *North Carolina Wesleyan College, Rocky Mount, NC.*

U4: THE EFFECTS OF DIETARY BEETROOT JUICE SUPPLEMENTATION ON SIMPLE REACTION TIME AND AGILITY PERFORMANCE
Ashleigh Davis, Ashley Rice, Justin Moody, Christopher G. Ballmann, FACSM, Tyler D. Williams, Rebecca R. Rogers. *Samford University, Birmingham, AL.*

U5: A COMMUNITY NEEDS ASSESSMENT USED TO DEVELOP A WORKPLACE NUTRITION AND PHYSICAL ACTIVITY EDUCATION PROGRAM
Talya E. Geller, Gabrielle Clancy, Elizabeth Bailey, Svetlana Nepocatych. *Elon University, Elon, NC.*

U6: EFFECTS OF VARYING FACEMASK REINFORCEMENT ON AGILITY AND FUNCTIONAL REACTIVE ABILITY IN NCAA FOOTBALL PLAYERS
Nathan East, Christopher G. Ballmann, FACSM, Gracie Robbins, Amanda Dumar, Ashleigh Davis, Ashley Rice, Rebecca R. Rogers. *Samford University, Birmingham, AL.*

Thursday, February 17, 2022

4:00–6:00 PM STUDENT AWARD POSTER COMPETITION (D1–D8, M1–M8, U1–U8) *Studio 220*

U7: HEALTH AND PHYSICAL ACTIVITY CHANGES OF HIKERS IN KENTUCKY DURING TWO YEARS OF THE PANDEMIC
Jesse John Kiboi, Louisa A. Summers. *Berea College, Berea, KY.*

U8: PRIOR SARS-COV-2 INFECTION DOES NOT INCREASE RISK OF EXERTIONAL HEAT STROKE OR CAUSE DETRIMENTAL CHANGES IN PLASMA CYTOKINES
Rachel Kowis, Rachael Badeau, Matthew Kuennen. *High Point University, High Point, NC.*

4:00–6:00 PM POSTER PRESENTATION SESSION 1 (P1-P37) *Studio 220*

Chair: Alyssa Parten, *University of North Alabama*

P1: ASSOCIATIONS BETWEEN CARDIOVASCULAR REACTIVITY AND AUTOMATIC EVALUATION OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR
Nicholas Barefoot, Battogtokh Zagdsuren, Mark Richardson, Hayley MacDonald. *The University of Alabama, Tuscaloosa, AL.*

P2: COMPARISON OF TRADITIONAL VERSUS NON-TRADITIONAL DISTANCE EDUCATION STUDENTS' MOTIVES FOR ENGAGING IN PHYSICAL ACTIVITY
T. Isaac White, Bhibha M. Das, FACSM. *East Carolina University, Greenville, NC.*

P3: ASSOCIATIONS BETWEEN SLEEP AND MENTAL HEALTH ACROSS THE COLLEGE TRANSITION
Christina Marie Westbrooks. *Elon University, Elon, NC.*

P4: TIME PERCEPTION CHANGES WITH AFFECTIVE VALENCE DURING CYCLING EXERCISE
Andrew R. Moore, Maddie Olson. *Augusta University, Augusta, GA.*

P5: CONSISTENCY OF AFFECTIVE VALENCE ACROSS BOUTS OF MUSCLE-STRENGTHENING AND AEROBIC EXERCISE IN COLLEGE STUDENTS
Jenna A. Parsons[1], Cary Springer[1], Ryanne Carmichael[2], Kelley Strohacker[1]. *[1]University of Tennessee Knoxville, Knoxville, TN. [2]Plymouth State University, Plymouth, NH.*

P6: THE EFFECT OF COVID-19 ON PHYSICAL ACTIVITY PARTICIPATION ALONG THE ATLANTA BELTLINE
Sarah Appleton, Rebecca Ellis. *Georgia State University, Atlanta, GA.*

P7: PRACTICING VISUALIZATION WHILE PERFORMING A SKILL ENHANCES SELF-EFFICACY, MOTIVATION, POSITIVE THINKING AND DECREASE ANXIETY
Hannah Renee Walker, Mackenzie Manning, Joy Carlson, Hannah Dresner, Marcos Daou. *Coastal Carolina University, Conway, SC.*

P8: DETERMINING THE DIMENSIONALITY OF READINESS-TO-EXERCISE IN ADULTS PREPARING TO ENGAGE IN RESISTANCE EXERCISE
Cory Beaumont, Adam Ibrahim, Kelley Strohacker, FACSM. *University of Tennessee, Knoxville, Knoxville, TN.*

P9: PHYSICAL ACTIVITY IN WOMEN WITH PREGNANCY HYPERGLYCEMIA PARTICIPATING IN A PILOT TRIAL
Gulsah Onar[1], Jill Maples[2], Bethany Rand[1], Sara Burnette[1], Nikki Zite[2], Kimberly Fortner[2], Samantha Ehrlich[1]. *[1]The University of Tennessee-Knoxville, Knoxville, TN. [2]The University of Tennessee Graduate School of Medicine, Knoxville, TN.*

Thursday, February 17, 2022

4:00–6:00 PM POSTER PRESENTATION SESSION 1 (P1-P37) ***Studio 220***

P10: PERSONALITY AND MOTIVATION TO ENGAGE IN RECREATIONAL EXERCISE
Ian C. Macali[1], Megan E. Holmes[1], Matthew Symonds[2]. *[1]Mississippi state, Mississippi state, MS. [2]Northwest Missouri State University, Maryville, MO.*

P11: COMPARING THE EFFECTS OF HATHA YOGA AND VINYASA YOGA ON CREATIVE THINKING
Emma Pierce, Justin Moody, Rebecca R. Rogers. *Samford University, Birmingham, AL.*

P12: ASSOCIATION BETWEEN PHYSICAL ACTIVITY (MIMS/DAY AND PEAK 30-MIN MIMS) AND COGNITIVE FUNCTION AMONG OLDER ADULTS: NHANES 2011-2014
Peixuan Zheng[1], Jim Pleuss[2], Dusty Turner[3], Scott W. Ducharme[4], Elroy J. Aguiar[1]. *[1]The University of Alabama, Tuscaloosa, AL. [2]United States Military Academy-West Point, West Point, NY. [3]Center for Army Analysis, Fort Belvoir, VA. [4]California State University Long Beach, Long Beach, CA.*

P13: THE EFFECT OF MODERATE-VIGOROUS PHYSICAL ACTIVITY ON THE RELATIONSHIP BETWEEN PERCEIVED STRESS AND COVID-19
Jacklyn Rojas, Patricia Pagan Lasalle, Lauren C. Bates, Eric D. Hanson, FACSM, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P14: COMPARING DIARY LOGS TO AUTOMATED ALGORITHMS AND VISUAL INSPECTION FOR TOTAL-BEDTIME ESTIMATION IN POSTPARTUM WOMEN
Bethany Grace Rand[1], Samantha F. Ehrlich[1], Assiamira Ferrara[2], Scott E. Crouter, FACSM[1], Matthew Buman, FACSM[3], Monique M. Hedderson[2], Susan D. Brown[4]. *[1]The University of Tennessee Knoxville, Knoxville, TN. [2]Kaiser Permanente Northern California, Oakland, CA. [3]Arizona State University, Phoenix, AZ. [4]University of California, Davis, Davis, CA.*

P15: AN EXAMINATION OF THE EFFECTS OF COVID-19 QUARANTINE ON MENTAL HEALTH IN COLLEGE ATHLETES
Terrik Johnson, Joni Boyd, David Schary. *Winthrop University, Rock Hill, SC.*

P16: A COMPARISON OF STRESS LEVELS, ACTIVITY, SLEEP, AND HEALTH BETWEEN COUNTY AND UNIVERSITY LAW ENFORCEMENT
Taylor A. Behl, Jenna Rodgers, David W. Eccles, Lynn B. Panton, FACSM. *Florida State University, Tallahassee, FL.*

P17: PERCEPTIONS OF THE EXERCISE IS MEDICINE ON CAMPUS INITIATIVE AMONG COLLEGE STUDENTS
Samantha Cohen-Winans, Kaitlyn Armstrong, M. Allison Ford. *The University of Mississippi, University, MS.*

P18: NEGATIVE 24-HOUR MOVEMENT BEHAVIORS IN CANCER POPULATIONS: CLUSTERING OF PHYSICAL ACTIVITY, SEDENTARY BEHAVIOR, AND SLEEP
Lauren C. Bates, Gabriel Zieff, Lee Stoner, FACSM, Erik D. Hanson, FACSM. *The University of North Carolina Chapel Hill, Chapel Hill, NC.*

P19: POTENTIAL MEDIATING EFFECTS OF SOCIAL SUPPORT AND PHYSICAL ACTIVITY ON COGNITIVE FUNCTION AND MORTALITY RISK
Madeline Breck Zipperer. *University of North Florida, Jacksonville, FL.*

P20: CHARACTERISTICS ASSOCIATED WITH A POOR 24-HOUR ACTIVITY PROFILE IN UNIVERSITY STUDENTS
Benjamin Donald Boudreaux[1], Virginia M. Frederick[2], Ellen M. Evans, FACSM[1], Patrick J. O'Connor, FACSM[1], Michael D. Schmidt[1], Michael D. Schmidt[1]. *[1]University of Georgia, Athens, GA. [2]Mercer University, Macon, GA.*

Thursday, February 17, 2022

4:00–6:00 PM POSTER PRESENTATION SESSION 1 (P1-P37) ***Studio 220***

P21: EFFECT OF HOME-BASED EXERCISE ON PHYSICAL ACTIVITY IN BREAST AND PROSTATE CANCER SURVIVORS: A META-ANALYSIS
Kyle M. Edgar, Cameron K. Stopforth, Lauren C. Bates, Sasha Riley, Kaileigh Moertl, Erik D. Hanson, FACSM, Lee Stoner, FACSM. *University of North Carolina Chapel Hill, Chapel Hill, NC.*

P22: A PROFILE OF PHYSICAL ACTIVITY CONDUCTED AT AN URBAN BIKE PARK
Douglas A. Gregory[1,2], Eugene Fitzhugh[1]. *[1]University of Tennessee, Knoxville, TN. [2]Tennessee Wesleyan University, Athens, TN.*

P23: NO CHANGES IN SYMPATHETIC NEURAL ACTIVITY OR TRANSDUCTION OVER SIX MONTHS RECOVERY FROM SARS-COV-2
Shawn Roberts, Abigail Stickford, Jonathon Stickford, Rachel Szeghy, Stephen Ratchford, Nina Stute, Marc Augenreich, Valesha Province. *Appalachian State University, Boone, NC.*

P24: HOW TEACHER VERBAL PROMPTING AND DEMONSTRATED MODELING CORRELATE TO PRESCHOOLER'S PHYSICAL ACTIVITY LEVELS
Alexandra V. Carroll[1], Darby Winkler[1], Katherine E. Spring[1], Kameron Suire[2], Danielle D. Wadsworth[1]. *[1]Auburn University, Auburn, AL. [2]University of Kansas Medical Center, Kansas City, KS.*

P25: RESILIENT PEDAGOGY EXPERIENCES OF KINESIOLOGY FACULTY DURING COVID-19
Samantha L. Johnson[1], Jennifer Caputo[1], Katherine Spillios[2], Astrid Mel[3], Mary Stenson[4], Jessica K. Fleming[5]. *[1]Middle Tennessee State University, Murfreesboro, TN. [2]University of Mount Union, Alliance, OH. [3]Mercy College, Dobbs Ferry, NY. [4]College of Saint Benedict/Saint John's University, Saint Joseph, MN. [5]The University of Tennessee, Knoxville, TN.*

P26: USING WEARABLE TECHNOLOGY FOR EARLY DETECTION OF COVID-19 IN DIVISION I COLLEGIATE FEMALE ATHLETES
Sarah E. Johnson[1], Elisa A. Angeles[1], Casey E. Greenwalt[1], Shiloah A. Kviatkovsky[1], Liliana I. Rentería[1], Tucker R. Zeleny[2], Michael J. Ormsbee, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]University of Nebraska, Lincoln, NE.*

P27: ASSESSMENT OF ACSM'S EXERCISE PREPARTICIPATION SCREENING IN OLDER ADULTS AND THOSE WITH CHRONIC DISEASES
Kyle Reason, Lauren Killen, Kyle Miller, Victor Alves, Ashely Cook, Jackie Allen, JM Green, FACSM. *University of North Alabama, Florence, AL.*

P28: THE EFFECTS OF YOGA ON PERCEIVED ANXIETY, DEPRESSION AND SALIVARY CORTISOL LEVELS IN YOUNG WOMEN
Lillian Caryl Niehaus. *Elon University, ELON, NC.*

P29: INHERITABILITY OF THE "ATHLETE'S PARADOX": THE IMPACT OF MATERNAL EXERCISE ON OFFSPRING SKELETAL MUSCLE HEALTH
Polina Krassovskaia, Nicholas T. Broskey. *East Carolina University, Greenville, NC.*

P30: THE IMPACT OF SOCIO-DEMOGRAPHICS ON SPORT PREFERENCE
Crystal Adrianenna Fields, Gregg Rich, FACSM. *Georgia Southern University, Statesboro, GA.*

P31: IMPACT OF VACCINATION STATUS ON 24-H BEHAVIOR: A RESEARCH PROPOSAL
Grayson Carey, Nathan Adams, Jillian Poles, Patricia Pagan Lassalle, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

Thursday, February 17, 2022

4:00–6:00 PM POSTER PRESENTATION SESSION 1 (P1-P37) ***Studio 220***

P32: THE IMPACT OF ORGANIZED SPORTS ON YOUNG ADOLESCENTS WITH AUTISM SPECTRUM DISORDER
Merytt Haney, Alexander Pomeroy, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P33: DOES THE ASSOCIATION BETWEEN CARDIORESPIRATORY FITNESS AND PERCEIVED STRESS DIFFER BY BIOLOGICAL SEX?
Alex McGowan[1], Kayla Brown[2], Qiana D. Bryan[1], Patricia Pagan Lassalle[1], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]North Carolina Agricultural and Technical State University, Greensboro, NC.*

P34: PSYCHOLOGICAL SAFETY IN COLLEGIATE ATHLETICS: HOLISTIC EXAMINATION OF THE "STUDENT-ATHLETES"
Andre George Simmond, Kofan Lee, Thomas L. Andre. *University of Mississippi, University, MS.*

P35: THE ROLE OF ENGAGEMENT IN THE EFFECTS OF A DIGITAL DIABETES PREVENTION PROGRAM
Kristy K. Lievense, Jeffrey A. Katula. *Wake Forest University, Winston Salem, NC.*

P36: PRESS PLAY TO INCREASE ACTIVITY
Halle E. Prine, Madison Arsenault, Raven Flicek, Madison Kindred. *Augusta University, Augusta, GA.*

P37: FEASIBLE SEDENTARY BEHAVIOR SUBSTITUTION STRATEGIES TO REDUCE CARDIOVASCULAR DISEASE RISK IN ENDOMETRIAL CANCER SURVIVORS
Margaret I. Damare, Lauren C. Bates, Erik D. Hanson, FACSM, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

5:00–5:50 PM SYMPOSIUM 3 ***Regency Ballroom C***

Chair: Amy Knab, *Queens University of Charlotte*

S3: SURVIVAL OF THE "FIT TEST": DETERMINING ROLES, RELEVANCE AND APPLICATION OF FITNESS TESTNG IN YOUTH
Dawn Podulka Coe, FACSM[1], Rebecca A. Battista, FACSM[2]. *[1]The University of Tennessee, Knoxville, Knoxville, TN. [2]Appalachian State University, Boone, NC.*

5:00–5:50 PM SYMPOSIUM 4 ***Regency Ballroom H***

Chair: Cody Morris, *University of Alabama at Birmingham*

S4: CALLING PASS INTERFERENCE: IMPACT OF AMERICAN FOOTBALL FACEMASKS AND VISORS ON VISUOMOTOR PERFORMANCE
Rebecca R. Rogers, Christopher G. Ballmann, FACSM. *Samford University, Birmingham, AL.*

5:00–5:50 PM TUTORIAL 3 ***Regency Ballroom D & E***

Chair: Dano Tolusso, *Western Kentucky University*

T3: CULTURALLY RELEVANT PEGAGOGIES IN THE FIELDS OF EXERCISE SCIENCE AND HEALTH PROMOTION
Brittany Pinkerton. *Augusta University, Augusta, GA.*

Thursday, February 17, 2022

5:00–5:50 PM TUTORIAL 4 ***Regency Ballroom G***

Chair: Lauren Killen, *University of North Alabama*

T4: ACSM CERTIFICATIONS: DEFINING AN EXERCISE PROFESSION AND HOW TO SUCCEED IN THE EXERCISE PROFESSION
Meir Magal, FACSM. *North Carolina Wesleyan College, Rocky Mount, NC.*

7:30–9:00 PM OPENING REMARKS AND KEYNOTE ADDRESS ***Regency Ballroom A & B***

Presiding: Matt Green, FACSM. *University of North Alabama, Florence, AL.*
Speaker introduction: David Bassett, Jr., FACSM. *University of Tennessee, Knoxville, TN.*

PHYSICAL ACTIVITY AND FITNESS GUIDELINES: CHANGES OVER THE PAST 50 YEARS
Edward Howley, FACSM. *University of Tennessee, Knoxville, TN.*

Friday, February 18

6:45–7:45 AM **EMILY HAYMES MENTORING BREAKFAST** ***Teal***

Presiding: Leanna Ross. *Duke University, Durham, NC.*

8:00–8:50 AM **SYMPOSIUM 5** ***Regency Ballroom C***

Chair: Eric O'Neal, *University of North Alabama*

S5: EXERTIONAL-RELATED HEAT ILLNESS IN ACTIVE DUTY MILITARY: CURRENT PROBLEMS AND FUTURE DIRECTIONS
Kaemmer N. Henderson. *United States Army Research Institute of Environmental Medicine, Columbus, GA.*

8:00–8:50 AM **SYMPOSIUM 6** ***Regency Ballroom G***

Chair: Jason Casey, *University of North Georgia*

S6: THE HISTORY OF SEDENTARY BEHAVIOR: AN EVOLUTIONARY PERSPECTIVE
Lee Stoner, FACSM, Alex Pomeroy, Lauren Bates, Craig Paterson, Simon Higgins. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

8:00–8:50 AM **TUTORIAL 5** ***Regency Ballroom D & E***

Chair: Lee Winchester, *University of North Alabama*

T5: DEVELOPING A CLINICAL COLLABORATION AND AFTER-SCHOOL EXERCISE PROGRAM FOR CHILDREN WITH OBESITY
Karissa L. Peyer[1], Blake Pierce[1], Sierra Davis[2], Joani Jack[2]. *[1]University of Tennessee at Chattanooga, Chattanooga, TN. [2]University of Tennessee College of Medicine Chattanooga and Children's Hospital at Erlanger, Chattanooga, TN.*

8:00–8:50 AM **TUTORIAL 6** ***Regency Ballroom H***

Chair: Gordon Fisher, *University of Alabama at Birmingham*

T6: BINGOCIZE: PREPARING STUDENTS FOR CAREERS IN AGING CARE THROUGH SERVICE-LEARNING
Brett A. Davis[1], Angela R. Russell[1], Joni M. Boyd[2], K. Jason Crandall[3]. *[1]Auburn University at Montgomery, Montgomery, AL. [2]Winthrop University, Rock Hill, SC. [3]Western Kentucky University, Bowling Green, KY.*

8:00–10:00 AM **ORAL PRESENTATION SESSION 2 (O9-O16)** ***Regency Ballroom F***

Chair: Justin Guilkey, *Coastal Carolina University*

O9: ABSTRACT WITHDRAWN

O10: PILOT DATA ON THE LONGITUDINAL CHANGES IN METABOLIC AND INFLAMMATORY URINARY BIOMARKERS IN EARLY INFANCY
Laurie Wideman, FACSM, Travis Anderson, Lenka Shriver, Cheryl Buehler, Esther Leerkes. *UNC Greensboro, Greensboro, NC.*

Friday, February 18

8:00–10:00 AM ORAL PRESENTATION SESSION 2 (O9-O16) ***Regency Ballroom F***

O11: ASSOCIATION OF LIFESTYLE FACTORS AND CARDIOMETABOLIC HEALTH AMONG PREADOLESCENT CHILDREN
Gabriel Zieff[1], Nicholas Castro[2], Lauren Bates[1], Patricia Pagan Lassalle[1], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]University of North Carolina at Wilmington, Wilmington, NC.*

O12: EVALUATING IN-SCHOOL PHYSICAL ACTIVITY MOVEMENT PATTERNS IN RELATION TO STATE MANDATE
Riley Galloway[1], Hunter Haynes[1], Jacob Gdovin[2], Junyoung Kim[3]. *[1]The University of Southern Mississippi, Hattiesburg, MS. [2]Winthrop University, Rock Hill, SC. [3]Missouri State University, Springfield, MO.*

O13: METABOLIC RESPONSES AND PERCEPTIONS OF ENJOYMENT, COMPETENCE AND EXERTION DURING THE GONOODLE PHYSICAL ACTIVITY PROGRAM
Aaron P. Wood[1], Vincenzo G. Nocera[2], Tyler J. Kybartas[3], Payton N. Benko[1], Dawn P. Coe, FACSM[1], Scott E. Crouter, FACSM[1]. *[1]University of Tennessee, Knoxville, Knoxville, TN. [2]Plymouth State University, Plymouth, NH. [3]Illinois State University, Normal, IL.*

O14: INFLUENCE OF PERCEIVED NEIGHBORHOOD FOOD AND PHYSICAL ACTIVITY ENVIRONMENTS ON CHILD WEIGHT TRAJECTORY
Bryn Haden, Alexis Hartranft, Kavya Iyer, Elizabeth Ackley. *Roanoke College, Salem, VA.*

O15: SIMULTANEOUS INVESTIGATION OF ACTIVITY BEHAVIORS, DIETARY PATTERNS, AND PHYSICAL FITNESS WITH ADIPOSITY IN PREADOLESCENT CHILDREN
Juliette Levet-Bourtayre[1], Lauren C. Bates[1], Nicholas Castro[2], Gabriel Zieff[1], Patricia Pagan Lassalle[1], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]University of North Carolina at Wilmington, Wilmington, NC.*

O16: UNDERSTANDING THE ROLE PRESCHOOLERS BODY COMPOSITION PLAYS IN FMS DEVELOPMENT
Katherine E. Spring, Alexandra V. Carroll, Danielle D. Wadsworth. *Auburn University, Auburn, AL.*

8:00–9:30 AM THEMATIC POSTER SESSION 2 (TP7-TP12) ***Think Tank***

Chair: Leanna Ross, *Duke University*

TP7: ACUTE PHYSIOLOGICAL RESPONSES TO ELECTRICAL MUSCULAR STIMULATION WITH BLOOD FLOW RESTRICTION IN DAILY WHEELCHAIR USERS
Lauren Hopps, Abby R. Fleming, Tiffany Adams, Jordan Saliba, Lee J. Winchester. *University of Alabama, Tuscaloosa, AL.*

TP8: BALANCE AND FUNCTIONAL GAIT RELATE TO DAILY PHYSICAL ACTIVITY IN INDIVIDUALS WITH DOWN SYNDROME.
Nicholas Buoncristiani, Whitley Stone, Grant Malone, Kayla Baker. *Western Kentucky University, Bowling Green, KY.*

TP9: HIGH-INTENSITY INTERVAL TRAINING VERSUS MODERATE-INTENSITY TRAINING ON CARDIOMETABOLIC HEALTH MARKERS IN SPINAL CORD INJURY
Jacob Logan Adams. *University of Alabama at Birmingham, Birmingham, AL.*

Friday, February 18

8:00–9:30 AM THEMATIC POSTER SESSION 2 (TP7-TP12) ***Think Tank***

TP10: INVESTIGATION OF BLOOD LACTATE AS A MARKER OF METABOLIC DYSFUNCTION DURING PREGNANCY.
Jill M. Maples[1], Nicholas T. Broskey[2], Maire Blankenship[3], Alissa Paudel[1], Alicia Mastronardi[1], Nikki B. Zite[1], Jaclyn B. van Nes[1], Kimberly B. Fortner[1], Rachel A. Tinius, FACSM[3]. *[1]University of Tennessee Graduate School of Medicine, Knoxville, TN. [2]East Carolina University, Greenville, NC. [3]Western Kentucky University, Bowling Green, KY.*

TP11: LIMB ASYMMETRY: COMPARISON OF ADOLESCENTS WITH AND WITHOUT AUTISM SPECTRUM DISORDER AT DUAL RUNNING SPEEDS
Lauren A. Luginsland, Hunter J. Bennett, Justin A. Haegele. *Old Dominion University, Norfolk, VA.*

TP12: NEUROMOTOR CONTROL DIFFERENCES IN THE UPPER EXTREMITY BETWEEN THOSE WITH AND WITHOUT RHEUMATOID ARTHRITIS
Julianna Ethridge, Georgia Parnell, Madison Holloman, and Nicholas Murray. *East Carolina University, Greenville, NC.*

8:00–9:30 AM POSTER PRESENTATION SESSION 2 (P38-P93) ***Studio 220***

Chair: Gaven Barker, *University of North Alabama*

P38: COMPARATIVE IMPACT OF PALM COOLING TEMPERATURES ON THERMAL AND PERCEPTUAL INDICES
Elisabeth J. Dichiara, Chris E. Colborn, Steve R. Soltysiak, Alex CS Shefflette, Neel L. Patel, Alexandria C. Vanhoover, John F. Caruso. *University of Louisville, Louisville, KY.*

P39: COMPARATIVE IMPACT OF PALM COOLING TEMPERATURES ON ERGOGENIC AND CARDIOVASCULAR INDICES.
Neel L. Patel, Chris E. Colborn, Steve R. Soltysiak, Alex CS Shefflette, Elisabeth J. Dichiara, Alexandria C. Vanhoover, John F. Caruso. *University of Louisville, Louisville, KY.*

P40: DETRIMENTAL SLEEP SCHEDULES IN FIREFIGHTERS
Makenzie Corgan, Sarah Brown, Paige Bramblett, Ben Lloyd, Lainey Hunnicutt, Caroline Smith, Ph.D., FACSM, Scott Collier, Ph.D., FACSM. *Appalachian State University, Boone, NC.*

P41: COMPARISON OF PHYSIOLOGICAL AND PSYCHOLOGICAL RESPONSES TO INDOOR AND OUTDOOR EXERCISE IN A HOT ENVIRONMENT
Luke A. Willis, Andrew T. Singer, Brian Parr, FACSM. *University of South Carolina Aiken, Aiken, SC.*

P42: FATAL AND NON-FATAL ILLNESS AND INJURY IN SPORTING OFFICIALS
Anne M. Mulholland, Hayley V. MacDonald, Jonathan E. Wingo, FACSM. *The University of Alabama, Tuscaloosa, AL.*

P43: TIME COURSE OF DERMAL ANTHRACENE ABSORPTION UTILIZING INTRADERMAL MICRODIALYSIS
Dristen D. Trate[1], Killian D. Wustrow[1], Nelson R. Vineuza[2], Xinyi Sui[2], Morgan Demmler[2], Emiel A. DenHartog[2], Scott R. Collier, FACSM[1], Caroline J. Smith, FACSM[1]. *[1]Appalachian State University, Boone, NC. [2]North Carolina State University, Raleigh, NC.*

P44: INTRADERMAL MICRODIALYSIS AS A NOVEL APPROACH FOR DERMAL POLYCYCLIC AROMATIC HYDROCARBON ABSORPTION ASSESSMENT
Roman W. Galaska[1], Killian D. Wustrow[1], Nelson R. Vineuza[2], Xinyi Sui[2], Morgan Demmler[2], Emiel A. DenHartog[2], Scott R. Collier, FACSM[1], Caroline J. Smith, FACSM[1]. *[1]Appalachian State University, Boone, NC. [2]North Carolina State University, Raleigh, NC.*

Friday, February 18

8:00–9:30 AM POSTER PRESENTATION SESSION 2 (P38-P93) ***Studio 220***

P45: SLEEP CHARACTERISTICS OF POLICE OFFICERS DURING NIGHT VS DAY SHIFTS
Sarah R. Brown, Makenzie Corgan, Ben Lloyd, Paige Bramblett, Caroline J. Smith, FACSM, Scott R. Collier, FACSM. *Appalachian State University, Boone, NC.*

P46: WORK RATE ADJUSTMENTS, CARDIOVASCULAR STRAIN, AND THERMAL STRAIN DURING HIGH-INTENSITY INTERVAL EXERCISE IN THE HEAT
Hillary A. Yoder, Anne M. Mulholland, Nick Barefoot, Katie Sullivan, Hayley V. MacDonald, Jonathan E. Wingo, FACSM. *University of Alabama, Tuscaloosa, AL.*

P47: PULMONARY FUNCTION FOLLOWING ACUTE FORMALDEHYDE EXPOSURE IN YOUNG ADULTS
William C. Norris[1], Marc A. Augenreich[1], Janet Cope[2], Cynthia Bennett[2], Stephen M. Ratchford[1], Jonathon L. Stickford[1]. *[1]Appalachian State University, Boone, NC. [2]Elon University, Greensboro, NC.*

P48: IMPACT OF BODY POSITION ON MEASURING DIAPHRAGMATIC ENDURANCE IN YOUNG, HEALTHY INDIVIDUALS
Kristin M. Mendez, Alexander W. Parsons, Khase E. Willis, Kevin K. McCully, FACSM. *University of Georgia, Athens, GA.*

P49: ACUTE ELECTRONIC CIGARETTE USE DOES NOT ALTER INDICATORS OF THORACIC GAS COMPRESSION
Austin Gooch, Marc A. Augenreich, Jonathon L. Stickford. *Appalachian State University, Boone, NC.*

P50: METHOD OF TIDAL EXPIRATORY FLOW VOLUME LOOP CONSTRUCTION DOES NOT ALTER EXPIRATORY FLOW LIMITATION MEASUREMENT
Amy Rebecca Sheldon, Savannah J. Barbieri, William C. Norris, Marc A. Augenreich, Austin D. Gooch, Jonothan L. Stickford. *Appalachian State University, Boone, NC.*

P51: EFFECTS OF INTRAINDIVIDUAL MATERNAL EXERCISE OR NO-EXERCISE ON PREGNANCY AND BIRTH OUTCOMES
Breanna D. Wisseman[1], Christy Isler[1], Edward R. Newton[1], James DeVente[1], Samantha McDonald, FACSM[2], Cody Strom[3], Linda E. May, FACSM[1]. *[1]East Carolina University, Greenville, NC. [2]Illinois State University, Normal, IL. [3]University of Southern Indiana, Evansville, IN.*

P52: THE RELIABILITY OF ADULT FEMALE'S RECALL OF THEIR MENSTRUAL CYCLE CHARACTERISTICS DURING MID- TO LATE-ADOLESCENCE.
Rebecca Cerminaro, Hanna Gardner, Jessica Dollar, Sandra Shultz, Laurie Wideman, Donna Duffy. *University of North Carolina Greensboro, Greensboro, NC.*

P53: RELIABILITY OF HEART-TEMPLE PULSE-WAVE VELOCITY ASSESSMENTS DERIVED FROM A SIMPLE PHOTOPLETHYSMOGRAPHY DEVICE
Drew Elliott[1], Gracie Whitley[1], Gabriel Zieff[1], Keeron Stone[2], Craig Paterson[2], Simon Fryer[2], Jake Diana[1], Jade Blackwell[3], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]University of Gloucestershire, Cheltenham. [3]University of Arizona, Tucson, NC.*

P54: PHYSICAL FITNESS, BUT NOT PHYSICAL ACTIVITY, IS ASSOCIATED WITH MENTAL HEALTH IN HEALTHY YOUNG ADULTS
Wesley Blumenburg[1], Josiah Frederick[1], Brett Cross[1], Meral Culver[1], Alexander Montoye, FACSM[2], Andrew Flatt[1], Greg Grosicki[1]. *[1]Georgia southern university, savannah, GA. [2]alma college, Alma, MI.*

P55: CHARACTERIZATION AND STRATIFICATION OF RESTING BLOOD PRESSURE IN MALE CAREER FIREFIGHTERS
Robert Bailey[1], Thomas Nagel[1], Bridget Melton[1], Wesley Blumenburg[2], Brett Cross[2], Gregory Grosicki[2]. *[1]Georgia Southern University, Statesboro, GA. [2]Georgia Southern University, Savannah, GA.*

Friday, February 18

8:00–9:30 AM POSTER PRESENTATION SESSION 2 (P38-P93) ***Studio 220***

P56: HEART RATE VARIABILITY AND AEROBIC FITNESS ARE INDEPENDENTLY ASSOCIATED WITH AORTIC STIFFNESS IN YOUNG ADULTS
Joseph D. Vondrasek, Nate K. McMillan, Meral N. Culver, Gregory J. Grosicki, Andrew A. Flatt. *Georgia Southern University, Savannah, GA.*

P57: AGREEMENT BETWEEN SINGLE- AND DOUBLE-POINT ESTIMATIONS OF PULSE WAVE VELOCITY
Jillian Poles[1], Nathan Adams[1], Grayson Carey[1], Kevin S. Heffernan[2], Michelle L. Meyer[1], Achim Schwarz[3], Christopher Mayer[4], Bernhard Hametner[4], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]Syracuse University, Syracuse, NY. [3]ALF Distribution GmbH, Aachen. [4]AIT Austrian Institute of Technology, Vienna.*

P58: AUGMENTATION INDEX AND PULSE WAVE VELOCITY AFTER DELIVERY IN WOMEN WITH AND WITHOUT AN ADVERSE PREGNANCY OUTCOME
Marnie Kelly McLean, Paige Wilbanks, Brooke Wilson, Marcey Jiles, Kaitlyn Ramey, Seth Byland, Abbi Lane-Cordova. *University of South Carolina, Columbia, SC.*

P59: THE TIME-COURSE OF BLOOD PRESSURE CHANGE IN ADULTS DURING PROLONGED SITTING: A THREE-LEVEL META-ANALYSIS
Nathan T. Adams[1], Jillian Poles[1], Craig Paterson[2], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]University of Gloucestershire, Gloucester.*

P60: CARDIAC AUTONOMIC ACTIVITY ACROSS THE MENSTRUAL CYCLE IN NATURALLY CYCLING FEMALES
Emily E. Bechke[1], Mitchell E. Zaplatosch[1], Samantha J. Goldenstein[1], Laurie Wideman, FACSM[1], William M. Adams, FACSM[2]. *[1]University of North Carolina-Greensboro, Greensboro, NC. [2]United States Olympic & Paralympic Committee, Colorado Springs, CO.*

P61: ACTIGRAHY-DERIVED SLEEP QUALITY AND BLOOD PRESSURE REACTIVITY IN YOUNG APPARENTLY HEALTHY ADULTS
Meral N. Culver, Braxton A. Linder, McKenna A. Tharpe, Alex M. Barnett, Zach J. Hutchison, Austin T. Robinson. *Auburn University, Auburn, AL.*

P62: SHORT-TERM SALT LOADING DOES NOT INFLUENCE HEART RATE VARIABILITY DURING SUBMAXIMAL EXERCISE AND RECOVERY
Braxton A. Linder[1], Joseph C. Watso[2], Matthew C. Babcock[3], Kamilla U. Pollin[4], William B. Farquhar, FACSM[5], Austin T. Robinson[1]. *[1]Auburn University, Auburn, AL. [2]University of Texas, Dallas, TX. [3]University of Colorado Denver-Anschultz Campus, Aurora, CO. [4]Veteran Affairs Medical Center, Washington, DC. [5]University of Delaware, Newark, DE.*

P63: ABSOLUTE PEAK OXYGEN CONSUMPTION IS INDEPENDENTLY CORRELATED WITH FAT-FREE MASS IN YOUTH SOCCER PLAYERS
Casey J. Metoyer, Oleg Sinelnikov, Michael V. Fedewa, Michael R. Esco, FACSM. *The University of Alabama, Tuscaloosa, AL.*

P64: COLD PRESSOR TEST BLUNTS REACTIVE HYPEREMIA DURING PASSIVE LIMB MOVEMENT
Rachel E. Szeghy, Nina L. Stute, Stephen M. Ratchford, Abigail S.L. Stickford. *Appalachian State University, Boone, NC.*

P65: CAFFEINE ABSTINENCE IN HABITUATED USERS: CARDIOVASCULAR AND PERCEPTUAL RESPONSES TO EXERCISE WITH BLOOD FLOW RESTRICTION
Chance J. Davidson, Matthew A. Chatlaong, Daphney M. Stanford, William M. Miller, Matthew B. Jessee. *University of Mississippi, University, MS.*

Friday, February 18

8:00–9:30 AM POSTER PRESENTATION SESSION 2 (P38-P93) ***Studio 220***

P66: COMPARING THE RESTING CARDIOVASCULAR RESPONSE TO COMMONLY USED BLOOD FLOW RESTRICTION DEVICES
J Barnes Benton, Daphney M. Stanford, Matthew A. Chatlaong, William M. Miller, Matthew B. Jessee. *University of Mississippi, University, MS.*

P67: RELATION BETWEEN TISSUE OXYGENATION AND WALKING IMPAIRMENT QUESTIONNAIRE SCORES IN PAD PATIENTS
Alexandra Conley[1], Matthew Martenson[1], Judy Muller-Delp[1], Jacob Caldwell[2], Lawrence Kaelin[3], Albert Hakaim[4], Lynn Panton, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]University of Wisconsin-La Crosse, La Crosse, WI. [3]Vascular Surgery Associates of Florida, Tallahassee, FL. [4]Mayo Clinic, Jacksonville, FL.*

P68: VITAMIN D RECEPTOR EXPRESSION DURING RECOVERY FOLLOWING SEVERE SKELETAL MUSCLE INJURY
Jonathan Howard[1,2], Jeff Otis[2]. *[1]Georgia Highlands College, Rome, GA. [2]Georgia State University, Atlanta, GA.*

P69: ALTERED AUTOPHAGY AND ENDOPLASMIC RETICULUM STRESS RESPONSE TO MECHANICAL OVERLOAD IN CACHECTIC APCMIN MICE
Alexis N. Milton, Shuichi Sato. *University of Louisiana at Lafayette, Lafayette, LA.*

P70: THE EFFECTS OF ACUTE AEROBIC VS ACUTE RESISTANCE EXERCISE ON COGNITION
Madelyn Jennings, Gina Jones, Rebecca Rogers, Tyler Williams, Christopher Ballmann, FACSM, Mallory Marshall, Justin Moody. *Samford University, Birmingham, AL.*

P71: IS NEGATIVE AS EFFECTIVE AS POSITIVE WORK IN THOSE WITH NEUROLOGICAL CONDITIONS: A META-ANALYSIS
Whitley Stone[1], Dano Tolusso[1], Catie Duchette[2], Grant Malone[1], Angie Dolan[3]. *[1]Western Kentucky University, Bowling Green, KY. [2]Alabama College of Osteopathic Medicine, Dothan, AL. [3]Hanover College, Hanover, IN.*

P72: AT-HOME EXERCISE IMPROVES CARDIORESPIRATORY FITNESS IN BREAST AND PROSTATE CANCER SURVIVORS: A META-ANALYSIS
Caroline Inga Shealy, Lauren C. Bates, Sasha Riley, Cameron Stopforth, Kaileigh Moertl, Kyle Edgar, Lee Stoner, FACSM, Erik D. Hanson, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC, NC.*

P73: WEARABLE ACTIVITY TRACKERS DO NOT INCREASE PHYSICAL ACTIVITY IN INDIVIDUALS WITH DOWN SYNDROME
Grant Malone, Whitley Stone, Nicholas Buoncristiani, Kayla Baker. *Western Kentucky University, Bowling Green, KY.*

P74: HOME-BASED EXERCISE IMPROVES QUALITY OF LIFE IN BREAST AND PROSTATE CANCER SURVIVORS: A META-ANALYSIS
Sasha Riley, Lauren C. Bates, Cameron K. Stopforth, Kaileigh Moertl, Kyle M. Edgar, Lee Stoner, FACSM, Erik D. Hanson, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P75: RISEDRONATE USE TO ATTENUATE COMPARTMENTAL BONE LOSS FOLLOWING SLEEVE GASTRECTOMY: A PILOT RANDOMIZED CONTROLLED TRIAL
Rebecca Knapp[1], Katelyn Greene[2], Ashley Weaver[2], Ashlyn Swafford[1], Jamy Ard[2], Daniel Beavers[2], Kristen Beavers[1]. *[1]Wake Forest University, Winston-Salem, NC. [2]Wake Forest School of Medicine, Winston-Salem, NC.*

Friday, February 18

8:00–9:30 AM POSTER PRESENTATION SESSION 2 (P38-P93) ***Studio 220***

P76: COMPARING THE EXERCISE RESPONSE AND IMMEDIATE RECOVERY BETWEEN TWO DIFFERENT BLOOD FLOW RESTRICTION DEVICES
Daphney M. Stanford, Matthew A. Chatlaong, William M. Miller, Matthew B. Jessee. *University of Mississippi, Oxford, MS.*

P77: RELIABILITY OF MANUAL VS AUTOMATIC ULTRASOUND ANALYSES
Kealey J. Wohlgemuth[1], Malia M. Blue[2], Jacob A. Mota[1]. *[1]University of Alabama, Tuscaloosa, AL. [2]University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P78: INJURIES AND STRENGTH AND CONDITIONING PRACTICES IN COLLEGIATE TENNIS
Ecaterina Vasenina[1], William B. Hammert[2], Ryo Kataoka[2], Scott J. Dankel[3], Samuel L. Buckner[2]. *[1]University of Central Florida, Orlando, FL. [2]University of South Florida, Tampa, FL. [3]Rowan University, Glassboro, NJ.*

P79: EFFECT OF TRANSDERMAL MAGNESIUM CHLORIDE ON MAXIMAL ISOMETRIC HANDGRIP STRENGTH
Sarah Blount, Sasha Riley, Kyle M. Edgar, Mark Belio, Andrei Sergeyev, Mohamdod Alzer, Joshua Beaver, Alain Aguilar, Erik D. Hanson, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P80: TRANSDERMAL MAGNESIUM CHLORIDE DOES NOT IMPROVE RECOVERY OF MAXIMAL ISOMETRIC HANDGRIP FORCE FOLLOWING FATIGUE
Mark Belio, Kyle M. Edgar, Sasha Riley, Mohamdod S. Alzer, Andrei Sergeyev, Sarah Blount, Alain Aguilar, Joshua Beaver, Erik D. Hanson, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P81: DECLINES IN ISOMETRIC STRENGTH FOLLOWING ISOKINETIC FATIGUE: THE INFLUENCE OF ECHO INTENSITY
McKenzie M. Hare, Kathryn E. Southall, Kealey J. Wohlegemuth, Abbey T. Jordan, Katherine L. Ryan, Mackenzie S. Kennedy, Jacob A. Mota. *The University of Alabama, Tuscaloosa, AL.*

P82: THE ROLE OF MUSCLE QUALITY AND SEX ON SKELETAL MUSCLE FATIGUABILITY
Kathryn Southall, McKenzie M. Hare, Kealey J. Wohlegemuth, Abbey T. Jordan, Katherine L. Ryan, Mackenzie S. Kennedy, Jacob A. Mota. *The University of Alabama, Tuscaloosa, AL.*

P83: ABSTRACT WITHDRAWN

P84: THE INFLUENCE OF MUSCLE SIZE AND QUALITY ON VERTICAL JUMP PERFORMANCE
Mackenzie S. Kennedy, McKenzie M. Hare, Kathryn E. Southall, Kealey J. Wohlgemuth, Abbey T. Jordan, Katherine L. Ryan, Jacob A. Mota. *University of Alabama, Tuscaloosa, AL.*

P85: INFLUENCE OF ULTRASOUND FREQUENCY ON TEST-RETEST RELIABILITY OF MUSCLE ARCHITECTURE
Abbey T. Jordan. *The University of Alabama, Tuscaloosa, AL.*

P86: COMPARISON OF THE BIODEX DYNAMOMETER AND KINEMATIC ANALYSIS FOR MEASURING INDIVIDUAL QUADRICEPS MUSCLE TORQUE
Christopher L. Rawdon, Christopher Ingalls, FACSM, Feng Yang. *Georgia State University, Atlanta, GA.*

Friday, February 18

8:00–9:30 AM POSTER PRESENTATION SESSION 2 (P38-P93) *Studio 220*

P87: EFFECTS OF EXERCISE MODALITIES ON TUMOR GROWTH AND SKELETAL MUSCLE FUNCTION IN TUMOR BEARING MICE
Jason T. Brantley, Louisa Tichy, George B. Blackburn, Traci L. Parry. *University of North Carolina Greensboro, Greensboro, NC.*

P88: EFFECTS OF GRADED PROTEIN INTAKE WITH RESISTANCE TRAINING ON SKELETAL MUSCLE OUTCOMES IN OLDER ADULTS
J. Max Michel, Michael J. Berry, FACSM, Peter H. Brubaker, FACSM, Gary D. Miller. *Wake Forest University, Winston-Salem, NC.*

P89: RECONDITIONING EXERCISE FOR COVID-19 PATIENTS EXPERIENCING RESIDUAL SYMPTOMS
Lydia Bailey, Michael Berry, FACSM. *Wake Forest University, Winston Salem, NC.*

P90: HOW BODY POSITION ON EQUINE AFFECTS RIDER HEART RATE AND BLOOD OXYGEN LEVELS
Sarah-May Brooks. *Montreat College, Montreat, NC.*

P91: IMPACT OF PRIOR AEROBIC EXERCISE ON ARTERIAL STIFFNESS DURING PROLONGED SITTING IN ACTIVE HEALTHY ADULTS
Daniela Paz, Sasha Riley, Erik Hanson, FACSM. *University of North Carolina Chapel Hill, Chapel Hill, NC.*

P92: IMPACT OF IN VITRO METFORMIN ON OFFSPRING MITOCHONDRIAL BIOENERGETICS WITH MATERNAL EXERCISE OR GESTATIONAL DIABETES
Ericka M. Biagioni, Nicholas T. Broskey. *East Carolina University, Greenville, NC.*

P93: IDENTIFYING SEDENTARY BEHAVIOR INTERRUPTION STRATEGIES TO REDUCE CARDIOVASCULAR DISEASE RISK IN BREAST CANCER SURVIVORS
Suhani Ramchandra, Lauren C. Bates, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

9:00–9:50 AM SYMPOSIUM 7 *Regency Ballroom C*

Chair: Mike McKenzie, *Appalachian State University*

S7: THINKING STRATEGICALLY ABOUT ORGANIZATIONAL DIVERSITY: PROMISING PRACTICES AND ACTION STEPS FOR KINESIOLOGY UNITS
Jared Russell[1], T J Exford[2], DeAnne Brooks[3], Gilaine Nettles[4]. *[1]Auburn University, Auburn, AL. [2]North Carolina A&T State University, Greensboro, NC. [3]University of North Carolina–Greensboro, Greensboro, NC. [4]Alabama State University, Montgomery, AL.*

9:00–9:50 AM SYMPOSIUM 8 *Regency Ballroom G*

Chair: Mallory Marshall, *Samford University*

S8: EFFECT OF FASTING OR CARBOHYDRATE INGESTION PRIOR TO RUN IN ATHLETES USING CONTINUOUS GLUCOSE MONITORING
Suzanne L. McDonough. *Mississippi College, Clinton, MS.*

Friday, February 18

9:00–9:50 AM TUTORIAL 7 *Regency Ballroom D & E*

Chair: Karissa Peyer, *University of Tennessee Chattanooga*

T7: EXPLORING SCOPE OF PRACTICE: THE FUNCTIONAL EXERCISE SCIENCE PRACTICE MODEL IN EXERCISE SCIENCE EDUCATION
Mark R. Erickson, Patricia W. Bauer. *Florida Gulf Coast University, Fort Myers, FL.*

9:00–9:50 AM TUTORIAL 8 *Regency Ballroom H*

Chair: Nicole Rendos, *Emory University*

T8: INCORPORATING MINDFULNESS INTO YOUR PERSONAL TOOLBOX
Kylie Roberts, Kaytlyn Johnson, Tamerah Hunt, Megan Byrd. *Georgia Southern University, Statesboro, GA.*

10:00–11:00 AM ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS *Regency Ballroom A & B*

Presiding: Edward Howley, FACSM. *University of Tennessee, Knoxville, TN.*
Speaker introduction: Edward Howley, FACSM. *University of Tennessee, Knoxville, TN.*

A PERSONAL HISTORY OF SOUTHEAST ACSM
Bruce Gladden, FACSM. *Auburn University, Auburn, AL.*

11:10 AM–12:00 PM CLINICAL CROSSOVER LECTURE *Regency Ballroom A & B*

Presiding: Brent Messick, MD, FACSM. *Atrium Health, Concord, NC*
Speaker introduction: Brent Messick, MD, FACSM. *Atrium Health, Concord, NC.*

PHYSICAL ACTIVITY AND HEALTH: FROM INTEGRATED PHYSIOLOGY TO PUBLIC HEALTH: CHALLENGES, CAVEATS, AND UNANSWERED QUESTIONS
William Kraus, FACSM. *Duke University, Durham, NC.*

Friday, February 18

12:30–6:00 PM SPORTS MEDICINE PHYSICIAN TRACK SESSIONS *Redbud*

12:30 Welcome and Announcements
Ryan Draper, DO. *Cone Health, Greensboro, NC.*

12:45 Rocks, Rolls, and Falls; Lacs, Strains, Drums, and Squirts–Another Day in the Boat
Keith Anderson, MD. *Novant, Charlotte, NC.*

1:15 Mountain Medicine
Kim Kaiser, MD *University of Kentucky, Lexington, KY.*

1:45 Skate or Die!! Skateboarding and Sports Medicine
David Price, MD. *Atrium Health, Charlotte, NC.*

2:20 Discussion

2:25 Break

Fellow Case Presentations- Session #1
2:40 Fellow Case #1
2:55 Fellow Case #2
3:10 Fellow Case #3

3:30 Common Skiing and Snowboarding Injuries
Jason Folk, MD. *Prisma Health, Greenville, SC.*

4:00 Ultramarathon: A Physician's Perspective
Brent Messick *Atrium Health, Concord, NC.*

4:30 Discussion

4:35 Break

4:55 Physical Activity and Health: From Integrated Physiology to Public Health: Challenges, Caveats, And Unanswered Questions
William Kraus, MD. *Duke University, Durham, NC.*

5:55 Discussion

1:15–2:15 PM BASIC SCIENCE LECTURE *Regency Ballroom A & B*

Presiding: Matt Green, FACSM. *University of North Alabama, Florence, AL.*
Speaker introduction: Morgan Smith. *Auburn University, Auburn, AL.*

CIRCADIAN RHYTHMS AND CLOCKS: EXERCISE PERFORMANCE AND ADAPTATIONS
Karyn Esser, FACSM. *University of Florida, Gainesville, FL.*

2:30–3:20 PM SYMPOSIUM 9 *Regency Ballroom H*

Chair: Shu Sato, *University of Louisiana at Lafayette*

S9: POST-STROKE EXERCISE AND REHABILITATION: INTERNAL AND EXTERNAL DRIVERS OF NEUROPLASTICITY
John H. Kindred[1,2], Ryan E. Ross[1,2], Nick J. Siekirk[3]. *[1]Ralph H. Johnson VAMC, Charleston, SC. [2]Medical University of South Carolina, Charleston, SC. [3]Georgia Southern University, Statesboro, GA.*

Friday, February 18

2:30–3:20 PM SYMPOSIUM 10 ***Regency Ballroom D & E***

Chair: Andy Bosak, *Liberty University*

S10: DO RECENT SPORTS DRINK INNOVATIONS HELP YOU GO THE DISTANCE?
Michael J. Saunders, FACSM[1], Daniel A. Baur[2]. *[1]James Madison University, Harrisonburg, VA. [2]Virginia Military Institute, Lexington, VA.*

2:30–3:20 PM TUTORIAL 9 ***Regency Ballroom G***

Chair: Whitley Stone, *Western Kentucky University*

T9: MEASURING FATIGUE AND FATIGABILITY
Kevin K. McCully, FACSM, Abisola Akinbobola. *University of Georgia, Athens, GA.*

2:30–4:30 PM ORAL PRESENTATION SESSION 3 (O17-O24) ***Regency Ballroom F***

Chair: Scott Lyons, *University of North Alabama*

O17: ABSTRACT WITHDRAWN

O18: SHORT-TERM SUPPLEMENTATION WITH β-HYDROHYBUTYRATE KETONE SALT SUPPLEMENT DOES NOT ALTER ENERGY INTAKE IN FEMALES
Svetlana Nepocatych, Miranda Thompson. *Elon University, ELON, NC.*

O19: THE EFFECTS OF THE OPTIFAST DIET AND AEROBIC EXERCISE ON INSULIN SENSITIVITY
Taylor T. Brown[1], Emily Grammer[2], Tyler Brown[1], Josh McGee[1], Marie Clunan[1], Anna Huff[1], Briceida Osborne[1], Laura Matarese[1], Walter Pories[1], Joseph Houmard[1], Robert Carels[1], Chuck Tanner[1], Damon Swift[2]. *[1]East Carolina University, Greenville, NC. [2]University of Virginia, Charlottesville, VA.*

O20: EFFECTS OF YOHIMBINE HYDROCHLORIDE SUPPLMENTATION ON EXPLOSIVE BENCH PRESS PERFORMANCE AND STRENGTH-ENDURANCE
Lauren Boag, Hope Sternenberg, Rebecca R. Rogers, Tyler D. Williams, Christopher G. Ballmann, FACSM. *Samford University, Birmingham, AL.*

O21: PRELOADED BETAINE SUPPLEMENTATION ON THERMOREGULATION, FLUID BALANCE, AND CYCLING PERFORMANCE IN HEAT: A PILOT STUDY
Liliana I. Renteria[1], Brandon D. Willingham[2], Ericka M. Biagioni[3], Matthew J. Poland[1], Casey E. Greenwalt[1], Michael J. Ormsbee, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]Coastal Carolina University, Conway, SC. [3]East Carolina University, Greenville, NC.*

O22: PHYSIOLOGICAL AND PSYCHOPHYSIOLOGICAL RESPONSES TO REPEATED SUPRAMAXIMAL EXERCISE WITH YOHIMBINE HCL INGESTION
Kylie Nixon, Mckenzie Parker, Megan Barnes, Lauren Boag, Camryn Cowan, Julianne Hill, Shelby Parker, Shelby Tidwell, Lenox Jones, Mary Raymond, Hope Sternenberg, Taylor Yount, Rebecca R. Rogers, Tyler D. Williams, Christopher G. Ballmann, FACSM. *Samford University, Birmingham, AL.*

O23: THE EFFECT OF ACUTE CREATINE MONOHYDRATE LOADING ON BODY COMPOSITION, STRENGTH, AND FATIGABILITY IN WOMEN
Michaela Grace Alesi[1], Benjamin E. Dalton[2], Jacob M. McDougle[3], Ginger Nee[4], Darren G. Candow[5], Abbie E. Smith-Ryan[6], Robert Buresh[4], Garrett M. Hester[4], Trisha A. VanDusseldorp[4]. *[1]Virginia Polytechnic Institute and State University, Blacksburg, VA. [2]University of Guelph, Guelph, ON. [3]University of Connecticut, Storrs, CT. [4]Kennesaw State University, Kennesaw, GA. [5]University of Regina, Regina, SK. [6]University of North Carolina, Chapel Hill, NC.*

Friday, February 18

2:30–4:30 PM ORAL PRESENTATION SESSION 3 (O17-O24) ***Regency Ballroom F***

O24: THE EFFECTS OF TART CHERRY JUICE AND WHEY PROTEIN ON EXERCISE INDUCED MUSCLE DAMAGE RECOVERY
Hailey E. Jurgens, Sara Higgins, Takudzwa A. Madzima, Svetlana Nepocatych. *Elon University, Elon, NC.*

2:30–4:00 PM THEMATIC POSTER SESSION 3 (TP13-TP18) ***Think Tank***

Chair: Lynn Panton, *Florida State University*

TP13: EFFECT OF QUARANTINE AND ISOLATION ON MENTAL HEALTH IN STUDENT ATHLETES
Victoria Tredinnick, Walker Gagnon, Jake Tingom, Steven Pfeiffer, Amy Knab, FACSM. *Queens University of Charlotte, Charlotte, NC.*

TP14: WHO WE ARE AND WHAT WE DO: AN EXPLORATION OF INDIVIDUAL DIFFERENCES FOR EXERCISE BEHAVIOR
Allyson G. Box, Jonathan R. North, Steven J. Petruzzello, FACSM. *University of Illinois Urbana-Champaign, Urbana, IL.*

TP15: A COMPARISON OF MINDFULNESS AMONG LAW ENFORCMENT OFFICERS AND FIREFIGHTERS
Bridget F. Melton[1], Richard Cleveland[1], Catherine Gallagher[1], Nicholas Hunt[1], Greg Ryan[2]. *[1]Georgia Southern University, Statesboro, GA. [2]Peidmont University, Demorest, GA.*

TP16: EFFECT OF FASTED OR CARBOHYDRATE INGESTION ON MOOD STATE POST RUN MEANSURED BY PANAS-GEN SURVEY AND CONTINUOUS GLUCOSE MONITORING
McKenzie L. Hargrove, Suzanne L. McDonough. *Mississippi College, Clinton, MS.*

TP17: INTERACTION BETWEEN AUTOMATIC AND REFLECTIVE PROCESSES IN THE PREDICTION OF ACCELEROMETER-DERIVED PA BEHAVIORS
Battogtokh Zagdsuren, Nicholas Barefoot, Makena Clark, Mark Richardson, Hayley MacDonald. *The University of Alabama, Tuscaloosa, AL.*

TP18: REV IT UP: THE PSYCHOLOGICAL EFFECTS OF MYOFASCIAL RELEASE DURING RESISTANCE EXERCISE
Daniel R. Greene, Adrian Stone. *Augusta University, Augusta, GA.*

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) ***Studio 220***

Chair: Savannah Knight, *University of North Alabama*

P94: EFFECT OF CENTRAL VERSUS PERIPHERAL ADDED MASS ON BIPEDAL HOPPING
Hannah Smedley, Mackenzie Wall, Caroline Phelps, Josh Shoaf, John Fox. *Methodist University, Fayetteville, NC.*

P95: SAME DAY RESISTANCE TRAINING EFFECTS ON COUNTERMOVEMENT JUMP PERFORMANCE
Peter Gaither, Bryan Riemann. *Georgia Southern, Savannah, GA.*

P96: EFFECT OF WALKING SPEED ON THE MAGNITUDE AND DISTRIBUTION OF PLANTAR GROUND REACTION FORCES
Ryan T. Conners[1], Paul N. Whitehead[1], Madison Quick[2], Kathryn Rodebaugh[3], Piotr Urbański[4]. *[1]The University of Alabama in Huntsville, Huntsville, AL. [2]The University of Mississippi, University, MS. [3]Milligan University, Milligan, TN. [4]Poznań University of Physical Education, Poznań.*

Friday, February 18

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) ***Studio 220***

P97: SINGLE-SUBJECT ANALYSIS OF PHASE-SPECIFIC FORCE AND TIME VARIABLES DURING VERTICAL HOPPING IN CHRONIC ANKLE INSTABILITY
Jeffrey Simpson[1], Nicole Rendos[2], Hoon Kim[3], John Harry[4]. *[1]University of West Florida, Pensacola, FL. [2]Emory University, Atlanta, GA. [3]University of North Carolina-Chapel Hill, Chapel Hill, NC. [4]Texas Tech University, Lubbock, TX.*

P98: CAN RECUMBENT EXERCISE IMPROVE GAIT AND ARTERIAL STIFFNESS OUTCOMES?–A LONGITUDINAL CASE STUDY
Kylee S. West[1], Jacob Smith[1], Savannah Lyons[2], Austen Arnold[1], Greg Grosicki[3], Nick J. Siekirk[1]. *[1]Biomehcanics Lab, Georgia Southern University, Statesboro, GA. [2]Honors College, Georgia Southern University, Statesboro, GA. [3]Biodynamics and Human Performance Center, Georgia Southern University (Armstrong), Savannah, GA.*

P99: INFLUENCE OF A WARM-UP PROTOCOL INVOLVING THE KINETIC CHAIN ON ATHLETES' HIP AND SHOULDER ROTATIONAL ISOMETRIC STRENGTH: A PILOT STUDY
Courtney E. Weber, Jeff W. Barfield. *Lander University, Greenwood, SC.*

P100: CHARACTERIZING PRIMARY STABLIZERS OF THE FOOT AND ANKLE THROUGH FOOT ORTHOTIC APPLICATION DURING DYNAMIC TASK
Aaron Griffith. *Mississippi State University, Starkville, MS.*

P101: SHOULDER RANGE OF MOTION DIFFERENCES IN MASTERS OLYMPIC WEIGHTLIFTERS
Cullun Q. Watts, George J. Davies, Bryan L. Riemann. *Georgia Southern University-Armstrong, Savannah, GA.*

P102: UPPER BODY MUSCLE EXCITATION DURING SPRINTING
Victoria Ann Conn, Eileen Wheelen, David Elmer, Jessica Washington. *Berry College, Mount Berry, GA.*

P103: CENTER OF MASS DYNAMICS AND PERFORMANCE OF VERTICAL HOPPING IN FEMALES WITH CHRONIC ANKLE INSTABILITY
Alyssa Parten[1], Jeffrey Simpson[2], Hunter Waldman[1], Nicole Rendos[3], Hoon Kim[4], John Harry[5]. *[1]University of North Alabama, Florence, AL. [2]University of West Florida, Pensacola, FL. [3]Emory University, Atlanta, GA. [4]University of North Carolina-Chapel Hill, Chapel Hill, NC. [5]Texas Tech University, Lubbock, TX.*

P104: EXAMINING PERCENT ACTIVATION CHANGES IN DIFFERENT PHASES OF THE SWING IN COLLEGIATE SOFTBALL PLAYERS
Charles Caleb Williams[1], Paul T. Donahue[2], Samuel J. Wilson[3], Grant Mouser[4], Chris Hill[5], Lauren Luginsland[6], Chip Wade[7], John C. Garner[4]. *[1]University of North Florida, Jacksonville, FL. [2]University of Southern Mississippi, Hattisburg, MS. [3]Georgia Southern University, Statesboro, GA. [4]Troy University, Troy, AL. [5]Northern Illinois University, DeKalb, IL. [6]Old Dominion University, Norfolk, VA. [7]Auburn University, Auburn, AL.*

P105: ANKLE ANGULAR VELOCITY AND ACCELERATION ARE RELIABLE MEASURES WITH POSITIVE CORRELATIONS TO POST-STROKE CLINICAL OUTCOMES
Jasmine Cash[1], Shraddha Srivastava[1,2], John Kindred[1,2], Bryant Seamon[1,2], Steven Kautz[1,2], Mark Bowden[1,2]. *[1]Medical University of South Carolina, Charleston, SC. [2]Ralph H. Johnson Veterans Affair Medical Center, Charleston, SC.*

P106: THE EFFECT OF A STABILIZATION PERIOD ON GAIT PARAMETERS WHILE DUAL TASKING
Sarah-Ashby Calhoun, Hannah Thigpen, Rebecca R. Rogers, Mallory R. Marshall, Justin Moody. *Samford University, Birmingham, AL.*

Friday, February 18

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) ***Studio 220***

P107: PHASE-SPECIFIC FORCE AND TIME METRICS OF VERTICAL HOPPING IN CHRONIC ANKLE INSTABILITY
Nicole K. Rendos[1], Jeffrey D. Simpson[2], Hoon Kim[3], John R. Harry[4]. *[1]Emory University, Atlanta, GA. [2]University of West Florida, Pensacola, FL. [3]University of North Carolina at Chapel Hill, Chapel Hill, NC. [4]Texas Tech University, Lubbock, TX.*

P108: PSYCHOLOGICAL EFFECT AND RESILIENCY DUE TO LONG-TERM ABSENCE INJURIES IN COLLEGIATE ATHLETES
Joshua Davis Clothier, Kristin Riggsbee. *Maryville College, Knoxville, TN.*

P109: ASSESSMENT OF EXERCISE-INDUCED INJURIES AMONG CAREER FIREFIGHTERS
Matthew S. Brock, Alyssa Eastman, Emily Langford, Nick Heebner, Mark G. Abel. *University of Kentucky, Lexington, KY.*

P110: WHOLE BODY VIBRATION AND BLOOD FLOW RESTRICTION FOR MUSCLE RECOVERY FOLLOWING EXERCISE-INDUCED MUSCLE DAMAGE
Matthew A. Chatlaong, Daphney M. Stanford, William M. Miller, Matthew B. Jessee. *University of Mississippi, University, MS.*

P111: THE EFFECTS OF RESISTANCE TRAINING AND PROTEIN SUPPLEMENTATION IN TRANSCATHETER AORTIC VALVE REPLACEMENT PATIENTS
Christopher Schattinger[1], Mia Newlin-Bradner[1], Michael J. Ormsbee, FACSM[1], Morgan Pleasants[1], Jenna Rodgers[1], Michael Lauber[1], Ginny Smith[2], Shelby Vidor[2], Catie Yarborough[2], Pablo Rengifo-Moreno[2], Thomas Noel[2], Lynn B. Panton, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]Tallahassee Memorial Healthcare, Tallahassee, FL.*

P112: COMPARATIVE CASE STUDY OF BLOOD FLOW RESTRICTION TRAINING FOR INJURED VS. HEALTHY ATHLETE
Emily Sanders, Briley Lawson, Jeremiah G. Lukers. *Truett McConnell University, Cleveland, GA.*

P113: UNILATERAL CONTRIBUTIONS TO BILATERAL ECCENTRIC HAMSTRING EXERCISE–A PRELIMINARY CASE SERIES ANALYSIS
Jacob M. Smith, Kylee West, Jordan Brown, Brianna Simmons, Austen Arnold, Derick Anglin, Tanya Miller, Jessica Mutchler, Sam Wilson, Nicholas Siekirk. *Georgia Southern University, Statesboro, GA.*

P114: INCREASED MASS INFLUENCES HOPPING STIFFNESS
John Fox, Blake Justice, Matthew Condo, Matthew Foreman. *Methodist University, Fayetteville, NC.*

P115: DO COMPRESSION PANTS INFLUENCE MUSCLE OSCILLATION, MUSCLE ACTIVATION TIME, AND OXYGEN CONSUMPTION DURING RUNNING?
Andrew Craig-Jones[1], Jacquelyn Sertic[2], Brittany Shimana[3], James W. Navalta, FACSM[3], John A. Mercer, FACSM[3]. *[1]Augusta University, Augusta, GA. [2]University of Minnesota, St. Paul, MN. [3]University of Nevada, Las Vegas, Las Vegas, NV.*

P116: LEG STIFFNESS AND PITCH TYPES IN HIGH SCHOOL BASEBALL PITCHERS
Anthony W. Fava[1], Jessica L. Talmage[2], Gretchen D. Oliver, FACSM[1]. *[1]Auburn University, Auburn, AL. [2]Northern State University, Aberdeen, SD.*

P117: COMPARING KINETICS OF PITCH TYPE BETWEEN YOUTH BASEBALL PITCHERS WITH AND WITHOUT UPPER EXTREMITY PAIN
Chris Novellino, Anthony Fava, Nicole Bordelon, Adam Nguyen, Katherine Everhart, Gretchen Oliver, FACSM. *Auburn University, Auburn, AL.*

Friday, February 18

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) ***Studio 220***

P118: PELVIS AND TRUNK KINEMATIC DIFFERENCES EXIST BETWEEN BASEBALL TEE AND FRONT TOSS HITTING
Mary Beth McCullough[1], Nicole Bordelon[1], Kenzie Friesen[2], Anthony Fava[1], Katherine Everhart[1], Gretchen Oliver, FACSM[1]. *[1]Auburn University, Auburn, AL. [2]University of Saskatchewan, Saskatoon, SK.*

P119: STANDING BALANCE MEASURES IN COLLEGIATE CHEERLEADERS BETWEEN NEW AND OLD CHEER SPECIFIC FOOTWEAR
Diego Castro-Diaz[1], Abigail Johnson[2], Jessica Mutchler[1], Jay Garner[3], Li Li, FACSM[1], Barry Munkasy[1], Sam Wilson[1]. *[1]Georgia Southern University, Statesboro, GA. [2]University of Florida, Gainesville, FL. [3]Troy University, Troy, AL.*

P120: BALANCE MEASURES BETWEEN OLD AND NEW CHEERLEADING FOOTWEAR IN FLYER SPECIFIC CHEER POSITIONS
Petra Kis[1], Abigail Johnson[2], Jessica Mutchler[1], Li Li, FACSM[1], Barry Munkasy[1], Sam Wilson[1]. *[1]Georgia Southern University, Statesboro, GA. [2]University of Florida, Gainesville, FL.*

P121: PREVENTION AND TREATMENT METHODS ON THE OCCURRENCE OF MEDIAL TIBIAL STRESS SYNDROME IN HIGH SCHOOL CROSS COUNTRY ATHLETES
Kayla Baker, Makayla Mack, Rachel Tinius. *Western Kentucky University, Bowling Green, KY.*

P122: INFLUENCE OF DEMOGRAPHIC FACTORS ON CONCUSSION-RELATED DECISION-MAKING BY CERTIFIED ATHLETIC TRAINERS
Melissa K. Kossman[1], Zachary Y. Kerr[2], Kristen L. Kucera[2], J.D. DeFreese[2], Meredith A. Petschauer[2], Johna K. Register-Mihalik[2]. *[1]University of Southern Mississippi, Hattiesburg, MS. [2]University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P123: TRUNK ANGLE EFFECTS ON QUADRICEPS:HAMSTRING RATIO DURING BODYWEIGHT SQUATS
Penny Schulken, John Fox. *Methodist University, Fayetteville, NC.*

P124: THE EFFECT OF ONE NIGHT OF SLEEP RESTRICTION ON SUBSEQUENT AEROBIC PERFORMANCE
Trent A. Hargens, FACSM, Lindsay J. Lickers, Amanda J. Becker, Christopher J. Womack, FACSM, Nicholas D. Luden. *James Madison University, Harrisonburg, VA.*

P125: RELIABILITY OF TMS MEASURES OF LOWER LIMB CORTICOSPINAL EXCITABILITY
Jason I. Pagan[1], Kylie K. Harmon[1], Ryan M. Girts[1], Gabriela Rodriguez[1], Rob J. MacLennan[2], Jesus Hernandez Sarabia[2], Nicholas Coker[3], Joshua C. Carr[4], Xin Ye[5], Jason M. DeFreitas[2], Matt S. Stock[1]. *[1]University of Central Florida, Orlando, FL. [2]Oklahoma State University, Stillwater, OK. [3]Springfield College, Springfield, MA. [4]Texas Christian University, Fort Worth, TX. [5]University of Hartford, West Hartford, CT.*

P126: THE VALIDITY OF RHRV IN BATCH PROCESSING RAW EKG SIGNALS FOR THE DETERMINATION OF HEART RATE VARIABILITY
Travis Anderson, Jennifer L. Etnier, Emily E. Bechke, Laurie Wideman, FACSM. *University of North Carolina at Greensboro, Greensboro, NC.*

P127: ASSESSING BEVERAGE BIOAVAILABILIY USING DEUTERIUM OXIDE APPEARANCE IN BLOOD: DO METHODS MATTER?
Mateo Golloshi. *Georgia Institute of Technology, Atlanta, GA.*

Friday, February 18

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) *Studio 220*

P128: THE EFFECT OF FARMERS WALK EXERCISE ON PERFORMANCE MEASURES UP TO THREE DAYS POST EXERCISE
Jacob D. Fanno[1], Jason McCormack[2], Anthony Sanchez[2], Heather E. Webb[3]. [1]*Kennesaw State University, Kennesaw, GA.* [2]*Texas A&M University, Corpus Christy, TX.* [3]*Mercer University, Macon, GA.*

P129: SEASON LONG IN-GAME PERFORMANCE VARIATIONS IN PROFESSIONAL SOCCER PLAYERS
Greg A. Ryan[1], Hannah Ramirez[2], Cameron Horsfall[2], Drew S. DeJohn[3], Lucas Haaren[2], Stephen J. Rossi[2]. [1]*Piedmont University, Demorest, GA.* [2]*Georgia Southern University, Statesboro, GA.* [3]*South Georgia Tormenta FC, Statesboro, GA.*

P130: PILOT STUDY: IMPACT OF 2.4-KG PROXIMAL EXTERNAL LOADING ON 10-KM RUN PERFORMANCE IN RECREATIONALLY COMPETITIVE RUNNERS
Victor A. Alves, Savanna N. Knight, Tate M. Dean, Bandar A. Alghamdi, Brett A. Davis, Lauren G. Killen, Hunter S. Waldman, Eric K. O'Neal. *University of North Alabama, Florence, AL.*

P131: EVALUATION OF ATHLETE LOAD AND RELATIONSHIP BETWEEN EQUATION VARIABLES IN DIVISION I WOMEN'S LACROSSE
Andrew Thornton, Jennifer A. Bunn, FACSM. *Sam Houston State University, Huntsville, TX.*

P132: DIFFERENCES IN PSYCHOLOGICAL HARDINESS AMONG CLASSIFICATION AND POSITION IN DIVISION I WOMEN'S LACROSSE
Abigail P. Cooley[1], Andrew Thornton[2], Jennifer A. Bunn, FACSM[2], Paula Parker-Fordyce[1]. [1]*Campbell University, Buies Creek, NC.* [2]*Sam Houston State University, Huntsville, TX.*

P133: CHANGES IN SLEEP QUALITY IN DIVISION I WOMEN'S LACROSSE ATHLETES
Sarah Lynn Grace[1], Jennifer A. Bunn, FACSM[2]. [1]*Campbell University, Buies Creek, NC.* [2]*Sam Houston State University, Huntsville, TX.*

P134: DESCRIPTIVE STUDY OF COMPETITIVE BATON TWIRLERS
Alexis Dicks[1], Rhiannon Gregory[1], Miranda Proctor[2], Amanda Trujillo[2], Andrew Hatchett[1]. [1]*University of South Carolina Aiken, Aiken, SC.* [2]*University of South Carolina, Columbia, SC.*

P135: CHARACTERIZATION OF THE RELATIONSHIP BETWEEN MENARCHE AND BODY COMPOSITION IN ELITE COLLEGIATE GYMNASTS
Sam R. Moore, Hannah E. Cabre, Amanda N. Gordon, Abbie E. Smith-Ryan, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P136: 24-H HYDRATION BEHAVIORS DURING ONCE VERSUS TWICE PER DAY COLLEGIATE SOCCER PRACTICES IN HOT-HUMID CONDITIONS
Tate M. Dean[1], Savannah N. Knight[2], Marcus Robinson[1], Angela R. Russell[1], Eric K. O'Neal[2], Brett A. Davis[1]. [1]*Auburn University at Montgomery, Montgomery, AL.* [2]*University of North Alabama, Florence, AL.*

P137: EXAMINING THE RELATIONSHIP BETWEEN LATERAL ROTATIONAL BROAD JUMPS AND BAT SPEED FOR COLLEGE BASEBALL PLAYERS
Brennen Hogan[1], Colin Corcoran[1], Jacob Gdovin[2], Charles Williams[1]. [1]*University of North Florida, Jacksonville, FL.* [2]*Winthrop University, Rock Hill, SC.*

P138: AN EVALUATION OF DRILL INTENSITIES IN DIVISION I WOMEN'S LACROSSE
Briana Robinson[1], Jennifer A. Bunn, FACSM[2]. [1]*Campbell University, Buies Creek, NC.* [2]*Sam Houston State University, Huntsville, TX.*

Friday, February 18

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) *Studio 220*

P139: COLLEGIATE ATHLETES REPORT HIGHER RPE'S ON WEEKEND GAME-DAYS COMPARED TO WEEKDAY GAME-DAYS.
Anna L. Gray[1], Travis Anderson[1], Jessica McNeil[1], Laurie Wideman, FACSM[1], William M. Adams, FACSM[2]. *[1]University of North Carolina Greensboro, Greensboro, NC. [2]United States Olympic & Paralympic Committee, Colorado Springs, CO.*

P140: COMPARISON OF GOOD AND POOR JUMPERS AS DETERMINED BY REACTIVE STRENGTH INDEX MODIFIED
Paul T. Donahue, Lindsey Legg, Hunter Haynes, Megan Rush. *University of Southern Mississippi, Hattiesburg, MS.*

P141: ASSOCIATIONS BETWEEN COUNTERMOVEMENT JUMP PERFORMANCE AND BODY COMPOSITION IN FEMALE ATHLETES
Lindsey T. Legg[1], Megan Rush[1], Stephanie McCoy[1], John C. Garner[2], Paul T. Donahue[1]. *[1]University of Southern Mississippi, Hattiesburg, MS. [2]Troy University, Troy, AL.*

P142: THE EFFECT OF PITCHING WITH UNDERWEIGHT AND OVERWEIGHT BALLS ON PITCH VELOCITY IN COLLEGIATE BASEBALL PITCHERS
Hillary Ake[1], Hunter Haynes[2], Riley Galloway[2], Paul Donahue[2], John C. Garner[3]. *[1]University of Florida, Gainesville, FL. [2]Univeristy of Southern Mississippi, Hattiesburg, MS. [3]Troy University, Troy, AL.*

P143: ASSOCIATIONS BETWEEN GPS-DERIVED TRAINING METRICS AND SUBJECTIVE READINESS RATINGS IN NCAA FEMALE SOCCER PLAYERS
Alex Ehlert. *North Carolina Wesleyan College, Rocky Mount, NC.*

P144: PREDICTING VO_{2MAX} USING BODY FAT PERCENTAGE IN PROFESSIONAL AND COLLEGIATE MALE SOCCER PLAYERS
Cameron Matthew Horsfall[1], Greg A. Ryan[2], Hannah E. Ramirez[1], Drew S. DeJohn[1], Lucas Haaren[1], Stephen J. Rossi[1]. *[1]Georgia Southern University, Statesboro, GA. [2]Piedmont University, Demorest, GA.*

P145: SEASONAL VARIATION IN ANTHROPOMETRIC AND PERFORMANCE VARIABLES IN AMERICAN PROFESSIONAL SOCCER PLAYERS
Hannah Elizabeth Ramirez[1], Greg A. Ryan[2], Drew DeJohn[1], Lucas Haaren[1], Cameron Horsfall[1], Stephen J. Rossi[1]. *[1]Georgia Southern University, Statesboro, GA. [2]Piedmont University, Demorest, GA.*

P146: RELATIONSHIP BETWEEN COMMON HEALTH, SKILL, AND PERFORMANCE SPORT SCIENCE MEASURES IN PROFESSIONAL MALE SOCCER ATHLETES
Jason C. Casey[1], Robert L. Herron[2], Greg A. Ryan[3], Hannah Ramirez[4], Cameron Horsfall[4], Drew DeJohn[4]. *[1]University of North Georgia, Oakwood, GA. [2]United States Sports Academy, Daphne, AL. [3]Piedmont University, Demorest, GA. [4]Georgia Southern University, Statesboro, GA.*

P147: INTERNAL WORKLOAD, TRAINING DISTRESS, AND STARTING STATUS IN COLLEGIATE VOLLEYBALL PLAYERS DURING A COVID-19 SEASON.
Caroline S. Vincenty, Gabriella Hickman, Alexa J. Chandler, Harry P. Cintineo, Bridget A. McFadden, Shawn M. Arent, FACSM. *The University of South Carolina, Columbia, SC.*

P148: EFFECTS OF CLEAR AND TINTED FOOTBALL VISORS ON AGILITY AND FUNCTIONAL REACTIVE ABILITY IN NCAA FOOTBALL PLAYERS
Gracie Robbins, Shelby Tidwell, Rebecca R. Rogers, Nathan East, Amanda Dumar, Ashleigh Davis, Ashley Rice, Christopher G. Ballmann, FACSM. *Samford University, Birmingham, AL.*

Friday, February 18

2:30–4:00 PM POSTER PRESENTATION SESSION 3 (P94-P155) ***Studio 220***

P149: PHYSIOLOGICAL CHARACTERISTICS OF COLLEGIATE TENNIS PLAYERS PRIOR TO PRESEASON
Braxton W. Byrd, Blaine S. Lints, Alexa J. Chandler, Harry P. Cintineo, Bridget A. McFadden, Shawn M. Arent, FACSM. *Department of Exercise Science, University of South Carolina, Columbia, SC.*

P150: PERFORMANCE AND BODY COMPOSITION MEASURES IN MALE TENNIS PLAYERS DURING A COVID-19 MODIFIED COLLEGIATE YEAR
Gianna F. Mastrofini, Alex F. Miller, Megan S. Ward, Harry P. Cintineo, Alexa J. Chandler, Blaine S. Lints, Bridget A. McFadden, Shawn M. Arent, FACSM. *University of South Carolina, Cayce, SC.*

P151: ACCURACY OF SUBJECTIVE LOAD PARAMETERS COMPARED TO ANALYTICAL LOAD MEASUREMENTS IN NCAA DI WOMEN'S VOLLEYBALL
Hannah Nelson[1], Katie Pierce[2], Paul Loprinzi[1], Matthew Jessee[1], Chas Ossenheimer[1], Melinda Valliant[1], Thomas Andre[1]. *[1]University of Mississippi, Oxford, MS. [2]University of Tennessee, Knoxville, TN.*

P152: VISUAL TRACKING SPEED AND SOCCER PERFORMANCE METRICS
Julia Phillips, Thomas Andre, Jeremy Loenneke. *University of Mississippi, Oxford, MS.*

P153: CHARACTERISTICS OF MENSTRUAL CYCLE AND HORMONAL CONTRACEPTIVE USE IN COLLEGIATE FEMALE ATHLETE IN THE UNITED STATES
Shiloah A. Kviatkovsky[1], Stacy T. Sims[2], Casey E. Greenwalt[1], Tucker Zeleny[3], Matthew D. Vukovich[4], Abbie E. Smith-Ryan[5], Christopher W. Bach[6], David Presby[7], Kristen Holmes[7], Michael J. Ormsbee, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]Auckland University of Technology, Auckland. [3]Whoop Inc, Boston, MA. [4]South Dakota State University, Brookings, SD. [5]University of North Carolina Chapel Hill, Chapel Hill, NC. [6]University of Nebraska, Lincoln, NE. [7]Whoop Inc., Boston, MA.*

P154: IDENTIFYING MECHANISMS OF FIREFIGHTER INJURIES: A HEALTHCARE PRACTITIONER PERSPECTIVE
Alyssa Q. Eastman, Nick R. Heebner, Phillip A. Gribble, Beth S. Rous, Emily L. Langford, Spencer Brock, Rosie K. Lanphere, Mark G. Abel. *University of Kentucky, Lexington, KY.*

P155: EFFECTS OF AN 8-WEEK ACCOMMODATING RESISTANCE TRAINING PROGRAM ON MARKERS OF PERFORMANCE IN STRENGTH-TRAINED FEMALES
Alyssa L. Parten, Hunter S. Waldman. *University of North Alabama, Florence, AL.*

3:30–4:20 PM SYMPOSIUM 11 ***Regency Ballroom H***

Chair: Jonathon Stickford, *Appalachian State University*

S11: THE EVOLUTION OF EXERCISE AND SPORTS SCIENCE: INTERDISCIPLINARY TEAMS AND THE FUTURE OF THE FIELD
Justin B. Moore, FACSM[1], Lee Stoner, FACSM[2], Simon Higgins[3], Malia NM Blue[2], Abbie E. Smith-Ryan, FACSM[2]. *[1]Wake Forest School of Medicine, Winston-Salem, NC. [2]University of North Carolina at Chapel Hill, Chapel Hill, NC. [3]Elon University, Elon, NC.*

3:30–4:20 PM SYMPOSIUM 12 ***Regency Ballroom D & E***

Chair: Greg Ryan, *Piedmont University*

S12: FACTORS AFFECTING THE FEMALE COLLEGIATE ATHLETE AND PERFORMANCE
Jennifer A. Bunn, FACSM[1], Paula Parker-Fordyce[2]. *[1]Sam Houston State University, Huntsville, TX. [2]Campbell University, Buies Creek, NC.*

Friday, February 18

3:30–4:20 PM **TUTORIAL 10** ***Regency Ballroom G***

Chair: Ashley Artese, *Duke University*

T10: THE INFLUENCE OF GRAVITATIONAL FORCES ON HUMAN PERFORMANCE AND PHYSIOLOGY: A REVIEW OF NAVAL AEROSPACE OPERATIONS IN EXTREME ENVIRONMENTS
Leslie Jerome Brandon, FACSM[1], Tristan Alston[2], Trudy Moore-Harrison[2]. [1]*Georgia State University, Atlanta, GA.* [2]*University of North Carolina-Charlotte, Charlotte, NC.*

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Saturday, February 19

7:30 AM–1:00 PM SPORTS MEDICINE PHYSICIAN TRACK SESSIONS *Redbud*

7:30 Welcome and Announcements
Ryan Draper, DO. *Cone Health, Greensboro, NC.*

7:45 Parkour, Parkour!
Andrew Gregory, MD. *Vanderbilt University, Nashville, TN.*

8:15 What a Sports Doc Should Know on BMX and Mountain Biking
Leonardo Oliveira, MD. *Cleveland Clinic, Jacksonville, FL.*

8:45 Surfing and Paddle Board Injuries
John Batson, MD. *Low Country Spine and Sport, Hilton Head, SC*

9:15 Discussion

9:25 Break

Fellow Case Presentations- Session #2
9:40 Fellow Case #4
9:55 Fellow Case #5
10:10 Fellow Case #6

10:25 Coming to Grips with Rock Climbing Injuries
Shane Hudnall, MD. *Cone Health, Greensboro, NC.*

10:55 Discussion

11:25 Break

Fellow Case Presentations- Session #3
11:50 Fellow Case #7
12:05 Fellow Case #8
12:20 Fellow Case #9

12:35 Voting for Best Case Presentation

12:45 Closing Remarks

12:55 Adjourn

8:00–8:50 AM SYMPOSIUM 13 *Regency Ballroom C*

Chair: Mark Schafer, *Western Kentucky University*

S13: CONCUSSION AND FLUID-BASED BIOMARKERS: WHERE DO WE STAND AND WHERE ARE WE HEADED?
Matthew J. Rogatzki, Jazmin O. Harrell, Chandler K. Bartol. *Appalachian State University, Boone, NC.*

Saturday, February 19

8:00–8:50 AM TUTORIAL 11 *Regency Ballroom G*

Chair: Lauren Killen, *University of North Alabama*

T11: GRADUATE STUDENTS MENTORING UNDERGRADUATE STUDENTS IN A SERVICE-LEARNING EXPERIENCE
Katy Johnson, Kylie Roberts, Megan Byrd, Tamerah Hunt, FACSM. *Georgia Southern University, Statesboro, GA.*

8:00–8:50 AM TUTORIAL 12 *Regency Ballroom H*

Chair: Elizabeth Edwards, *James Madison University*

T12: CORRECTING RISKY-TACKLE TECHNIQUE IN AMERICAN FOOTBALL CONCEPTS FOR SCREENING AND ASSESSMENT TO ELIMINATE TARGETING
Scott Dietrich. *Barry University, Miami Shores, FL.*

8:00–10:00 AM ORAL PRESENTATION SESSION 4 (O25-O32) *Regency Ballroom D & E*

Chair: Katie Collins, *Duke University*

O25: THE IMPACT OF COVID-19 ON EXERCISE IN THE SENIOR POPULATION
Dana Cruise[1], Kivana Keane[1], Trudy Moore-Harrison[1], L. Jerome Brandon, FACSM[2]. *[1]University of North Carolina at Charlotte, Charlotte, NC. [2]Georgia State University, Atlanta, GA.*

O26: RESPONSE TO A COMPREHENSIVE EXERCISE PRESCRIPTION IN A PREVIOUSLY SEDENTARY 59-YEAR-OLD FEMALE WITH A PACEMAKER.
Jacob C. Newman, Mark Erickson, Patti Bauer. *Florida Gulf Coast University, Fort Myers, FL.*

O27: CADENCE (STEPS/MIN) ASSOCIATED WITH MAXIMAL OXYGEN CONSUMPTION MODERATE INTENSITY IN OLDER ADULTS: THE CADENCE-ADULTS STUDY
Cayla R. McAvoy[1], Jose Mora-Gonzalez[1], Taavy Miller[1,2], Hai Yan[1], Scott W. Ducharme[3], Elroy J. Aguiar[4], Catrine Tudor-Locke, FACSM[1]. *[1]University of North Carolina–Charlotte, Charlotte, NC. [2]Hanger Institute for Clinical Research and Education, Austin, TX. [3]Department of Kinesiology, California State University, Long Beach, Long Beach, CA. [4]Department of Kinesiology, The University of Alabama, Tuscaloosa, AL.*

O28: RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND BODY COMPOSITION IN OLDER ADULTS IN A SOUTHEASTERN CITY
Kivana Keane[1], Trudy Moore-Harrison, PhD[1], L. Jerome Brandon, PhD, FACSM[2]. *[1]UNC Charlotte, Charlotte, NC. [2]Georgia State University, Atlanta, GA.*

O29: ASSOCIATION BETWEEN HEMOGLOBIN A1C LEVELS AND LOWER SOCIOECONOMIC BACKGROUNDS IN OLDER ADULTS IN A SOUTHEASTERN AREA
Niyati Danda[1], Kivana Keane[1], Trudy Moore-Harrison[1], L. Jerome Brandon, FACSM[2]. *[1]University of North Carolina-Charlotte, Charlotte, NC. [2]Georgia State University, Atlanta, GA.*

O30: EVALUATION OF BIOELECTRICAL IMPEDANCE VECTOR ANALYSIS ACCORDING TO FALL RISK APPRAISAL CATEGORIZATION IN OLDER ADULTS
David H. Fukuda, Ladda Thiamwong, Joon-Hyuk Park, Jeffrey R. Stout, FACSM. *University of Central Florida, Orlando, FL.*

O31: DOES DOG SPORT PARTICIPATION IMPROVE THE HEALTH OF WOMEN OVER 50 AND THEIR DOGS
Rebecca L. Jones, Heidi A. Kluess, FACSM. *Auburn University, Auburn, AL.*

Saturday, February 19

8:00–10:00 AM ORAL PRESENTATION SESSION 4 (O25-O32) ***Regency Ballroom D & E***

O32: EFFECT OF EXERCISE AND DAY-LONG MOVEMENT ON SOCIAL COGNITIVE OUTCOMES IN OLDER ADULTS
Joy Furlipa. *Wake Forest University, Winston Salem, NC.*

8:00–10:00 AM ORAL PRESENTATION SESSION 5 (O33-O40) ***Regency Ballroom F***

Chair: Jonathan Wingo, *University of Alabama*

O33: 8-MONTH LEADERSHIP DEVELOPMENT PROGRAM IMPROVES PHYSICAL ABILITIES IN CORP OF CADETS
Gregory Palevo. *Columbus State University, Columbus, GA.*

O34: THE HEALTH IMPLICATIONS OF WELLNESS PROGRAMMING ON RURAL SOUTHEASTERN FIREFIGHTERS
Austen Arnold[1], Thomas Nagel[1], Gregory Ryan[2], Mario Keko[1], Bridget Melton[1]. *[1]Georgia Southern University, Statesboro, GA. [2]Piedmont University, Demorest, GA.*

O35: ABSTRACT WITHDRAWN

O36: EFFECTS OF A LIFESTYLE INTERVENTION ON TRIMETHYLAMINE N-OXIDE (TMAO) CONCENTRATIONS IN OVERWEIGHT AND OBESE ADULTS
Emily E. Grammer[1], Joshua McGee[2], Taylor Brown[2], Marie Clunan[2], Anna Huff[2], Briceida Osborne[2], Laura Matarese[2], Walter Pories[2], Joseph Houmard[2], Robert Carels[2], Damon L. Swift[1]. *[1]University of Virginia, Charlottesville, VA. [2]East Carolina University, Greenville, NC.*

O37: COMPARISON OF RING-FIT ADVENTURE VERSUS A SPRINT INTERVAL + RESISTANCE TRAINING INTERVENTION ON BODY COMPOSTION
Chloe S. Jones[1], Kameron Suire[2], Katherine E. Spring[1], Monaye Merritt[1], Darby Winkler[1], Alexandra V. Carroll[1], Danielle W. Wadsworth[1]. *[1]Auburn University, Auburn, AL. [2]University of Kansas Medical Center, Kansas City, KS.*

O38: DYNAMIC BALANCE AND CORE ENDURANCE IMPROVE IN HEALTHY FEMALES FOLLOWING SUSPENSION TRAINING
Emily Cavallaro, Kate Pfile, J. Megan Irwin, Wesley D. Dudgeon. *College of Charleston, Charleston, SC.*

O39: IMPACT OF A CLINIC-BASED, PRAGMATIC LIFESTYLE INTERVENTION FOR THE MANAGEMENT OF TYPE 2 DIABETES MELLITUS
Nathan R. Weeldreyer[1], Matthew Martin[2], Mindy McEntee[2], Farshad Fani Marvasti[3], Rodger Kessler[4], Glenn Gaesser, FACSM[2], Siddhartha S. Angadi, FACSM[1]. *[1]University of Virginia, Charlottesville, VA. [2]Arizona State University, Phoenix, AZ. [3]University of Arizona, Phoenix, AZ. [4]University of Colorado Anschutz, Aurora, CO.*

O40: CARDIOVASCULAR DISEASE RISK AND THE PUSHUP: PHYSIOLOGICAL CHANGES ASSOCIATED WITH A 30-DAY PUSHUP CHALLENGE.
Owen Nobles, Dillon G. Gooch, Robert S. Bowen, Jeremiah G. Lukers. *Truett McConnell University, Cleveland, GA.*

Saturday, February 19

8:00–9:30 AM THEMATIC POSTER SESSION 4 (TP19-TP24) ***Think Tank***

Chair: Peter Grandjean, *University of Mississippi*

TP19: COMPARISON OF THE 'SEATTLE' AND 'INTERNATIONAL' CRITERIA ELECTROCARDIOGRAM INTERPRETATION IN AFRICAN AMERICAN COLLEGE ATHLETES
Ludmila Cosio Lima, FACSM, Lauren Adlof, Amy Crawley, Youngil Lee. *University of West Florida, Pensacola, FL.*

TP20: RACIAL DIFFERENCES IN NIGHT-TO-DAY BLOOD PRESSURE RATIO AND BLOOD PRESSURE DIPPING IN HEALTHY YOUNG ADULTS
Soolim Jeong, Braxton A. Linder, McKenna A. Tharpe, Zach J. Hutchison, Meral N. Culver, Olivia I. Nichols, Thomas E. Fuller-Rowell, Austin T. Robinson. *Auburn University, Auburn, AL.*

TP21: INFLUENCE OF ACUTE SUPPLEMENTATION WITH MITOCHONDRIAL ANTIOXIDANT MITOQ ON VASCULAR FUNCTION IN HEALTHY ADULTS
Zach J. Hutchison, McKenna A. Tharpe, Alex M. Barnett, Braxton A. Linder, Meral N. Culver, Michael D. Brown, FACSM, Andreas N. Kavazis, FACSM, Austin T. Robinson. *Auburn University, Auburn, AL.*

TP22: THE IMPACT OF PERCEIVED DISCRIMINATION AND PERCEIVED STRESS ON CARDIORESPIRATORY FITNESS
Kayla Brown[1], Qiana Bryan[2], Alex McGowan[2], Patricia Pagan Lassalle[2], Lee Stoner, FACSM[2]. *[1]North Carolina Agricultural and Technical State University, Greensboro, NC. [2]University of North Carolina at Chapel Hill, Chapel Hill, NC.*

TP23: ASSESSMENT OF LABORATORY DEVICES FOR ESTIMATING BODY COMPOSITION IN A HISPANIC POPULATION
Ronald Lee Snarr[1], Brett S. Nickerson, FACSM[2]. *[1]Missouri State University, Springfield, MO. [2]Texas A&M International University, Laredo, TX.*

TP24: MEASURED AND PREDICTED RESTING ENERGY EXPENDITURE IN OVERWEIGHT BLACK AND WHITE YOUNG ADULT WOMEN
Daishan Johnson, Ronald Evans, FACSM, Autumn Lanoye, Jessica LaRose. *Virginia Commonwealth University, Richmond, VA.*

8:00–9:30 AM POSTER PRESENTATION SESSION 4 (P156-P210) ***Studio 220***

Chair: Pedrica Bain, *University of North Alabama*

P156: FATIGUE NEURAL SIGNATURE IS DISTINCT FROM CONCUSSION
Gustavo Sandri Heidner, Caitlin O'Connell, Zachary Domire, Chris Mizelle, Patrick Rider, Nicholas Murray. *East Carolina University, Greenville, NC.*

P157: INCREASED ALPHA DESYNCHRONIZATION DURING DYNAMIC VISUAL ASSESSMENTS WITHIN ONE YEAR OF CONCUSSION
Joshua Lawton[1], Riley Warlick[1], Melissa Hunfalvay[2], Nicholas Murray[1]. *[1]East Carolina University, Greenville, NC. [2]RightEye, Bethesda, MD.*

P158: COMBINING PHYSICAL AND MENTAL PRACTICES OF A DART-THROWING TASK ENHANCES MOTOR LEARNING
Mackenzie Manning, Hannah Walker, Joy Carlson, Hannah Dresner, Marcos Daou. *Coastal Carolina University, Conway, SC.*

P159: A COMPARISON OF EFFICACY OF NEED SUPPORTIVE AND THWARTING INSTRUCTION ON ENJOYMENT AND STATE ANXIETY
Yongju Hwang, Yangyang Deng, Taewoo Kim, Sami R. Yli-Piipari. *University of Georgia, Athens, GA.*

Saturday, February 19

8:00–9:30 AM POSTER PRESENTATION SESSION 4 (P156-P210) ***Studio 220***

P160: EFFECT OF CLINICALLY ENGAGED ANATOMY CURRICULUM ON DOCTORATE OF PHYSICAL THERAPY STUDENT PERFORMANCE
Matthew P. Condo, Blake Justice, John Fox, Michael Tighe, Matthew Foreman. *Methodist University, Fayetteville, NC.*

P161: THE EFFECT OF FATIGUE ON NEUROMUSCULAR COUPLING IN PRINT AND CURSIVE HANDWRITING
Alexandra Harrison, Lorynn Saxton, Timothy Cleveland, Rebecca Rogers, Cristopher Ballmann, FACSM, Justin Moody. *Samford University, Birmingham, AL.*

P162: EFFECTS OF PROXIMAL LIMB BLOOD FLOW RESTRICTION TRAINING ON DISTAL LIMB FATIGUE AND RECOVERY
Keith S. Saffold[1], Bjoern Hornikel[1,2], Lee J. Winchester[1]. *[1]The University of Alabama, TUSCALOOSA, AL. [2]The University of Alabama at Birmingham, Birmingham, AL.*

P163: CARDIORESPIRATORY AND MUSCLE RECRUITMENT RESPONSE TO INCREMENTAL EXERCISE IN FLYWHEEL-BASED INERTIAL TRAINING (FIT) SQUATS
Clara Mitchinson, Lance Bollinger. *University of Kentucky, Lexington, KY.*

P164: KNOWLEDGE OF THE FEMALE ATHLETE TRIAD AMONG PHYSICALLY ACTIVE PREMENOPAUSAL WOMEN
Samantha J. Goldenstein, Lenka H. Shriver, Laurie Wideman, FACSM. *University of North Carolina-Greensboro, Greensboro, NC.*

P165: DIETARY PRACTICES AND SOURCES OF DIETARY INFORMATION AMONG CROSSFIT® PARTICIPANTS: PRELIMINARY FINDINGS
Taylor Morneault[1], Matthew Brisebois[1], Samuel Kramer[2], James Kamla[1], Kelvin Wu[1], Jerold Corpuz[1], Katherine Fowler[1], Keston Lindsay[3]. *[1]The University of South Carolina Upstate, Spartanburg, SC. [2]International Vitamin Corporation, Greenville, SC. [3]University of Colorado-Colorado Springs, Colorado Springs, CO.*

P166: DIETARY AND SPORT SUPPLEMENT USE AND SOURCES OF INFORMATION AMONG CROSSFIT® PARTICIPANTS: PRELIMINARY FINDINGS
Samuel Kramer[1], Matthew Brisebois[2], James Kamla[2], Kelvin Wu[2], Taylor Morneault[2], Jerold Corpuz[2], Katherine Fowler[2], Keston Lindsay[3]. *[1]International Vitamin Corporation, Greenville, SC. [2]The University of South Carolina Upstate, Spartanburg, SC. [3]University of Colorado-Colorado Springs, Colorado Springs, CO.*

P167: THE PLACEBO EFFECT OF CAFFEINATED GUM ON ANAEROBIC PERFORMANCE IN COLLEGE AGED FEMALES
Corey Grozier, Andrea Bryant, Bandar Alghamdi, Lauren Killen, Hunter Waldman. *University of North Alabama, Florence, AL.*

P168: CAFFEINE NEGATIVELY AFFECTS SHORT PUTTS MADE BUT REDUCES SHOULDER FATIGUE DURING 18-HOLE SIMULATION
Noah L. Bishop, James Green, FACSM, Eric K. O'Neal, Lauren Killen, Corey Grozier. *University of North Alabama, Florence, AL.*

P169: THE INFLUENCE OF MENSTRUAL CYCLE PHASE ON FLUID INTAKE AND URINARY HYDRATION MARKERS
Mitchell E. Zaplatosch[1], Emily E. Bechke[1], Samantha J. Goldenstein[1], Madelyn G. Biffle[1], Laurie Wideman, FACSM[1], William M. Adams, FACSM[2]. *[1]University of North Carolina at Greensboro, Greensboro, NC. [2]United States Olympic & Paralympic Committee, Colorado Springs, CO.*

Saturday, February 19

8:00–9:30 AM POSTER PRESENTATION SESSION 4 (P156-P210) *Studio 220*

P170: CHARACTERIZING STRENGTH, PROTEIN INTAKE, AND PHYSICAL ACTIVITY IN PRE- AND POST-MENOPAUSAL WOMEN
Hannah E. Cabre, Lacey M. Gould, Amanda N. Gordon, Sam R. Moore, Hayden K. Dewig, Abbie E. Smith-Ryan, FACSM, Eric D. Ryan, FACSM. *The University of North Carolina, Chapel Hill, NC.*

P171: DAILY FLUID INTAKE BEHAVIORS AND ASSOCIATED HEALTH EFFECTS AMONG AUSTRALIAN AND UNITED STATES POPULATIONS
Jesse N. L. Sims[1], Justin J. Holland[2], Travis Anderson[1], William M. Adams, FACSM[3]. *[1]University of North Carolina Greensboro, Greensboro, NC. [2]Queensland University of Technology, Brisbane, QLD, Australia. [3]United States Olympic & Paralympic Committee, Colorado Springs, CO.*

P172: BODY COMPOSITION CHANGES DURING SUMMER TRAINING AMONG COLLEGIATE MEN'S BASKETBALL PLAYERS
Shuan Kuo, Aston Dommel, Drew Sayer. *University of Alabama at Birmingham, Birmingham, AL.*

P173: ESTIMATION OF TOTAL BODY WATER USING SINGLE FREQUENCY BIOIMPEDANCE ANALYSIS: A SYSTEMATIC REVIEW AND META-ANALYSIS
Zackary S. Cicone[1], Michael V. Fedewa[2], Clifton J. Holmes[3], Michael R. Esco, FACSM[2], Hayley V. MacDonald[2]. *[1]Shenandoah University, Winchester, VA. [2]The University of Alabama, Tuscaloosa, AL. [3]Washington University in St. Louis, St. Louis, MO.*

P174: RELATIONSHIP BETWEEN BODY COMPOSITION AND SELF-ESTEEM IN COLLEGE FEMALES
Samuel T. Belau, Abbie Carter, Douglas Gregory, FACSM. *Tennessee Wesleyan University, Athens, TN.*

P175: COMPARISON OF MAXIMAL FAT OXIDATION RATES BETWEEN EXERCISE MODALITIES IN COLLEGE-AGED WOMEN
Allyson Wahus, Caroline Jones, Molly Dyer, Jinkyung Park, Kelly Massey. *Georgia College & State University, Milledgeville, GA.*

P176: NHLH2 EXPRESSION IN MUSCLE MAY CONTRIBUTE TO ENERGY EXPENDITURE PATHWAYS
Jessica Melvin, Dane Fausnacht, Deborah Good. *Virginia Tech, Blacksburg, VA.*

P177: IMPACT OF TRADITIONAL BLOOD FLOW RESTRICTION VERSUS BAND TISSUE FLOSSING ON METABOLISM AND PERFORMANCE
Morgan Taylor Jones, A. Fleming, B. Hornikel, K. Saffold, L. Winchester. *University of South Carolina, Columbia, SC.*

P178: EFFECT OF CARBOHYDRATE TO PROTEIN RATIO ON METABOLIC FLEXIBILITY IN WOMEN ACROSS THE MENOPAUSE TRANSITION
Maggie E. Hostetter, Hannah E. Cabre, Amanda N. Gordon, Lacey M. Gould, Sam R. Moore, Noah D. Patterson, Abbie E. Smith-Ryan, FACSM. *UNC Chapel Hill, Chapel Hill, NC.*

P179: THE AGREEMENT OF BODY FAT PERCENTAGE ESTIMATES FROM ULTRASOUND, SKINFOLD, AND AN UNDERWATER WEIGHING CRITERION
Katherine Sullivan, Casey J. Metoyer, Michael R. Esco, Michael V. Fedewa. *University of Alabama, Tuscaloosa, AL.*

P180: TRACKING BODY COMPOSITION CHANGES IN COLLEGIATE BASKETBALL PLAYERS: COMPARISON OF METHODS
Amanda N. Gordon, Hannah E. Cabre, Taylor E.A Morrison, Sam R. Moore, Maggie E. Hostetter, Noah D. Patterson, Abbie E. Smith-Ryan, FACSM. *University of North Carolina, Chapel HIll, NC.*

Saturday, February 19

8:00–9:30 AM POSTER PRESENTATION SESSION 4 (P156-P210) ***Studio 220***

P181: RESTING METABOLIC RATE IN RESISTANCE-TRAINED MALES AND FEMALES AGED 18-49: A PILOTED PREDICTION EQUATION
Adam H. Ibrahim[1], Alexander Brooks[1], Traci Smith[1], Cary Springer[2], Bill Campbell[1]. *[1]University of South Florida, Tampa, FL. [2]University of Tennessee, Knoxville, TN.*

P182: BODY COMPOSITION OF DIVISION I BASKETBALL PLAYERS PRE AND POST 8-WEEK STRENGTH AND CONDITIONING PROGRAM
Noah D. Patterson, Amanda N. Gordon, Hannah E. Cabre, Sam R. Moore, Maggie E. Hostetter, Abbie E. Smith-Ryan, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P183: SUBOPTIMAL SLEEP AND ADIPOSITY IN COLLEGE STUDENTS
Grace Holmes, Simon Higgins. *Elon University, Elon, NC.*

P184: FAT-FREE MASS IS A PREDICTOR OF ENERGY INTAKE IN YOUNG ADULTS
Hannah Koch[1], Jessica McNeil[1], Lenka Shriver[1], Jessica Dollar[1], Susan D. Calkins[1], Susan P. Keane[1], Lilly Shanahan[2], Laurie Wideman[1]. *[1]UNC- Greensboro, Greensboro, NC. [2]University of Zurich, Zurich, Switzerland.*

P185: ASSESSMENT OF EXERCISE-INDUCED DEHYDRATION AND REHYDRATION: EFFECTIVENESS OF USING PREDICTION EQUATIONS FOR PLASMA OSMOLALITY
Chiagoziem K. Ohamadike, Lia Teng, HyunGyu Suh, Mindy L. Millard-Stafford, FACSM. *Georgia Institute of Technology, Atlanta, GA.*

P186: THE EFFECT OF FLUID AVAILABILITY ON CONSUMED FLUID VOLUME AND PERCEPTUAL THIRST MEASURES DURING AEROBIC EXERCISE
Shealyn G. Sullivan, Luke W. Dobbins, Rebecca R. Rogers, Tyler D. Williams, Mallory R. Marshall, Joseph A. Pederson, Christopher G. Ballmann, FACSM, Courteney L. Benjamin. *Samford University, Homewood, AL.*

P187: THE IMPACT OF SEXUAL ORIENTATION ON FOOD INSECURITY AMONG DIVISION 1 STUDENT ATHLETES
Jackson Dellana[1], Lexi Chimera[1], Alisha Farris[1], Danielle Nunnery[1], Tara Harman[2], Aston Dommel[2], Kelsey Rushing[2], Lee Stowers[2], Christian Behrens Jr[1]. *[1]Appalachian State University, Boone, NC. [2]University of Alabama at Birmingham, Birmingham, AL.*

P188: FOOD INSECURITY AMONG COLLEGE STUDENT ATHLETES IN THE SOUTHEASTERN REGION: A MULTI-SITE STUDY
Lexi Chimera[1], Jackson Dellana[1], Alisha Farris[1], Laurel Wentz[1], Tara Harman[2], Aston Dommel[2], Kelsey Rushing[2], Lee Stowers[2], Christian Behrens Jr[1]. *[1]Appalachian State University, Boone, NC. [2]University of Alabama at Birmingham, Birmingham, AL.*

P189: THE EFFECT OF CAFFEINE SUPPLEMENTATION ON RATE OF TORQUE DEVELOPMENT IN FEMALES
Kaitlyn F. Overstreet, Ryan J. Colquhoun, Sydnie R. Fleming, Katie G. Kennedy, Caitlyn C. White, Keelan I. Stricklin. *University of South Alabama, Mobile, AL.*

P190: SEX DIFFERENCES IN BODY COMPOSITION CHANGE IN COLLEGE ATHLETES DURING AN EXTENDED HOLIDAY BREAK
Aston Dommel, Jose R. Fernandez, R Drew Sayer. *University of Alabama at Birmingham, 1675 University Blvd, AL.*

Saturday, February 19

8:00–9:30 AM POSTER PRESENTATION SESSION 4 (P156-P210) *Studio 220*

P191: THE EFFECT OF DIETARY NITRATE SUPPLEMENTATION ON SKELETAL MUSCLE CONTRACTILE PROPERTIES IN FEMALES AND MALES
Joaquin Ortiz de Zevallos[1], Austin C. Hogwood[1], Ka'eo K. Kruse[1], Jeison De Guzman[1], Meredith Buckley[1], Alexandra F. DeJong[1,2], Arthur L. Weltman, FACSM[1], Jason D. Allen, FACSM[1]. *[1]University of Virginia, Charlottesville, VA. [2]The Micheli Center for Sports Injury Prevention, Boston, MA.*

P192: A PILOT STUDY EXAMINING EXERCISE AND GASTROINTESTINAL HABITS AMONGST COLLEGE STUDENTS
Adam Williamson, Ashley Licata, Joni Boyd, Jessie B. Hoffman. *Winthrop University, Rock Hill, SC.*

P193: EFFECT OF QUARANTINE AND ISOLATION ON NUTRITION AND FOOD INSECURITY IN STUDENT-ATHLETES
Walker B. Gagnon, Jake Tingom, Victoria Tredinnick, Steven Pfeiffer, Amy Knab, FACSM. *Queens University of Charlotte, Charlotte, NC.*

P194: ACUTE CAFFEINE SUPPLEMENTATION ENHANCES BASEBALL PITCHING PERFOMANCE
Jarrod Kennington, John Kennington, Garrett Brown, Tyler McManus, Rebecca Rogers, Mallory Marshall, Courteney Benjamin, Christopher Ballmann, FACSM, Tyler Williams. *Samford University, Birmingham, AL.*

P195: EFFECTS OF ACUTE YOHIMBINE HCL INGESTION ON ANAEROBIC SPRINT PERFORMANCE
Megan Barnes, Camryn Cowan, Shelby Parker, Lauren Boag, Julianne Hill, Lenox Jones, Kylie Nixon, Mckenzie Parker, Mary Raymond, Hope Sternenberg, Shelby Tidwell, Taylor Yount, Rebecca R. Rogers, Tyler D. Williams, Christopher G. Ballmann, FACSM. *Samford University, Birmingham, AL.*

P196: THE EFFECTS OF ACUTE RAUWOLSCINE SUPPLEMENTATION ON ANAEROBIC EXERCISE PERFORMANCE
Lenox Jones, Julianne Hill, Tanner Clark, Brendan Torres, Rebecca Rogers, Mallory Marshall, Courteney Benjamin, Christopher Ballmann, FACSM, Tyler Williams. *Samford University, Birmingham, AL.*

P197: PRE-SLEEP FEEDING IN NCAA DIVISION I FEMALE ATHLETES
Casey Greenwalt[1], Lilliana Rentería[1], Katherine Schiltz[1], Elisa Angeles[1], Abbie Smith-Ryan, FACSM[2], Chris Bach[3], Matthew Vukovich, FACSM[4], Stacy Sims[5], Tucker Zeleny[3], Kristen Holmes[6], David Presby[7], Michael Ormsbee, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]University of North Carolina, Chapel Hill, NC. [3]University of Nebraska, Lincoln, NE. [4]South Dakota State University, Brookings, SD. [5]Auckland University of Technology, Auckland. [6]WHOOP, Inc., Boston, MA. [7]WHOOP, Inc, Boston, MA.*

P198: THE EFFECTS OF THREE WEEKS OF TIME-RESTRICTED EATING WITH RESISTANCE EXERCISE ON MUSCULAR STRENGTH IN COLLEGE AGED ADULTS.
Jinkyung Park, Bradley Hilley, Harper Vick, Cassidy Markle, Ariel Edenfield. *Georgia College & State University, Milledgeville, GA.*

P199: PRIORITIZING HEALTHBEHAVIORS FORFIRSTYEAR STUDENTS TOMANAGESTRESS AND DEPRESSION
Jordan Taylor[1], Erica Taylor, FACSM[2], Angela Shorter[3], Kiayona Grimes[4]. *[1]The University of Memphis, Memphis, TN. [2]Colombus State, Columbus, GA. [3]Delaware State, Dover, DE. [4]Values into Action, Clementon, NJ.*

P200: POSITIVE RELATIONSHIPS BETWEEN UNLIMITED ONLINE QUIZZES AND IN-CLASS EXAM PERFORMANCE IN AN UNDERGRADUATE NUTRITION COURSE
Grayson F. Lipford, Greg Stewart. *Methodist University, Fayetteville, NC.*

Saturday, February 19

8:00–9:30 AM POSTER PRESENTATION SESSION 4 (P156-P210) ***Studio 220***

P201: THE METABOLIC AND PHYSIOLOGICAL DEMANDS OF A FIRE GROUNDS TASK VS. A LIVE-BURN IN PROFESSIONAL FIREFIGHTERS
Andrea R. Bryant[1], Matthew J. McAllister[2], Hunter S. Waldman[1]. *[1]University of North Alabama, Florence, AL. [2]Texas State University, San Marcos, TX.*

P202: GENETICALLY-ESTIMATED TELOMERE LENGTH WEAKLY ASSOCIATES WITH BODY COMPOSITION AND METABOLIC PROFILES BUT NOT CARDIORESPIRATORY FITNESS
Charles S. Schwartz[1], Fadi J. Charchar[2], Jacob L. Barber[1], Jeremy M. Robbins[3], Prashant Rao[3], Michael Mi[3], Sujoy Ghosh[4,5], Robert E. Gerszten[3], Claude Bouchard, FACSM[5], Mark A. Sarzynski, FACSM[1]. *[1]University of South Carolina, Columbia, SC. [2]Federation University Australia, Victoria. [3]Beth Israel Deaconess Medical Center, Boston, MA. [4]Duke-National University of Singapore Medical School, Singapore. [5]Pennington Biomedical Research Center, Baton Rouge, LA.*

P203: EFFECTS OF CAFFEINE ABSTINENCE ON THE ACUTE RESPONSE TO LOW-LOAD BLOOD FLOW RESTRICTION EXERCISE
William M. Miller, Matthew A. Chatlaong, Daphney M. Stanford, Matthew B. Jessee. *University of Mississippi, University, MS.*

P204: MALE COLLEGIATE SOCCER PLAYERS UNDERESTIMATE SWEAT LOSSES REGARDLESS OF SWEAT LOSS VOLUME
Marcus A. Robinson[1], Tate M. Dean[1], Savanna N. Knight[2], Angela R. Russell[1], Eric K. O'Neal[2], Brett A. Davis[1]. *[1]Auburn University at Montgomery, Montgomery, AL. [2]University of North Alabama, Florence, AL.*

P205: EFFECT OF CAFFEINE ON PHYSICAL PREFORMANCE IN FEMALE COLLEGE SOCCER PLAYERS
Gaven Barker, Victor Alves, Lauren Killen, James M. Green, FACSM. *University of North Alabama, Florence, AL.*

P206: EFFECT OF THERAPEUTIC EXERCISE ON RELAPSE RATE IN HOSPITALIZED EATING DISORDER PATIENTS VERSUS STANDARD TREATMENT
Sarah E. Overby, Nathan Adams, Jillian Poles, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

P207: THE IMPACT OF A HIGH FIBER DIET ON PULSE WAVE VELOCITY IN YOUNG ADULTS AT RISK FOR CARDIOVASCULAR DIESEASE
Christa Michelle Bazemore, Lauren C. Bates, Lee Stoner, FACSM. *University of North Carolina–Chapel Hill, Chapel Hill, NC.*

P208: IMPACT OF DIETARY HABITS ON THE EXTENT OF FRAILTY IN ADULT SURVIVORS OF CHILDHOOD CANCER
Alexandra K. Stoll, Takudzwa A. Madzima. *Elon University, Elon, NC.*

P209: THE IMPACT OF A WORKPLACE PHYSICAL ACTIVITY AND NUTRITION EDUCATION PROGRAM ON BEHAVIORAL CHANGE
Gabrielle Clancy, Svetlana Nepocatych, Elizabeth Bailey, Talya Geller. *Elon University, Elon, NC.*

P210: FAMILY DIETARY CHARACTERISTICS AND CHANGES IN EATING HABITS ACROSS THE TRANSITION TO COLLEGE
Anna Morton, Eric Hall, Simon Higgins. *Elon University, Elon, NC.*

Saturday, February 19

9:00–9:50 AM SYMPOSIUM 14 *Regency Ballroom G*

Chair: B. Sue Graves, *Florida Atlantic University*

S14: FACTORS OF CONSIDERATION WHEN ASSESSING RUNNING ECONOMY
Eric K. O'Neal, Savanna N. Knight. *University of North Alabama, Florence, AL.*

9:00–9:50 AM TUTORIAL 13 *Regency Ballroom H*

Chair: B. Eric Hanson, *University of North Carolina at Chapel Hill*

T13: UTILIZING MOTIVATIONAL STRATEGIES TO IMPROVE ATHLETE, CLIENT, AND/OR STUDENT PERFORMANCE
Andy Bosak, Andrew Fields. *Liberty University, Lynchburg, VA.*

9:00–9:50 AM TUTORIAL 15 *Regency Ballroom C*

Chair: Rebecca Battista, *Appalachian State University*

T15: ENHANCING A NEW HEALTHY LIFESTYLE WITH EXERCISE AND AUTISM
David S. Geslak[1], Benjamin D. Boudreaux[2]. *[1]Exercise Connection & American College of Sports Medicine, La Grange, IL. [2]University of Georgia, Athens, GA.*

9:30–11:00 AM POSTER PRESENTATION SESSION 5 (P211-P260) *Studio 220*

Chair: Kyle Reason, *University of North Alabama*

P211: EFFECTS OF CHEMOTHERAPY REGIMENS ON SKELETAL MUSCLE MITOCHONDRIAL FUNCTION IN BREAST CANCER PATIENTS MEASURED BY NEAR INFRARED SPECTROSCOPY
Chloe W. Caudell[1], Shannon Smith[1], Randy Hutchison[2], Jennifer Trilk, FACSM[1]. *[1]University of South Carolina School of Medicine Greenville, Greenville, SC. [2]Furman University, Greenville, SC.*

P212: SURFACE EMG COMPARISON OF ISOMETRIC POSTERIOR CHAIN EXERCISE IN TORQUE MATCHED CONDITIONS
Blake D. Justice. *Methodist University, Fayetteville, NC.*

P213: INCIDENCE OF PAIN IN YOUTH SOFTBALL PITCHERS AND POSITIONAL PLAYERS
Nicole M. Bordelon[1], Peyton Gober[1], Jessica Talmage[2], Kyle Wasserberger[1], Anthony Fava[1], Kate Everhart[1], Jeff Dugas[3], Gretchen Oliver, FACSM[1]. *[1]Auburn University, Auburn, AL. [2]Northern State University, Aberdeen, SD. [3]Andrews Sports Medicine Institute, Birmingham, AL.*

P214: COMPARING TRAINING VOLUMES BETWEEN SOFTBALL PITCHERS WITH AND WITHOUT UPPER EXTREMITY PAIN
PEYTON N. GOBER, Nicole Bordelon, Katherine Everhart, Gretchen Oliver, FACSM. *Auburn University, Auburn, AL.*

P215: CHARACTERIZATION OF CARDIAC AND HEMODYNAMIC RESPONSES TO BLOOD FLOW RESTRICTION IN MEN
Abby R. Fleming, Lee J. Winchester, Keith S. Saffold. *The University of Alabama, Tuscaloosa, AL.*

P216: ENJOYMENT AND PERCEIVED DURATION BETWEEN STANDARD AND INTERACTIVE EXERCISE BIKES
Lauren G. Killen, Kyle Reason, James M. Green, FACSM, Krystin Lehtola. *University of North Alabama, Florence, AL.*

Saturday, February 19

9:30–11:00 AM POSTER PRESENTATION SESSION 5 (P211-P260) ***Studio 220***

P217: COMPARING METABOLIC AND CARDIOVASCULAR DEMANDS BETWEEN DIFFERENT BOUTS OF HIFT
Shane S. Robinson, Jason C. Casey. *University of North Georgia, Oakwood, GA.*

P218: VISCERAL FAT AND ARTERIAL STIFFNESS IN YOUTH WITH HEALTHY WEIGHT, OBESITY, AND TYPE 2 DIABETES
Simon Higgins[1], Babette S. Zemel[2], Philip R. Khoury[3], Elaine M. Urbina[4,3], Joseph M. Kindler[5]. *[1]Elon University, Elon, NC. [2]The Children's Hospital of Philadelphia, Philadelphia, PA. [3]Cincinnati Children's Hospital Medical Center, Cincinnati, OH. [4]University of Cincinnati, Cincinnati, OH. [5]University of Georgia, Athens, GA.*

P219: COMPARISON OF THE POWER OUTPUTS AT PERCEPTUAL AND PHYSIOLOGICAL THRESHOLDS
Minyoung Kwak[1], Pasquale J. Succi[1], Taylor K. Dinyer-McNeely[2], Caleb C. Voskuil[3], Brian Benitez[1], Haley C. Bergstrom[1]. *[1]University of Kentucky, Lexington, KY. [2]Oklahoma State University, Stillwater, OK. [3]Texas Christian University, Fort Worth, TX.*

P220: NEUROMUSCULAR RESPONSES DIFFER DURING CYCLE ERGOMETRY TO EXHAUSTION AT TWO SEVERE INTENSITY DOMAIN POWER OUTPUTS
Brian Benitez[1], Pasquale J. Succi[1], Taylor K. Dinyer-McNeely[2], Caleb C. Voskuil[3], Minyoung Kwak[1], Haley C. Bergstrom[1]. *[1]University of Kentucky, Lexington, KY. [2]Oklahoma State University, Stillwater, OK. [3]Texas Christian University, Fort Worth, TX.*

P221: UTILIZING ACTIVPAL ACCELEROMETERS TO MONITOR WEIGHTED VEST WEAR COMPLIANCE IN THE INVEST RCT: ALGORITHM DEVELOPMENT
Kathryn H. Alphin. *Wake Forest University, Winston-Salem, NC.*

P222: COMPARISON OF RESPONSE TO EXERCISE AT CONSTANT HEART RATE VERSUS CONSTANT POWER OUTPUT
Pasquale J. Succi[1], Taylor K. Dinyer-McNeely[2], Caleb C. Voskuil[3], Brian Benitez[1], Minyoung Kwak[1], Mark G. Abel[1], Jody L. Clasey, FACSM[1], Haley C. Bergstrom[1]. *[1]University of Kentucky, Lexington, KY. [2]Oklahoma State University, Stillwater, OK. [3]Texas Christian University, Fort Worth, TX.*

P223: EFFECTS OF HIGH INTENSITY INTERVAL STAIR CLIMBING ON ARMY COMBAT FITNESS SCORES
Adriel Ruiz-Rodriguez, Timothy Leszczak. *Austin Peay State University, Clarksville, TN.*

P224: THE INFLUENCE OF SONOGRAPHER EXPERIENCE ON MEASUREMENTS OF SKELETAL MUSCLE CROSS-SECTIONAL AREA
Jonathan P. Beausejour[1], Caleb C. Voskuil[2], Dustin Dunnick[3], Kristen M. Badillo[1], Joel E. Harden[4], Jason I. Pagan[1], Kylie K. Harmon[1], Ryan M. Girts[1], Gena R. Gerstner[4], Joshua C. Carr[2], Matt S. Stock[1]. *[1]University of Central Florida, Orlando, FL. [2]Texas Christian University, Fort Worth, TX. [3]Arkansas Tech University, Russellville, AR. [4]Old Dominion University, Norfolk, VA.*

P225: VO_{2MAX} AND BODY FAT PERCENTAGE VARIATIONS BASED ON SPORT INVOLVEMENT
Lauren MacKenzie Starnes, FACSM. *Montreat College, Montreat, NC.*

P226: CAN YOGA INCREASE PHYSICAL AND MENTAL HEALTH?
Kaitlyn Faith Adams, FACSM, Kaylie M. Bean, FACSM. *Montreat College, Montreat, NC.*

P227: COMPARING ACTIVE ADULT WOMEN AND COLLEGE FEMALE ATHLETES HEART RATE, BLOOD PRESSURE, AND OXYGEN LEVEL
Hope E. Ramsey. *Montreat College, Montreat, NC.*

Saturday, February 19

9:30–11:00 AM POSTER PRESENTATION SESSION 5 (P211-P260) ***Studio 220***

P228: CAN AGE AND BONE MINERAL DENSITY PREDICT VERTICAL JUMP PERFORMANCE IN FIREFIGHTERS?
Savannah McLain, Sarah Lanham, Mario Keko, Bridget Melton. *Georgia Southern University, Statesboro, GA.*

P229: THE VALIDATION OF A WEIGHTED AEROBIC RUN FOR IMPROVING TACTICAL READINESS (V-WARFITR)
George L. Grieve, Ronald J. Reid, Christopher J. Sole, Kimbo E. Yee, Ryan S. Sacko, Christopher R. Bellon. *The Citadel, The Military College of South Carolina, Charleston, SC.*

P230: POST-EXERCISE HYPOTENSIVE RESPONSES TO ACUTE ISOVOLUMETRIC STRENGTH AND ENDURANCE EXERCISE
Madison Colson, Matthew D. Ruiz, Ruth N. Henry, Laurel A. Littlefield. *Lipscomb University, Cookeville, TN.*

P231: THE EFFECT OF SIX-WEEK NEUROMUSCULAR TRAINING INTERVENTION ON MUSCLE ACTIVATION OF THE LOWER LIMB
Kiara Barrett, Zachary A. Sievert, Hunter J. Bennett. *Old Dominion University, Norfolk, VA.*

P232: EFFICACY OF A MOTIVATIONAL VIDEO ON HEART RATE, RPE, AND WORK PERFORMED DURING STATIONARY CYCLING
Jill Lucas, DuAnn Kremer, Hannah Angelella. *University of Lynchburg, Lynchburg, VA.*

P233: RELATIONSHIP BETWEEN CHANGE IN VO_2VT_2 AND CHANGE IN 2-MILE RUN TIME
Blaine Lints. *University of South Carolina, Columbia, SC.*

P234: RELATIONSHIPS BETWEEN RELATIVE STRENGTH AND ADIPOSITY IN CAREER STRUCTURAL FIREFIGHTERS
Sarah Lanham, Savannah McLain, Mario Keko, Bridget Melton. *Georgia Southern University, Statesboro, GA.*

P235: THE EFFECT OF SPRING-LOADED KNEE BRACES ON VERTICAL JUMP, SPRINT PERFORMANCE, AND USER PERCEPTION
Morgan Karst, Zoe Perrin, Justin Moody, Tyler D. Williams, Courteney L. Benjamin, Christopher G. Ballmann, FACSM, Rebecca R. Rogers. *Samford University, Birmingham, AL.*

P236: IT'S ELECTRIC! QUANTIFYING ENERGY EXPENDITURE DIFFERENCES BETWEEN REGULAR PEDAL BICYCLES AND ELECTRIC-ASSIST BIKE-SHARE BICYCLES.
Jennifer Sella[1], S. Morgan Hughey[1], J D. Adams[1], Sarah Porto[1], Daniel Bornstein[2], Dimitra Michalaka[2], Kweku Brown[2], William J. Davis[2], Safae Amahrir[3], Kari Watkins[3]. *[1]College of Charleston, Charleston, SC. [2]The Citadel, Charleston, SC. [3]Georgia Institute of Technology, Atlanta, GA.*

P237: INFLUENCE OF FARTLEK TRAINING ON COLLEGIATE VOLLEYBALL PLAYERS
Kaylee McMillian, Kathryn Weaver. *Montreat College, Montreat, NC.*

P238: CREATING AN OPTIMAL PERFORMER: A BODY COMPOSITION AND PERFORMANCE ANALYSIS
Cassidy Perry, Takudzwa Madzima, Renay Aumiller. *Elon University, Elon, NC.*

P239: THE EFFECTS OF AN EXTRINSIC MOTIVATOR ON VERTICAL JUMP HEIGHT
DuAnn E. Kremer, Lauren Stanford, Jill Lucas. *University of Lynchburg, Lynchburg, VA.*

P240: THE EFFECT OF AMMONIA INHALANTS ON ANEROBIC PERFORMANCE AND PSYCHOLOGICAL VARIABLES
Kalee Beardsley, Peighton Cumbie, Justin Moody, Tyler D. Williams, Christopher G. Ballmann, FACSM, Rebecca R. Rogers. *Samford University, Birmingham, AL.*

Saturday, February 19

9:30–11:00 AM POSTER PRESENTATION SESSION 5 (P211-P260) ***Studio 220***

P241: HEART RATE VARIABILITY IN RESPONSE TO BLOOD FLOW RESTRICTION TRAINING AND REDUCED SEDENTARY TIME: A PILOT STUDY
Tanya Miller, Clayton Nicks, Brian Tyo, Kate Early. *Columbus State University, Columbus, GA.*

P242: DO CHANGES IN NAVY FITNESS TESTING PROTOCOLS IMPACT SERVICE MEMBERS PERFORMANCE?
Alison Colao, Nicholas Buoncristiani, Kayla Baker, Sarah Scali, Rachel Tinius, FACSM. *Western Kentucky University, Bowling Green, KY.*

P243: VALIDITY OF WRIST-WORN STEP COUNTING MONITORS DURING ACTIVITIES LIMITING ARM SWING
Emma Cate Jones, Melissa Gagnon, Emma Sullins, Joseph Pederson, Rebecca Rogers, Mallory Marshall. *Samford University, Birmingham, AL.*

P244: THE INFLUENCE OF SEGMENTAL BIOELECTRICAL IMPEDANCE SPECTROSCOPY PROPERTIES ON STAIR CLIMB PERFORMANCE IN CAREER FIREFIGHTERS
Evangeline P. Soucie[1], Gena R. Gerstner[1,2], Megan R. Laffan[1], Abigail J. Trivisonno[1], Hayden K. Giuliani-Dewig[1], Jacob A. Mota[3], Eric D. Ryan[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]Old Dominion University, Norfolk, VA. [3]University of Alabama, Tuscaloosa, AL.*

P245: THE EFFECT OF LISTENING VOLUME OF PEFERRED MUSIC ON AEROBIC EXERCISE PERFORMANCE AND PSYCHOLOGICAL VARIABLES
Ashley Aurit, Marina Shunnarah, Rebecca R. Rogers, Christopher G. Ballmann, FACSM, Tyler D. Williams, Justin Moody. *Samford University, Birmingham, AL.*

P246: RELATIONSHIP BETWEEN VISUAL ANALOG SCALES AND COMMONLY USED SCALES OF PERCEIVED READINESS AND EXERTION
Robert L. Herron[1], Christopher P. Bonilla[1], Greg A. Ryan[2], Jason C. Casey[3], Brandon D. Spradley[1]. *[1]United States Sports Academy, Daphne, AL. [2]Piedmont University, Demorest, GA. [3]University of North Georgia, Gainesville, GA.*

P247: VALIDATION OF AN AIR CONSUMPTION DRILL IN STRUCTURAL FIREFIGHTERS
Emily L. Langford, Haley Bergstrom, Stuart Best, Xin Ma, Alyssa Q. Eastman, Mark G. Abel. *University of Kentucky, Lexington, KY.*

P248: EFFECTIVENESS OF A POSTACTIVATION PROTOCOL FOR IMPROVING PERFORMANCE IN THE ARMY COMBAT FITNESS TEST
Christopher Bonilla[1], Robert L. Herron[1], Greg A. Ryan[2], Jason C. Casey[3], Brandon D. Spradley[1]. *[1]United States Sports Academy, Daphne, AL. [2]Piedmont University, Demorest, GA. [3]University of North Georgia, Gainesville, GA.*

P249: GENDER DIFFERENCES IN FUNCTIONAL MOVEMENT SCREENING SCORES IN MEN'S AND WOMEN'S COLLEGIATE TENNIS
Kathleen S. Thomas, Larry Holmes, Donna L. Wolf. *Norfolk State University, Norfolk, VA.*

P250: EVALUATION OF THE EFFECTIVENESS OF ROTC ARMY CADET EXERCISE TRAINING FOR THE ARMY COMBAT FITNESS TEST
Kelsey A. Rushing, Simone A. Cannon, Jake A. Mintz, Brandon M. Roberts, Gregor W. Jenkins, Gordon Fisher, FACSM, Eric P. Plaisance, FACSM, Cody E. Morris. *University of Alabama at Birmingham, Birmingham, AL.*

P251: THE EFFECT OF ACUTE AGMATINE SULFATE SUPPLEMENTATION ON REPEATED ANAEROBIC SPRINT PERFORMANCE
Cliff Helton, Luke Middleton, Justin Moody, Christopher G. Ballmann, FACSM, Tyler D. Williams, Rebecca R. Rogers. *Samford University, Birmingham, AL.*

Saturday, February 19

9:30–11:00 AM POSTER PRESENTATION SESSION 5 (P211-P260) *Studio 220*

P252: INTER-LIMB ASYMMETRIES, PEAK POWER, AND INTERNAL TRAINING LOADS IN NCAA DIVISION I FEMALE SOCCER ATHLETES
Drake Dillman, Ryan Albino, Caroline Vincenty, Alex Miller, Alexa J. Chandler, Harry P. Cintineo, Bridget A. McFadden, Shawn M. Arent, FACSM. *University of South Carolina, Columbia, SC.*

P253: DIFFERENCES IN BASELINE FITNESS LEVELS OF NROTC MIDSHIPMEN BETWEEN FALL 2020 AND FALL 2021
Alexa Jenny Chandler, Harry P. Cintineo, Bridget A. McFadden, Shawn M. Arent, FACSM. *University of South Carolina, Columbia, SC.*

P254: ASSESSMENT OF PHYSICAL FITNESS AND BODY COMPOSITION IN FIRST-YEAR COLLEGIATE DANCERS
Jessica Sansone, Barry Parker, Morgan Mays. *Shenandoah University, Winchester, VA.*

P255: AGREEMENT BETWEEN IPAQ AND SBQ ESTIMATES OF SEDENTARY BEHAVIOR IN UNIVERSITY STUDENTS
Sule N. Anik[1], Benjamin D. Boudreaux[1], Virgina M. Frederick[2], Ellen M. Evans, FACSM[1], Michael D. Schmidt[1]. *[1]University of Georgia, Athens, GA. [2]Mercer University, Macon, GA.*

P256: ALCOHOL CONSUMPTION AND PHYSICAL ACTIVITY, SEDENTARY, AND SLEEP BEHAVIORS IN UNIVERSITY STUDENTS
Ashley M. Taylor[1], Benjamin D. Boudreaux[1], Virginia M. Frederick[2], Ellen M. Evans, FACSM[1], Michael D. Schmidt[1]. *[1]The University of Georgia, Athens, GA. [2]Mercer University, Macon, GA.*

P257: A PHYSICAL ACTIVITY INTERVENTION IN ADULTS WITH LYMPHOMA UNDERGOING TREATMENT: FEASIBILITY AND NEXT STEPS
Juliana V. Costa[1], Shannon Mihalko[1], Peter Brubaker, FACSM[1], Alex Lucas[2], James Gerosa[1], Alex Marshall[2], Greg Hundley[2]. *[1]Wake Forest University, Winston Salem, NC. [2]Virginia Commonwealth University, Richmond, VA.*

P258: IMPACT OF EMBEDDED FITNESS PROGRAMMING IN SOUTHEASTERN GEORGIA CAREER FIREFIGHTERS
Derick Anglin[1], Greg A. Ryan[2], Thomas Nagel[1], Mario Keko[1], Harish Rochani[1], Catherine Gallagher[1], Bridget Melton[1]. *[1]Georgia Southern, Statesboro, GA. [2]Piedmont University, Demorest, GA.*

P259: CHANGES IN NEAR-INFRARED SPECTROSCOPY ASSESSED MUSCLE OXIDATIVE CAPACITY IN COLLEGIATE CROSS-COUNTRY ATHLETES
James E. Brown, Riley Melton, Jakob D. Lauver, Timothy Rotarius, Justin P. Guilkey. *Coastal Carolina University, Conway, SC.*

P260: THE INFLUENCE OF A COLLAGEN-BASED MULTIPLE INGREDIENT SUPPLEMENT ON MUSCLE PERFORMANCE
Rhiannon Gregory, Alexis Dicks, Matt Helms, Andrew Hatchett. *University of South Carolina Aiken, Aiken, SC.*

10:00–10:50 AM SYMPOSIUM 15 Regency Ballroom G

Chair: Emily Zumbro, *University of Alabama at Birmingham*

S15: EXERCISE IN HEART FAILURE: TIME TO HIIT AND PRIME THE HEART AND SKELETAL MUSCLE?
Siddhartha S. Angadi, FACSM, Jason D. Allen, FACSM. *University of Virginia, Charlottesville, VA.*

Saturday, February 19

10:00–10:50 AM TUTORIAL 14 **Regency Ballroom H**

Chair: Alyssum Reno, *University of Alabama at Huntsville*

T14: THE EFFECTIVENESS OF CARDIOMETABOLIC RISK FACTORS ESTIMATING CARDIOVASCULAR DISEASE IN MULTICULTURAL POPULATIONS
Trudy Moore-Harrison[1], L. Jerome Brandon, FACSM[2]. *[1]University of North Carolina at Charlotte, Charlotte, NC. [2]Georgia State University, Atlanta, GA.*

11:00 AM–12:00 PM HENRY J. MONTOYE AWARD LECTURE ***Regency Ballroom C***

Presiding: John Petrella, FACSM. *Samford University, Birmingham, AL.*
Speaker introduction: John Petrella, FACSM. *Samford University, Birmingham, AL.*

PAYING IT FORWARD: THE LIFEBLOOD OF SCIENCE
Laurie Wideman, FACSM. *University of North Carolina Greensboro, Greensboro, NC.*

12:00–2:00 PM SEACSM LUNCH AND LECTURE ***Regency Ballroom A & B***

Presiding: Bruce Gladden, FACSM. *Auburn University, Auburn, AL*
Speaker introduction: Bruce Gladden, FACSM. *Auburn University, Auburn, AL.*

SEACSM PROUD: HISTORY OF ACSM MEMBERS LEADING THE WAY
Scott Powers, FACSM. *Stetson University, DeLand, FL.*

Abstracts

PRECONFERENCE SESSIONS (PC1–PC2)

PC1: NAVIGATING SEACSM AND BEYOND

JohnEric W. Smith[1], Dulce H. Gomez[2], Katherine E. Spring[2].
[1]Mississippi State University, Starkville, MS. [2]Auburn University, Auburn, AL.

The purpose of this preconference symposium is to provide student members tips to navigating the SEACSM Annual Meeting, as well as discuss the fundamentals of networking. Attendees will have the opportunity to engage with current SEACSM Student Representatives to learn tips on navigating the conference. Additionally, our lead speaker will provide information on networking to enhance their professional careers inside and outside of the conference setting. Discussion topics will include: (1) key tactics to navigating SEACSM, (2) utilizing events and social media to increase opportunities for networking, and (3) networking and professional development. This fun and interactive setting is designed to be welcoming and encourage first-time attendees to expand their social network during the conference. Time for discussion and questions will be included at the end of the presentation.

PC2: RAPID RESEARCH RACE

B. Sue Graves, FACSM[1], Samuel L. Buckner[2], Katherine E. Spring[3], Dulce H. Gomez[3]. *[1]Florida Atlantic University, Boca Raton, FL. [2]University of South Florida, Tampa, FL. [3]Auburn University, Auburn, AL.*

Purpose: The Rapid Research Race (RRR) Preconference presents SEACSM research within three minutes**. Methods:** Within this session, graduate students (Ph.D. and M.S.), along with faculty, will present each attendee the opportunity to learn about a variety of quality research projects. **Results:** Each speaker presents current laboratory and original research findings in two minutes. Followed by a one-minute question-and-answer session. **Conclusions:** This event offers the opportunity to learn about diverse research projects throughout the region in a short span of time, network with these researchers, and further inquire about the research.

STUDENT AWARD POSTER COMPETITION (D1–D8, M1–M8, U1–U8)

D1: EVALUATING THE ACCURACY AND PRECISION OF COMMERCIALLY AVAILABLE ACTIVITY TRACKERS IN SCHOOL-AGED CHILDREN

Alex Atwood[1], Hassan-Galaydh Farah[2], Michael Teater[2], Julia Brisbane[2], Robin Queen, FACSM[2], Stephanie DeLuca[3]. *[1]Virginia Tech Carilion, Roanoke, VA. [2]Virginia Tech, Blacksburg, VA. [3]Fralin Biomedical Research Institute, Roanoke, VA.*

BACKGROUND: Physical activity (PA) has been linked to many health benefits and plays a crucial role in the prevention of obesity (Janssen & LeBlanc, 2010; Strong et al., 2005). Quantifying PA is difficult because it encompasses a wide array of constructs. One of the most common measures of PA in children is self-reported questionnaires. Given the subjectivity of self-reported measures, activity trackers have garnered increased interest to obtain objective data. In addition, their portability allows for measurement across differing environments. However, there is a gap in knowledge regarding the accuracy and precision of activity trackers within pediatric populations. Studies have demonstrated the accuracy and reliability of activity trackers in recording step counts in adults (Paul et al., 2015; Takacs et al., 2014), but those investigating accuracy in pediatric populations are limited (Godino, Job G., et al., 2020). We sought to address this gap by determining the accuracy and precision of two activity trackers (Fitbit ACE 2 & Garmin Vivofit Jr. 2). **METHODS:** Thirty ambulatory children (8 - 14 years old) were recruited from nearby communities. The study involved participants walking on a treadmill (TM) and completing an obstacle course (OC) while wearing the activity trackers. Steps recorded by activity trackers were compared to actual step count (obtained via motion tracking software) to determine device accuracy and precision. Percent error (PE)in step count was used to determine accuracy, while precision was determined using linear correlations. **RESULTS:** The average PE for the Fitbit during TM and OC walking were -4.94% and -1.32%, respectively, while the Garmin had -1.32% during TM walking and 3.35% during the OC. Both devices had a strong positive correlation with actual step count during TM walking (Fitbit: r = 0.84, Garmin: r = 0.89). During OC walking, the Fitbit demonstrated a moderately strong positive correlation with actual step count (r = 0.57), while the Garmin Vivofit Jr. 2 demonstrated a negligible correlation with the actual step count (r = 0.20). **CONCLUSION:** This data suggests that both devices can be used to accurately monitor step counts in school-aged children. It also suggests that both devices demonstrate high precision in step counting when walking at a set pace. Precision, however, appears to be impacted by more diverse environments with reduced precision during OC walking.

D2: IMPACT OF CREATINE MONOHYDRATE SUPPLEMENTATION ON MACROVASCULAR ENDOTHELIAL FUNCTION IN OLDER ADULTS

Holly Elizabeth Clarke[1], Michael J. Ormsbee, FACSM[1,2], Neda S. Akhavan[1], Taylor A. Behl[1], Diana L. Williams[1], Cesar A. Meza[1], Do-Houn Kim[1,3], Robert C. Hickner, FACSM[1,2]. *[1]Florida State University, Tallahassee, FL. [2]University of KwaZulu-Natal, KwaZulu-Natal. [3]Albany State University, Albany, GA.*

BACKGROUND: Cardiovascular disease (CVD) remains the leading cause of mortality in the United States, and the process of aging remains the primary unmodifiable risk factor and independent predictor of CVD events across the lifespan. Nutraceuticals can provide vascular health benefits to reduce CVD risk, and emerging evidence suggests that creatine supplementation may also serve as a therapeutic aid. Although the metabolic properties of creatine are well known, recent research has exposed a much broader application for creatine in clinical populations when acting as an antioxidant and anti-inflammatory agent. Despite these known benefits, however, there is scarce information on the application of creatine to improve vascular health in older adults. Thus, the purpose of this study was to determine the effects of 4 weeks of creatine monohydrate (CM) supplementation on vascular endothelial function in older adults. **METHODS:** Twelve healthy older adults (M = 6, W = 6; Mean ± SD: 58 ± 3 years) consumed CM and a placebo for 4 weeks in a randomized, double-blind, crossover design. Both pre- and post-supplementation, participants underwent doppler-ultrasound measurements of flow-mediated dilation to determine macrovascular endothelial function, measured as flow-mediated dilation response (FMD%), absolute change in diameter (Δ mm), and normalized FMD% (FMD%/SS_{AUC}). Results were analyzed for interactions and main effects by 2x2 Repeated Measures ANOVA, with significance accepted as $p < 0.05$. **RESULTS:** Following CM supplementation there were significant improvements in FMD% (Pre: 7.68 ± 2.25 %, Post: 8.9 ± 1.99 %; $p < .005$), Δ mm (Pre: 0.33 ± 0.12 mm, Post: 0.38 ± 0.12 mm; $p < .05$), and normalized FMD% (Pre: 2.57E-04 ± 1.03E-04 %/SS_{AUC}, Post: 3.42E-04 ± 1.69E-04 %/SS_{AUC}; $p < .05$), in comparison to placebo supplementation. **CONCLUSIONS:** Our findings indicate that 4 weeks of CM supplementation elicit improvements in macrovascular endothelial function in older adults. Considering the correlation between improved FMD% and decreases in CVD events, these results highlight the potential for creatine to serve as a beneficial vascular nutraceutical. Further research is needed to determine the mechanism by which creatine elicits these vascular benefits in older adults. **FUNDING:** This project was funded by the ACSM Foundation Doctoral Student Research Grant. Supplements were provided by Dymatize Nutrition ®.

D3: EFFECT OF INORGANIC NITRATE ON MAX VOLUNTARY CONTRACTION AND ISOKINETIC TORQUE ACROSS THE MENSTRUAL CYCLE

Austin C. Hogwood[1], Joaquin Ortiz de Zevallos Muñoz[1], Ka'eo Kruse[1], Jeison DeGuzman[1], Meredith Buckley[1], Arthur Weltman, FACSM[1,2], Jason Allen, FACSM[1,2]. *[1]University of Virginia, Charlottesville, VA. [2]University of Virginia School of Medicine, Charlottesville, VA.*

Background: Inorganic nitrate (NO_3^-) supplementation increases nitric oxide (NO) bioavailability and may improve exercise performance. In females, estrogen increases endogenous eNOS production of NO, but estrogen fluctuates throughout the menstrual cycle (MC). It is unknown if different phases of the MC or exogenous NO_3^- supplementation impact maximal voluntary isometric contraction (MVIC), isokinetic torque, or power in apparently healthy young females. The purpose of this study was to examine potential differences in MVIC, isokinetic torque, and power between the early (EF) and late follicular (LF) phase of the MC, and with either beetroot juice (BR-containing ~13 mmol NO_3^-) or identical placebo (PL) supplementation. Methods: Seven recreationally active females (age: 24.7 ± 4 yrs, VO_{2peak}: 34.4 ± 8 mL/kg/min) with normal MC and not using contraceptives were recruited in this double-blinded crossover study. Subjects were randomized to consume BR or PL, twice daily, for 5 days prior to testing that was conducted during EF and again during LF (1-5 and 11-14 days after menses onset, respectively). Subjects also consumed the supplement 2 hours prior to the testing, and a 14-day washout period was utilized between treatments. A linear mixed effects model was used to examine differences between MC phase, supplements, and interaction effects. MVIC (at 90°), peak torque (PT), PT normalized to bodyweight, time to PT, average PT, and average power were acquired via a Biodex isokinetic dynamometer during knee extension when measured at 180°, 270°, and 360°/second. Data are mean ± SD and significance was determined *a priori* at $p < 0.05$.Results: Mixed effects models revealed no significant differences in MVIC, power, or any measures of torque either between the MC, or the PL and BR supplementations (all $p > 0.05$). There were also no significant interaction effects for MVIC (PL EF: 1.12 ± 0.3; PL LF: 1.10 ± 0.3; BR EF: 1.18 ± 0.3; BR LF: 1.14 ± 0.3 Hz; $p = 0.93$) or any other outcomes. Conclusion: This preliminary data suggests that neither the follicular phase of the menstrual cycle, nor NO_3^- supplementation, impacts MVIC or outcomes such as peak torque or average power during isokinetic knee extension in healthy young females.

D4: EXERCISE TRAINING-INDUCED CHANGES IN LIPID TRAITS ARE ASSOCIATED WITH CHANGES IN CIRCULATING PROTEINS AND METABOLITES

Jacob L. Barber[1], Guoshuai Cai[1], Jeremy M. Robbins[2], Prashant Rao[2], Michael Mi[2], Sujoy Ghosh[3], Clary Clish[4], Dan H. Katz[2], Robert E. Gerszten[2], Claude Bouchard, FACSM[5], Mark A. Sarzynski, FACSM[1]. *[1]University of South Carolina, Columbia, SC. [2]Beth Israel Deaconess Medical Center, Boston, MA. [3]Duke-NUS Medical School, Singapore. [4]Broad Institute of Harvard and MIT, Cambridge, MA. [5]Pennington Biomedical Research Center, Baton Rouge, LA.*

BACKGROUND: Regular exercise is associated with beneficial effects on lipid metabolism, however the molecular mechanisms responsible for these benefits are unclear. **METHODS:** Circulating proteins (n=4979), metabolites (n=300), and lipids/lipoproteins were measured in 647 Black and White adults from the HERITAGE Family Study at baseline and after 20 weeks of supervised endurance training. The current analysis focused on 7 lipid/lipoprotein traits that significantly changed with training in the overall HERITAGE cohort: HDL- cholesterol (HDL-C), triglycerides (TG), large TG-rich lipoprotein particles (LTRLP), large HDL particles (LHDLP), small LDL particles (SLDLP), and mean TRLP (TRLPz) and LDLP size (LDLPz). The relationship between exercise-induced fold changes in circulating molecules and changes in lipid traits was examined using sparse canonical correlation analysis (R package 'PMA'), a technique for assessing the joint associations between two sets of variables by creating composite canonical variates. All variables were corrected for age, sex, race, baseline BMI, baseline value, and family membership via linear mixed models. **RESULTS:** We identified 3 canonical variate pairs of exercise-induced changes in lipid traits and circulating molecules. Molecular variate 1 was positively correlated with changes in TG, LTRLP, SLDLP, and TRLPz (r=0.29-0.57, p<0.0001). Conversely, molecular variate 3 was negatively correlated with changes in TG, LTRLP, SLDLP, and TRLPz (r=-0.30 to -0.39, p<0.0001), and positively correlated with changes in LDLPz (r=0.38, p<0.0001). Molecular variate 2 was negatively correlated with HDL-C (r=-0.46, p<0.0001) and LHDLP (r=-0.22, p<0.0001) changes with training. Molecular loadings on the respective variates were largely distinct. For example, plasma diacylglycerols (DAGs), phosphatidylethanolamines (PEs), and proteins such as WNT5A, QORL1, and APOC-III were positively loaded, while several plasma carnitines were negatively loaded on variate 1. Molecular variate 2 was negatively loaded by proteins such as adiponectin and neuropeptide S and positively loaded by multiple complement system proteins. **CONCLUSIONS:** We identified groups of circulating molecules whose changes in response to exercise training are associated with changes in the plasma lipid and lipoprotein profile and may provide insights into the mechanisms underlying exercise-induced changes in lipid metabolism.

D5: EXERCISE TRAINING SLOWS DOWN PROTEOMIC AGE ACCELERATION IN MIDDLE-AGED TO OLDER ADULTS-HERITAGE FAMILY STUDY

Prausn Kumar Dev[1], Jacob L. Barbar[1], Guoshuai Cai[1], Jeremy M. Robbins[2], Prashant Rao[2], Michael Mi[2], Sujoy Ghosh[3,4], Clary Clish[5], Daniel H. Katz[2], Robert E. Gerszten[2], Claude Bouchard, FACSM[4], Mark A. Sarzynski, FACSM[1]. *[1]University of South Carolina, Columbia, SC. [2]Beth Israel Deaconess Medical Center, Boston, MA. [3]Duke-National University of Singapore Medical School, Singapore. [4]Pennington Biomedical Research Center, Baton Rouge, LA. [5]Broad Institute of Harvard and MIT, Cambridge, MA.*

Introduction: Identification of a robust molecular signature is a major goal in aging research. Recent studies have identified proteins that resemble a proteomic clock and can predict accelerated biological aging. Exercise is well known to mitigate the physiological and molecular changes associated with healthy biological aging. However, it is unknown whether regular exercise affects the predicted protein age. **Hypothesis:** We hypothesized that exercise training would attenuate proteomic age acceleration as evidenced by decreasing the difference between protein predicted age and actual age. **Methods:** We measured over 5,000 circulating proteins using an aptamer-affinity based platform (SomaScan) before and after 20 weeks of endurance exercise training in 647 Black (n=210) and White (n=417) adults from the HERITAGE Family Study. Proteomic age score was calculated by summing the weighted expression values across 360 proteins validated in previous proteomic age score studies. Delta age (or proteomic age acceleration) was quantified as the difference between predicted and chronological age. Change in delta age was calculated by subtracting baseline delta age from post-training delta age. **Results:** The proteomic age score was very strongly correlated with chronological age (r=0.94, p<0.0001). Proteomic age acceleration was associated with ethnicity, generation (parent vs offspring), and their interaction, but not sex**.** Specifically, baseline delta age (mean (SD)) was significantly lower in parents (5.2 (4.1) yrs) compared to offspring (10.6 (4.2) yrs) and in Blacks (8.0 (4.7) yrs) compared to Whites (9.2 (5.0) yrs). Exercise training resulted in a decrease in delta age in parents only (i.e., training attenuated proteomic age acceleration), with the decrease larger in White (-13.7 (8.0) yrs) compared to Black (-7.4 (9.0) yrs) parents. Conversely, offspring of both ethnic groups showed mean increases (+6.1 (4.1) yrs) in delta age with training (i.e., proteomic age acceleration increased). **Conclusion:** These results indicate that an established proteomic signature of age is sensitive to exercise training, but the magnitude of response differs by subgroups of age and ethnicity thereby limiting its potential clinical utility. Further studies are needed to examine whether reduced proteomic age acceleration with exercise training is associated with concomitant improvements in cardiometabolic traits related to healthy aging.

D6: 24-HOUR ACTIVITY BEAHVIORS ARE ASSOCIATED WITH COVID-19 PREVALENCE

Patricia Pagan Lassalle, Lauren C. Bates, Peter Halpin, Zachary Y. Kerr, Erik D. Hanson, FACSM, Michelle L. Meyer, Lee Stoner, FACSM. *The University of North Carolina at Chapel Hill, Chapel Hill, NC.*

BACKGROUND: Beneficial 24-hour activity behaviors (i.e., limiting sedentary behavior, physical activity, sleep) are critical for chronic disease prevention, but were altered by the COVID-19 pandemic. Less time in beneficial 24-hour activity behaviors may place individuals at greater risk for contracting COVID-19. Further, some populations may be more impacted than others, with demographic and environmental (rural/urban/suburban) factors influencing access to healthcare and COVID-19 information. **METHODS:** In December 2020, we recruited

an online convenience sample of 746 adults aged 18 years or older residing in the US. Of the sample, 400 (39±14 years old, 52% female, 15% Hispanic, 78% White, and 28% had or survived cancer) had complete data for our variables of interest. Participants self-reported demographic information, COVID-19 diagnosis (yes/no), total weekday and weekend sedentary behavior (hours/day), moderate to vigorous physical activity (mins per week), sleep (hours/day), and environment (rural/urban/suburban). a) A k-fold cross-validation, machine learning variable selection (glmnet) approach was used to identify which variables were most strongly associated with COVID-19 prevalence, as determined by specifying the tuning parameter, λ, at its minimum value. This approach minimizes the elastic net penalty and optimizes the model fit. b) Logistic regression was used to calculate odds ratios (OR) and 95% confidence intervals (95%CI) for the strongly associated variables. **RESULTS:** a) The variables most associated with COVID-19 prevalence were total sedentary behavior during weekdays, sleep, biological sex, race, and environment (λ=0.012). b) Holding all other parameters constant, the odds of having COVID-19 were lower for every additional hour of sleep (OR=0.87, 95%CI=0.79, 0.96); identifying as non-white versus white (OR=0.46, 95%CI=0.23, 0.87); living in a rural versus urban area (OR=0.42, 95%CI=0.18, 0.92); and higher for being male versus female (OR=2.79, 95%CI=1.69, 4.67). Non-significant decreases were found for weekday sedentary behavior (OR=0.97; 95%CI=0.92, 1.02) and living in a suburban versus urban areas (OR=0.63, 95%CI=0.38, 1.05). **CONCLUSION:** Less sleep, identifying as non-white, female, and residing in rural areas were associated with a lower COVID-19 prevalence.

D7: STRETCHING WITH ANKLE DORSIFLEXION SPLINT IMPROVES MICROVASCULAR REACTIVITY IN PERIPHERAL ARTERY DISEASE PATIENTS

Matthew Martenson[1], Judy Muller-Delp[1], Jacob Caldwell[2], Lawrence Kaelin[3], Albert Hakaim[4], Lynn Panton, FACSM[1]. *[1]Florida State University, Tallahassee, FL. [2]University of Wisconsin La Crosse, La Crosse, WI. [3]Vascular Surgery Associates, Tallahassee, FL. [4]Mayo Clinic, Jacksonville, FL.*

BACKGROUND: Peripheral Artery Disease (PAD) is a vascular disease that affects over 8 million Americans. PAD patients commonly have difficulty walking due to pain in the legs during physical exertion. Walking therapy has been recommended to improve walking performance and attenuate disease progression, but this therapy remains underutilized in PAD patients. Recent evidence indicates that muscle stretching via ankle dorsiflexion splints improves vascular health and walking performance in PAD; however, it is currently unknown how muscle stretching affects tissue oxygenation (StO_2) in PAD. PURPOSE: Purpose of study was to determine the impact of 4 wks of calf muscle stretching on measures of tissue oxygenation in patients with PAD. METHODS: Thirteen PAD patients (69.3±9.4 yrs) were randomized to either a stretch (n=9) or a non-stretch group (n=4). Patients in the stretch group wore the splints for 30 min/day, 5 days/wk for 4 wks. A 5-min vascular occlusion test and a 6-min walk test (6MWT) were administered before and after the intervention. StO_2 was monitored via Near-Infrared Spectroscopy (NIRS) during the vascular occlusion test and the 6MWT. Tissue oxygen uptake and microvascular reperfusion were determined from the vascular occlusion test, while relative changes in StO_2 were determined at minutes 1 and 2 of the 6MWT. Change data were analyzed using paired t-tests and significance was accepted at $p<0.05$. RESULTS: Muscle stretching improved microvascular reperfusion following occlusion (Pre: 0.34±0.25; Post: 0.52±0.29 ΔStO_2/sec). The relative increase in oxygen utilization at minute 1 (Pre: 63±25; Post: 73±23%) and minute 2 (Pre: 69±22; Post: 84±17 %) of the 6MWT was greater after 4 wks of muscle stretching. The rate of tissue oxygen uptake during occlusion tended to increase after muscle stretching (Pre: -0.10±0.03; Post: -0.12±0.04 ΔStO_2/sec; p=0.06). Walking distance also tended to increase following the intervention (Pre: 330±118m; Post:351±117m; p=0.08). There were no significant changes in any of the NIRS measurements in the non-stretch group. CONCLUSIONS: These results indicate that 4 wks of muscle stretching improves microvascular reactivity and StO_2 of the calf muscles during walking. This muscle stretching intervention may have value as a means of maintaining perfusion and function of the calf muscles in PAD patients with limited mobility.

D8: THE EFFECT OF MENSTRUAL CYCLE PHASE ON BLOOD LACTATE DURING HIGH-INTENSITY INTERVAL EXERCISE.

Alyssa Olenick, Regis Person, Nathan Jenkins. *University of Georgia, Athens, GA.*

BACKGROUND: The menstrual cycle may impact metabolic responses to exercise such as blood lactate, with findings indicating elevated exercise blood lactate concentrations in the follicular phase. However, no studies have examined blood lactate during high-intensity interval exercise (HIIE) across the menstrual cycle. METHODS: We explored the impact of the menstrual cycle phase in 8 young, healthy, active women (24.4±2.4 yrs; 167.0±6.3cm; 66.8±11.7kg; 29.5±3.7% BF; VO2peak: 37.5±3.1 ml/kg/min) experiencing a regular menstrual cycle (n=5) or using oral contraceptives (OC) (n=3). Participants completed a baseline and two identical counterbalanced HIIE sessions. All exercise was performed on an electrically-braked cycle ergometer. One HIIE session took place in the week following the onset of the menstrual cycle or non-active OC days 2-5 during the follicular phase (FP). The other took place ~6-8 days following urine ovulation or days 20-23 of active OC pills during the luteal phase (LP). HIIT sessions were 4x4 min intervals performed at the power output corresponding to 50% of the difference between the ventilatory threshold and VO2peak separated, with 3 min of unloaded cycling (0W) as recovery between intervals. Blood lactate was assessed via finger stick across all exercise intervals, during rest periods between intervals, and at 5, 10 and 15 minutes post-exercise. RESULTS: Blood lactate was significantly greater during the FP than the LP during rest interval 1 (FP: 7.1±1.8, LP: 5.9±1.3; p=0.014) and rest interval 3 (FP: 8.4±2.2; LP: 7.0±1.9; p=0.045). Lactate trended greater in the FP during high 2 (8.1±2.4; LP: 7.2±1.7; p=0.074) and recovery at 15 minutes (FP: 4.6±1.5; LP: 4.1±1.1; p=0.076). Area under the blood Lactate curve (AUC) was not different between phases (FP: 280.4±116, LP: 266.7±81.7, p=0.598). CONCLUSION: Our results reflect elevated blood lactate during the follicular phase during HIIE, especially during recovery periods between intervals. These results suggest that intra-workout recovery during HIIE may vary across the menstrual cycle.

M1: ASTAXANTHIN REDUCES EXERCISING HEART RATE BY 7% IN OVERWEIGHT INDIVIDUALS

Alissa Wika[1], Kyle Reason[1], James Green, FACSM[1], Lauren Killen[1], Matthew McAllister[2], Hunter Waldman[1]. *[1]University of North Alabama, Florence, AL. [2]Texas State University, San Marcos, TX.*

BACKGROUND: Astaxanthin (AX), a carotenoid found in marine species has been found to positively impact metabolic markers, including reducing inflammation, hypertension, diabetes, and even some types of cancer. Additionally, studies focused on healthy individuals have shown AX may improve fat oxidation rates and spare endogenous carbohydrates, which in turn should improve markers of metabolic flexibility. However, to date, no studies have examined the impact of AX in an overweight cohort. Therefore, this study assessed the impact AX supplementation on markers of metabolic flexibility in overweight individuals (≥25 bodyfat percentage). **METHODS:** Subjects supplemented with 12 mg AX or placebo (PLA) for 4 weeks in between pre and post trials. Pre and post trials included anthropometric measurements (height, mass, bodyfat percentage, and blood pressure) and a graded exercise test (GXT) on the Velotron bike. The GXT included 6 stages, each lasting 5 min, with the first being a resting stage. Stage 2 started at 30 W (females) and 50 W (males). Resistance increased 15 W after each stage ended, completing a total of 90 W (females) and 110 W (males). Following completion of 6 stages, resistance increased by 15 W every minute, until volitional exhaustion where VO_{2peak} was recorded. During the last 30 s of Stages 1-6, subjects had their finger pricked for the measurement of capillary lactate and glucose. In addition, VO_2, VCO_2, heart rate (HR), respiratory exchange ration (RER), and overall ratings of perceived exertion (RPE) were recorded at the end of each stage. **RESULTS:** There were no changes found in fat oxidation rates, blood lactate levels, or bodyfat percentage (all $P > 0.05$). However, there was a significant decrease in carbohydrate oxidation from pre to post supplementation AX only ($P = 0.02$, $d = 0.23$; ~8%). Additionally, the AX group also showed a dramatic decrease in exercising heart rate from pre to post supplementation ($P < 0.001$, $d = 0.46$, ~7%, 9 bpm). Although no changes were observed in primary markers of metabolic health (i.e. fat oxidation rates, bodyfat percentage), the significant decrease in HR following AX supplementation, at any given absolute intensity during cycling, provides some implications for reducing cardiac strain in overweight individuals during exercise and may have implications for future clinicians.

M2: PILOT STUDY: IMPACT OF 2.4-KG PROXIMAL EXTERNAL LOADING ON 15-KM RUN PERFORMANCE IN COLLEGIATE CROSS-COUNTRY RUNNERS

Eric K. O'Neal[1], Savanna Knight[1], Tate Dean[2], Bandar Alghamdi[1], Brett Davis[2], Lauren Killen[1], Hunter Waldman[1], Eric K. O'Neal[1]. *[1]University of North Alabama, Florence, AL. [2]Auburn University Montgomery, Montgomery, AL.*

BACKGROUND: This pilot study investigated the effects of modest changes (< 5% body mass) from a 2.4 kg, gel-based weighted compression garment on running performance in collegiate cross-country runners (F = 5; M =8). **METHODS:** An outdoor, unweighted 15-km control run (CON) with a pacing goal resulting in a session rate of perceived exertion (RPE) of ~7 on a 10-point scale was completed 7-14 days before a run with load (LOAD) with a goal to match CON pace. In a final session, subjects performed two, 5-minute running economy bouts at the average pace of their CON run (grade: 1%) in the laboratory with and without loading, to examine metabolic data. **RESULTS:** Performance decreased 1.6 ± 0.7% (p = 0.044) from CON (63.66 ± 7.50 min) to LOAD (64.70 ± 8.09 min), but the decrement was of low magnitude (*d* = 0.13). Outdoor run heart rate was increased (p < 0.05) by ~10 beats/min at each 2.5-km split during LOAD, and overall and breathing RPE displayed marked favor in CON versus LOAD. Heart rate was also higher during laboratory testing, but no metabolic profile variables were compromised by LOAD despite trends favoring CON. **CONCLUSIONS:** The addition of 5+ % body mass has been repeatedly shown to negatively influence metabolic demand during running. This is the first investigation to provide evidence that a modest proximal loading challenge can impair longer distance road running performance. Runners should consider this in regards to weight management, body mass changes due to carbohydrate loading/hyperhydration efforts before competition, and when selecting running hydration and gear backpacks.

M3: THE IMPACT OF RACE AND ETHNIC IDENTITY ON BODY DISSATISFACTION IN COLLEGE AGE FEMALES

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BACKGROUND: Most of the research conducted on body dissatisfaction (BD) has primarily studied White females and their drive for thinness; this research is limited and less generalizable because it lacks representation of diverse racial populations in the US. Therefore, the purpose of this exploratory study was to assess how race impacts a woman's body image. METHODS: Female college students between the ages of 18-25 years were recruited to take an online survey. Demographic and body image questionnaires were used. An independent t-test was used to analyze the impact of race on BD. A linear regression model was used to assess the impact of demographic data on BD. RESULTS: Participants (N = 314; 21.81±2.05 years; 33.1% Non-White) had an average BMI of 25.30±6.14 kg/m^2. After separating the sample by race (White females versus Non-White females), BD was assessed. BD is scored from 1 to 5 with lower scores indicating higher BD. White females (n=192) scored 3.16 ± 0.71 while Non-White females (n=98) scored 3.19 ± 0.71 (p=.722); thus, there was no significant difference between BD in White versus Non-White females. Race (B=-.23, p<.797) was not shown to significantly influence body image, however, females with a higher BMI had a higher level of BD (B=-.035, p<.001). Additionally, females in which a majority of their friends engage in health/fitness activities had higher levels of BD (B=-.26, p<.01) with an adjusted R-Square of 0.02 (F(4, 285) = 4.88, p<.001). CONCLUSION: BD impacts woman of multiple races, it is specifically elevated in women of higher BMI and women associating with physically active friends. Future research studies should examine qualitative reasons why females who associate with physically active friends have higher levels of BD.

M4: EFFECTS OF LOW INTENSITY TREADMILL EXERCISE ON MUSCLE WASTING IN THE MALE TUMOR BEARING MOUSE

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Background: Cancer cachexia is a multifactorial, metabolic wasting syndrome that is responsible for up to one-third of deaths in cancer patients. While research is growing, there are no clear diagnostic criteria and cancer cachexia remains an untreated condition. Current research shows that exercise interventions could have a positive impact on cancer cachexia by slowing its development. Questions remain regarding the most effective time, duration, and intensity of exercise as a preventative intervention against cancer cachexia. **Purpose:** The purpose of this study was to determine if low intensity treadmill exercise can act as a protective measure and treatment intervention against cancer-mediated muscle wasting in male mice. **Methods:** Male LC3 Tg+ mice and WT mice were randomly separated into four groups, sedentary non-tumor bearing (SED+NT), sedentary tumor bearing (SED+T), treadmill exercise non-tumor bearing (Low+NT), and treadmill exercise tumor bearing (Low+T). Mice were injected with tumor cells (T group; 5x10^5 LLC cells in flank) or remained non-tumor (NT) for 4 weeks. During the 4 weeks, mice underwent a low-intensity treadmill exercise training protocol (Low) or remained sedentary (SED). To examine the protective effects of exercise, grip strength, echocardiography and tumor growth evaluations were taken at baseline and the 4-week time points. **Results:** Sedentary tumor bearing mice (SED+T) exhibited the worst skeletal muscle function (grip strength) and cardiac function (fractional shortening) compared to all other groups. Low intensity treadmill appeared to protect the musculature since exercised tumor bearing mice (Low+T) showed a preservation of both grip strength and fractional shortening compared to their sedentary counterparts (SED+T). Additionally, treadmill exercise (Low+T) resulted in smaller tumor mass and volume (p=0.066) compared to the SED+T group. **Conclusion:** Low-intensity treadmill exercise shows potential to preserve skeletal and cardiac muscle function, as well as stunt tumor growth. Therefore, low-intensity treadmill exercise may be an effective, affordable, and accessible treatment intervention for cancer patients. This information is crucial in understanding the significance of exercise in cancer patients and elucidating the importance of timing and intensity of exercise as a protective measure against the detrimental effects of cancer cachexia.

M5: THE EFFECTS OF WEIGHT LOSS AND AEROBIC EXERCISE ON 10-YEAR AND LIFETIME ASCVD RISK

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BACKGROUND: Atherosclerotic Cardiovascular Disease (ASCVD) is the leading cause of morbidity and mortality in the United States. The American Heart Association (AHA) and American College of Cardiology (ACC) developed the Pooled Cohort Equations (PCE) to estimate10-year and lifetime ASCVD risk. Exercise and hypocaloric diets reduce ASCVD risk score by decreasing blood pressure and cholesterol. However, there are currently no data on the magnitude of change in ASCVD score from a lifestyle intervention. METHODS: Thirty-six overweight and obese adults (Age: 46.5 10.5 yrs.; Weight: 95.5 12.7 kg; BMI: 34.4 3.4) participated in 10 weeks of supervised aerobic exercise while participating in an OPTIFAST weight loss program to achieve clinically significant weight loss (7% body weight). The OPTIFAST program was 800 kcals per day of total meal replacement consumed as shakes, bars, and soups. By week 8, participants increased daily intake to 1300-1500 kcals and could replace two products with whole foods per day. Participants were also encouraged to attend weekly behavioral classes to assist with dietary compliance. The weekly aerobic exercise volume began at 300 MET min per week and increased by 50 MET min each week until 700 MET min each week was reached. Ten year and lifetime ASCVD risk scores were calculated using the PCE. RESULTS: At baseline, participants had a mean 10-year ASCVD risk of 3.0% and mean lifetime risk of 32.8%. Following the intervention, there was a mean decrease in body weight (-8.4 kg, -9.9 %, p<0.001), systolic BP (-9.1 mmHg, p<0.001), diastolic BP (-5.7mmHg, p<0.001), total cholesterol (-15.1 mg/dL, p<0.001), low-density lipoproteins (-7.8 mg/dL, p<0.006), and high-density lipoproteins (-2.4 mg/dL, p<0.038). There were also reductions in 10-year (-0.6%, p<0.001) and lifetime ASCVD risk (-8.1%, p<0.006) after the intervention. Changes in ASCVD risk were associated with changes in systolic BP (r=0.481, p<0.017) and diastolic BP (r=0.64, p< 0.001). No associations were observed between the change in 10-year or lifetime ASCVD risk in body composition or fitness variables. CONCLUSION: Our results suggest a combined weight loss and aerobic exercise program elicited a large change in lifetime scores, but not in 10-year ASCVD scores. Future research should investigate the impact of lifestyle interventions in participants in populations with high ASCVD risk at baseline.

M6: ASSOCIATIONS BETWEEN CHANGES IN PLASMA PROTEINS AND BODY COMPOSITION TRAITS IN RESPONSE TO ENDURANCE TRAINING

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BACKGROUND: Although exercise training is known to improve body composition, the molecular biomarkers and mechanisms related to these changes have not been fully elucidated. The purpose of this study was to examine the associations between change in plasma proteins and change in body composition traits in response to endurance training. METHODS: Measurements were taken before and after 20 weeks of standardized, endurance training in Black and White adults of the HERITAGE Family Study (n=652). Over 5,000 plasma proteins were measured using an aptamer-affinity based platform (SomaScan). Underwater weighing, CT scans, and anthropometric measurements were used to derive the 11 body composition traits included in this study: BMI, body surface area (BSA), fat mass, fat free mass (FFM), percent fat, waist circumference, waist-to-hip ratio (WHR), body weight, and abdominal visceral, subcutaneous, and total fat. Linear mixed models were used to test the association between change in plasma proteins and change in each body composition trait adjusted for age, sex, race, family membership, baseline BMI, and baseline trait value with significance set to FDR<0.05. RESULTS: Subjects were 35% Black, 56% female, and on average 35 years old and overweight at baseline (mean BMI 26.4 (SD 5.3) kg/m^2), with percent fat of 27.5 (10.4). All 11 traits significantly improved in response to training. Significant associations between changes in proteins and body composition were found for all traits except WHR, with 58 unique proteins identified. Weight and BSA had the most associated proteins with 43 and 40, while visceral fat and FFM had the least with 1 protein each. Leptin was the top association (range: $0.023<\text{FDR p-value}<4.2\text{x}10^{-12}$) for all 9 body composition traits it associated with (excluding FFM and WHR). Changes in growth hormone receptor, secretoglobin family 3A member 1, and Protein delta homolog 1 were significantly associated with the training response of 8, 6, and 5 body composition traits, respectively. CONCLUSIONS: Although dozens of proteins were associated with changes in body composition traits, 4 proteins were among the top associations for half or more of the traits (when excluding WHR). Globally, these proteins are involved in pathways such as adipogenesis, energy balance, and cell growth, which may potentially influence body composition and fat distribution traits.

M7: LOW-INTENSITY CONTRACTIONS CAUSE GREATER REDUCTIONS IN QUADRICEPS MUSCULAR STRENGTH AND MUSCLE EXCITATION

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BACKGROUND: It is well established that maximal force declines with the accumulated fatigue from intermittent isometric contractions. However, the changes in neuromuscular properties following high- and low-intensity exercise remain unclear. Therefore, the purpose of this investigation was to determine changes in maximal force and muscle activation of the knee extensors following high- and low-intensity intermittent isometric contractions. **METHODS:** Ten recreationally active, healthy females (Mean ± SD; Age: 21±2 y) completed two experimental visits, consisting of repeated isometric contractions of the right knee extensors to failure at either 30 or 70% maximum voluntary isometric contraction (MVIC). Each contraction lasted 20 s., with 6 s. rest between repetitions. The order of each visit was randomized and counterbalanced, and each visit was separated by 5±2 days, and the same time of day (±1 h). Prior to each bout (PRE), participants completed two MVICs to determine their target torque. A single MVIC attempt was recorded immediately following (POST) each bout, which ended when participants could no longer maintain the target torque. Electromyographic signals from the vastus lateralis (VL) and vastus medialis (VM) were recorded during each MVIC. MVIC strength and root mean square (RMS) of the VL and VM were calculated offline. **RESULTS:** Condition × time interactions were observed for MVIC ($p = 0.006$), VL RMS ($p = 0.011$), and VM RMS ($p = 0.018$). Post-hoc analyses indicated that MVIC significantly decreased from PRE to POST in both the 30% ($p<0.001$; PRE_{30}: 183.8 ± 60.9 N·m; $POST_{30}$: 111.1 ± 42.5 N·m) and 70% ($p=0.001$; PRE_{70}: 177.4 ± 73.3 N·m; $POST_{70}$: 125.2 ± 50.5 N·m) conditions but was significantly less at $POST_{30}$ when compared to $POST_{70}$ ($p=0.012$). Both VL RMS ($p = 0.001$; PRE_{30}: 0.08 ± 0.04 mV; $POST_{30}$: 0.05 ± 0.03 mV) and VM RMS ($p=0.040$; PRE_{30}: 0.10 ± 0.06 mV; $POST_{30}$: 0.07 ± 0.02 mV) significantly decreased in the 30% condition, while no changes were observed in either the VL ($p=0.946$) or the VM ($p=0.856$) in the 70% condition. **CONCLUSIONS:** While both high- and low-intensity conditions produced significant declines in MVIC, 30% MVIC produced significantly greater reductions. Further, muscle activation was only altered following low intensity exercise. These data suggest that the mechanisms of fatigue differ between high- and low-intensity intermittent isometric contractions in college-aged females.

M8: THE ROLE OF VENOUS BLOOD POOLING DURING PROLONGED SITTING ON CEREBRAL BLOOD FLOW

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PURPOSE: A primary risk factor for dementias is atherosclerosis of the cerebral arteries. Prolonged sitting has been associated with precursors to atherosclerosis, including acute reductions in cerebral blood flow (CBF) and concomitant reductions in shear stress, but the mechanism for cerebral hemodynamic changes is unclear. Venous blood pooling (VBP) in the calves due to gravity is a plausible pathway. The purpose of this study was to investigate the relationship between VBP and changes in CBF. **METHODS:** Five participants (n = 5, 23.6 [5.3] y, 40% F, 23.1 [3.2] kg/m2) underwent two conditions in a randomized cross-over trial, both with a two-hour sitting bout: CUFF, where bilateral occlusive cuffs were applied to the legs to induce venous pooling and NON-CUFF, where occlusive cuffs were applied, but not inflated as a control condition. CBF was measured with mean volumetric blood flow through the common carotid artery using duplex Doppler ultrasound. Shear rate was calculated to determine changes in forces on the cerebral arteries. Results were analyzed using a random-effects mixed model, and effect sizes were reported using Cohen's d. **RESULTS:** The interaction effect between time and condition was significant (ß = 35.91 ml/min, ES = 1.00) for CBF. CBF decreased 3.7% for CUFF and increased 19.5% in the NON-CUFF condition. Similarly, there was a significant interaction effect between time and condition for shear rate (ß = 62.9 s^{-1}, ES = 0.72). Shear rate increased 1.9% in the CUFF condition and increased 25.8% in the NON-CUFF condition. **CONCLUSIONS:** CBF decreased in the CUFF condition, while increasing in the NON-CUFF condition over time. Positive shear rate increased slightly in the CUFF condition, but increased greatly in the NON-CUFF condition. These effects indicate VBP may be a driver of CBF and shear stress changes in the cerebral vasculature.

U1: PHYSICAL ACTIVITY DURING AND AFTER THE COVID-19 STAY-AT-HOME ORDERS IN ACTIVE OLDER ADULTS

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BACKGROUND: To reduce the spread of COVID-19, the state of Virginia issued a stay-at-home order and required closure of fitness centers from March 24th to June 5th, 2020. It is not known how these closures affected physical activity (PA) in older adults who regularly participated in the fitness centers' supervised exercise programs. In addition, more research is needed to determine older adults' motivations for returning to these programs when centers reopened. PURPOSE: The purpose of this study was to: (1) investigate the effects of fitness center closures on PA in older adults who participate in supervised exercise classes; (2) explore older adults' motivations for returning to classes when centers reopened despite the COVID-19 risks. METHODS: Older adults participating in water-based exercise classes were recruited 4.5 months after fitness centers reopened. Researchers conducted semi-structured interviews relating to PA changes during the stay-at-home order and motivations for returning to classes. Interviews were transcribed and analyzed via first and second cycle coding to identify emergent themes. RESULTS: Eleven older adults (69 ± 7 years) completed the interviews. Pre-pandemic class attendance was 4.6 ± 1.4 times/week. Ten participants (90.9%) engaged in PA during the stay-at-home order with 4 participants reporting maintenance or increased PA compared to pre-pandemic levels. Three themes were identified regarding PA participation: Recognizing the value of PA, preparation for independent exercise, and

adaptation to circumstances. Following the reopening of fitness centers, participants attended 3.5 ± 1.2 classes/week. Three themes emerged regarding the choice to return: Increased exercise motivation, health benefits from classes, and benefits outweighing risks of COVID-19. CONCLUSIONS: Findings suggest that prior exercise class participation positively influenced older adults' engagement in PA during the stay-at-home order. While most participants did not maintain pre-pandemic PA levels, they remained active because they recognized the benefits of PA, were prepared to independently exercise due to prior experience, and found PA alternatives to adapt to the circumstances. Despite COVID-19 risks, benefits specific to exercise classes motivated participants to return when centers opened. This highlights the role of supervised group exercise in promoting health benefits and PA adherence in older adults. FUNDING INFORMATION: This research was supported by the Roanoke College Pathways Program

U2: WEAK RELATIONSHIPS BETWEEN VASCULAR AND COGNITIVE FUNCTION DESPITE SEX DIFFERENCES IN YOUNG ADULTS

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Background: The purpose was to determine if vascular function was related to specific cognitive domains and to determine if there were underlying sex differences in vascular function and cognition possibly related to body composition. **Methods:** Thirty adults completed 2 visits which included the assessment of vascular function, cognition, and body composition. Microvascular function was examined during an occlusion test via near-infrared spectroscopy. The oxygenation signal defined the rate of muscle desaturation and reperfusion, which were calculated across a 120-s period of ischemia and the 10-s following the ischemia. Macrovascular function was assessed by insonating the internal carotid artery (ICA). Each participant completed the CNS Vital Signs battery exam. Body composition was estimated using digitally derived circumferences. All values (not cognition) were averaged across the two visits, and *t*-tests were used to identify mean differences. Individual rates of desaturation and reperfusion were used to generate composite models for the males and females. The composite slopes were tested for sex differences. First-order correlations were performed to determine relationships among vascular function, cognition, and body composition. **Results:** The males had significantly ($p<0.05$) more lean body mass than the women (66.9±9.5 vs. 47.5±5.2 kg), yet there was no difference in fat mass (18.4±5.3 vs. 17.8±4.5 kg). The males also exhibited significantly ($p<0.001$) faster rates of desaturation (0.18±0.00 vs. 0.15±0.00%·s^{-1}) and reperfusion (2.2±0.22 vs. 2.0±0.05%·s^{-1}) than females. The females (106.1±9.1) earned a higher ($p=0.020$) score within the visual memory domain compared to males (93.4±17.2). Correlational analysis revealed, independent of sex, the rate of desaturation was correlated ($r=-0.369$) with psychomotor speed and motor speed ($r=-0.377$). Motor speed was correlated ($r= 0.376$) with ICA blood flow. **Conclusion:** Men exhibited faster muscle oxygen kinetics and greater lean mass, yet there were no sex-specific correlations. The women, however, displayed superior visual memory, but this was not related to any measurement. It is possible a threshold exists such that if an individual presents adequate health, they do not display the relationships to be expected within a clinical population (*e.g.,* vascular health - cognitive decline). Work remains warranted across the lifespan, especially in midlife adults.

U3: SLEEP AND DEPRESSIVE SYMPTOMS AFTER SPORT-RELATED CONCUSSION

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INTRODUCTION: Evidence suggests that sport-related concussion (SRC) may increase the risk for depression, but the precise mechanisms underlying the link between SRC and depression risk are not fully understood. Considering that sleep problems are frequently reported following SRC, and that sleep disturbances are also strongly linked to the development and maintenance of depressive disorders in other populations, it is possible that sleep changes associated with SRC may increase risk for depression. To date, there is limited study of the mediating role of sleep disturbances on depression risk following SRC. The purpose of this study, therefore, was to compare acute sleep disturbances, and depressive symptoms, between collegiate athletes who have sustained an SRC and non-concussed athletes. METHODS: Athletes from teams with higher concussion rates (football, soccer, volleyball, and basketball) completed consent procedures at the beginning of the academic year. NCWC athletic trainers then informed the research team when a consenting athlete sustained an SRC, and a matched (by age, sex, sport, and BMI) control subject was identified. Within 4 days post-SRC, both concussed (n=4) and control (n=4) participants completed the Beck Depression Inventory (BDI) and a one-week sleep monitoring period (daily sleep diaries and wrist actigraphy). RESULTS: Preliminary results of this ongoing study showed that athletes who sustained an SRC exhibited significantly longer objectively-measured wake after sleep onset (70.9 min vs. 37.2 min; $t = 2.8$, $p = 0.03$), a significantly higher number of objectively-measured nighttime awakenings (29.9 vs.18.9; $t = 3.16$, $p = 0.02$), significantly lower self-reported sleep quality ($t = -3.1$ $p = 0.02$), and higher objectively-measured sleep fragmentation (37.1 vs. 25.8, $t = 2.1$, $p = 0.08$; trend) within the first few days post-SRC. Concussed athletes also reported higher depressive symptoms (BDI score 16.8 vs. 9.3; $t = 1.32$, $p = 0.23$), though this measure is not currently significant in this preliminary data. CONCLUSIONS: Preliminary results suggest that individuals who have sustained an SRC exhibited significantly more fragmented and disrupted sleep, and higher depressive symptoms, within the first few days post-SRC, compared to non-concussed controls. Future studies with longer follow-up are needed to investigate whether sleep mediates the link between SRC and depression.

U4: THE EFFECTS OF DIETARY BEETROOT JUICE SUPPLEMENTATION ON SIMPLE REACTION TIME AND AGILITY PERFORMANCE

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BACKGROUND: Beetroot juice is a nitrate rich supplement commonly used as an ergogenic aid for resistance and endurance exercise performance. Additionally, previous research shows beetroot juice can decrease simple reaction time in adults with type 2 diabetes; however, this has never been studied in healthy adults. The purpose of the study is to investigate the effects of acute beetroot juice supplementation on simple reaction time and agility performance in young adults. METHODS: In this double-blinded study, physically active, college-age males (21.3±1.2 yrs, 92.1±12.8 kg, 72.7±2.8 in) were recruited. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory two times and completed four simple reaction time or agility tests: a simple reaction time test, the home base drill, the semi-circle drill, and the universal drill. All drills used FITLIGHT target sensors to record reaction time and time to completion. Two hours prior to the visit, participants either consumed 140 mL of beetroot juice (BRJ) or placebo (black currant juice) (PL). The BRJ and PL trials were randomized and counterbalanced. Each visit was separated by a 72-hour washout period. RESULTS: Simple reaction time ($p=0.28$), home base drill reaction time ($p=0.07$), semi-circle drill reaction time ($p=0.83$), and universal drill reaction time ($p=0.98$) were not significantly different between BRJ and placebo trials. Additionally, time to completion on the simple reaction time test ($p=0.49$), home base drill ($p=0.54$), semi-circle drill ($p=0.36$), and the universal drill ($p=0.45$) were not significantly different between conditions. CONCLUSION: Findings do not support the acute use of beetroot juice supplementation for improving simple reaction time and agility performance in healthy, physically active men.

U5: A COMMUNITY NEEDS ASSESSMENT USED TO DEVELOP A WORKPLACE NUTRITION AND PHYSICAL ACTIVITY EDUCATION PROGRAM

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BACKGROUND: Metabolic syndrome (MetS) is a growing concern, and many communities lack the resources to effectively address the contributing behaviors. MetS is a cluster of cardiovascular disease and type 2 diabetes risk factors such as hypertension, hyperlipidemia, hyperglycemia, and obesity. The purpose of this study was to investigate the needs and interests of faculty and staff at a small liberal arts university to design and deliver a workplace education program to decrease the risk factors associated with MetS. The project is a two phase study with phase 1) the community needs assessment and development of a nutrition and physical activity education

program, and 2) the 16-week workplace education program and assessment of its effectiveness. METHODS: 53 faculty and staff members (weight: 85±19 kg, height 163±25 cm, and BMI 31±6 kg/m2) completed a community needs assessment and intervention program interest survey. The community needs assessment survey included demographics, overall health satisfaction, lifestyle habits, and interest in a nutrition and physical activity education program. After completion of the survey, 16 individuals participated in the Zoom focus groups. Meetings were video recorded and used for data analysis. During these focus groups participants were asked about what topics, skills, and resources they would like to learn in a workplace nutrition and physical activity education program to help support long-term lifestyle behavioral change. RESULTS: 63% of the survey respondents were dissatisfied with their physical activity habits, 47% with their eating habits, 49% with their overall health and 60% said they would be interested in the education program. Information collected from the focus groups resulted in the identification of relevant themes for the education program including: mindful eating, calorie counting, meal planning, grocery shopping, effective physical activity, motivation for exercise, sleep, and physical and mental health self-care. CONCLUSION: The collected information was used to develop an engaging 16-week workplace nutrition and physical activity education program for a target population to encourage lifestyle behavioral change and to reduce the risk of developing MetS risk factors.

U6: EFFECTS OF VARYING FACEMASK REINFORCEMENT ON AGILITY AND FUNCTIONAL REACTIVE ABILITY IN NCAA FOOTBALL PLAYERS

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BACKGROUND: Football headgear has become increasingly bulkier over time in efforts to prevent head/neck injuries. However, increases in facemask reinforcement have been shown to cause vision impairment. We have previously shown that peripheral vision reaction time and target detection are hindered with heavier facemask reinforcement. However, athletes were stationary when completing reaction time tests which may not translate to actual gameplay. **PURPOSE:** The purpose of this study was to identify how varying facemask reinforcement influences agility and functional reactive ability in NCAA football players **METHODS:** Division 1 NCAA football players with normal/corrected to normal vision participated. In a randomized manner, participants completed reactive tests for the following conditions: Baseline/no helmet (BL), Light reinforced (HL), Medium reinforced (HM), Heavy reinforced (HH) face masks. For each condition, participants completed two reactive tests using a FITLIGHT trainer system: reactive reach test (RRT) and reactive step test (RST). For the RRT, 5 poles equipped with a total of 10 LED sensors were placed in a semi-circle 1 meter around a center point. Participants were asked to step and reach to hit 10 lights with their hands as fast as possible. For the RST, 5 LED sensors were place on the ground in a semi-circle pattern 1 meter around a center point. Participants were asked to step and hit each sensor with their foot to hit 5 lights as fast as possible. Each reactive test was repeated for a total of 3 attempts. Average reaction time and time to test completion (TTC) were analyzed and compared between facemask condition. **RESULTS:** HL (p= 0.030), HM (p= 0.034), and HH (p=0.003) conditions resulted in slower reaction time during RRT compared to BL. TTC was significantly increased during the HL (p= 0.021), HM (p= 0.013), and HH (p=0.011) versus BL. However, no differences existed between facemasks (p> 0.05). For the RST, reaction time was slower during HL (p= 0.027), HM (p= 0.018), and HH (p= 0.015) conditions versus BL. TTC was significantly higher during the HL (p= 0.046), HM (p= 0.029), and HH (p=0.017) versus BL. No differences existed between facemask conditions (p> 0.05). **CONCLUSIONS:** Regardless of facemask reinforcement, wearing a football helmet impairs functional reactive ability and agility performance. Since unobstructed vision on the field is important for safety and performance, these findings may have important implications on equipment regulations for safety in collegiate football.

U7: HEALTH AND PHYSICAL ACTIVITY CHANGES OF HIKERS IN KENTUCKY DURING TWO YEARS OF THE PANDEMIC

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BACKGROUND: The Covid 19 pandemic caused worldwide change in patterns of behavior. Physical inactivity is a significant health issue in the State of Kentucky and Appalachia. The study aimed to examine health and physical activity changes amongst day hikers during 2020 and 2021. The primary outcomes measures were: 1) subjective health rating, 2) number of days per week of moderate physical activity, and 3) total minutes on the trail. A secondary outcome was purpose for trail use. METHODS: A modified QR code version of the valid and reliable American Tobacco Trail (Cook et al., 2016) survey collected data. In addition, researchers greeted hikers during June and July in 2020 and 2021. RESULTS: Residents comprised 23% of the sample in 2020 and 15% in 2021. In the summer of 2020, for the sample of 215 hikers, the median age was 34.0 years (range of 15-74). In 2021, for the sample of 200, had a median age of 36 years (range 15-76). During the height of pandemic, 23% of hikers rated health as "excellent," 43% very good, and 29% good. In 2021, 28% "excellent," 40% very good, and 30% good. There were no significant differences in total physical activity time on the trail in 2020 (M = 114.7 mins, SD 62.7) versus 2021 (M = 116.1 mins, SD 65.6). In addition, when asked the number of days per week doing 30 minutes of moderate to vigorous physical activity, the percentage of hiker meeting or exceeding the national guidelines were 40% in 2020 and 41% in 2021. Thus, almost 60% of hikers reported not meeting the national guidelines of 30 minutes five days per week. The most striking results were the shift in purpose for hiking the trail. In 2020, recreation was listed most frequently during the lockdown, second was exercise, then family time. In 2021, family time jumped to number one reason hikers came to the Pinnacles, with exercise second and recreation third. DISCUSSION. The results indicate that physical activity usage patterns did not change in the two years during the pandemic physical ac amongst this sample of day hikers. Given the emphasis on physical activity to improve and maintain health, it is evident that this sample maintained subjective levels of health during this period. The importance of family time became evident during year 2 of the pandemic.

U8: PRIOR SARS-COV-2 INFECTION DOES NOT INCREASE RISK OF EXERTIONAL HEAT STROKE OR CAUSE DETRIMENTAL CHANGES IN PLASMA CYTOKINES

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Background. SARS-CoV-2 is a viral infection that can cause systemic inflammation with fever symptoms and impaired respiration. Data from animal models suggest that some forms of viral infection can increase risk for exertional heatstroke (EHS), possibly via reductions in the cellular stress response that lead to impaired stress tolerance. **Purpose.** To determine if persons with prior clinical diagnosis of SARS-CoV-2 infection exhibit any differences in thermoregulatory or cardiopulmonary responses to 60min of cycling exercise in hot, dry ambient conditions. **Methods.** Nine participants (Age: 22 ± 2 years, Stature: 1.74 ± 0.02 m, Mass: 71.3 ± 3.9 kg, VO_{2max}: 46 ± 2 $mL^{-1}kg$ lean body $mass^{-1}{\cdot}min^{-1}$) completed 1hr of cycling exercise in an environmental chamber (35°C / 35% RH) at an intensity that elicited 9.0 W/kg of metabolic heat production. Four participants had been previously diagnosed with SARS-CoV-2, and the other five participants served as the Control group. Heart rate (HR), esophageal temperature (T_c), mean body temperature (T_b), physiological strain index (PSI), minute ventilation (V_E), and oxygen consumption (VO_2) were examined throughout exercise. Interleukin 1 Receptor Antagonist (IL-1RA) and Interleukin 6 (IL-6) were assayed from plasma samples that were collected before (Pre), after (Post), and 1h after (1-Post) exercise. Differences between group data were determined with Two-Way RM-ANOVA with Tukey Post Hocs. **Results:** As compared to the Control group, persons with prior SARS-CoV-2 infection did not exhibit greater elevations in HR (84 ± 4% of HR_{max} *vs* 87 ± 2% of HR_{max}), T_c (1.4 ± 0.3 °C *vs* 1.1 ± 0.2 °C), T_b (1.2 ± 0.3 °C *vs* 1.1 ± 0.2 °C), PSI (6.9 ± 1.0 *vs* 6.7 ± 0.6), V_E (38.8 ± 4.3 L/min *vs* 40.5 ± 0.3 L/min) or VO_2 (23.8 ± 1.1 ml/kg/min *vs* 21.0 ± 1.4 ml/kg/min) during 1hr of cycling exercise at a fixed rate of heat production in hot/dry ambient conditions [all P > 0.05]. There were no differences in plasma IL-1RA between the two groups at any time-point [all P > 0.05]. Despite having similar plasma IL-6 concentrations at baseline (0.5 ± 0.2 pg/ml vs 0.6 ± 0.3 pg/ml), the increase in IL-6 post-exercise was more than two-fold greater in the Control group (5.9 ±1.6 pg/ml vs 2.8 ± 0.6 pg/ml; P = 0.04). **Conclusions.** As compared to Control, we see no evidence of greater thermal or cardiovascular strain during 1hr of exertional heat stress in persons with prior SARS-CoV-2 infection. We also see no difference between groups in plasma IL-RA (which is anti-inflammatory), whereas the plasma IL-6 response to exercise appears to be diminished in persons with prior SARS-CoV-2 infection. While the exact physiologic relevance of this change remains to be determined,

present study data do not provide any evidence of an adverse response to exertional heat stress in persons with prior SARS-CoV-2 infection.

SYMPOSIUMS (S1–S15)

S1: AN OPEN FORUM ON DIMENSIONS OF DIVERSITY IN KINESIOLOGY

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Diversity, equity, and inclusion (DEI) commitments enrich experiences in higher education institutions for both students and faculty. As historically underrepresented groups select kinesiology programs at higher education institutions, there is a need for organizations and systems to create forums for organic and open dialogue in areas traversing the dimensions of DEI. In creating these organic and open spaces for candid discussions there is the prospect of; 1). introducing multiple perspectives international and interregional, 2). diminishing stereotypes, 3). encouraging cooperation, and 4). attenuating cultural encapsulation. As such, this symposium will examine the experiences of minority members in the field of kinesiology. Panelists will discuss strategies used in developing career goals, finding appropriate mentors, finding support in an environment where minority faculty are few or nonexistent, and best practices from learned experiences for professional success in kinesiology. In addition, the panelists will discuss grant opportunities in diversity, equity, and inclusion that may support the research and scholarship agendas of students and faculty. Lastly, ways in which SEACSM can foster inclusive conference culture through marketing images and conference activities will be discussed. This symposium is directed towards an audience that might include undergraduate and graduate students, researchers, faculty, and administrators who have an interest in the values diversity bring to kinesiology programs in the preparation of those who will work in the field of kinesiology.

S2: LOW ENERGY AVAILABILITY (LEA) AND HYPERTENSION IN DIVISION I COLLEGIATE ATHLETES

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Large percentages of athletes suffer from low energy availability (LEA) during training and competition by not consuming adequate calories to meet the total daily energy expenditure. LEA can increase the sympathetic stress response that results in hypertension, or cardiometabolic dysfunction (CMD). However, in athletes, as a result of the high intensity exercise they participate in, positive adaptations affecting hemostatic function include cardiac chamber dimension, myocardial thickness, and vasculature adaptations improve to cardiovascular performance. This presents a paradox whereby, despite these positive cardiovascular changes, chronic systematic stress due to LEA negatively resonates as CMD. Hypertension is the most commonly observed CMD within athletic populations. Post-mortem forensic studies show that 80% of all sudden cardiac deaths (SCD) in athletes are the result of cardiomyopathy directly related to hypertension. Pilot data indicate that 85% of athletes with LEA expressed elevated blood pressure which is shown to progress into hypertension during the competitive season. Therefore, the purpose of this symposium is: 1) to evaluate the relationship with LEA and CMD; 2) consider the nutrient content of those with LEA and effect on CMD; 3) explore the contributions of social determinants of health (e.g.: sex, ethnicity, socioeconomic status, nutrition, and chronic stress) that are known influence development of CMD. Researchers and practitioners will gain understanding of the influence of nutritional deficiencies on performance and health related outcomes in athletes. Further benefit includes discussion on current limitations of evaluating LEA and CMD and how they perpetuate morbidity in athletes despite the perception of health.

S3: SURVIVAL OF THE "FIT TEST": DETERMINING ROLES, RELEVANCE AND APPLICATION OF FITNESS TESTNG IN YOUTH

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Fitness testing has long played a disputed role in health, wellness, sport, activity, and development in youth. There has been debate amongst physical educators and exercise scientists as to the usefulness and necessity of fitness testing in youth. Historically, longitudinal studies have provided valuable lessons and developed practices related to fitness testing, including assessments of motor skills, health-related, and performance-related physical fitness. This symposium will introduce a variety of constructs of fitness and psychometrics of fitness testing. The tensions that have developed between researchers and practitioners regarding fitness assessments will also be explored. Additionally, current testing practices, use and interpretation of the data, and relevance of the assessments will be examined. The objective of this symposium is to describe the impetus behind fitness testing, the evolution of changes in fitness testing over time, and how these factors impact our views regarding the importance of youth fitness assessment in its current format. To achieve these objectives, the symposium will focus on two specific areas related to fitness testing. (1) Why have youth fitness testing efforts been viewed as misguided? Topics in this areas will include fitness assessments in different contexts (school vs. laboratory-based) and voluntary vs. state-mandated fitness assessments. (2) What should the goal of the fitness testing be and how should those goals be achieved? Topics will include the use of different types of health models to illustrate the role of fitness in overall health, long term athlete development, physical literacy, and the inclusion of fitness as an outcome variable in the National Physical Activity Plan. The symposium will conclude with the suggestion that perhaps the spotlight should shift to a more inclusive view focusing on appropriate constructs of movement and relating them to youth fitness testing and interpretation.

S4: CALLING PASS INTERFERENCE: IMPACT OF AMERICAN FOOTBALL FACEMASKS AND VISORS ON VISUOMOTOR PERFORMANCE

Rebecca R. Rogers, Christopher G. Ballmann, FACSM. *Samford University, Birmingham, AL.*

Protective American Football headgear became mandatory for game play in the 1940's at almost all skill levels. Overtime, headgear designs have becoming increasingly bulkier in efforts to mitigate head and/or neck injury including the addition of heavier reinforced facemasks. Furthermore, use of visors/face-shields have been added to prevent ocular injury. Since unimpeded sight and reactive ability during competition are crucial for peak performance and player safety, understanding how modern protective football headgear influences players' ability to respond appropriately to visual stimuli surrounding them could have important implications for game and equipment rules. In this symposium, we provide evidence on how different types of facemasks, which are currently legal or illegal for game play by rules of the National Collegiate Athlete Association (NCAA) and National Football League (NFL), may impair peripheral visuomotor ability. Analysis and presentation of evidence for how clear and tinted visors influence reactive ability will be shown. How previous findings translate to sports specific skills and different visual spatial regions will be discussed. Lastly, this presentation will also feature practical applications and recommendations for player safety from observed evidence of how football headgear influences visuomotor performance.

S5: EXERTIONAL-RELATED HEAT ILLNESS IN ACTIVE DUTY MILITARY: CURRENT PROBLEMS AND FUTURE DIRECTIONS

Kaemmer N. Henderson. *United States Army Research Institute of Environmental Medicine, Columbus, GA.*

Exertional heat illnesses occurs when the demand for energy, paired with increased heat production, leads to the inability for the body to dissipate heat at a sufficient rate. Heat illnesses range in severity from minor heat illness, such as heat cramps and heat exhaustion, to more severe illnesses, such as heat injury and heat stroke. Repeated exposure to physical activity in the heat greatly increases the risk of a heat illnesses occurring. The military population has an increased risk of suffering from heat illnesses due to extreme environmental exposure and the subsequent physical exertion required in these extreme temperatures. Heat illnesses lead to decreased physical performance, a loss of duty time, and possibly long-term adverse effects on the health of soldiers, ultimately impacting the readiness of the troops as a whole. The purpose of this symposium has several aims including: 1) addressing the physiology of heat illness and its effects on our military population, 2) discussing possible factors that could predispose an individual to heat illnesses, and 3) discuss current

research efforts and studies being conducted in our laboratory at USARIEM. Researchers and practitioners will gain a more thorough understanding of the possible underlying causes of heat illness, factors that might predispose someone for a heat illness and adjusting their training programs to address this factor, and practical interventions for mitigating heat illnesses/casualties in soldiers during field work.

S6: THE HISTORY OF SEDENTARY BEHAVIOR: AN EVOLUTIONARY PERSPECTIVE

Lee Stoner, FACSM, Alex Pomeroy, Lauren Bates, Craig Paterson, Simon Higgins. *University of North Carolina at Chapel Hill, Chapel Hil, NC.*

A ubiquitous aspect of contemporary societies is sedentary behavior (SB), defined as low-intensity activities in a seated, recumbent, or supine posture. Leading public health agencies, including the WHO, have recognized the strong association between SB and poor health outcomes, particularly cardiometabolic diseases. However, while public health agencies have begun to advocate for "reductions" in SB, the guidelines are typically vague and non-specific. There is good reasoning behind this non-committal advocacy - there us limited mechanistic and clinical evidence to support policy development. To guide SB policy development, it is important to first consider the origins and evolution of SB, including the following: (i) is SB really a novel/contemporary behavior? i.e., how has this behavior evolved? (ii) how did our forebears sit and in what contexts? (iii) how does SB interact with 24 h activity behaviors, including physical activity and sleep? and (iv) what other historical and contemporary facets of life interact with SB, including nutrition and different types of stressors? This symposium will attempt to address these questions and stimulate discussion pertaining to the lessons that we can learn from an historical and evolutionary perspective, with a goal of guiding the development of SB reduction policy.

S7: THINKING STRATEGICALLY ABOUT ORGANIZATIONAL DIVERSITY: PROMISING PRACTICES AND ACTION STEPS FOR KINESIOLOGY UNITS

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Institutions, organizations, and individuals benefit from a culture of diverse thinking and inclusive excellence. This is possible when students, faculty, and leadership with diverse traits and backgrounds (e.g., race/ethnicity, gender, age, physical capability, socioeconomic background, and/or sexual orientation) each have equitable access to opportunities for academic and professional growth. Achieving sustainable organizational diversity and a culture of inclusive excellence requires a strategic emphasis on nontraditional means to identify and develop students, faculty, and leaders. The next 50 years of SEACSM is positioned to be the representative ACSM chapter of inclusivity and diversity through partnerships and alliances with many of the 48 Historically Black Colleges and Universities (HBCUs) within the southeastern region. The purpose of this session is to present innovative, creative, and effective strategies by which Kinesiology students and professionals can work together to positively influence the field of Kinesiology. Attendees will be introduced to programmatic models that promote diversity, equity, and inclusive excellence in several Departments of Kinesiology located in the Southeastern United States. Examples of strategies specifically purposed to enhance institutional and organizational diversity will be presented. Speakers will also describe newly-developed and long-standing programs and partnerships created to enhance institutional diversity in Kinesiology at the department, regional, and national organizational levels. Participants will gain an understanding of intentional, sustainable, and strategic planning processes that can lead to enhanced organizational diversity through successful recruitment, retention, and advancement of traditionally underrepresented faculty, staff, and students. Strategies presented in this session will serve individual departments and organizations as well as the greater communities in which the organizations or institutions exist (Pittinsky, 2010).

S8: EFFECT OF FASTING OR CARBOHYDRATE INGESTION PRIOR TO RUN IN ATHLETES USING CONTINUOUS GLUCOSE MONITORING

Suzanne L. McDonough. *Mississippi College, Clinton, MS.*

Continuous glucose monitoring (CGM) devices have been in use for years primarily for diabetics who rely on them to monitor life-threatening swings in their blood glucose levels. CGMs are devices that attach to your body for up to 14 days and take ongoing measurements of circulating blood glucose. The devices detect the glucose in subcutaneous fluid just under the skin via a tiny, imperceptible probe and transmits raw data to a smart phone or computer. The software then interprets the value and give the user context to gauge the impact of various meals and exercise on their blood glucose levels. Over the past few years these devices have gradually been making their way into mainstream use among recreational and professional athletes. Given the interest in the implementation of CGM use with athletes, the purposes of this symposium are to discuss the feasibility and considerations for developing best practices in the application of CGM, to examine the processes that must be gone through to have these devices available for use by athletes, to discuss the ways the devices can be used to aid athletes in their quest for optimized blood glucose maintenance before, during, and after exercise, and to consider discuss the outcomes from our pilot study with recreationally trained distance runners. Researchers and practitioners will gain a greater understanding of the CGMs and how they can be used for an off-label application to strengthen nutritional counseling for athletes with regard to pre-run meals, snacks, and post run re-fueling. Researchers and practitioners will also learn how CGMs can be used as a valuable tool to identify blood glucose levels associated with an individual's mood and well-being via survey data.

S9: POST-STROKE EXERCISE AND REHABILITATION: INTERNAL AND EXTERNAL DRIVERS OF NEUROPLASTICITY

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Nearly 800,000 Americans suffer a stroke each year. While stroke mortality rates have been decreasing, the increased survivorship leaves many individuals with permanent disabilities. Chief among them are upper and lower extremity motor impairments. Physical and occupational therapies are typically performed to reduce these impairments. These therapies seek to harness neuroplasticity, which is defined as the nervous system's ability to adapt and/or change behavior in response to learning and experience. The purpose of this symposium is to introduce the concept of neuroplasticity and how exercise and rehabilitation can beneficially affect the neuroplastic environment leading to improved motor function.

Motor rehabilitation typically involves the use of repetitive task-based movements. Under such parameters, long-term potentiation (LTP) (i.e., strengthening of neural connections) like mechanisms are thought to enhance the neuroplastic environment. Additionally, aerobic exercise is thought to increase local and peripheral metabolites/neurotrophic factors (e.g., Brain-derived Neurotropic Factor) that increase the effectiveness of LTP-like mechanisms thereby enhancing the neuroplastic environment. However, improvements in laboratory measurements may not always transfer to real-world situations as the transfer may be dependent on the intervention itself, the timing of the intervention, and how (e.g., verbal cues, attentional focus) they are performed.

In this symposium, we will discuss the basics of neuroplasticity. We will discuss our recent and ongoing work that utilizes exercise as a priming method to enrich the neuroplastic environment and subsequently enhance the rehabilitation response. We will also discuss how altering exercise and rehabilitation modalities may better retrain stroke survivors to be independently mobile while reducing the risk of secondary stroke. Lastly, we will introduce several external methods/technologies that can assist in creating a more beneficial neuroplastic environment. These adjuvant therapies may help improve motor outcomes post-rehabilitation.

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S10: DO RECENT SPORTS DRINK INNOVATIONS HELP YOU GO THE DISTANCE?

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It is well-established that carbohydrate ingestion during prolonged exercise (> 2 h) enhances endurance performance. There is also evidence of a dose-response relationship, whereby the consumption of larger amounts of carbohydrate is associated with greater ergogenic effects. However, high carbohydrate intake during exercise is also associated increased risk of gastrointestinal intolerance, resulting in symptoms (fullness, nausea, abdominal cramps, etc.) which negatively affect performance. Therefore, recent innovations in sports drink composition have aimed to enhance gastrointestinal tolerance, while also increasing carbohydrate availability to the muscle; in effect, increasing the "maximal beneficial carbohydrate dose". The development of multiple transportable carbohydrates (i.e. combining glucose + fructose, which utilize different intestinal uptake transporters), and carbohydrate hydrogel beverages are two prominent examples of this approach. This tutorial will: a) examine the physiological rationale for multiple transportable carbohydrates and hydrogel beverages, b) discuss the efficacy of these innovations, regarding their effects on carbohydrate oxidation rates, gastrointestinal tolerance, and exercise performance, and c) discuss practical considerations for athletes. The tutorial is targeted to students, professionals and practitioners who have an interest in the effects of nutritional modifications on metabolic responses and performance in endurance athletes.

S11: THE EVOLUTION OF EXERCISE AND SPORTS SCIENCE: INTERDISCIPLINARY TEAMS AND THE FUTURE OF THE FIELD

Justin B. Moore, FACSM[1], Lee Stoner, FACSM[2], Simon Higgins[3], Malia NM Blue[2], Abbie E. Smith-Ryan, FACSM[2]. *[1]Wake Forest School of Medicine, Winston-Salem, NC. [2]University of North Carolina at Chapel Hill, Chapel Hill, NC. [3]Elon University, Elon, NC.*

The field of exercise and sports science has evolved considerably from its origins as a relatively narrow collection of physiologists, biomechanists, and psychologists into a broader array of specialties and disciplines. However, opportunities still exist for interdisciplinary training and research collaboration if the maximal impact of exercise and sports science research is to be fully realized. Regrettably, the journey from basic discovery, to application, to population impact remains painfully slow. In addition, many of the meaningful questions that can be answered by relatively homogeneous teams have been answered, revealing increasingly complex challenges facing the field that require diverse and complimentary expertise to overcome. Furthermore, dissemination of new knowledge and skills to the public and practice communities requires concentrated effort and expertise in a field where misinformation and disinformation are prevalent and persistent. Therefore, this symposium will include the following topics: (i) an overview of the disciplines contributing to exercise and sports sciences; (ii) discussion of potential disciplines and specialties that largely exists outside of exercise and sports sciences and their potential contributions to interdisciplinary teams; (iii) implications for pedagogy and professional training in the field of exercise and sports sciences, and (iv) potential impact of interdisciplinary teams on

S12: FACTORS AFFECTING THE FEMALE COLLEGIATE ATHLETE AND PERFORMANCE

Jennifer A. Bunn, FACSM[1], Paula Parker-Fordyce[2]. *[1]Sam Houston State University, Huntsville, TX. [2]Campbell University, Buies Creek, NC.*

Understanding contributing factors for sport and human performance is a growing research field as microtechnology has advanced and become more affordable. However, the primary focus of the sport science literature has been centered on elite/professional male athletes, with only a small portion of the literature devoted to collegiate athletes and even less devoted to female athletes. Collegiate athletes are unique compared to their professional counterparts due to the academic demands of the student-athlete. Further, female athletes are different from their male counterparts physiologically and psychologically. The purpose of this symposium is to discuss the influencing factors for sport performance in Division I female athletes. Data presented will include performance information obtained from microtechnology (e.g., global positioning systems, accelerometers, heart rate monitors), game statistics, daily wellness assessments, sleep assessments, psychological hardiness measures, and ratings of perceived exertion. The presenters will discuss the relationships between these data and how female student-athletes' performance and wellness fluctuate with the training year and the academic calendar. Information presented will focus on four years of data collection with a collegiate women's lacrosse team and will be compared to research findings research findings from other collegiate female athletes as well as counterpart populations (e.g., male lacrosse players, male collegiate athletes). Identifying unique physiological and psychological factors in female collegiate athletes can lead to recommendations for application. These recommendations will include how researchers, sport coaches, strength and conditioning coaches, sports medicine and sport psychologists may manage training to see better physical and mental outcomes in their athletes.

S13: CONCUSSION AND FLUID-BASED BIOMARKERS: WHERE DO WE STAND AND WHERE ARE WE HEADED?

Matthew J. Rogatzki, Jazmin O. Harrell, Chandler K. Bartol. *Appalachian State University, Boone, NC.*

Accurate concussion diagnosis at the sideline of an athletic event is important for two primary reasons: 1) to remove concussed athletes from play so they do not experience further brain injury and 2) to allow athletes who have not suffered a concussion re-entry into the game or match. This puts tremendous pressure on certified athletic trainers and team physicians to make the correct diagnosis as quickly as possible. Currently, the Sports Concussion Assessment Tool-5th Edition (SCAT5) is commonly used to diagnose concussion. However, the full SCAT5 assessment is difficult to perform as quickly as players and coaches would like for questions of return to play. It is also possible for SCAT5 performance to change following a concussion. For example, a recently concussed athlete may perform satisfactorily on the SCAT5 but 30 minutes later may perform much worse. Therefore, research is ongoing to find additional indicators of concussion that can be included to improve speed and accuracy of concussion diagnosis. Since the beginning of the 21st century fluid-based biomarkers have been under investigation as a potential objective tool for aiding concussion diagnosis. In many instances media outlets will glamorize the findings that come from this research with headlines such as "FDA authorizes marketing of first blood test to aid in the evaluation of concussion in adults" or "Saliva test can accurately diagnose concussion, rugby study shows." These headlines may garner readership but creates confusion among the public and practitioners, especially novice practitioners, who may be led to believe that concussion can be diagnosed simply through a finger prick or spitting into a cup. This research review symposium will 1) provide a background into the potential utility of fluid-based biomarkers in concussion diagnosis, 2) give insight into the fluid-based biomarker current state of affairs, and 3) discuss future directions of fluid-based biomarker research.

S14: FACTORS OF CONSIDERATION WHEN ASSESSING RUNNING ECONOMY

Eric K. O'Neal, Savanna N. Knight. *University of North Alabama, Florence, AL.*

Distance running performance can be challenging to assess in the laboratory setting. The physiologically exhaustive nature of maximal effort distance running requires recovery periods much longer than those of short duration maximal effort tasks. For example, sprinters may compete in multiple heats in a single day; however, competitive marathon runners may take weeks or months off between competitions to regain performance capacity. This is problematic for repeated measures design studies. While treadmill time trials may lack in ecological validity, time trials on outdoor road courses or tracks must contend with environmental factors influencing internal validity. Out of practical necessity, running economy (RE) is often used as a surrogate to determine if a treatment intervention will potentially influence running performance. This symposium will have four primary purposes. The first is to provide a brief background on the primary measurements that have been used as RE outcomes (i.e. $\dot{V}O_2$ and metabolic cost). The second goal is to contrast the strengths and weakness of using $\dot{V}O_2$ versus metabolic cost. The presenters will then offer methodological preparation advice to investigators that are considering using RE as a dependent variable in future research projects. Finally, the presentation will include discussion on whether or not reporting RE is a valid substitute versus actual running performance task assessment. This symposium will focus on physiological versus biomechanical factors, and also include considerations for runner's sex.

S15: EXERCISE IN HEART FAILURE: TIME TO HIIT AND PRIME THE HEART AND SKELETAL MUSCLE?

Siddhartha S. Angadi, FACSM, Jason D. Allen, FACSM. *University of Virginia, Charlottesville, VA.*

Heart failure is a major health concern and is the leading cause of hospitalization among aging Americans with estimated direct and indirect costs of treatment at ~$39.2 billion and a ~75% 5-year mortality rate. The principal disease phenotypes of the disease are heart failure with reduced ejection fraction (HFrEF-primary systolic dysfunction) and heart failure with preserved ejection fraction (HFpEF-primary diastolic dysfunction). Both phenotypes are associated with poor survival and high rates of hospital readmission. The heart failure syndrome is characterized by significant cardiac and skeletal muscle dysfunction that manifests as significant activity intolerance in older adults with associated restrictions in the ability to carry out daily activities, high rates of disability, dependence, and nursing home admissions. Fitness as defined by VO_2peak and muscle strength as well as functional tests (such as the Senior Fitness Test) are modifiable predictors of morbidity and mortality in these patients. Exercise training is a valuable therapeutic adjunct in the management of the disease process. Traditional moderate intensity exercise training has been used with some success in this population. However, high intensity interval training (HIIT) and Peripheral Remodeling through Intermittent Muscular Exercise (PRIME) represent novel exercise interventions that have been demonstrated to result in greater improvements in fitness and function in patients with HFpEF and HFrEF. This symposium will explore the epidemiology and available treatments in this clinical population. Further, it will explore in depth the physiological bases of these novel exercise interventions and delve into the direct cardiac (systolic/diastolic function) and peripheral skeletal muscle effects of these interventions. Finally, we will discuss the future of exercise interventions as well as potential exercise + dietary strategies that could be used to optimize health in patients with heart failure.

TUTORIALS (T1–T15)

T1: WORKING WITH TACTICAL ATHLETES: TIPS, TRICKS, AND LESSONS LEARNED

Carly Beck[1], Marissa Villafuerte-Brooks[2], Shelby Harbison[1], Tamerah Hunt, FACSM[1], Richard Westrick[3]. *[1]Georgia Southern University, Statesboro, GA. [2]Optim Health, Statesboro, GA. [3]United States Army Research Institute of Environmental Medicine, Natick, MA.*

The tactical athlete population presents a set of unique considerations for healthcare providers compared to traditional college, high school, or professional athlete populations. There are numerous variables to be considered when learning how to skillfully serve as a medical provider in this population. Those serving in the military, as a police officer, or as a firefighter all require high levels of physical and mental capabilities, and the training required to reach this level can be extremely demanding. Tactical athletes are expected to consistently meet these demands and remain resilient throughout. This expectation creates stigmas associated with injury, pain, and displayed weakness within this population. Further, a general mistrust in the healthcare system has been recognized among these individuals. In order to combat this, healthcare providers must be able to build rapport with these individuals, understand the unique lifestyles they serve, and prepare them to be physically ready to fulfill their duties. This can be difficult as a civilian healthcare provider due to the lack of familiarity with how these populations function. Various elements such as jargon, unique injuries, complex healthcare histories, and large patient populations can impede a provider's ability to best serve tactical athletes, especially when it is a new experience. The purpose of this presentation is to provide civilian healthcare providers insight on working with tactical athletes through the lessons learned by individuals working in this setting. We will discuss each tactical setting and their duties, the learning curves presented to civilian healthcare workers first breaking into working with this population, and how to best serve tactical athletes through patient/provider trust and efficient healthcare. Learning objectives: After attending this session, attendees will 1) understand the unique aspects of working with tactical athletes, 2) recognize the importance of building rapport with tactical athletes, and 3) incorporate important takeaways from this presentation into their care for tactical athletes. The target audience for this presentation is any healthcare provider interested in, or currently working with tactical athletes.

T2: HOW TO FORMULATE RELEVANT RESEARCH QUESTIONS THAT HAVE AN IMPACT

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From writing papers to developing grant applications, the ability to formulate relevant and impactful research questions is a critical skill for scientists. A well-written research question is clear, focused, concise, feasible, and novel. In the field of exercise and health science, good research questions are also ethical and clinically relevant. Without education, practice, guidance, and experience, students and early career investigators may not adequately develop this critical skill. Furthermore, one of the professional development responsibilities of scientific mentors is to enhance their mentees' ability to formulate strong research questions. Thus, the purpose of this tutorial session is to 1) provide a didactic overview of key research question components spanning basic to clinical disciplines; 2) collaboratively evaluate examples of both poorly and well-written research questions; and 3) facilitate interactive panelist discussion based on questions generated by the attendees. Panelists' career stages range from doctoral student to distinguished professor emeritus. The learning objectives are to 1) identify the importance and key concepts of strong research questions; and 2) improve application of these key concepts for development of well-written research questions. As formulating relevant and impactful research questions is a skill continually developed throughout a scientist's career, the target audience for this tutorial session ranges from undergraduate students to faculty members.

T3: CULTURALLY RELEVANT PEGAGOGIES IN THE FIELDS OF EXERCISE SCIENCE AND HEALTH PROMOTION

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With diversity equity and inclusion being at the forefront of many organizations' missions it is important to understand and learn pedagogies that promote said mission. The integration of culturally relevant pedagogies (CRP) and utilization of the cultural relevance cycle (CRC) may enhance practitioners understanding and reflection of culture to become more aware of their position in the faculty-staff or researcher-subject relationship. Without personal reflection, understanding of bias, and a willingness to learn from others, we may fail to recognize and promote values that considered to be of the culture of power. The purpose of this presentation is to discuss the integration and appreciation of culture within our respected exercise science concentrations. Concepts include a) defining CRP, b) use of CRC, and c) an example of the application of CRP & CRC to sports-based youth development programs. The learning objectives are to a) improve understanding of CRP b) Encourage the implementation of CRC in practice. The target audience for this information will be faculty and researchers that work with human subjects.

T4: ACSM CERTIFICATIONS: DEFINING AN EXERCISE PROFESSION AND HOW TO SUCCEED IN THE EXERCISE PROFESSION

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Professional certification is a voluntary process in which a reputable organization, such as the American College of Sports Medicine (ACSM), grants time-limited recognition and use of a credential to individuals who comply with eligibility requirements and meet a minimum level of professional competence. ACSM certifications are pivotal in establishing professional standards in both the health fitness and clinical exercise settings. The ACSM Certification Department and the ACSM Committee on Certification and Registry Boards (CCRB) implement rigorous psychometric development standards and continual process improvement strategies to ensure its certification exams are valid, reliable, and fair for exam candidates, and, more importantly, provide reasonable assurance to the public the ACSM exercise professionals can safely and effectively perform their job duties. This tutorial will (1) provide information on the development and ongoing maintenance of ACSM certifications, (2) role and purpose of ACSM's professional certifications, (3) provide insights into how to adequately prepare for a high stakes ACSM certification exam, and (4)

provide personal insights from gained from employer feedback in succeeding in the exercise profession.

T5: DEVELOPING A CLINICAL COLLABORATION AND AFTER-SCHOOL EXERCISE PROGRAM FOR CHILDREN WITH OBESITY

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Specialized medical clinics focusing of childhood overweight and obesity can now be found across the country. These programs may provide access to physicians, dietitians, exercise physiologists, mental health professionals and more. Some house their own after-school programs to provide an opportunity for physical activity, but not all clinics have this capacity. Additionally, many of these clinics are in college towns where there is a potential opportunity to partner with departments focused on health, exercise, and wellness. This tutorial will discuss the development of such a partnership between the Erlanger Childhood Healthy Eating and Active Living Center and the Department of Health and Human Performance at the University of Tennessee at Chattanooga. The tutorial will discuss the planning and development process of MOC PALS (Movement on Campus - Partners for Active Lifestyle Success), an after-school physical activity program on the university campus and staffed by university faculty and students. Topics will include establishing community partnerships, identifying patient needs and interests, formalizing the agreement through a Memorandum of Understanding, recruiting university students, and guidance for programs on campus that involve minors. At the completion of the tutorial, attendees should be able to explain the importance of these various features to the potential success of a program. Attendees interested in developing similar programs with clinical partners in their communities will leave with knowledge of how to begin building these relationships and a general outline for the steps necessary to institute this type of program. Funding: Funding for the MOC PALS program was provided by the Department of Health and Human Performance at the University of Tennessee at Chattanooga.

T6: BINGOCIZE: PREPARING STUDENTS FOR CAREERS IN AGING CARE THROUGH SERVICE-LEARNING

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Fun and effective health promotion programs are needed to help address older adults' declines in functional mobility, cognition, activities of daily living, social engagement, and increases in fall risk. Bingocize, an evidence-based health promotion program that combines exercise, health education, and the widely popular game of Bingo, was created to address these problems. The program is currently used throughout the United States and internationally in all types of older adult communities, including senior centers, assisted living, and long-term care. University faculty use Bingocize to provide students with an engaging service-learning activity in certified nursing homes in Kentucky, Alabama, and other states. The purpose of this presentation is to describe the Bingocize program and how it can be used to help prepare future health professionals to work with older adults across the spectrum of care. Attendees will learn how to engage students in a service-learning project using Bingocize. Discussion in this session will focus on how: 1) Bingocize can improve physical, cognitive, social, and physiological health of older adults, 2) Bingocize can be used in a service-learning project to engage future health professionals, and 3) what external funding is available from the United States Center for Medicare and Medicaid to help implement the Bingocize service-learning project in older adult communities. The service-learning model discussed in this presentation can be used to facilitate partnerships between older adult communities, university staff, and students. Funding information: United States Center for Madicare Services Civil Money Penalty Grant; Crandall, KJ. Bingocize: An evidence-based health promotion program to improve the quality of life of Tennessee certified nursing facility residents. $1,008,217.00, 2019; United States Center for Medicare Services Civil Money Penalty Grant; Davis, BA. Bingocize: An evidence-based health promotion program to improve quality of life of Alabama Certified Nursing Facility Residents. $948,718.00, 2021.

T7: EXPLORING SCOPE OF PRACTICE: THE FUNCTIONAL EXERCISE SCIENCE PRACTICE MODEL IN EXERCISE SCIENCE EDUCATION

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Exercise science (ES) professionals are often not recognized in a manner commensurate with their skill set and educational training. In addition, one of the greatest challenges faced by ES educators is teaching students to reach necessary levels of problem solving and critical thinking. To meet these challenges, an innovative practice model was implemented in an ES curriculum. The purpose of this tutorial is to describe the basis for and implementation of the Functional Exercise Science Practice Model (FESPM) in ES education and practice. The model consists of the following six categories/lines of thought: psychosocial, assessment, diagnosis, prognosis, interventions and outcomes. Preliminary data indicate the model effectively advances student recall and application during laboratory instruction, written examination and practical simulations. Without a shift toward a more functional practice model, the schism between ES education and delivery of care will persist, inhibiting the ES impact on current societal needs. The FESPM also advances the exercise science profession by describing professional boundaries, while effectively working within the scope of practice. Exercise science professionals identify/"diagnose" limitations in flexibility, strength/power/endurance, body composition, cardiorespiratory fitness, and motor control/movement as contributors to limited health, fitness, and performance. Communicating that diagnosing and prognosing is within the exercise science scope indicates a higher level of function to exercise science professionals, other health professionals, and the population at large. In summary, the authors have implemented a well-received instructional model to effectively teach critical thinking and problem solving to exercise science students while promoting professional advancement within the health care system. Learning objectives include: 1) know current exercise science trends in practice and their associated repercussions, 2) understand the basis for and implementation of the FESPM critical thinking and problem solving model in exercise science education, 3) learn specific instructional design and assessment components within the six lines of thought, 4) apply FESPM to exercise science courses and curricula. The tutorial target audience is all Exercise Science related faculty, preceptors and practitioners.

T8: INCORPORATING MINDFULNESS INTO YOUR PERSONAL TOOLBOX

Kylie Roberts, Kaytlyn Johnson, Tamerah Hunt, Megan Byrd. *Georgia Southern University, Statesboro, GA.*

According to Mental Health America, mental health is at the forefront of discussions with 19% of adults reporting a mental illness, which is equivalent to over 47 million Americans. Examples within the current media involve discussions across numerous venues including high profile athlete testimony and advertisements focusing on mental health in the general population. These changes highlight the importance of being able to cope in a healthy manner, especially as people face extremely difficult situations such as COVID-19. Mindfulness is a technique that encourages individual awareness of judgmental thoughts and unconscious expectations thus allowing them to turn their focus on being in the present moment. Traditionally mindfulness has been associated with relaxation techniques that have been cultivated out of historical traditions. The practice of mindfulness has the potential to influence many aspects of one's life. As an intervention, mindfulness has been shown to offer individuals techniques to decrease both stress and anxiety following implementation. As mindfulness continues to grow in popularity, more programs are being utilized and further research is being done in a variety of settings. Presently, mindfulness is being seen in Division I Athletic Departments as well as Colleges, Universities, hospitals and clinics across the country. Larger corporations such as Google are also beginning to adopt mindfulness programs into their companies to support their employees. The purpose of this presentation is to discuss how to incorporate mindfulness into one's general practice. We will discuss the purpose of mindfulness and how it can be used in daily activities and provide hands-on demonstrations of tools and strategies to help the attendees: 1) focus on the present 2) conceptualize work life balance and 3) manage stress. Learning objectives: After completing this session, attendees will: 1) understand the concept of mindfulness 2) be able to apply mindfulness techniques and 3) develop a personal mindfulness plan for practice. Additionally, a list of tips and tricks will be provided on how to use mindfulness to manage stress.

The target audience for this tutorial is students, faculty, staff and anyone that exhibits stress in their lives.

T9: MEASURING FATIGUE AND FATIGABILITY
Kevin K. McCully, FACSM, Abisola Akinbobola. *University of Georgia, Athens, GA.*

Fatigue is one of the universal responses to physical activity. Fatigue is an essential component of most sports competitions and is an extremely common symptom in patients with a wide variety of conditions. The term 'muscle wisdom' has been used to describe fatigue as a protective mechanism that prevents exercise from causing muscle damage. Fatigue is often thought of as a sensation of fatigue while fatigability is thought of as the potential or likelihood that a muscle will fatigue. This tutorial will go over definitions and mechanisms behind fatigue/fatigability. Then methods of how fatigue and fatigability are measured will be discussed. Finally, the consequences and significance of fatigue and fatigability in athletic and patient populations will be discussed. The goal of this tutorial is for the attendees to have better understanding of these terms and how they can be assessed in their own studies.

T10: THE INFLUENCE OF GRAVITATIONAL FORCES ON HUMAN PERFORMANCE AND PHYSIOLOGY: A REVIEW OF NAVAL AEROSPACE OPERATIONS IN EXTREME ENVIRONMENTS
Leslie Jerome Brandon, FACSM[1], Tristan Alston[2], Trudy Moore-Harrison[2]. *[1]Georgia State University, Atlanta, GA. [2]University of North Carolina-Charlotte, Charlotte, NC.*

The human body is an amazing organism and is often asked to function under extremely challenging circumstances. An example of the body's ability to endure these significant challenges (threats) can be seen in ever echelons of Naval Aviation. Naval aircraft have the ability to take takeoff, land, and preform various dynamic flight regimes; introducing accelerative or gravitational forces (G-force) to the human system in mere seconds. Therefore, the purpose of this tutorial is to discuss and provide personal data relative to the impact of acceleration, deceleration, and G-forces on human performance and physiology. We will further discuss the effects of take-offs and landings (carriers vs runway), dynamic flight in naval aircrafts (climbs, dives, and short turns), acceleration (linear, angular, and rotational), G-forces (+/- Gx; +/- Gy and +/- Gz) and the physiological responses required to survive these events. Questions about the alterations in the cardiovascular, circulatory, eyes physiology will be discussed. The audience should better understand how G-forces can cause body responses to occur in seconds as acceleration and deceleration reduces circulatory responses. The audience will also become aware of how G-forces can reduce neurological functions, disable vision and cause unconsciousness. Finally, the audience will gain a better understanding of the relative impact of the G-forces on survival. In summary, due to threats of naval aerospace travel extensive training and conditioning is necessary for successful trips.

T11: GRADUATE STUDENTS MENTORING UNDERGRADUATE STUDENTS IN A SERVICE-LEARNING EXPERIENCE
Katy Johnson, Kylie Roberts, Megan Byrd, Tamerah Hunt, FACSM. *Georgia Southern University, Statesboro, GA.*

According to Tourigny and Pulich (2005), mentoring is a critical component to gaining knowledge based on personal experience, intuition, judgment and individual insight. Moreover, mentoring relationships have the potential to enhance personal, academic, and professional growth. When coping with the stress of undergraduate studies, it is perhaps even more critical that students have peer-mentor relationships to help develop their knowledge outside of their program. In many instances, peer mentors offer emotional support through empathy and validation (Greene, 2021). The advantages of mentoring extend beyond just the mentee, as the mentor can also benefit in both psychosocial and career development. Advantages include, but are not limited to, a sense of belonging, enhanced self-esteem, career satisfaction and involvement, and increased self-confidence and role modeling (Kowtko, 2010). Given the benefits of mentoring, the utilization of graduate students as mentors for undergraduate students offers a unique opportunity for mutual learning. Further, graduate mentoring was pertinent to the effectiveness of a service-learning undergraduate course, in which students were tasked with educating members of the community on the topics of fitness and mindfulness. Therefore, the purpose of this presentation is to discuss the learning experiences of graduate students involved in the mentoring process of undergraduate students and the potential benefits of a synergistic peer-mentoring relationship. In addition to the experiences of graduate students, the logistical nature of providing mentoring sessions to undergraduate students and the progression and reflection of undergraduate students who participated in the class will also be addressed. Following the presentation, attendees will gain an understanding of what mentoring an undergraduate service-learning experience looks like through the perspectives of graduate students as well as how future students could benefit from mentoring experiences. The target audience for this tutorial is students, faculty, and staff that wish to incorporate graduate-level mentoring and service-learning experiences into their programs.

T12: CORRECTING RISKY-TACKLE TECHNIQUE IN AMERICAN FOOTBALL CONCEPTS FOR SCREENING AND ASSESSMENT TO ELIMINATE TARGETING
Scott Dietrich. *Barry University, Miami Shores, FL.*

USA Football(R) and the Center for Disease Control (CDC) have made advancements in how coaches are trained to teach tackle skills, yet it remains unknown if youth football players can effectively utilize these skills. A coach's ability to assess six key components is an important part of teaching fundamentals and for the early identification of risky tackle behaviors. Categorizing the behaviors as safe or risky at key intervals during task performance coupled with providing accurate and meaningful corrective feedback may help reduce the risk of sustaining serious head or neck injuries. The purpose of this presentation is to review relevant literature on skill-based interventions for teaching tackle technique and explain the application of a technology-based screening method, coupled with corrective strategies for identifying and correcting risky tackle behaviors. Concepts include a) using player self-assessment to improve learning and communication, b) integrating video instruction to enhance corrective feedback strategies relevant to skill development, c) embedding regular season tackle screens and qualitative assessments from the (coach, parent, health care professional) using a standard rubric, and d) corrective feedback strategies for delivering results. Learning objectives for the session are to 1) describe the correct set up for the tackle assessment drill, 2) identify six components for assessing a safe football tackle, and 3) provide two cues for correcting common technique faults. The target audience for this pedagogy and research tutorial is coaches, exercise science professionals and sports medicine providers who supervise or provide medical coverage for youth or scholastic American football.

T13: UTILIZING MOTIVATIONAL STRATEGIES TO IMPROVE ATHLETE, CLIENT, AND/OR STUDENT PERFORMANCE
Andy Bosak, Andrew Fields. *Liberty University, Lynchburg, VA.*

The focus of exercise science or related studies on health, wellness, movement, and performance through scientific inquiry has greatly contributed to various professional opportunities that potentially await students upon graduation. However, it is becoming more common for many students to work in human performance or exercise science related fields before they complete their degree(s). Required internships and on-the-job training provides students the chance to work with athletes, patients, clients etc. in the personal training, strength training and conditioning, health and wellness, and clinical sectors. Often, the "success" of the clientele in achieving their goals or peak performance further contributes to the learning process and future success of the students. Thus, understanding and implementing the content, learned in various degrees, is very important in exercise program design and administration. However, one cannot argue that another critical part of a client's success is the motivation level that each client has which is often influenced by the person who trains them. Thus, the purpose of this tutorial will be to help session attendees explore and further understand all of the various aspects that relate to successfully motivating clients in various exercise science and human performance sectors. The learning objectives are: 1) understand various leadership styles and how they can be utilized to improve a client's successful goal obtainment, 2) discuss how goal setting strongly relates to successful performance, 3) identify motivation considerations for optimal performance, and 4) review the importance of mentorship and how it can be used to improve client compliance and success. This presentation is intended for A) students and faculty who are currently or seek to eventually be future personal trainers, strength and conditioning coaches, exercise physiologists, wellness coaches, etc., and B) new instructors or junior faculty who

are seeking methods to advise and mentor their current students for academic or future career success.

T14: THE EFFECTIVENESS OF CARDIOMETABOLIC RISK FACTORS ESTIMATING CARDIOVASCULAR DISEASE IN MULTICULTURAL POPULATIONS

Trudy Moore-Harrison[1], L. Jerome Brandon, FACSM[2]. *[1]University of North Carolina at Charlotte, Charlotte, NC. [2]Georgia State University, Atlanta, GA.*

Cardiovascular disease (CVD) prevalence has been reported to be extensive and disproportion among older multicultural adults. Prediction of CVD with cardiometabolic risk factors (CMO) among Hispanic Americans (HA), African Americans (AA), and European Americans (EA) are estimated with the same cutoff points even though the prevalence and clustering pattern among the three populations are different. In the Jackson Heart Study, systematically lower effect sizes for 12 risk variants discovered in European populations on the African local ancestry suggest the need for caution when projecting the impact of a risk factor in one population on another population. Complicating this issue is that AA and HA adults have CMO profiles that place them at a greater risk of CVD, and they actually have higher CVD prevalence than EA. Factors that results in them having higher CVD is not clear. Lipoprotein lipase has been reported to cause the body to harbor variants that account for interethnic variation in HDL-C and TG. Glycosylated hemoglobin (HbA1c) has a higher optimal HbA1c thresholds in AA than in EA suggesting a need to individualize HbA1c relative to glucose levels if HbA1c is used to diagnose diabetes. African Americans have more challenging issues with body fat deposit, both in terms of total and location of the fat deposit. Cardiovascular health trajectories differs between HA, AA, and EA during the early and middle adult years. However further information is needed as to CMO and CVD status in old age. Therefore, based on the literature and data from our labs, the purpose of this tutorial is: 1) A discussion of lipid and lipoprotein levels, and clustering pattern in older AA, HA, and EA. 2) A discussion of contributions body fat, HbA1c, and blood pressure make to CVD in AA, HA, and EA.

T15: ENHANCING A NEW HEALTHY LIFESTYLE WITH EXERCISE AND AUTISM

David S. Geslak[1], Benjamin D. Boudreaux[2]. *[1]Exercise Connection & American College of Sports Medicine, La Grange, IL. [2]University of Georgia, Athens, GA.*

Emerging evidence suggests that regular exercise may provide positive benefits in individuals diagnosed with autism. Some of these health benefits include: increase attention span, reduce stress, enhance language development and reduce stereotypical behaviors. Interestingly, the fitness industry, higher education, or allied health community, tend to have limited knowledge about the benefits exercise has on the autism community. Moreover, these professionals are willing to help but are limited due to the scope of practice or unsure of how to take appropriate first steps to make an individual diagnosed with autism successful and healthy. Ben and David's stories reveal a tremendous opportunity for professionals in the fitness industry, higher education, or allied health community who want to combine their love of exercise with a desire to make a profound effect on a community that desperately needs exercise. Benjamin D. Boudreaux, a doctoral candidate and person with autism shares the journey of his struggles with autism as well as being newly diagnosed with Type 1 Diabetes. He aims to explain how exercise went from being a source of frustration and failure to becoming the gateway to improved confidence and, ultimately, success. David Geslak recognized that most of his clients on the autism spectrum share similar experiences to Ben. For more than 15 years, David has developed and continues to fine-tune exercise protocols to effectively bring exercise to the autism community. Ben and David want to empower medical professionals, researchers, and professors to have a life-changing effect on individuals with autism and their families through exercise training and physical activity. Learning objectives include 1) Discuss and critique exercise research for the autism community 2) Will have a general understanding of autism, its signs and symptoms, and the benefits exercise can have 3) Know what evidence-based teaching practices to use to successfully teach exercise in both an individual and group setting. 4) Define The Five Components of Fitness for Individuals with Autism 5) Understand how to breakdown various exercises to accommodate the different learning styles of autism.

ORAL PRESENTATION SESSIONS (O1–O40)

O1: MORNING RESISTANCE TRAINING SESSION ON SAME DAY AFTERNOON COUNTERMOVEMENT JUMP PERFORMANCE

Matthew J. Johnson, George J. Davies, Bryan L. Riemann. *Georgia Southern University, Savannah, GA.*

BACKGROUND: Although studies have examined the acute effects of resistance training (RT) on various performance indicators, such as countermovement jumps (CMJ), fewer have quantified the effects several hours after a resistance training session (RTS). Currently, there is a void of research examining whether propulsion contribution changes differ between the dominant (DL) and nondominant limb (NDL). PURPOSE: To determine if a morning RTS affects afternoon vertical ground reaction force (VGRF) bilateral symmetry during the propulsion phase of CMJ in collegiate women athletes. METHODS: Fifteen National Collegiate Athletic Association Division I women's soccer and volleyball athletes (18-24 years, 73.6±8.4 kg, 1.74±.19 m) who participated in offseason RT completed 5 CMJ during two afternoon sessions (48hr apart), one which was 4-6hrs after a morning RTS and one on a rest day (RD). The RTS consisted of 6 sets (2 sets per exercise) of 10 repetitions at 80% 1RM for back squat, front squat, and forward lunge. Session order was randomized between participants. CMJ trials were completed with arms akimbo and with 1 minute rest between trials. Dual force plates recorded VGRF separately for the two limbs. Jump height (JH), ground off and ground contact limb differences were computed from the VGRF. Additionally, VGRF impulse for each limb was computed for the eccentric-acceleration, eccentric-deceleration, and concentric phases, as well as peak concentric force. RESULTS: JH was slightly less, but not significantly different (P=.472, d=.19), for the RTS (.208±.038m) compared to RD (.215±.051m). There were no significant (P≥.137) ground off/ground contact limb differences. There were no significant session or limb differences (P>.05) for impulse during the eccentric-acceleration and eccentric-deceleration phases. Concentric phase impulse was less, but statistically significant (P=.048, d=.24), for the RTS (.218±.030 BW•s) compared to the RD (.226±.034 BW•s). DL (.228±.033 BW•s) concentric phase impulse was significantly greater (P=.015, d=.30) than the NDL (.217±.029 BW•s). Peak concentric force had no significant results (P≥.249). CONCLUSIONS: These results suggest a morning RTS has minimal impact on afternoon CMJ performance and no influence on VGRF limb symmetry. As the DL contributed slightly more to CMJ performance, future research should consider the source (i.e., strength differences) of the asymmetry.

O2: INCREASED MASS INFLUENCES BRAKING AND PROPULSION IN BIPEDAL HOPPING

Amanda Ransom, Blake Justice, Matthew Condo, Matthew Foreman, John Fox. *Methodist University, Fayetteville, NC.*

BACKGROUND: The purpose of this study was to evaluate the influence of added mass on braking and propulsion time in human hopping. Given the effect of increased mass on a linear spring, it was hypothesized that braking and propulsion time would increase with increased mass. **METHODS:** A total of 14 volunteers between 18 and 40 years of age (mass = 77.87 kg, sd = 11.31 kg; height = 1.72m, sd = 0.07 m) performed two 20 second trials of bipedal hopping at preferred frequency under 3 loading conditions. Loading conditions consisted of no added mass, 10% body mass, and 20% body mass added. First, participants performed unweighted hopping. Conditions involving 10% and 20% added body mass were ordered randomly. Mass was added via a weighted vest on the trunk. Ground reaction force (GRF) was measured via two Bertec force plates. Given that equilibrium in hopping occurs when GRF is equal to bodyweight, contact time was considered to be the time in which GRF was greater than bodyweight. Therefore, braking time was the time from the first equilibrium point to peak force. Propulsion time was the time from peak force to the second equilibrium point. A 1 (group) x 3 (conditions) x 2 (trials) factorial ANOVA was used to estimate the influence of loading condition on braking and propulsion time. **RESULTS:** There was a significant main effect of trial on braking time ($F_{(1, 12.90)} = 5.667$, $p < 0.033$). Participants decreased braking time in the second trial. There was a significant main effect for trial ($F_{(1, 11.91)} = 7.550$, $p < 0.018$) and a significant loading condition by trial interaction ($F_{(2, 1869.48)} = 14..4137$, $p < 0.001$) on propulsion time. Post hoc analysis found propulsion time decreased between the first and second trials. Specifically, propulsion time significantly decreased in the 20% mass added condition from the first to second trial ($p < 0.001$). **CONCLUSIONS:** This study provides evidence that adding

enough mass to the trunk may lead to decreased braking and propulsion time over multiple hops and trials. Given the extra mass and number of hops this change in stiffness could be due to fatigue. In general, these results suggest that large amounts of mass must be added to the system to alter spring-mass parameters. These results may inform future clinical applications in obesity management.

O3: ANKLE KINEMATICS IN NEW AND OLD CHEERLEADER FOOTWEAR DURING AN INVERSION ANKLE SPRAIN PERTURBATION

Samuel J. Wilson[1], Abigail Johnson[2], Jessica Mutchler[1], Diego Castro-Diaz[1], Li Li, FACSM[1], Barry Munkasy[1]. *[1]Georgia Southern University, Statesboro, GA. [2]University of Florida, Gainesville, FL.*

BACKGROUND: Cheerleading requires athletes to perform sports-specific movements such as tumbling, jumping, and stunting. The leading injury in cheerleading is an inversion ankle sprain. Previous research has examined biomechanics of the ankle during a step-down task on flat and tilted surfaces and suggests that footwear may influence recovery mechanisms during an inversion perturbation. However, cheerleading-specific footwear has not been examined. Thus, the purpose of this study was to examine ankle kinematics in collegiate cheerleaders while wearing "old" and "new" cheer shoes during a step-down landing task. **METHODS:** Twenty-five healthy male (n = 5) and female (n = 20) collegiate cheerleaders with no history of neuro-musculoskeletal disorders completed this study. Participants completed unexpected step-down tasks on a flat surface and a surface tilted 25 degrees in the frontal plane from a height of 30cm. Initial contact was identified from the force plate and max inversion ankle angle and maximum inversion velocity during the 150-ms post initial contact. A 2 x 2 (footwear [Old vs New] x condition [level vs tilted]) repeated measures analysis of variance was used to analyze time-averaged ankle movement with an alpha level of 0.05 and partial eta squared was calculated for measures of effect size. **RESULTS:** Analyses revealed a statistically significant interaction between shoe and condition when examining the ankle joint angle during step-down tasks ($F(1,24)=12.070$, $p = 0.002$). Further investigation revealed main effects of both shoe ($F(1,24)=85.541$, $p < 0.001$) and condition ($F(1,24)=893.489$, $p < 0.001$) when examining ankle joint angular velocity during step-down tasks. **CONCLUSIONS:** Old shoes and tilted surfaces appear to display decrements in step-down, landing mechanics when compared to their counterparts. Previous research has suggested footwear differences in step-down landing mechanics. The older cheer footwear may have worn down soles and shoe body through continued use. The decreased structural support of the footwear may explain the increases in inversion ankle angle and velocity during landing. These findings may suggest that regularly replacing aging cheer footwear is important in reducing injury risk.

O4: UTILIZING COUNTERMOVEMENT JUMPS AS A MEASURE OF MATCH PREPAREDNESS IN NCAA DIVIDION I WOMEN'S SOCCER

Silvio Polly da Costa Valladao, Thomas L. Andre, Julia Phillips. *University of Mississippi, Oxford, MS.*

BACKGROUND: Training load quantification and monitoring is used in collegiate athletics to help coaches and supporting staff to determine whether players are prepared for upcoming matches. The purpose of this study was to assess the within-subjects correlation of matchday countermovement jump (CMJ) height and the 3-day sum of training load variables preceding matchday in NCAA Division I women's soccer athletes. The authors hypothesized that matchday CMJ height would show negative moderate correlations with the 3-day sum of training load variables. **METHODS**: A total of 23 female soccer players (20 ± 1.1 years; 1.70 ± 0.07 m; 64.6 ± 7.0 kg) participated in this study. Data from seven matches from the 2020 season were included in this analysis. Repeated measures correlations (rmcorr) were used to determine the within-subjects correlations of matchday CMJ height and total distance covered (TD), training load score (TLS; using training impulse [TRIMP] calculations), number of sprints, and distanced covered at high-speed (< 9.32 mph; HODO). Alpha was set a priori at $p \leq 0.05$ and the data was analyzed using R Studio (version 1.4.1106, R Studio, Boston, MA, USA) executing R (version 4.0.4, University of California, Berkeley, CA, USA). **RESULTS**: The correlations between training load variables were not statistically significant ($p > 0.05$). The matchday CMJ height showed very weak nonsignificant relationships with TD ($r = -0.071$, $p = 0.450$, 95% CI = -0.254, 0.116), TLS ($r = -0.016$, $p = 0.874$, 95% CI = -0.191, 0.223), number of sprints ($r = -0.116$, $p = 0.218$, 95% CI = -0.296, 0.071), and HODO ($r = -0.011$, $p = 0.904$, 95% CI = -0.175, 0.197). **CONCLUSIONS**: The results suggest that the 3-day sum of training load variables preceding matchday may not be a good indicator of matchday preparedness in collegiate Division I women's soccer as they did not correlate with matchday CMJ height. Future research should aim to address other strategies to assess matchday preparedness in collegiate women's soccer in order to enhance training periodization to better prepare the athletes for competition.

O5: NEURAL CORRELATES OF LOWER EXTREMITY INTERLIMB COORDINATION DURING A NOVEL MULTI-JOINT BILATERAL LEG PRESS

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BACKGROUND: Athletes with high injury risk landing mechanics rely on greater recruitment of cognition-based brain regions for knee motor control. However, prior research utilizing functional magnetic resonance imaging (fMRI) and 3D motion analysis to isolate neural activity of knee motor control has been limited to unilateral movements, and thus could not evaluated lower extremity motor coordination. The purpose of this study was to investigate the relationship between bilateral knee motor control kinematics and brain activity using a novel, multi-joint fMRI leg press paradigm. METHODS: Seventeen adolescent female athletes (15.0 ± 1.4 years) completed a bilateral leg press during fMRI with concurrent 3D motion capture to quantify interlimb coordination via the correlation between peak-to-peak knee flexion cycle time between legs. Participants completed 4-30sec blocks of bilateral, ankle, knee, and hip flexion and extension movements against resistance, interspersed with 30-sec rest blocks while undergoing brain fMRI. During the movement blocks, participants moved to the beat of a metronome (1.2 Hz) while fully instrumented for biomechanical assessment using a single camera, MRI-compatible 3D motion analysis system. Standard preprocessing and statistical analyses for task-based neuroimaging were completed in FSL, with lower extremity coordination as a covariate of interest. A cluster wise multi-comparison correction was applied at $z>3.1$ and $p <.05$. RESULTS: Less lower extremity coordination during the bilateral leg press resulted in greater activation in the posterior cingulate gyrus and precuneus (voxels=478, $z_{max}=5.56$, $p<.001$), bilateral clusters in the lateral occipital cortices (right: voxels=157, $z_{max} =5.29$, $p<.021$; left: voxels=141, $z_{max} =6.84$, $p=.033$), and the right hippocampus (voxels=138, $z_{max} =4.13$, $p=.036$). CONCLUSIONS: Less lower extremity coordination during a leg press maneuver resulted in greater activation of attention- and memory-related brain regions. Such increased activity may indicate elevated cognitive appraisal of motor control, limiting or interfering with optimal processes for coordination. Future research aiming to improve bimanual motor coordination should consider interventional approaches capable of promoting neural efficiency of cognitive and memory regions during physical activity (e.g., dual-task neuromuscular training).

O6: THE WALLS ARE CLOSING IN: POSTURAL RESPONSES TO A VIRTUAL CLAUSTROPHOBIC SIMULATION

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BACKGROUND: Changes in the visual environment and therefore, the spatial orientation can induce postural instability that could lead to falls. Virtual reality (VR) has been used to expose individuals to virtual environments (VE) that increase postural threats. Claustrophobia is an anxiety disorder categorized under situational phobias and can induce postural threats in a VE. RESEARCH QUESTION: Can VR-generated claustrophobic simulation induce postural threats leading to postural instability? METHODS: Thirty healthy males and females (age: 20.7 ± 1.2 years; height: 166.5 ± 7.3 cm; mass: 71.7 ± 16.2 kg) were tested for postural stability while standing on a force platform upon exposure to five different testing trials that included a normal stance (No VR), stationary VE (VR), and three consecutive, randomly initiated, unexpected claustrophobia trials (CP1, CP2, CP3). The claustrophobia trials (CP1, CP2, CP3) involved all four walls closing in towards the center of the room. Center of pressure (COP) derived postural sway variables were analyzed with a one-way 1 × 5 [No VR × VR × CP1 × CP2 × CP3] repeated measures analysis of variance at an alpha level of 0.05. RESULTS & DISCUSSION: Significant main effect differences

existed in all but one dependent COP-derived postural sway variable. Post-hoc pairwise comparisons with a Bonferroni correction revealed that postural sway excursions were significantly lower in claustrophobia trials than No VR and VR but only accomplished with significantly increased sway velocity, suggesting a bracing and co-contraction strategy when exposed to virtual claustrophobic postural threats. Additionally, postural sway decreased with subsequent claustrophobia trials, suggesting potential motor learning effects. CONCLUSIONS: Virtual claustrophobic simulations involving "the walls closing in" alter postural control responses in healthy young adults. These types of perturbations are susceptible to learning effects, which could serve as the basis for future interventions for those with claustrophobia in VR exposure therapy (VERT).

O7: SENSORY ORGANIZATION TEST CONDITIONS INFLUENCE POSTURAL STRATEGY RATHER THAN FOOTWEAR OR WORKLOAD

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Background: Postural strategies such as ankle, hip, or combined ankle-hip strategies are used to maintain optimal postural stability, which can be influenced by the footwear type and physio-logical workload. Purpose: This paper reports previously unreported postural strategy scores during the six conditions of the sensory organization test (SOT). **Methods:** Fourteen healthy males (age: 23.6±1.2 years; height: 181±5.3 cm; mass: 89.2±14.6 kg) were tested for postural strategy adopted during SOT in three occupational footwear (steel-toed work boot, tactical work boot; low-top work shoe, every 30 minutes during a 4-hour simulated occupational workload. Postural strategy scores were analyzed using a 3 (footwear) × 6 (SOT conditions) within-subjects repeated measures analysis of variance with all nine points of testing (0 min to 240 min) averaged repeated measures analysis of variance (RMANOVA) and a 9 (time points of testing) × 6 (SOT conditions) within-subjects RMANOVA with all footwear averaged at 0.05 alpha level. **Results:** The 3 × 6 RMANOVA revealed significant main effect differences for SOT conditions [F (5, 65) = 217.206, $p < 0.001$, $\eta_p^2 = 0.944$] and the 9 × 6 RMANOVA revealed significant main effect for time points tested [F (8, 104) = 2.635, $p = 0.011$, $\eta_p^2 = 0.169$] and significant main effect differences for SOT conditions [F (5, 65) = 215.795, $p < 0.001$, ηp2 = 0.943]. Significant differences among postural strategy scores were only evident between SOT conditions, and but not between footwear type or the workload. **Conclusion:** Findings indicate that occupational footwear and occupational workload did not cause a significant change in reliance on postural strategies. The significant changes in postural strategy scores were due to the availability of accurate and/or conflicting sensory feedback, during SOT conditions. In SOT conditions where all three, sensory feedback was available, ankle strategy was predominantly adopted, while more reliance on hip strategy occurred in conditions with absent or conflicting sensory feedback.

O8: BASEBALL PITCHING UPPER TORSO ROTATION DURING THE ARM-ACCELERATION PHASE: IMPACT ON OVERALL BIOMECHANICS

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BACKGROUND: Elite baseball pitchers rapidly rotate the upper-torso (UT) during the arm-cocking phase of the pitch. By the end of this phase, the UT is "facing the catcher" (approximately 95°). Then, the arm-acceleration phase begins. Interestingly, UT axial rotation becomes highly variable during this phase. Some pitchers cease UT rotation while others continue to rotate the UT another 20°. **PURPOSE**: Determine if UT axial rotation style (during the arm-acceleration phase of the pitch) impacts overall pitching biomechanics. **METHODS**: 285 professional pitchers (25.8±6.0 yrs) were evaluated using 8-camera motion capture system (Motion Analysis Corporation, Santa Rosa CA) at 480 Hz. Each pitcher threw approximately 10 fastball pitches and the fastest strike was analyzed. Two groups were formed (N=45 in each group) based on the amount of UT rotation completed during the arm acceleration phase (19.2° ±2.5° vs. 4.6°±2.0°). Independent t-tests were used to test for significant differences in throwing velocity, overall torso kinematics, and critical throwing arm kinetics. **RESULTS**: There were no significant differences (p=0.10) in throwing velocity between the rotators (39.9±1.8m/s) and non-rotators (39.3±1.6m/s). The non-rotators generated significantly more (p<0.01) torso lateral flexion at ball release (27.0±11.0° vs. 11.3±10.0°) and had a significantly higher (p<0.01) peak torso flexion velocity (467.0±209.5°/s vs. 356.5±146.6°/s). The rotators had a more "open" pelvis at the beginning of the arm-acceleration phase (103.3±10.4° vs. 95.7±18.3°) and a significantly higher (p<0.01) peak pelvis rotational velocity (726.4±94.9°/s vs. 638.0±106.1°/s). Kinetic analysis revealed that rotators had a significantly higher (p<0.01) peak shoulder distraction force (1156.3±195.7N vs. 1046.0±171.3N), but there were no differences (p=0.77) in peak elbow valgus torque (87.6±16.6N·m vs. 88.9 ±16.0N·m). **CONCLUSION**: Pitchers with limited UT axial rotation appear to rely more on torso flexion and torso lateral flexion strategies. Future studies should attempt to understand why the axial rotators had a higher peak shoulder distraction force.

O9: ABSTRACT WITHDRAWN

O10: PILOT DATA ON THE LONGITUDINAL CHANGES IN METABOLIC AND INFLAMMATORY URINARY BIOMARKERS IN EARLY INFANCY

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BACKGROUND: Previous data suggest that levels of certain metabolic and inflammatory biomarkers in cord blood impact obesity outcomes in childhood. But cord blood comingles biomarker concentrations from the mom and fetus, making it difficult to ascertain biomarker production in newborn infants or decipher the role of these biomarkers in later weight-related outcomes. PURPOSE: To measure changes in several urinary metabolic (i.e., insulin, leptin) and inflammatory (i.e., c-reactive protein (CRP), interleukin (IL)-6, tumor necrosis factor (TNF)-α) biomarkers across early infancy (age 2-24 months). METHODS: As part of a larger longitudinal study, mother-infant dyads (maternal age=28.3±4.5 years) were recruited for a study on prenatal and early life predictors of subsequent obesity. Pilot testing included 23 full-term infants (>38 weeks, 39% female, birth weight=3561±493 g), with urine samples at 2, 6, 12, and 24 months. Urine collection occurred at least 7 days after immunizations or illness. Following manufacturer guidelines, urinary biomarker analysis was completed with a multiplex assay that assessed all 5 biomarkers in a single run. Change across time was individually assessed for each biomarker via multilevel growth models. RESULTS: IL-6 and TNF-α levels were low (<1 pg/ml) and remained stable across time. The number of samples with undetectable IL-6 levels was high at all time points (43-60%), while the undetectable levels for TNF-α were much lower (10-24%). CRP levels were detectable in all samples and were higher at 6 months (1004±3105 pg/ml), than at 2, 12 and 24 months (range: 135.1±309.0 to 245.1±749.0 pg/ml), but the difference was not significant. Leptin levels remained stable over the first 24 months (9-11 pg/ml), with undetectable levels in ~40% of samples at each time point. Insulin levels demonstrated a statistically significant increase in concentration from 2 (1.4±3.1 μIU) to 24 (4.2±4.8 μIU) months (p = 0.031), with undetectable levels dropping from 19% at 2 months to 0% at 24 months. CONCLUSIONS: Urinary metabolic and inflammatory biomarkers were detectable in most infant samples. As expected, given our collection criteria, urinary inflammatory biomarkers were low and relatively stable across the first 24 months of life. Insulin increased across infancy, with the largest change occurring from 6 to 12 months, likely reflecting changes in feeding (integration of solid foods into the diet).

O11: ASSOCIATION OF LIFESTYLE FACTORS AND CARDIOMETABOLIC HEALTH AMONG PREADOLESCENT CHILDREN

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BACKGROUND: Cardiometabolic disease (CMD) risk may begin early in life, with lifestyle behaviors (e.g. activity, dietary behaviors) playing a prominent role. However, it is unclear how these lifestyle behaviors associate with each other in preadolescents and whether certain individual or combination of behaviors are more or less important to CMD risk than others. Further, prior studies have mostly examined singular CMD risk factors, combined risk factors as a linear sum, and/or investigated lifestyle behaviors in isolation. Thus, the purpose

of this cross-sectional study was to simultaneously examine the associations among lifestyle behaviors (sedentary minutes, social jetlag, handgrip strength, cardiorespiratory fitness, processed food pattern, fruit/veg pattern) with CMD risk in preadolescent children. METHODS: A data-driven approach (factor analysis), using 11 variables, identified four cardiometabolic risk factors: blood pressure, cholesterol, vascular, and carbohydrate-metabolic. Multivariable analyses, adjusted for age, sex, ethnicity, and socioeconomic status identified associations between the exposure (lifestyle behaviors) and outcome (cardiometabolic factors) variables. RESULTS: Sedentary minutes, social jetlag, and fruit/veg pattern associated with the cholesterol factor (β = .001, -0.20 and -0.08, respectively; all p < 0.05); sedentary minutes and processed food pattern associated with the vascular factor (β = .001 and .08, respectively, both p < 0.05); and cardiorespiratory fitness and handgrip strength associated with the carbohydrate-metabolic factor (β = -.08 and .07, respectively; both p < 0.001). No exposure variables associated with the blood pressure factor. CONCLUSIONS: With respect to cardiovascular risk, sedentarism may be an especially critical behavior, followed by diet quality. In terms of metabolic control, physical fitness may be key. This cross-sectional study was a necessary starting point to gain an initial understanding of multiple lifestyle behaviors and their effects on CMD risk in preadolescents. However, future longitudinal studies are needed to identify optimal CMD risk prevention strategies in this population.

O12: EVALUATING IN-SCHOOL PHYSICAL ACTIVITY MOVEMENT PATTERNS IN RELATION TO STATE MANDATE

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Background: As evidence continues to grow strengthening the associations between morbidity and childhood obesity, school-based physical activity (PA) policies remain ill-defined, underfunded, and difficult for most schools to implement along with no accountability metric in place. A dramatic decline in PA participation with progressing school years testifies to the urgency for schools to implement mandatory policies for the accumulation of age appropriate moderate-to-vigorous PA (MVPA) for children. This study sought to quantify in-school PA levels among elementary students during recess, physical education (P.E.), and classroom movement integration. **Methods:** Third through sixth grade public school students (N=78: male=31, female=47) were asked to participate by donning an accelerometer (ActiGraph GT9X+, ActiGraph LLC, Pensacola, FL) on the right hip during school hours for 5 consecutive days. Tri-axial movement was recorded from 5-second 'epochs' and converted to minutes of PA according to previously established cut-points. PA logs were kept by teachers. All data was imported to ActiLife (v6.13.4) software and analyzed by one-way ANOVA using SPSS (version 24, Chicago, IL). **Results:** Results show students spent a concerning amount of time as sedentary during PA opportunities. During recess, 40.1% of offered time (336.9±23.1 min.) was completely sedentary. Combining sedentary and light categories accounted for 75.5% of recess. MVPA accounted for 24.8% of recess time (18.1±10.4 min./day). During P.E. opportunities (84.6±24.8 min.), 43.1% was considered completely sedentary while 75.6% of the time was accounted for when combining sedentary and light PA. Only 19.8% of P.E. was considered MVPA (3.9±4.1 min./day). Lastly, of classroom movement integration opportunities (10.9±12.6 min.), 38.1% was considered sedentary with 68.7% of the time accounted for by combining sedentary and light PA. A limited 3.1% was considered MVPA (0.6±1.2 min./day). **Conclusions:** Overall, students fell short of the mandate recommended 30 minutes of MVPA per day during school hours and the recommended amount of P.E. that should be at least moderate intensity. Due to a significant portion of childhood waking hours being spent in school, this information provides valuable insight to the PA levels and potential health status of children in school hours, which supports the need for enhanced attention to accountability of school-based PA.

O13: METABOLIC RESPONSES AND PERCEPTIONS OF ENJOYMENT, COMPETENCE AND EXERTION DURING THE GONOODLE PHYSICAL ACTIVITY PROGRAM

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BACKGROUND: GoNoodle is an online activity platform that is cost-effective and allows activity participation using a confined space without equipment, which is especially important during the COVID-19 pandemic. The purpose of this study was to evaluate metabolic responses, enjoyment, perceived competence, and rating of perceived exertion (RPE) while participating in GoNoodle Indoor Recess activities. METHODS: Twenty-two children (8.6±2.2y; 64% male) completed two trials of Indoor Recess. Oxygen Consumption (VO_2; $mL \cdot kg^{-1} \cdot min^{-1}$) was measured using a portable metabolic system (OxyCon Mobile) during different phases [Warm-Up (WARM), Activity (ACT), and Cool-Down (COOL)] of each trial. Kilocalories expended ($Kcal \cdot min^{-1}$), youth METs (MET_Y), volume of activity ($MET_Y \cdot min^{-1}$), and respiratory exchange ratio (RER) were estimated from the measured VO_2 and VCO_2 during the three phases of each trial. Participants reported their enjoyment (score range 7-35), perceived competence (score range 5-25), and RPE (OMNI scale) after each trial. Five 2X3 (TrialXPhase) repeated measures ANOVAs were run to examine differences in metabolic responses between trials, among phases of each trial, and interactions. Paired samples t-tests were used to examine differences in enjoyment, competence, and RPE between trials. RESULTS: Compared to WARM and COOL, the ACT phase resulted in significantly higher VO_2 [13.9±4.3(WARM); 17.4±4.0(ACT); 12.1±2.8(COOL)], $Kcal \cdot min^{-1}$ [2.2±0.8(WARM); 3.0±1.4(ACT); 2.0±0.8(COOL)], MET_Y [2.7±0.8(WARM); 3.5±1.1(ACT); 2.4±0.6(COOL)], and $MET_Y \cdot min^{-1}$ [8.4±3.0(WARM); 25.9±9.6(ACT); 7.2±2.0(COOL)] (all, p<0.001). RER was significantly higher during COOL (0.89±0.15; p=0.03) compared to WARM (0.84±0.18) but not different from ACT (0.87±0.15). The overall intensity was considered moderate based on MET_Y values (3.0±0.9 MET_Y). WARM (2.7±0.8 MET_Y) and COOL (2.4±0.7 MET_Y) were classified as light intensity and ACT was moderate (3.4±1.1 MET_Y). The average enjoyment (29.4±4.6) and perceived competence (20.8±4.3) scores were high for both trials and perceived competence improved from Trial 1(19.9±5.0) to Trial 2 (21.7±3.7; p<0.05). RPE was not different between trials (Trial 1 3.4±3.4 vs. Trial 2 5.0±4.1; p=0.234). CONCLUSIONS: These findings indicate that the Indoor Recess series of GoNoodle is a feasible means for children to accumulate physical activity in environments with limited space and resources during the pandemic.

O14: INFLUENCE OF PERCEIVED NEIGHBORHOOD FOOD AND PHYSICAL ACTIVITY ENVIRONMENTS ON CHILD WEIGHT TRAJECTORY

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BACKGROUND: To better understand the influence of social determinants on health outcomes and behaviors, a recent call to action by the National Institutes of Health described a need to explore the utility of perceived neighborhood environments as a predictor of health outcomes. PURPOSE: This study expands upon emergent research exploring the role of neighborhood environments on children's weight trajectories as a function of perceived access to neighborhood food and physical activity resources. METHODS: Data from the 2017 (n = 1,003) and 2019 (n = 765) *Roanoke Valley Community Healthy Living Index* was used to explore the relationship between perceived neighborhood food and physical activity environment (low access; high access) and weight trajectory in elementary school-aged youth (healthy weight trajectory = maintain or return to healthy BMI-for-age; unhealthy weight trajectory = regress to or persist at unhealthy BMI-for-age) using Chi Square analysis. RESULTS: Complete data was obtained from 70 children (age = 7.3 ± 1.8 years); 80% of children perceived they live in a high access neighborhood and 60% displayed a healthy weight trajectory. No relationship was observed between perceived neighborhood environment and weight trajectory in youth, $X^2(1) = .004$, p = 0.95. CONCLUSION: Perceptions of the neighborhood environment do not appear to influence weight trajectory in elementary school-aged youth. Additional studies are needed to explore this relationship in larger, more diverse samples.

O15: SIMULTANEOUS INVESTIGATION OF ACTIVITY BEHAVIORS, DIETARY PATTERNS, AND PHYSICAL FITNESS WITH ADIPOSITY IN PREADOLESCENT CHILDREN

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BACKGROUND: The increasing prevalence of childhood obesity is a major public health concern due to its association with an increased

risk of developing early-onset cardiometabolic diseases. Poor activity behaviors, dietary patterns, and physical fitness have been shown to independently contribute to adiposity risk, however these multifactorial behaviors interact with one another potentially increasing risk. Therefore, the purpose of this cross-sectional study was to simultaneously investigate the associations among dietary patterns, activity behaviors, and physical fitness with adiposity in preadolescent children. METHODS: A sample of 392 preadolescent children (age: 9.5 ± 1.1 years) were recruited from schools in three relatively large cities in New Zealand. Body fat percentage (BF%) and fat mass (kg) were measured via bioelectrical impedance analysis. Height, weight, waist circumference and hip circumference (waist to hip ratio, WHR) were measured to calculate the anthropometric indices. Fat mass index (FMI) was calculated by dividing fat mass (kg) by height squared (m^2) and body mass index (BMI) was calculated by diving body mass (kg) by height squared (m^2). Cardiorespiratory fitness (CRF, VO_2 max) was estimated via the 20-Meter Shuffle Test and muscular strength was assessed using a handgrip dynamometer. Physical activity (PA) and sedentary behavior were measured through the Youth Physical Activity Questionnaire. The PEDALS-Food Frequency Questionnaire (FFQ) was used to determine dietary patterns. Sleep questions were used to record sleep duration, social jetlag and sleep disturbance. RESULTS: Multivariable regression, adjusted for sex, ethnicity, age, and school decile revealed that (a) VO_2max, fruit and vegetables pattern and breakfast food pattern were associated with body fat percentage (β = -11.34, .44 and -.58, respectively; all $p < 0.05$); and (b) VO_2max was the only factor associated with FMI (β = -2.45; $p < .001$), BMI (β = -3.54; $p < .001$) and WHR (β = .03; $p \leq 0.01$). CONCLUSIONS: CRF correlated most strongly with adiposity. Therefore, participating in PA to increase CRF should be at the forefront of pediatric health guidelines to address the childhood obesity epidemic.

O16: UNDERSTANDING THE ROLE PRESCHOOLERS BODY COMPOSITION PLAYS IN FMS DEVELOPMENT

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BACKGROUND: Rates of obesity and severe obesity have increased in young children ages 3 to 5 years. Fundamental motor skills (FMS) are considered the building blocks of movement and are often deficient in overweight and obese children. Most preschool studies have relied on body mass index (BMI), and it is not fully known the role body composition plays in FMS. PURPOSE: The purpose of this study was to determine if body composition, fat mass (FM) and fat free mass (FFM) were a predictor of FMS. METHODS: Participants (n = 50) included from two preschools. Peabody Developmental Motor Scales (PDMS-2) subscale scores was used to assess gross motor skills in terms of stationary, locomotion, and object manipulation skills. FM and FFM were measured with foot-to-foot bioelectrical impedance. RESULTS: Participants had a mean age of 3.38 (± .697 years). There was an equal dispersion of males (50%) and females (50%), and most participants were Caucasian (80%). Participants had a mean gross motor quotient of 96.32 (±12.567). Most participants received an "average" score for stationary (60%), locomotor (80%) and object manipulation skills (58%). Results of linear regressions indicate significant models for stationary ($F = 7.36$, $p = .002$), locomotor ($F = 5.09$, $p = .010$), and object manipulation skills ($F = 10.687$, $p < .001$). FM ($t = -2,49$, $p = .040$) and FFM ($t = 3.80$, $p < .001$) were both significant predictors of stationary skills. However, FFM was the only significant predictor of locomotor ($t = 3.033$, $p = .004$) and object manipulation ($t = 3.593$, $p < .001$). CONCLUSION: Results of this study indicate that less FM and greater FFM is associated with higher stationary skill scores. These results further indicate that greater levels of FFM are associated with higher locomotor and object manipulation skill scores. This study highlights the need to target young children for obesity prevention, and specifically aim to improve FFM.

O17: ABSTRACT WITHDRAWN

O18: SHORT-TERM SUPPLEMENTATION WITH β-HYDROHYBUTYRATE KETONE SALT SUPPLEMENT DOES NOT ALTER ENERGY INTAKE IN FEMALES

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BACKGROUND: Ketogenic diets have been used to treat disease with metabolic components, alter energy metabolism and aid in weight loss. An alternative to ketogenic diets is the use of ketone salt supplements to induce nutritional ketosis (blood ketone level of 0.5-3.0 mmol/L) in a short period of time. Previously, ketone salt consumption showed increased beta-hydroxybutyrate (BHB) levels, suppressed appetite hormone levels and hunger. Therefore, the purpose of the study was to examine the effects of a 10-day supplementation with BHB ketone salts (KS) and placebo (PL) on appetite profile, energy intake, blood glucose and ketone levels. METHODS: Fourteen healthy females (age: 26±6 y, body fat %: 28.5±8.0, Body Mass Index: 26±8.4 kg/m2) were recruited to participate in a single-blind crossover study. Participants were randomly assigned to consume either 0.25g/kg of KS or flavor matched PL for 10 days with a 14-day wash-out period in-between. During each visit participants completed an appetite profile using Visual Analog Scale (VAS; 0-100mm) at pre, 0, 30, 60 and 90 minutes and blood glucose and ketone levels were measured pre, at 0, 45 and 90 minutes post supplement consumption. In addition, energy intake was calculated following an ad libitum breakfast and as a 10-day average. RESULTS: A repeated measure ANOVA was used for analysis with significance accepted at $p<0.05$. A significant time and supplement effect but not between D1 and D10 was observed for ketone levels (KS D1: 0.2±0.1, 0.3±0.2, 0.6±0.2, 0.4±0.2 mmol/L and PL D1: 0.3±0.3, 0.3±0.4, 0.3±0.4, 0.3±0.2 mmol/L, KS D10: 0.2±0.3, 0.4±0.4, 0.7±0.4, 0.4±0.3 mmol/L, PL D10: 0.2±0.2, 0.3±0.3, 0.2±0.1, 0.2±0.1 mmol/L, $p<0.05$) at pre, 0, 45 and 90 min, respectively. A significant difference over time ($p<0.05$) but not between supplements or days ($p>0.05$) was observed for glucose. There was no significant difference observed in appetite profile ($p>0.05$) and energy intake at breakfast (KS D1: 212±110, D10: 184±127 kcals and PL D1: 187±131, D10: 191±151 kcals, $p>0.5$) or over 10-day average (KS: 1263± 259 and PL:1335±200 kcals/day, p=0.4). CONCLUSIONS: Beta-hydroxybutyrate (BHB) ketone salt supplementation caused modest elevation in blood ketone levels, however, did not have an effect on glucose, appetite profile or energy intake.

O19: THE EFFECTS OF THE OPTIFAST DIET AND AEROBIC EXERCISE ON INSULIN SENSITIVITY

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BACKGROUND: Clinical weight loss (CWL) (5-10%) combined with aerobic exercise improves insulin sensitivity. The OPTIFAST program is a medically supervised diet for weight loss, however there is minimal data available on the OPTIFAST diet for improvement in insulin sensitivity. METHODS: Twenty-nine sedentary, overweight, and obese adults (Age: 44.8 ± 9.7 yrs; Weight: 95.6 ± 12.8 kg; BMI: 34.2 ± 3.3 kg/m^2) completed a 10-week intervention of supervised aerobic exercise training with an OPTIFAST program to achieve body weight loss of ≥7%. The aerobic exercise training consisted of 300 metabolic minutes (MET min) per week and increased by 50 MET min each week until 700 MET min per week was reached. The OPTIFAST diet included meal-replacement products (~800 kcals per day) and weekly classes about nutrition and behavior modification guided by a registered dietician. A 2-hour oral glucose tolerance test (OGTT) was performed, which involved ingestion of 75g of glucose; serum blood samples were obtained at 0, 30, 60, 90, and 120 minutes and analyzed for glucose and insulin levels. Insulin sensitivity was calculated using the Matsuda Index. A normal score for the Matsuda index is ≥3. RESULTS: After the intervention, Matsuda Index (3.1, $p<0.001$) and relative VO_{2peak} (2.5 mL/kg/min, $p<0.001$) increased, while weight (-9.1 kg, 9.4%, $p<0.001$), waist circumference (-8.5 cm, $p<0.001$), BMI (-3.2 kg/m^2, $p<0.001$), percent fat mass (-2.1%, $p<0.001$), and lean mass (-3.5 kg, $p<0.001$) decreased. Changes in insulin sensitivity via the Matsuda Index were associated with changes in percent weight loss ($r=-0.59$, $p<0.001$), body weight ($r=-0.46$, $p=0.012$), waist circumference ($r=-0.40$, $p=0.033$), fasting glucose ($r=-0.48$, $p=0.009$), and fasting insulin ($r=-0.56$, $p=0.002$). No other significant relationships were observed between changes in Matsuda Index with fitness or other body composition measurements (e.g., BMI, lean mass, and % fat mass). CONCLUSIONS: An OPTIFAST weight loss program combined with aerobic exercise improved insulin sensitivity in overweight and obese adults, with changes in body composition, glucose, and insulin representing important predictors of insulin sensitivity. Future research should investigate the effect of the OPTIFAST diet and aerobic exercise on insulin sensitivity during a weight maintenance period.

O20: EFFECTS OF YOHIMBINE HYDROCHLORIDE SUPPLMENTATION ON EXPLOSIVE BENCH PRESS PERFORMANCE AND STRENGTH-ENDURANCE

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BACKGROUND: Yohimbine hydrochloride (YHM) is an alpha-2-adrenergic receptor antagonist which has sympathomimetic properties. While it has been previously investigated for weight loss, few studies have investigated YHM the context of resistance exercise. **PURPOSE:** The purpose of this study was to examine the effects of acute YHM ingestion on bench press power, velocity, and repetition volume. **METHODS:** In a double-blinded crossover design, resistance trained males (n=11; ages 18-24) participated in two separate bench press trials each with a different single-dose treatment: Placebo (PL; gluten free corn starch) or Yohimbine Hydrochloride (YHM; 2.5 mg). In each trial, participants consumed their respective treatment 20 minutes prior to exercise. Following a warm-up, participants completed 1 set × 2 repetitions as explosively as possible while a linear position transducer monitored mean power and velocity. Participants then completed 3 sets × Repetitions to failure (RTF) at 75% of 1-RM separated by 2 minutes of rest. Motivation to exercise was measured post-exercise using a visual analog scale. Total RTF, mean velocity, mean power, and motivation were compared and analyzed. **RESULTS:** Total RTF was not significantly different between PL and YHM trials (p= 0.269; d= 0.29). Mean power (p=0.472; d= 0.16) and mean velocity (p= 0.297; d= 0.25) were unchanged by treatment. Motivation to exercise was significantly higher with YHM ingestion versus PL (p=0.029; d= 0.61) **CONCLUSIONS:** Current findings suggest that YHM consumption does not provide ergogenic benefit during explosive bench press exercise. However, YHM results in higher levels of motivation to exercise. YHM ingestion may therefore be useful for athletes or competitors seeking to improve feelings of motivation but may not benefit resistance exercise performance.

O21: PRELOADED BETAINE SUPPLEMENTATION ON THERMOREGULATION, FLUID BALANCE, AND CYCLING PERFORMANCE IN HEAT: A PILOT STUDY

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BACKGROUND: Exercising in the heat for long durations increases the risk of heat-related illnesses and declines performance. Research suggests betaine (BET)—found in wheat and beets—can act as an osmoprotectant, making cells and animals more resilient to thermal and hypertonic stress. Most of the research in this area has been conducted in passive heat settings using animal models, making the present pilot data novel to the body of research. The aim of this study was to assess how preloaded BET supplementation impacts humans undergoing active heat stress (i.e., cycling in the heat). METHODS: Six endurance trained men (Mean±SD: 23.3±2.6 yrs, 179.23±5.5 cm, 70.4±9.3 kg, VO_{2MAX} 54.4±3.3 ml/kg/min) completed a double-blind crossover design study in which participants supplemented with BET (50 mg/kg 2x/day) or a rice flour placebo (PLA; 50 mg/kg 2x/day) for 7 days before completing the experimental protocol. Participants then underwent a 7-day washout period and crossed over into the alternate condition. They were asked to consume 6 ml/kg of water with each dose and drink ad libitum the rest of the day. On days 0 and 7 of each condition, participants arrived fasted from calories (7-9 hr), caffeine (12 hr), as well as alcohol and exercise (24 hr). The experimental protocol involved cycling at 70% VO_{2MAX} for 1 hr and completing a time to exhaustion trial against 130% peak power output in the heat (33°C, 35% RH). A Shapiro Wilks test was used to establish normality and a paired samples t-test was used to determine significance. RESULTS: Ending core temperature was significantly lower in BET (38.1±0.5°C) compared to PLA (38.3±0.5°C; p=0.01). No significance was detected for changes in plasma osmolality after the active heat load in BET (Pre 289.0±3.4 mmol/L; Post 289.4±1.9 mmol/L; p=0.79), however there was a significant decrease in PLA (Pre 289.1±4.7 mmol/L; Post 283.8±4.8 mmol/L; p=0.04). Despite a mean increase in intracellular fluid (+1.15 L) in BET, it was not significantly different from the decrease (-0.37 L) observed in PLA (p=0.08). There were no significant differences in sprint duration between groups (p=0.67). CONCLUSION: In this pilot study, 7 days of BET supplementation maintained plasma osmolality and may potentially mitigate increased core temperature after 1 hr of exhaustive exercise in the heat without significant changes to intracellular fluid. This study was funded by NOW Foods.

O22: PHYSIOLOGICAL AND PSYCHOPHYSIOLOGICAL RESPONSES TO REPEATED SUPRAMAXIMAL EXERCISE WITH YOHIMBINE HCL INGESTION

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BACKGROUND: Supramaximal exercise can induce conspicuous alterations in both physiological and psychophysiological responses to exercise, many of which may have implications for adaptive or maladaptive consequences. Yohimbine Hydrochloride (YHM) is an alpha-2-adrenergic receptor antagonist popular in many commercially available supplements which increases sympathetic stimulation. Given that supramaximal exercise already imposes considerable demands on the exerciser, ingestion of YHM may further exacerbate responses although this is currently unknown. **PURPOSE:** The purpose of this study was to elucidate the effects of acute YHM ingestion on heart rate (HR), rate of perceived exertion (RPE), and blood lactate [La-] during repeated supramaximal exercise. **METHODS:** Physically active females (18-25 years) participated in two separate repeated supramaximal sprint trials each with a different single-dose treatment: Placebo (PL; gluten free corn starch) or Yohimbine Hydrochloride (YHM; 2.5 mg). For each trial, participants consumed their respective treatment 20 minutes prior to exercise. Following a warm-up, participants completed 3 × 15 second Wingate anaerobic tests (WAnT) separated by 2 minutes of active recovery. Blood [La-] was measured pre- and post-exercise. HR and RPE were measured following each WAnT. Signs of vasovagal syncope were also documented. **RESULTS:** Mean HR (p= 0.187) and RPE (p= 0.454) were not significantly different between treatments. However, post-exercise [La-] (p= 0.0124) was significantly higher with PL treatment versus YHM. Reports of nausea were more frequent with YHM treatment that PL. **CONCLUSIONS:** Current findings suggest that YHM does not alter HR or RPE during supramaximal exercise. However, [La-] was significantly lower with YHM than PL indicating possible increases in [La-] clearance. Feelings of nausea were more frequent with YHM which suggests that despite possible benefits of [La-] clearance, unwanted side effects may limit practical application of usage.

O23: THE EFFECT OF ACUTE CREATINE MONOHYDRATE LOADING ON BODY COMPOSITION, STRENGTH, AND FATIGABILITY IN WOMEN

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BACKGROUND: Creatine monohydrate is a well-researched supplement; however, few investigations have been conducted on its effect on women, and only one study to date has factored in the phases of the menstrual cycle. Acute supplementation with creatine monohydrate during exercise has been promoted to benefit body composition and increases in strength and fatigue resistance, however, these findings are more ambiguous in women as much of the data exists from investigations of men. METHODS: Twelve recreationally trained women (22.8 ± 2.98 yrs) participated in this cross-over study, wherein they took both supplements (creatine monohydrate, CM; placebo, maltodextrin, PL) in randomized, double-blind, counterbalance order during the luteal phase of their menstrual cycle. Women were asked to perform a CM or PL loading phase of 20g per day. A 28-day washout period was allowed after the initial supplementation period. Subjects completed 5 total visits. Visit 1 included informed consent and familiarization with the fatiguing exercise protocol. Visits 2-5 comprised measures of 4-compartment body composition and fatiguing exercise on an isokinetic dynamometer. The fatiguing protocol consisted of isokinetic knee extensions at 180 deg/sec for 5 sets of 30 contractions, with 2 min of rest after each set. After each set, participants were asked their rating of perceived exertion using the Borg 1-10 scale. Fatigue index was calculated as followed: (highest peak torque-minimum peak torque)/highest peak torque × 100. Relative fatigue was calculated for

each set as follows: (sum of peak toques for set 1 - sum of peak torque for set 2)/sum of peak torques for set 1 × 100. RESULTS: No significant changes for body mass (p=0.551), total body water (p=0.607), fat-free mass (p=0.789), or fat mass (p=0.943) were measured. Strength was unchanged, with no significant changes for peak torque (p=0.646). There was no change in relative fatigue (p= 0.525; p=0.525) or fatigue index (p= 0.823; p=0.149). There was no difference for rating of perceived exertion (p=0.570). CONCLUSIONS: A creatine monohydrate loading period of 20 grams per day for five days did not alter body composition, muscular strength, or fatigability in these recreationally trained women.

O24: THE EFFECTS OF TART CHERRY JUICE AND WHEY PROTEIN ON EXERCISE INDUCED MUSCLE DAMAGE RECOVERY

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BACKGROUND: Nutritional interventions to prevent and reduce the effects of exercise-induced muscle damage (EIMD), including natural anti-inflammatories have been found to decrease inflammation and aid in the recovery of EIMD. PURPOSE: To examine the effects of tart cherry juice and whey protein on measures of recovery following fatiguing forearm exercises. METHODS: 20 recreationally active women (age: 21±0.3yr; BMI: 23.42±2.79 kg/m 2) were randomly assigned to either one of two supplemental protocols (S1: 2x8 oz tart cherry juice + 30 g whey protein (WP)/day or S2: 30 g WP/day) for 3 days. Participants completed 3 sets of seven hand, wrist, and forearm exercises until fatigue with 60 s rest in between. Hand-grip strength, wrist circumference (WC), perceived recovery (PRS), fatigue, and muscle soreness (MS) were measured at pre-, 0, 24, 48, and 72h post-exercise. All measurements and exercise sessions were completed virtually over Zoom after all equipment and supplements were shipped to the participant's home. ANOVAs were used for analyses. Significance was set at $p<0.05$. RESULTS: No significant time or supplement effect ($p>0.05$) or interaction was observed for handgrip strength (p=0.70), fatigue (p=0.55), or WC (p=0.64) between S1 and S2 at pre-, 0, 24, 48 or 72h post-exercise, respectively. However, a significant time and supplement interaction was observed in MS (3.1±3.3, 4.0±2.2, 4.0±3.1, 5.0±3.5, 3.6±3.4, and 1.8±2.2, 5.4±2.4, 5.0±3.4, 4.8±3.4, 3.7±3.4, p=0.006) and PRS (7.5±2.7, 4.7±2.4, 7.0±2.6, 7.2±2.2, 7.4±1.8 and 6.8±2.6, 4.8±2.2, 7.2±2.0, 7.0±2.0, 7.1±1.7, p= 0.02) between S1 and S2 at pre-, 0, 24, 48, or 72h post-exercise, respectively. CONCLUSION: Supplementation of tart cherry juice and WP following fatiguing forearm exercise could be used to reduce the perception of recovery and muscle soreness after exercise. However, the addition of tart cherry juice to WP supplementation did not improve handgrip strength, perception of fatigue, or wrist circumference an indirect indicator of inflammation.

O25: THE IMPACT OF COVID-19 ON EXERCISE IN THE SENIOR POPULATION

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BACKGROUND: With COVID-19 causing a closure of senior centers, the senior population who partake in exercise classes were faced with the option of virtual or no exercise classes at all. The purpose of this study was to determine how the COVID-19 pandemic impacted attendance rates for exercise classes at senior centers. METHODS: Attendance records were taken from three exercise classes that occurred before the senior center closed due to COVID-19 and resumed after the center reopened. The sample size was 173 senior citizens (age 55 and older) who were attending exercise classes before the center closed. Attendance was measured via check-in prior to each class. Differences in attendance prior to and post closure were measured using a t-test. Reasons for not returning were obtained via phone call to participants. RESULTS: The number of participants in exercise classes before closure was significantly higher than those who returned after closure (87.33 participants vs 23 participants, p=0.01). Of the participants that answered the phone, fear of COVID-19 is the third leading cause of not returning (19%). CONCLUSIONS: COVID-19-related closures caused a significant reduction in exercise attendance rates at senior centers following reopening. Fear of COVID-19 remains in those who have not returned. This suggests that a pandemic can dramatically impact fitness levels of senior citizens.

O26: RESPONSE TO A COMPREHENSIVE EXERCISE PRESCRIPTION IN A PREVIOUSLY SEDENTARY 59-YEAR-OLD FEMALE WITH A PACEMAKER.

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BACKGROUND: This case report discusses the outcomes of an exercise intervention and corrective exercises following the ACSM guidelines for a 59-year-old female with a pacemaker as administered by a student enrolled in an exercise science program. There is limited research for pacemaker response with the effect of regular exercise; therefore, the purpose of this case report is to describe heart-rate response and other pertinent outcomes to initiating physical activity in a client with a pacemaker. METHODS: The subject has been dependent on a pacemaker for 20 years and was recently diagnosed with stage 2 breast cancer. Her primary goals included weight loss, increased energy, strength, and overall health and the main barriers were fatigue, pain, and time. The 12-week intervention incorporated the following assessments: PAR-Q, health history, Quality of Life and Lower Extremity Index Scale, Review of Systems, vital signs, balance, Elliptical equivalent of the Åstrand-Rhyming cycle ergometer test, static posture assessment, overhead squat assessment, plank test, flexibility, range of motion, and strength. Weekly workouts included moderate-intensity aerobic training on an Elliptical twice, Yoga once, and full-body resistance training at the local gym once. For progressions, increases were implemented in wattage and interval training for the Elliptical, time for Yoga, and weight/volume for resistance training. Corrective exercises for overactive gastrocnemius, excessive anterior pelvic tilt, and forward head posture were prescribed. RESULTS: Outcomes attributed to the intervention included decreased pain/fatigue and increased energy levels, confidence/motivation to exercise, and cardiovascular endurance. Posture related to forward head and pelvic tilt improved to a noticeable degree in standing. Heart rate and blood pressure did not undergo any distinct change in resting or exercise. In addition, Quality of Life and Lower Extremity Function have both improved by 5%, and weight decreased by 5 pounds. CONCLUSION: This case report indicates that with heart rate monitoring and medical clearance, a comprehensive exercise prescription designed and implemented by an exercise science student can contribute to meaningful changes in a previously sedentary adult female with multiple system comorbidities to improve the overall quality of life even when new health challenges arise.

O27: CADENCE (STEPS/MIN) ASSOCIATED WITH MAXIMAL OXYGEN CONSUMPTION MODERATE INTENSITY IN OLDER ADULTS: THE CADENCE-ADULTS STUDY

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BACKGROUND: A walking cadence of ≥100 steps/min has been associated with an absolutely-defined moderate intensity (≥3 metabolic equivalents or METs) in adults 21-85 years of age. Less is known about the relationship between cadence and relatively-defined moderate intensity (defined as ≥46% of maximal oxygen consumption [VO_2max]), especially in older adults. **PURPOSE:** To identify a heuristic (i.e., evidence-based, rounded) cadence threshold associated with ≥46% VO_2max in older adults. **METHODS:** Twenty-eight ambulatory and ostensibly healthy older adults (mean [SD], age = 67.5 [4.8], range= 61 to 76 years) completed a submaximal treadmill walking protocol consisting of 5-minute bouts (2-minute rest between bouts), progressing from 0.5 mph (13.4 m/min) up to 6.0 mph (160.9 m/min) in 0.5 mph increments. The test concluded after the bout when participants achieved 75% age-predicted heart rate max (HR_{max}; 220-age), naturally selected to run, and/or reported a rating of perceived exertion > 13. Cadence was directly observed and a chest-strap continuously measured heart rate. On a subsequent day, participants performed a maximal modified Balke treadmill protocol. Speed was set to elicit 70-75% age-predicted HR_{max} and remained constant, while grade progressively increased every 2 minutes until participants reached voluntary exhaustion. VO_2 was continuously assessed with a portable indirect calorimeter and rolling 15-second averages were used to calculate maximum individual VO_2max values. These identified values were then applied to the recorded data from the submaximal test and used to identify associated optimal cadence

thresholds using Receiver Operating Characteristic (ROC) curve analysis, including computations for 95% confidence intervals (CI), area under the curve (AUC), sensitivity (Se), and specificity (Sp). Youden's Index (YI) informed heuristic values. **RESULTS:** The optimal cadence threshold associated with ≥46% VO_{2max} was 103.3 steps/min (CI = 95.3-106.7), with AUC = 91.7%, Se=82.9%, and Sp=88.1%. When rounding to a heuristic cadence threshold of 100 steps/min for ease of application, Se=84.1%, Sp=80.5%, and YI=164.7. When rounding to 105 steps/min, Se=78.0%, Sp=88.1%, and YI=166.2 **CONCLUSION:** Maximizing YI, a heuristic cadence value of ≥105 steps/min was identified as a potentially useful proxy indicator of relatively-defined moderate intensity walking in ambulatory and ostensibly healthy older adults. **Funding:** NIH-NIA-5R01AG049024
Keywords: Walking, Older adults, Cadence, Oxygen consumption

O28: RELATIONSHIP BETWEEN SOCIOECONOMIC STATUS AND BODY COMPOSITION IN OLDER ADULTS IN A SOUTHEASTERN CITY

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Adults are prone to developing chronic diseases and loss of functional independence as they age. Multiple factors contribute to these conditions, but physical inactivity appears to be a major contributor as physical inactivity has been cited as a risk factor for the development of chronic diseases and becoming dependent on others. Purpose: Therefore, this study was designed to compare the relationship between socioeconomic status (SES) and body composition in older adults in a southeastern city. Methods: The participants were involved in structured, some in unstructured, and some in little or no physical activity at community recreation centers. The older adults signed institutional approved informed consent forms and were evaluated for differences in body mass index and body fat percentage. To assess body mass index and body fat percentage (BF%), the Omron HBF 306C handheld body fat analyzer was used and data was collected over a nine month period. Summary of Results: The participants were older adults (n=60) from two areas of the city with different SES that had an income range of $33,912-$38,156 (LSES - 25- 37% below poverty level) and $62,276- $103,416 (HSES = 2.3 to 11.5 below poverty level). Participants in the LSES community presented an average BMI of 33.4 and an average BF% of 40.9. Older adults in the HSES community had an average BMI of 30.9 and an average BF% of 39.0. Older adults from both communities, average BMI values place them in the obese category (ACSM guidelines); however, individuals in the LSES community have a trend of higher BMI and BF% that projects that they are at a greater risk for chronic diseases such as cardiovascular disease and cancer.

O29: ASSOCIATION BETWEEN HEMOGLOBIN A1C LEVELS AND LOWER SOCIOECONOMIC BACKGROUNDS IN OLDER ADULTS IN A SOUTHEASTERN AREA

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Purpose: The purpose of this study was to analyze if older adults with lower socioeconomic status (LSES) were more likely to have higher Hemoglobin A1c (HbA1c) levels compared to their higher socioeconomic status (HSES) counterparts. **Methods:** Adults 55 years and older participated in a voluntary community health risk assessment at their local senior centers. Blood profiles were completed via the PTS Diagnostics A1C Now machine to assess hemoglobin (HbA1c) three individual times over the course of nine months as part of the health risk assessments. Individuals were divided into two separate groups, LSES ($33,912-$38,156) and HSES ($62,276-$103,416), based on their average yearly income and senior center site. **Results:** A total of 37 older adults (55+) participated in this study, with a sample group of 16 representing the LSES area and a sample group of 21 representing the HSES area. The average HbA1c level in HSES older adults over a span of nine months was 5.72, while in LSES older adults it was 6.23. **Conclusion:** HbA1c levels were significantly higher in individuals with LSES than individuals with HSES.

O30: EVALUATION OF BIOELECTRICAL IMPEDANCE VECTOR ANALYSIS ACCORDING TO FALL RISK APPRAISAL CATEGORIZATION IN OLDER ADULTS

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BACKGROUND: Fall risk appraisal of older adults according to their physiological (i.e., balance/postural sway) and psychological capabilities (i.e., fear of falling/fall efficacy) has been proposed with individuals categorized into congruent (high fear/poor balance), incongruent (low fear/poor balance), irrational (high fear/normal balance), and rational (low fear/normal balance) groups. Bioelectrical impedance vector analysis (BIVA) allows for the examination of body tissues and is used in clinical conditions that may influence hydration and nutritional status. Thus, the underlying differences between fall risk appraisal groups may be highlighted through BIVA evaluation. The purpose of this study is to examine BIVA according to fall risk appraisal categorization in older adults. **METHODS:** Following completion of postural sway and fall efficacy assessments, a cross-sectional analysis of 121 older adults (age: 74.7 ± 7.4 y; body mass index: 26.9 ± 5.0 $kg \cdot m^{-2}$; 94 women and 27 men) separated into congruent (n=20), incongruent (n=24), irrational (n=21), and rational (n=56) groups was conducted. Raw, whole-body BIA parameters (50 kHz), including resistance, reactance, and phase angle, were compared between groups using ANOVA, while BIVA procedures were performed with two-sample Hotelling's T^2 tests. **RESULTS:** Significant differences between groups were found for reactance (p=0.007) but not resistance (p=0.590) or phase angle (p=0.315). Post-hoc analyses showed greater Xc (p=0.021; d=-0.807) in the rational group (59.2 ± 13.3 Ω) compared to the congruent group (46.7 ± 12.0 Ω). BIVA evaluation confirmed differences between rational and congruent groups (T^2 = 9.6; p=0.012), and further identified potential differences between the rational and incongruent groups (T^2 = 8.5; p=0.019). **CONCLUSION:** Fall risk appraisal groups differentiated primarily by the physiological risk of falling may exhibit unique body tissue characteristics estimated by BIA and highlighted by BIVA. Specifically, reactance values that may be indicative of body cell mass and/or cell membrane integrity appear to distinguish between these groups. **Grant or funding information:** Funded by NIH R03 AG069799

O31: DOES DOG SPORT PARTICIPATION IMPROVE THE HEALTH OF WOMEN OVER 50 AND THEIR DOGS

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BACKGROUND: Canine sport participation is a rapidly growing area of human-dog interaction with potential for positive health benefits for both the dog and the owner. Our hypothesis was that women that participate in dog sports will be more fit than traditional pet dog owners. We also hypothesized that the sport dogs will have better body condition compared to traditional pet dogs that do not participate in dog sports.
METHODS: Women at least 50 years old that owned dogs were recruited to visit the lab for testing. They completed a six-minute walk test, chair stand test, handgrip strength test, and a bioelectrical impedance test, and height and weight were measured to calculate body mass index (BMI). Dogs were evaluated anthropometrically and using the Purina Body Condition Scale. RESULTS: Twenty-four women (age: 60±7years; range: 51-74) were tested. The 6-minute walk test (538.8±55.4 meters) and the chair stand test (15±3 repetitions) were not different between groups. Handgrip strength (29.3±4.2 kg), percent fat (37.0±7.5 % fat), and BMI (27.1±5.1kg/m^2) were also similar between groups. We compared handgrip strength and BMI to population values from the 2011-2014 National Health and Nutrition Examination Survey (NHANES). Our participants aged 50-59 had significantly higher measured handgrip strength ($p<0.05$), but participants 60-69 years old were not significantly different from NHANES data (p=0.44). The BMI for 50-59 year old participants was lower than NHANES average (p=0.046), but the BMI for 60-69 year old participants was not different (p=0.097). Sport dogs (9.6±3.2% fat) were more lean than pet dogs (15.4±8.1% fat; p=0.036). Purina Body Condition score was significantly lower in the sport dogs (5±1; ideal) compared to the pet dogs (7±1; too heavy). CONCLUSIONS: We found that women that participated in dog sports were similarly fit compared to traditional pet owners. However, dog owners combined in the 50-59 years old age group were more fit than the national average, while the older age group was not different from the population average. Interestingly, dogs that participate in dog sports were more lean than their pet counterparts, but the owners were not different.

O32: EFFECT OF EXERCISE AND DAY-LONG MOVEMENT ON SOCIAL COGNITIVE OUTCOMES IN OLDER ADULTS

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BACKGROUND: Maintaining a healthy body weight and participating in sufficient levels of physical activity are important inputs to quality of life and physical function in aging. Existing weight loss and activity interventions largely focus on structured bouts of exercise, which often have the unintended consequences of increasing sedentary time and decreasing non-exercise physical activities. Therefore, it is unsurprising that weight loss is quickly regained on completion of the intervention. Less is known about the impact of accumulating movement across the day while reducing sedentary time on key psychosocial mediators of long-term weight maintenance. The objective of this study is to investigate the cross-sectional and longitudinal relationships between profiles of movement and key quality of life (QOL) and social cognitive theory (SCT) mediators of lasting behavior change in older adults. METHODS: Low active older adults (N=135; 70.0±4.42 years; 76.8% female; BMI=35.63.76) were randomized to one of three 6-month mHealth-supported group mediated weight loss (WL) interventions: WL+structured treadmill-based aerobic exercise (EX); WL+a novel daily movement intervention (SitLess); WL+EX+SitLess in older adults. Questionnaires including the 36-item short form survey (SF-36), the satisfaction with function scale (SAT-F), the self-efficacy for walking scale (SEW) were collected at baseline and 6-month follow-up. RESULTS: Regarding SEW, a mixed effects ANOVA revealed no group x time interaction and a significant main effect for time, $F(1,135)=81.03$, $p < .001$, $=.38$, such that all groups increased walking self-efficacy from baseline to follow-up. Similar results were observed for SAT-F [main effect for time: $F(1,135)= 47.15$, $p < .001$, $=.52$] as well as several SF-36 subscales including physical function $F(1,135)= 37.24$, $p < .001$, $=.22$], role limitations due to physical health $F(1,135)= 8.58$, $p = .004$, $=.06$], energy/fatigue $F(1,135)= 34.34$, $p < .001$, $=.204$], social functioning $F(1,135)= 7.05$, $p = .009$, $=.05$], bodily pain $F(1,135)= 4.28$, $p = .041$, $=.031$], and general health $F(1,135)= 20.72$, $p < .001$, $=.133$]. CONCLUSIONS: These results suggest a group mediated intervention paired with either structured exercise or day-long movement produces similar improvements to key mediators of long-term behavior change. FUNDING: This work was supported by the National Institute on Aging (R01AG05162).

O33: 8-MONTH LEADERSHIP DEVELOPMENT PROGRAM IMPROVES PHYSICAL ABILITIES IN CORP OF CADETS

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BACKGROUND: The Leadership Development Program (LDP) is designed to prepare Cadets for future Military Commissions. A large portion of the LDP is physical training, preparing the Cadets for the vigorous Cadet Summer Training (CST) program, an intense 38-day physical training program that takes place at Ft. Knox Kentucky. Passing both the LDP and CST are required to become a commissioned officer in the U.S. Army. METHODS: Fourteen cadets (10 males and 4 female) from the Leadership Development Program participated in this study. The LDP starts in September and end in April, making it an 8-month program. The training program is highly structured and progresses in volume and intensity every 2-3 weeks throughout the training period. Winter break (Thanksgiving to mid-January, the Cadets are given a routine to follow on their own). Physiological data collected included oxygen consumption (CosMed), heart rate, blood pressure, rate of perceived exertion (RPE), body composition (BOD POD), upper and lower body strength (1-RM) and core strength (Sorenson Hold). The following variables showed significant findings: GXT time, peak VO2, peak HR, percent body fat and core stability. RESULTS: GXT Time to Volitional Fatigue. The test endpoint was the subjects predicted sub maximal HR. Total time of the GXT using the Bruce Protocol to reach the test end-point was the variable evaluated. Volitional fatigue was used as the testing endpoint. Total time was calculated in seconds and the average means were compared. The average pre-test time was 603 ± 63.98 seconds, and the average post time was 670.75 ± 61.69 seconds. These results were statistically significant at a $P<0.022$. CONCLUSIONS: The principal findings from our study identified that there are significant physical improvements from the 8-month LDP. Areas of significant improvement included peak VO2, volitional fatigue, and core stability. This was no surprise to the research team as we expected the rigorous program to elicit these findings. We also feel that the COVID-19 pandemic played a role in many facets of our study. Five cadets were quarantined for 14 days due to exposure to a person with an active case of COVID-19, 1 of the cadets did contract COVID-19 and was symptomatic for 30 days. During that time frame he was not able to perform any physical activities. Those that were quarantined were not able to condition or exercise as they would have otherwise. With these considerations we feel the results were skewed, impacting some areas of improvement.

O34: THE HEALTH IMPLICATIONS OF WELLNESS PROGRAMMING ON RURAL SOUTHEASTERN FIREFIGHTERS

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BACKGROUND: Worksite wellness programs are an excellent option to help promote health and wellness among employees. However, there is little research that explores the value of embedded wellness program in rural fire departments (FD). **PURPOSE:** This study aimed to understand the impact of a departmental wellness program on health metrics in rural southeastern firefighters. **METHODS:** Sixty-five career firefighters from two rural southeastern Georgia FD participated in this study; FD1 (n=46) (age: 36.2 ± 8.8 years) had an established wellness program, and FD2 (n=19) (age: 30.4 ± 9.4 years) did not have a structured wellness program. The structured wellness program included weekly shift workouts and wellness micro lessons through the year focusing on sleep, nutrition, stress, and mindfulness. Each FD underwent a health metrics test battery, in line with National Fire Protection Association standards, including: body mass index (BMI); body fat percentage (BF%); hip circumference (HC); systolic and diastolic blood pressure (SBP and DBP); lung function; and resting heart rate (RHR). BMI was calculated from recorded height and weight on a calibrated stadiometer. BF% was measured via seven-site skinfold. HC was assessed using a tape measure. RHR was recorded via pulse oximeter. SBP and DBP were analyzed via an electronic sphygmomanometer, and lung function via spirometry. Independent samples t-tests were run ($\alpha = 0.05$) comparing each variable between the two FD. **RESULTS:** Statistical differences existed in spirometry (FD1: 91.9% ± 4.9%, FD2: 98.8% ± 9.8%; $p < 0.01$) and HC (FD1: 41.7 inches ± 3.2 inches, FD2: 42.8 inches ± 5.3 inches; $p < 0.01$). No statistical differences were noted between the FD in SBP ($p = 0.17$), DBP ($p = 0.34$), RHR ($p = 0.076$), BMI ($p = 0.072$), or BF% ($p = 0.15$). **CONCLUSIONS***:* The current study demonstrates a modest, positive impact on health metrics in the presence of a structured wellness program among rural firefighters. It is possible that the younger average age of FD2 could have masked the potential impact of the wellness program, as many of the health metrics analyzed increase with age.

O35: ABSTRACT WITHDRAWN

O36: EFFECTS OF A LIFESTYLE INTERVENTION ON TRIMETHYLAMINE N-OXIDE (TMAO) CONCENTRATIONS IN OVERWEIGHT AND OBESE ADULTS

Emily E. Grammer[1], Joshua McGee[2], Taylor Brown[2], Marie Clunan[2], Anna Huff[2], Briceida Osborne[2], Laura Matarese[2], Walter Pories[2], Joseph Houmard[2], Robert Carels[2], Damon L. Swift[1]. *[1]University of Virginia, Charlottesville, VA. [2]East Carolina University, Greenville, NC.*

BACKGROUND: Trimethylamine N-Oxide (TMAO), a metabolite produced by gut microbiota and flavin-containing monooxygenase-3 (FMO3) of the liver, is found in foods high in carnitine, choline, and lecithin (e.g., egg yolks and full-fat dairy). The oxidation of choline that leads to betaine production may also contribute to increased TMAO levels. Epidemiological studies have linked elevated TMAO concentrations with obesity and cardiovascular disease, yet there are few data regarding the effects of combined diet and exercise interventions on TMAO. METHODS: Twenty-six sedentary overweight and obese adults (Age: 47.4 ± 10.7 yrs.; Weight: 95.1 ± 13.2 kg; BMI: 34.1 ± 3.2 kg/m^2) completed a 10-week exercise and hypocaloric diet intervention to obtain clinically significant weight loss of ≥7%. Aerobic exercise volume began at 300 MET min per week and increased 50 MET min weekly until 700 MET min per week was reached. For 8 weeks, the OPTIFAST program included full meal replacement (~800 daily kcal). The last 2 weeks participants could replace 2 products with whole foods and increase intake (~1400 daily kcal). Weekly classes on behavior modification were also offered. Plasma blood samples were collected at baseline and follow-up and analyzed via nuclear magnetic resonance. RESULTS: At baseline, TMAO was correlated with body weight ($r=0.40$, $p=0.046$), waist circumference ($r=0.40$, $p=0.044$), and average RMR ($r=0.50$, $p=0.009$). After the intervention, waist circumference (-7.6 cm), BMI

(-3.1 kg/m^2), body weight (-8.5 kg, -9.0%), and total body fat percent (-1.7%) were reduced (all *ps*<0.001), while there were no changes in concentrations of TMAO (-0.3 *μM*, *p*=0.292) or betaine (0.3 *μM*, *p*=0.838). There were also decreases in 2-hr OGTT glucose (-12.8 mg/dL, *p*=0.032) and insulin (-43.7 mg/dL, *p*=0.002), HOMA-IR (-2.9, *p*<0.001), triglycerides (-31.7 mg/dL, *p*<0.001), and an increase in relative VO_{2peak} (2.4 ml/kg/min, *p*<0.001) following the intervention. Moreover, changes in TMAO were correlated with changes in waist circumference (r=0.50, *p*=0.010). Changes in betaine were correlated with average RMR changes (r=-0.42, *p*=0.037). CONCLUSIONS: Weight loss from a hypocaloric diet with aerobic exercise did not decrease TMAO levels, however, improvements in TMAO were associated with waist circumference reductions in overweight and obese adults. Future studies should evaluate predictors of TMAO alterations during weight maintenance.

O37: COMPARISON OF RING-FIT ADVENTURE VERSUS A SPRINT INTERVAL + RESISTANCE TRAINING INTERVENTION ON BODY COMPOSTION

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BACKGROUND: The use of active video games (AVG's) has increased recently with the emergence of the Ring-Fit Adventure (RF) and the Nintendo Switch. Literature surrounding the impact of AVG's on physical activity is mixed, and questions still exist about AVG's impact on body composition. The purpose of this study was to compare the impact of RF versus a sprint interval training plus resistance training (SIT+RT) regimen on body fat percentage (BF%) amongst women, who completed both studies. METHODS: 11 women completed a 10-week SIT+RT intervention consisting of 30 sessions in 2019 (*M* = 41.89 ± 9.81 years). The same women also completed an 8-week RF intervention for a total of 16 sessions in 2021 (*M* = 43.86 ± 9.79 years). Body composition, using the iDexa, was assessed pre- and post-intervention for both studies. RESULTS: There was no significant interaction found with BF%, $F_{1,20}$ = 2.44, *p* = .79, η^2 = .06 between groups from pre- to post-intervention. A significant interaction was noted for bone mineral density (BMD) $F_{1,20}$ = 5.52, *p* = .03, η^2 = .21 by group by time. The RF group gained BMD (*M* = .03 g/kg^2) compared to no change in the SIT+RT group. CONCLUSION: Although dose (16 sessions compared to 30 sessions) and duration (8 weeks compared to 10 weeks) were less in the RF intervention, results suggest the two interventions were comparable for changes in body fat percentage in women. Future studies should repeat this study design in a larger sample size of women.

O38: DYNAMIC BALANCE AND CORE ENDURANCE IMPROVE IN HEALTHY FEMALES FOLLOWING SUSPENSION TRAINING

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BACKGROUND: Many exercise modalities have been developed and marketed to improve core muscle function, and likewise there are multiple training programs that aim to improve balance. These variables are of interest given they are inherent to performing activities of daily living (ADLs) and maintaining physical activity levels. Our previous work has shown that TRX suspension training (SuT) is effective at improving body composition, muscular strength and muscular endurance in college aged females; however, the very nature of this exercise modality should also improve core muscle function and balance. The purpose of this study is to determine the effectiveness of six weeks of SuT in improving balance and core muscle function. **METHODS:** Sixteen SuT naïve females (19.6 +/-1.5 yrs; 167.3+/-4.6 cm; 62.4+/-7.4 kg) progressed through a six-week supervised training program consisting of 18 50-60-minute interval style workouts. Control subjects (n=5) maintained their normal activity levels. Dynamic balance was assessed using the Star Excursion Balance Test (SEBT). Static balance was assessed using the Balance Error Scoring System (BESS). Core endurance was assessed using the Endurance Plank Test. The same test protocols were used for pre and post testing. **RESULTS:** Dependent measures t-test analysis showed improvements (p<.05) in right leg stance SEBT scores (expressed as percentage of reference leg length) in all directions: anterior (pre=75.3+/-4.8, post=81.9+/10c %), posteromedial (105+/-13.3 to 116+/-14.1 %) and posterolateral (97.0+/-10.7 to 105.1+/-10.4 %). The SuT group also showed left leg improvements (p<.05) in the anterior (74.8+/-4.4 to 81.0+/- 11.8 %), posteromedial (105.6+/-711.9 to 113.0 +/- 12.3 %) and posterolateral (98.3+/-12.4 to 108.0+/-11.1 %) directions. There was an improvement in plank time (105.2+/-40.6 to 141.6+/-46.9 seconds: p<.05) in the SuT group. No difference in BESS scores were observed over time. There were no changes in any dependent variables in the control group. **CONCLUSIONS:** These data suggest that six weeks of SuT facilitated improvements in bilateral dynamic balance and core endurance. Additional work is needed to assess additional core stability and balance measures as well as to explain the lack of improvements observed in static postural control.

O39: IMPACT OF A CLINIC-BASED, PRAGMATIC LIFESTYLE INTERVENTION FOR THE MANAGEMENT OF TYPE 2 DIABETES MELLITUS

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BACKGROUND: Type 2 diabetes (T2D) is a common metabolic disorder affecting more than 34 million Americans. The associated hyperglycemia results in substantially increased morbidity and mortality risk. Even though efficacious pharmacotherapies exist, glycemic control remains poor with 33-49% of patients not meeting targets for glycemic control as quantified by HbA1c. This study sought to determine the efficacy of a clinic-based, healthy lifestyle intervention on measures of glycemia and cardiovascular health. METHODS: Patients with T2D (n=20; 56.7±12y; 170±9 cm; 98±22 kg; 33.7±7.2 BMI) with an HbA1c of 7.5-10% not requiring injectable insulin were recruited from the Dignity Health outpatient, family medicine clinic in Phoenix, AZ and underwent a quasi-experimental 3-month lifestyle intervention. Subjects were given a daily à la carte menu of healthy exercise, nutrition, and behavioral options from which to choose from. Exercise options consisted of subjects accumulating 150 minutes of moderate or 75 minutes of vigorous exercise a week utilizing various exercise schemes each day (e.g. 3 x 10 min bouts). The dietary intervention utilized increased fiber and healthy fat intake while avoiding refined and added sugars. This was accomplished by provided healthy food menus, nutritional counseling, and gift cards to local markets. Behavioral interventions utilizing motivational interviewing, acceptance and commitment therapy, and problem-solving therapy were used to help promote behavior change. The intervention was administered to patients by medical assistants in the family medicine clinics. Wilcoxon Signed Rank tests were used to analyze pre-and post-intervention differences. RESULTS: A reduction in HbA1c of 0.5% was observed after the intervention (8.6±0.9 vs. 8.1±1.2% respectively; *p*= 0.05). Additionally, there was a reduction in waist circumference of 3 cm seen (115.5±12.6 vs. 112.5±15.2 cm; *p*=0.014). Similarly changes in both body weight (97.7±21.9 vs. 95.6±23.9 kg; *p*= 0.016) and BMI (33.7±7.2 vs 32.8±7.5 kg/m^2; *p*= 0.028) were observed. CONCLUSIONS: Our pilot data suggest that a lifestyle intervention administered by medical assistants in a family medicine clinic demonstrates improvements in glycemic control, waist circumference, and body mass index. These results remain to be verified in a randomized controlled trial setting. Funding: Dignity Health/Arizona State University Strategic Initiatives Program

O40: CARDIOVASCULAR DISEASE RISK AND THE PUSHUP: PHYSIOLOGICAL CHANGES ASSOCIATED WITH A 30-DAY PUSHUP CHALLENGE.

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BACKGROUND: Body composition and blood cholesterol levels may undergo physiological changes when participating in the 30-day push-up challenge. The purpose of the study was to examine changes in percent body fat (%BF) and high-density lipoprotein cholesterol levels (HDL). METHODS: A convenience sample of twenty-four students and faculty/staff (n=24) volunteered for the study was approved by the Institutional Review Board at Truett McConnell University. Participants of the study performed 100 push-ups a day in a specific time period (60 minutes for males and 90 minutes for females) for 30 consecutive days. Body composition (% body fat-%BF) was measured by InBody 770 (Seoul, SK). A baseline measurement of muscular endurance was performed by completing a 1-minute push-up test. Participants were instructed on proper push-up form and were allowed the option to complete either a modified or regular push-up. Participants had blood drawn (vial of 10 ml) at pre- and post-test periods to assess

cardiovascular health changes through an HDL cholesterol (mg/dL) screening (catalog number MAK045) (Sigma-Aldrich, MO, USA). Blood draw was facilitated by the nursing faculty at Truett McConnell University. RESULTS: Fifteen participants (n=15) completed post-testing session, while having nine participants (n=9) withdraw. Initial measurements revealed a mean ± SD for regular push-up endurance (34.36 ± 12.69); post-test measurement revealed a mean ± SD (53.91 ± 13.25). Initial measurements for modified push-up endurance revealed a mean ± SD (37 ± 13.09); post-test measurement revealed a mean ± SD (47 ± 26.73). The initial measurement of pre- %BF revealed a mean ± SD (22.78 ± 9.40); post- %BF revealed a mean ± SD (22.09 ± 8.69). The initial measurement of pre- HDL screening revealed a mean ± SD (27.76 mg/dL ± 19.99 mg/dL); post- HDL screening revealed a mean ± SD (40.53 mg/dL ± 12.32 mg/dL). A paired t-test was run for data analysis. There was a significant difference between pre- and post-%BF change at p=0.018. There was a significant difference in pre- and post-regular push-ups at p=0.0002. However, there was no significant change in pre- and post-modified push-ups. Pre- and post-HDL cholesterol change showed a significant difference at p=0.004 CONCLUSIONS: The results suggest that a 30-day push-up challenge may cause a decrease in %BF and improve HDL cholesterol levels.

THEMATIC POSTER SESSIONS (TP1–TP24)

TP1: COMPARISION OF CENTRAL HEMODYNAMICS, ARTERIAL STIFFNESS, AND CARDIO-AUTONOMIC INDICES BETWEEN HEALTHY YOUNG MALES AND FEMALES

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Cardiovascular disease (CVD) is the leading cause of death globally. Uncontrolled high blood pressure, largely owing to non-compliant vasculature, is a leading risk factor for CVD. Further, males are disproportionately affected by CVD, but whether detriments in blood pressure and arterial stiffness at a young age contribute to this phenomenon is uncertain. **PURPOSE:** To compare central hemodynamics, arterial stiffness, and cardio-autonomic indices between apparently healthy young males and females. **METHODS:** Eleven males (25.5±4 yrs; BMI 25.3±3 kg/m^2) and 12 females (22.3±2 yrs; BMI 25.3±5 kg/m^2) made 2 visits to the laboratory (2-14 days apart) during morning hours following a 12-hour fast. After 10 minutes of supine rest, central blood pressure was assessed via pulse waveform analysis. Applanation tonometry was used to acquire carotid-femoral pulse wave velocity (cf-PWV; a non-invasive index of arterial stiffness). A Continuous Non-invasive Arterial Pressure device was used to measure beat-to-beat blood pressure changes over a 5-minute period to assess blood pressure variability (average real variability, successive variation, and blood pressure standard deviation (BPSD)) and cardiovagal baroreflex sensitivity (BRS). Sequences of at least 3 consecutive cardiac cycles in which changes in systolic pressure (≥1mmHg) and R-R interval (≥4ms) were the same were identified for BRS analysis. The mean values from the 2 visits were used to perform sex comparisons via independent t-tests. **RESULTS:** Aortic systolic pressure was greater (P=0.023) in males (107.0±7mmHg) than females (99.9±7mmHg). Similarly, cf-PWV was greater (P=0.017) in males (6.22±1m/s) than females (5.48±1m/s), however when mean arterial pressure was controlled for the results were inconclusive (P=0.05). Systolic BPSD was greater (P=0.028) in females (6.58±1mmHg) than males (5.35±1mmHg). An insufficient number of subjects (n=6) met criteria for BRS analysis. **CONCLUSIONS:** We observed higher blood pressure and greater aortic stiffness in apparently healthy young males vs females, changes that may precede the development of CVD. Unexpectedly, females exhibited greater BPSD, however this method has been criticized as it fails to account for beat-to-beat blood pressure variation. Observation periods of 5 minutes were inadequate to obtain viable BRS data using liberal sequence inclusion criteria, portending to the need for extended data collection sessions.

TP2: GENES RELATED TO MITOCHONDRIAL HEALTH IN MYOBLASTS ARE NEGATIVELY IMPACTED WITH AGE BUT MAY BE RESCUED WITH EXERCISE-ASSOCIATED PATHWAY STIMULATION DURING EARLY MYOGENESIS

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BACKGROUND: Skeletal muscle (SKM) health is impacted by the aging process and results in delayed regeneration and mitochondrial dysfunction. The purpose of this study is to investigate the molecular effects of an *in vitro* SKM myoblast aging protocol in combination with a β-2 adrenergic receptor agonist treatment on the expression of genes related to mitochondrial health. METHODS: Human SKM myoblasts (n = 6 per group) were cultured (3 x 10^5 seeding density) and proliferated to 85% confluency upon extraction. Groups included control cells (CON), aged cells (AGED), CON plus formoterol stimulation (CON + FORM; 30nM for 3h), and AGED plus FORM stimulation (AGED + FORM; 30nM for 3h). AGED myoblasts were passaged 18 times to exhibit reduced proliferative properties experienced in SKM of older adults, whereas CON myoblasts were analyzed at passage 5. qPCR analyses included the following genes: Nuclear Respiratory Factor (NRF1), Peroxisome Proliferator-Activated Receptor Gamma Coactivator-1 Alpha/Beta (PGC-1α/β), Superoxide Dismutase 2 (SOD2), Mitochondrial Transcription Factor A (TFAM), and Glutathione Synthetase (GSS). Data were analyzed via one-way ANOVA followed by Games-Howell post-hoc analyses with a Welch correction. Data are expressed as mean ± SEM. RESULTS: PGC1-β: CON + FORM (3.03 ± 0.43) was greater than CON (1.00 ± 0.14, p = 0.02); AGED + FORM (4.35 ± 0.51) was greater than CON (1.00 ± 0.14, p < 0.01) and AGED (1.49 ± 0.20, p = 0.01). TFAM: CON + FORM (2.92 ± 0.38) was greater than CON (1.00 ± 0.16, p = 0.01). NRF1, PGC1-α, SOD2, and GSS: No significance between groups. All reported differences are significant. CONCLUSIONS: Although our results within the AGED and AGED + FORM groups were not significant, likely due to high inter group variance, we found evidence of genetic dysregulation. Increases in SOD2 and GSS expression in the AGED group indicate increased oxidative stress, which potentially decreased in response to FORM stimulation. The potential presence of increased oxidative stress may influence the increase in mitochondrial biogenesis-related gene expression to combat this oxidative stress and reduce mitochondrial dysfunction. FORM appears to stabilize mitochondrial biogenesis-related genes in AGED myoblasts, indicating improved overall mitochondrial health.

TP3: THE EFFECTS OF VENOUS POOLING DURING PROLONGED SITTING ON CENTRAL ARTERIAL STIFFNESS

Melanie Sophia Semcesen, Alex Pomeroy, Katie Stanford, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

THE EFFECTS OF VENOUS POOLING DURING PROLONGED SITTING ON CENTRAL ARTERIAL STIFFNESS Melanie Semcesen, Alex Pomeroy, Katie Stanford, Lee Stoner
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BACKGROUND: Higher arterial stiffness (AS) is associated with increased cardiovascular disease (CVD) risk. During prolonged sitting (PS), AS increases. However, the mechanism for increased AS during PS has not been elucidated. One plausible mechanism is lower-extremity venous pooling (VP), which would subsequently reduce venous return and aortic shear stress. The aim of this study is to determine the effect of venous pooling manipulation on central AS. In order to more fully understand how AS increases during PS, pulse wave velocity, the "gold standard" non-invasive arterial stiffness measurement, was used to measure AS. In order to more fully understand CVD risk, it is important to see if there is relationship between PS and AS. METHODS: Nine participants were part of a randomized crossover trial, where they were assigned to one of two groups: a group who had a bilateral tourniquet applied bilaterally to their legs to induce VP (CUFF) and a control group who did not wear a bilateral tourniquet (NON-CUFF). The participant then sat in a standard chair for 120 minutes. VP was measured the change in calf circumference. Linear mixed models were used to compare the bfPWV values over time and across conditions. RESULTS: The calf circumference measurements increased by 3.69% for the CUFF condition and increased by 0.25% for the NON-CUFF condition. There was no interaction effect in this study. The main effect for time was non-significant for bfPWV (p=0.249, ß = 0.453 m/s). The main effect for condition was trending toward significance, but non-significant (p=0.069, ß = 0.273 m/s). One participant was not included because the participant suffered a vasovagal episode. CONCLUSIONS: While no significant results were found, this preliminary data resulted in a non-significant, condition effect (p=0.069, ß = 0.273 m/s) that trended toward significance. These preliminary data may show more statistically significant results when tested in a full-scale trial, with

greater participant count. This is something that can be used as pilot data, and can be further investigated in future and on-going studies. If an increase in bfPWV is found, treatments targeting VP could be used to affect bfPWV outcome.

TP4: ADJUSTING FOR EXERCISE INTENSITY ATTENUATES SEX DIFFERENCES IN BLOOD PRESSURE DURING EXERCISE IN HEALTHY ADULTS

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PURPOSE: The exercise pressor reflex, composed of the muscle mechano- and metaboreflex, increases blood pressure (BP). Compared to males, healthy female adults typically exhibit blunted BP responses to exercise. However, recent work suggests that sex differences in BP during isometric handgrip (HG) exercise and post-exercise ischemia (PEI; metaboreflex isolation) are attenuated after adjusting for differences in maximal voluntary contraction (MVC). Therefore, the purpose of this study was to determine whether sex differences in BP responses during HG and PEI would be abolished after adjustment for submaximal HG squeezing force. **METHODS:** We analyzed data from 89 participants including 30 females (age: 24±4 years, BMI: 24±4 kg/m^2, screening BP: 106±13/63±9 mmHg, Mean±SD) and 59 males (age: 24±4 years, BMI: 25±3 kg/m^2, screening BP: 113±11/66±9 mmHg). All females were tested during days 1-5 of their menstrual cycle. Maximal HG force for each participant was defined as the average of three MVCs. Following a 10-minute baseline period, participants performed isometric static HG exercise at 40% of their average MVC for two minutes followed by three minutes of PEI via brachial artery occlusion. We obtained beat-to-beat BP readings via finger photoplethysmography (Finometer). Statistical analyses included t-tests, 2-way ANOVAs (sex x time) and ANCOVAs (average force during HG minute 2 as a covariate). **RESULTS:** Females exhibited a lower absolute 40% HG force than males (106±30 N v. 163±48 N, p=0.026). There was a significant sex x time interaction for peak (minute 2) Δ systolic BP during HG (females: 19±12 mmHg v. 27±17 mmHg in males, p=0.022), but not diastolic (p=0.126) or mean BP (p=0.076). After adjusting for absolute HG force, the sex difference for Δ systolic BP during HG was attenuated (p=0.095). Additionally, in a small strength-matched cohort (N=48, 28 females, female HG force mean = 106±26 N, male HG force mean = 120±25 N, p=0.078) there was not a significant sex difference for peak Δ systolic BP during HG (p=0.200). During PEI there were sex x time interactions for systolic, diastolic, and mean BP (p<0.01 for all) and adjustment for HG force did not attenuate these differences. **CONCLUSION:** Our data indicate that the sex difference in BP reactivity is attenuated after adjusting for absolute HG force during exercise, but not metaboreflex isolation.

TP5: TIME COURSE OF CHANGE IN MACRO- AND MICRO-VASCULAR FUNCTION WITH BLOOD FLOW RESTRICTED RESISTANCE TRAINING

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BACKGROUND: Blood-flow restricted resistance training (BFR) permits skeletal muscle adaptations at low intensities, making this approach appealing to certain populations, including those with orthopedic complications. However, the findings are mixed when it comes to the effects of BFR on vascular function. The aim of this study was to determine the macrovascular and microvascular function responses to BFR compared to a high-intensity resistance training (HIT) control group. METHODS: Twenty-four young, healthy men were randomly assigned to BFR or HIT. Participants performed bilateral knee extensions and leg presses 4 days per week, for 4 weeks. For each exercise, the BFR group completed 3 X 10 repetitions/day at 30% of one repetition maximum (1-RM). The occlusive pressure was applied at 1.3 X individual systolic blood pressure. The exercise prescription was identical for HIT, except the intensity was set at 75% of 1-RM. Outcomes were measured pre- and post 2- and 4-weeks of training. The primary macrovascular function outcome was heart-ankle pulse wave velocity (haPWV), and the primary microvascular function outcome was tissue oxygen saturation (StO2) area under the curve (AUC) response to reactive hyperemia. RESULTS: Knee extension and leg press 1-RM increased by 14% for both groups after 4 weeks. There was a significant interaction effect for haPWV, decreasing -5% (Δ-31.8 mm s-1, 95%CI: -51.9 to -11.8, ES=-0.53) for BFR and -1% (Δ-4 mm s-1, 95%CI: -23.2 to 17.0, ES=-0.05) for HIT. Similarly, there was an interaction effect for StO2 AUC, increasing 5% (Δ47 %·s, 95%CI: -4.6 to 99.6, ES=0.31) for HIT and 17% (Δ159 %·s, 95%CI: 106.7 to 210.9, ES=1.03) for BFR group. CONCLUSIONS: The current findings suggest that, at least in young, healthy men, BFR can increase leg strength at low intensities without compromising macrovascular or microvascular function.

TP6: ARTERIAL STIFFNESS RESPONSES TO A SHORT DURATION, HIGH-INTENSITY SIMULATED FIRE ATTACK IN MALE CAREER FIREFIGHTERS

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BACKGROUND: Cardiovascular events are the leading cause of death in firefighters, and nearly two-thirds of these deaths occur during or immediately following a fire suppression event. Arterial stiffness is an independent predictor of cardiovascular-specific and all-cause mortality that may be increased by a fire attack. **PURPOSE:** To characterize changes in central arterial stiffness, indexed as carotid-femoral pulse wave velocity (cf-PWV), and peripheral arterial stiffness, indexed as Augmentation Index (AIx), following a simulated fire attack. **METHODS:** Twenty-one male career firefighters (35±8 yrs; 31±5 kg/m^2) reported to the testing facility in a fasted state during morning hours. After 10 minutes of supine rest, blood pressure was assessed via a brachial cuff and AIx and cf-PWV were determined via pulse waveform analysis and carotid applanation tonometry, respectively. Firefighters then participated in a seven-station simulated fire attack for time, and heart rate was continuously monitored via wireless telemetry. Brachial blood pressure, AIx, and cf-PWV were reacquired immediately upon completion. Paired t-tests were used to compare pre-post changes in blood pressure and arterial stiffness indices, and Pearson's correlations were used to explore predictors of arterial stiffness responses. **RESULTS:** Average heart rate during the simulated fire attack was 164±13 bpm, and average time to completion, a surrogate for fitness, was 8.7±1.7 min. Despite significant increases (p<0.01) in mean arterial pressure (94±9 vs. 115±10 mmHG) following the simulated fire attack, cf-PWV (7.6±1.0 vs. 7.8±0.9 m/s; p=0.34) and AIx (13.8±8.6 vs. 13.9±12.3 %; p=0.98) were unaltered. Pearson's correlations demonstrated that fire attack completion time was inversely associated with changes in cf-PWV (r=-0.53, p=0.01) but not AIx (r=-0.13, p=0.56). **CONCLUSIONS**: No changes in central or peripheral indices of arterial stiffness were observed following a short-duration, high-intensity simulated fire attack in male career firefighters. The observed association between fitness, indexed as fire attack completion time, and changes in cf-PWV may be explained by intensity-dependent arterial stiffness responses, whereby increases in arterial stiffness in fitter firefighters may be attributed to an ability to perform the task at a greater relative intensity.

TP7: ACUTE PHYSIOLOGICAL RESPONSES TO ELECTRICAL MUSCULAR STIMULATION WITH BLOOD FLOW RESTRICTION IN DAILY WHEELCHAIR USERS

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BACKGROUND: The application of blood flow restriction (BFR) during low intensity resistance training has been found to increase muscular strength to a similar extent as high-intensity resistance training. Electrical muscular stimulation in everyday wheelchair users has been found to reverse vascular damage and improve muscle strength resulting from injury or inactivity. Utilizing EMS during BFR in the lower extremities may increase muscle hypertrophy and strength, improve vascular health, and contribute to improved function. The purpose of this study was to compare acute physiological responses to EMS with and without BFR among individuals that primarily use wheelchairs for activities of daily life. METHODS: 10 participants who require daily wheelchair use are being recruited for this study. Individuals meeting the inclusion criteria are participating in 3 randomized experimental sessions: EMS, BFR, and EMS+BFR. Upon arrival, participant anthropometrics are collected and then the participants are seated on a standard hospital bed in an upright

position. After 5 minutes of rest, fingerprick lactate and posterior tibial artery ultrasound analysis are assessed. One of 3 treatment conditions are applied for 20 minutes and upon treatment cessation, lactate and arterial analyses are repeated. Repeated measures ANOVA will be used to assess differences between means, with an alpha level of 0.05 set for statistical significance. RESULTS: Preliminary data (n=4) for blood lactate show higher blood lactate post treatment in EMS compared with other groups (EMS pre = 1.05 ± 0.22 mmol, post = 4.0 ± 1.78 mmol; BFR pre = 0.93 ± 0.29 mmol, post = 1.23 ± 0.29 mmol; EMS+BFR pre = 1.02 ± 0.09 mmol, post = 1.36 ± 0.14 mmol). Posterior tibial artery diameter via ultrasonography seems to be similar among all conditions (EMS pre = 0.24 ± 0.40 cm, post = 0.25 ± 0.05 cm; BFR pre= 0.22 ± 0.009 cm, post= 0.21 ± 0.007 cm; EMS and BFR pre= 0.21 ± 0.003 cm, post= 0.21 ± 0.01 cm). Tibial artery volume flow follows a general trend for reduced volume flow after treatment, with BFR and EMS+BFR having the greatest change (EMS pre= 26.58 ± 9.28 cc/min, post= 23.80 ± 12.15 cc/min; BFR pre= 18.24 ± 5.05, post= 14.26 ± 5.06 cc/min; EMS and BFR pre= 18.29 ± 10.88 cc/min, post = 10.74 ± 2.96 cc/min). However, these results are preliminary and have not been statistically analyzed due to a very small sample number.

TP8: BALANCE AND FUNCTIONAL GAIT RELATE TO DAILY PHYSICAL ACTIVITY IN INDIVIDUALS WITH DOWN SYNDROME.

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BACKGROUND: Daily physical activity plays a vital role in quality of life, general physical preparedness, and decreased risk for disease while physical inactivity is associated with decreased coordination and increased difficulty performing activities of daily living. Although this information is prevalent within the literature, there is a sparsity of research pertaining to special populations, specifically individuals with Down syndrome. The purpose of this study was to determine if physical activity assessed by daily step count (PA) is associated with balance and functional gait performance. METHODS: Six participants, including four males and two females (age = 34 ± 10 years, height = 62.0 ± 2.2 in., body mass = 89.0 ± 21.9 kg), with Down syndrome took part in this within-subject study. During the first session, participants completed the BERG balance assessment and were fitted with a StepWatch accelerometer, the device considered the gold standard for impaired gait. Participants wore the accelerometer for seven days before completing the second session. During the second session, participants returned the monitor for data extraction and completed a functional gait analysis (FGA). The highest and lowest step counts across the seven days were removed and a five-day average was used for analysis. Assumptions for parametric testing were met, so the data were evaluated using Pearson correlations to determine if associations existed between the BERG test and FGA and PA, respectively. RESULTS: There was a significant correlation between both balance (r = 0.990, p = 0.010) and functional gait (r = 0.999, p < 0.001) and PA (3218± 1344 steps). CONCLUSIONS: Performance during the BERG balance test and FGA may directly transfer to day-to-day activity as they assess balance and functional gate; therefore, maintaining PA levels should be an important consideration for individuals with Down syndrome as PA is highly correlated with performance during these functional tests. Future research should examine whether PA influences balance and gait performance or vice versa in a larger sample of individuals with Down syndrome to continue to better understand the needs of this population.

TP9: HIGH-INTENSITY INTERVAL TRAINING VERSUS MODERATE-INTENSITY TRAINING ON CARDIOMETABOLIC HEALTH MARKERS IN SPINAL CORD INJURY

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BACKGROUND: Recent studies in nondisabled individuals have demonstrated that low-volume high-intensity interval training (HIIT) can improve cardiometabolic health similar to moderate-intensity training (MIT) despite requiring 20% of the overall time commitment. To date, there have been no studies assessing the effects of HIIT for improving cardiometabolic health in individuals with spinal cord injury (SCI). OBJECTIVES: The primary purpose of this pilot study was to compare the effects of 6 weeks of low-volume HIIT vs MIT using arm crank ergometer exercise to improve body composition, cardiovascular fitness, glucose tolerance, blood lipids, and blood pressure in a cohort of individuals with longstanding SCI. METHODS: Participants were randomized to 6 weeks of HIIT or MIT arm crank exercise training. Aerobic capacity, muscular strength, blood lipids, glucose tolerance, blood pressure, and body composition were assessed at baseline and 6 weeks post training. RESULTS: Seven individuals (6 male, 1 female; n = 3 in MIT and n = 4 in HIIT; mean age 51.3 ± 10.5 years) with longstanding SCI completed the study. The preliminary findings from this pilot study demonstrated that individuals with SCI randomized to either 6 weeks of HIIT or MIT displayed improvements in (a) insulin sensitivity, (b) cardiovascular fitness, and (c) muscular strength (p < .05). However, MIT led to greater improvements in arm fat percent and chest press strength compared to HIIT (p < .05). CONCLUSION: No differences between MIT and HIIT were observed. Both conditions led to improvements in insulin sensitivity, aerobic capacity, muscle strength, and blood lipids in individuals with SCI. Future larger cohort studies are needed to determine if the shorter amount of time required from HIIT is preferable to current MIT exercise recommendations. One way to address the need for larger cohort studies may be to incorporate telehealth exercise training that may ease the burden of traveling to facilities for individuals with SCI. Preliminary data from an ongoing telehealth study will be presented.

TP10: INVESTIGATION OF BLOOD LACTATE AS A MARKER OF METABOLIC DYSFUNCTION DURING PREGNANCY.

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BACKGROUND: Previous work suggests blood lactate can be used as an indicator of metabolic disease and is a useful predictor of clinical outcomes in non-pregnant populations. However, the utility of lactate as an indicator of metabolic dysfunction during pregnancy is unknown. The purpose of this study is to determine if fasting or postprandial lactate is related to established markers of metabolic dysfunction (weight status, insulin resistance, substrate oxidation) during pregnancy. The ability to detect metabolic dysfunction during pregnancy has the potential to impact the immediate and future health of both mother and infant. METHODS: Lactate, glucose, and insulin values were assessed in 64 participants during late pregnancy (34.5±1.7 weeks gestation) before (fasting) and after a high-fat meal (1hr). Insulin and glucose levels were used to calculate HOMA-IR, which is an index of insulin resistance. Respiratory quotient (RQ), which reflects the relative contribution of fat and carbohydrate oxidation, was estimated using indirect calorimetry. Height (objectively assessed) and pre-pregnancy weight (self-reported) were used to estimate pre-pregnancy Body Mass Index (BMI). Means were compared and potential correlations were assessed using nonparametric tests. Partial correlations were used to adjust for potential confounders. RESULTS: Fasting and 1hr lactate were higher among those with pre-pregnancy overweight/obese (OWOB, n=29) compared to lean (n=35) (fasting: OWOB 0.90±0.26 v lean 0.72±0.26, p=0.007; 1hr: OWOB 1.01±0.37 v lean 0.76±0.28, p=0.005). Fasting and 1hr lactate values were positively correlated to fasting and 1hr insulin and HOMA-IR (p<0.05). When adjusting for pre-pregnancy BMI, only 1hr lactate (not fasting) was correlated to insulin (1hr) and HOMA-IR (fasting and 1hr)(p<0.05). Fasting and 1hr lactate was positively correlated to 1hr RQ and this remained when adjusting for pre-pregnancy BMI and HOMA-IR(p<0.05). CONCLUSIONS: These data indicate lactate is associated with other markers of metabolic dysfunction during pregnancy. Future work should assess the clinical utility of lactate (fasting or postprandial), assessed at time points throughout pregnancy, as a potential biomarker for metabolic dysfunction or adverse obstetric outcomes, as in gestational or pre-pregnancy diabetes or fetal growth restriction. Funding was provided by NIH NIGMS Grant 5P20GM103436, WKU RCAP Grant 17-8011, and UTGSM Coffman Pediatric Research Endowment.

TP11: LIMB ASYMMETRY: COMPARISON OF ADOLESCENTS WITH AND WITHOUT AUTISM SPECTRUM DISORDER AT DUAL RUNNING SPEEDS

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BACKGROUND: Autism spectrum disorder (ASD) remains on the rise in the United States. While previous research has investigated walking

mechanics in adolescents, limited research on running mechanics in autistic persons exist. Running, like walking, is a highly popularized form of physical activity. Lower limb asymmetries in running provides a snapshot of overall lower limb motor control. The purpose of our study was to investigate running limb asymmetries in autistic youth compared to neurotypical controls. METHODS: Seventeen individuals (aged 14.7±1.5yrs, BMI 20.1±3.9kg/m^2) clinically diagnosed with ASD and seventeen age, sex, and BMI matched controls (aged 14.5±1.4yrs, BMI 20.3±3.6kg/m^2) ran shod over-ground at a standardized speed (3.0m/s) and a self-selected (SS) speed (2.63±0.33m/s & 2.74±0.39m/s, respectively). 3D kinematics (VICON Motion Systems) and ground reaction forces (GRFs) (Bertec Corporation) were collected and analyzed using Visual3D Biomechanical Software. Limb comparison symmetry index was calculated for step width and step length at 3.0m/s and SS speeds. Two-way (group x speed) mixed model analysis of variances (alpha = 0.05) were used to determine differences in asymmetry. RESULTS: The step width of ASD at SS and 3.0m/s were 0.16±0.03m and 0.15±0.03m and in CON 0.15±0.06 and 0.15±0.02m, respectively. The step length of ASD at SS and 3.0m/s were 1.08±0.16m and 1.13±0.13m and in CON were 1.22±0.11m and 1.13±0.14m, respectively. Limb asymmetries calculated for step width in ASD were 31.3±13.5% and 41.2±25.7% in CON. The step length asymmetry values calculated for individuals with ASD were 22.9±27.9% and 22.9±15.1% in CON. There were no significant interactions or speed/group main effects for step width asymmetry (F=4.39, p=0.05; F=0.21, p=0.68, & F=1.32, p=0.33) or step length asymmetry (F=0.22, p=0.89; F=1.18, p=0.31; F=2.46, p=0.13). CONCLUSION: Understanding lower limb asymmetries in running provides a snapshot of motor control function during this popular form of physical activity. The results here demonstrate autistic youth do not run with greater spatiotemporal asymmetries when running at similar speeds. However, it is important to note ASD is an umbrella term for a variety of social, physiological, and/or behavioral features; thus, our results may not be generalizable to portions of the ASD population that may (those requiring significant support) have motor control issues.

TP12: NEUROMOTOR CONTROL DIFFERENCES IN THE UPPER EXTREMITY BETWEEN THOSE WITH AND WITHOUT RHEUMATOID ARTHRITIS

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ABSTRACT BACKGROUND: Rheumatoid arthritis (RA) is an autoimmune disease that often leads to joint damage due to the breakdown of the synovial membrane (Smolen, Aletaha, Koeller, & Emery, 2007). Though RA affects the whole body, patients generally lose the most function in the wrists and fingers. Due to decreased hand strength and dexterity**,** RA patients typically adopt abnormal movement patterns to complete activities of daily living (ADLs) (Palamar, 2017). The purpose of this study was to observe the differences in neuromotor control and joint patterns of the upper extremities between RA patients and healthy individuals. In preliminary trials, RA patients were more inclined to rotate and overuse their shoulders to compensate for a loss of functioning in their hands; however, a healthy individual completes the marble task primarily using their elbow joint (Pierce, 2021). In addition, this study explored the relationship between intrinsic motivation and level of independence as RA symptoms progress. METHODS: To assess the difference in movement patterns, the participant used tweezers to manipulate marbles of different sizes. Using an electroencephalogram (EEG), neuromotor processes and cognitive workload were analyzed immediately before and following the participants' manipulation of the marbles. Vicon Nexus' motion capture software and upper limb model were used to track and analyze fine motor movements. Additionally, the participants' level of motivation and its subsequent effect on neuromotor processing was assessed using a survey based on the Self-Determination Theory of Motivation. RESULTS: Individuals with RA are more likely to utilize their shoulder joints during tasks involving the hands and wrists. The changes in movement patterns generally resulted in greater processing within the frontal cortex both before and throughout trial completion. Lastly, most of the individuals who were able to complete the tasks reported higher levels of intrinsic motivation and independence in completing activities of daily living. CONCLUSION: Due to changes in movement patterns, individuals with RA typically experience more shoulder pain than their healthy counterparts, and their movements are less accurate. Additionally, differences in intrinsic motivation prior to their initial diagnosis tends to affect how independent an individual is as their RA progresses.

TP13: EFFECT OF QUARANTINE AND ISOLATION ON MENTAL HEALTH IN STUDENT ATHLETES

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BACKGROUND: In 2019, the COVID-19 pandemic took a large toll on the mental health of many college students (Batra et al., 2021). In order to prevent the spread of the virus, quarantining and isolating became common place. The purpose of this study was to investigate the impact of quarantine and isolation due to COVID-19 on mental health of students and student athletes at Queens University of Charlotte. METHODS: A survey was developed specific to mental health outcomes in college students during quarantine and isolation. The anonymous survey (Microsoft Forms) was distributed via email to student-athletes toward the end of the Spring 2021 semester. RESULTS: 124 participants consented to the study (55 males, 68 females), 66% reported "white" for ethnicity, and were equally distributed freshman to senior. Sixty four percent of subjects reported having to isolate or quarantine at least once, with 50% doing so on campus. Of the nine questions pertaining to mental health, majority of subjects reported dramatically or slightly more than normal issues with: "getting upset over trivial things" (58.2%), "just couldn't seem to get going" (74.3%), "found it difficult to relax" (69.7%), and felt like I had nothing to look forward to" (63.7%). CONCLUSIONS: Given the context of already elevated stress and mental health pressures for college students, this data shows that quarantine and isolation only exasperated the existing mental health pressures in this student-athlete population. Current and future research on mitigating these issues in this population is warranted.

TP14: WHO WE ARE AND WHAT WE DO: AN EXPLORATION OF INDIVIDUAL DIFFERENCES FOR EXERCISE BEHAVIOR

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BACKGROUND: Even with the well-known and well-advertised preventative and therapeutic benefits of regular exercise, only ~20-25% of adults self-report meeting exercise recommendations, and the prevalence decreases to ~10-15% when behavior is assessed using device-based recordings. With 75-90% of adults failing to engage in enough exercise to reap the health benefits, it is crucial to direct efforts towards understanding why individuals do or do not choose to engage in exercise behavior. PURPOSE: Determine the extent to which personality dispositions and exercise attitudes explain future exercise behavior. METHODS: Undergraduates (N=84, 20±2 yrs, 50 ♀, 73% regular exercisers) completed an online survey to assess Extraversion (E), Conscientiousness (C), and Neuroticism (N; via Big Five Inventory), as well as exercise attitudes (via Affective Exercise Experiences). 2-weeks following initial survey completion, participants completed a 7-day journal where exercise type, intensity, duration, and frequency were self-reported each day. Separate, stepwise regressions were performed to determine explained variance on average exercise intensity, average duration, and frequency. RESULTS: E, C, and N were not related to exercise intensity (r_s = -0.15 - 0.00, P_s= .07-0.33), duration (r_s = -0.14 - 0.02, P_s= 0.09-0.50), or frequency (r_s = -0.16 - -0.04, P_s= 0.07-0.33) and were removed from subsequent regression models. Affective attitudes toward exercise explained significant variance in average exercise intensity (F(3,80)=7.85, P<0.001, R^2_{adj} =0.20) and exercise frequency (F(3,80)=2.91, P=0.040, R^2_{adj} =0.07), but did not explain variance in average exercise duration (F(3,80)=1.99, P=0.122, R^2_{adj}=0.04). CONCLUSION: While E, C, and N were not related to self-reported exercise behavior, attitudes towards exercise (e.g., belief exercise will bring pleasure, preference for exercise over sedentary behavior, feeling empowered by, or a sense of competence, with exercise) explained 23% and 7% variance in average exercise intensity and frequency (i.e., d·wk^{-1}), respectively. This suggests affective attitudes play an important role in how vigorous an individual exercises as well as provides some explanation for how frequently someone will exercise, which may result in greater health benefits.

TP15: A COMPARISON OF MINDFULNESS AMONG LAW ENFORCMENT OFFICERS AND FIREFIGHTERS

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BACKGROUND: Mindfulness, the ability to focus on thoughts, bodily sensations, and external stimuli with acceptance, openness, and curiosity, mitigates the effects of stress and increases decision-making, which are critical skills among fire responders such as Law Enforcement Officers (LEOs) and Firefighters (FFs). Limited research exists surrounding the differences between these tactical occupations. **PURPOSE:** The purpose was to compare LEO's and FF's mindfulness attentional awareness. **METHODS:** LEOs (n=25) and FF (n=36) from one southeastern rural municipal agency in Georgia were recruited to participate. They were asked to complete the Mindfulness Attention Awareness Scale (MAAS) as part of their routine fitness assessment. Independent samples t-tests at the $p < 0.05$ level were conducted, exploring mean differences between the two groups (LEOs and FFs) on global MAAS scores and individual items. Cohen's d test was used to investigate effect sizes. **RESULTS:** Dataset demonstrated normality and was appropriate for further statistical analyses. Independent samples t-tests of global MAAS scores and individual items found statistically significant mean differences between participating LEOs and FFs at the $p < 0.05$ level. LEOs demonstrated statistically significant higher means on global MAAS score (M=70.64, SD=11.98) versus FFs (M=64.77, SD=11.40), item #6 (M=3.92, SD=1.50 vs M=2.51, SD=1.34) and item #13 (M=4.40, SD=1.32 vs M=3.71, SD=1.22). Cohen's d statistics computed for items #6 (d=1.01), #13 (d=0.55), and global score (d=0.51) suggested large and medium effect sizes. **CONCLUSION:** Limited research exists exploring mindfulness with tactical groups. The scant studies indicate correlations between higher mindfulness levels (i.e., MAAS global score) and increased mental wellness. This study provided participating agencies with a context-specific mindful-based intervention for both the individual- and crew/team-level. Reported levels of mindfulness via the MAAS were consistent with existent literature. To the authors' awareness, this project is the first to actively explore differences in reported levels of mindfulness between LEOs and FFs. LEOs reported higher levels of awareness on two specific items as well as on overall mindfulness. This may be attributable to differences in role/training for LEOs (i.e., tactical training focusing on "situational awareness") vs FFs, but more research is necessary. The submitted work was conducted without funding.

TP16: EFFECT OF FASTED OR CARBOHYDRATE INGESTION ON MOOD STATE POST RUN MEANSURED BY PANAS-GEN SURVEY AND CONTINUOUS GLUCOSE MONITORING

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BACKGROUND: As technology advances, simpler means of regulating and tracking measures of health have become more readily available. One such means is continuous glucose monitoring. Continuous glucose monitoring (CGM) devices are becoming more popular as a simple method of tracking blood sugar in people with diabetes. However, the utility of these devices may extend further than just diabetes regulation. CGM devices are simple to use and provide very little discomfort to the individual utilizing them, which makes them an ideal way for athletes to measure their blood glucose levels during training. The purpose of this study is to report the relationship between blood glucose levels and feelings of well-being after a continuous 90-minute run. METHODS: A sample of 5 recreationally fit men (age 45.2±6.5) wore the Libre™ Continuous Glucose Monitor (CGM) and ran 9-12 miles at a tempo pace supervised by a researcher on 4 separate days. On two of the days, subjects were instructed to arrive in a fasted state and on the other two days they were asked to eat a high CHO snack an hour before the run. On each day, subjects completed the PANAS-GEN survey before and after the run in order to assess feelings of well-being. RESULTS: There were no significant differences between pre- and post-blood glucose levels (89.3 mg/dL vs 96.7mg/dL, p =.40) in the fasted state. There were significant differences between the pre- and post-blood glucose levels (88.4 mg/dL vs 106.3 mg/dL, p =.00) in the high CHO fed state. As a whole, there was an inverse relationship (p = .01, r = .531) between post-run blood glucose levels and negative affect scores: however, this relationship did not appear when groups were separated into fasting vs. non-fasting. CONCLUSIONS: The post-blood glucose levels in both the fasted and non-fasted state remained within a clinically normal range, suggesting that the subjects were fat-adapted and metabolically efficient. While positive affect did not increase post-run, negative affect did decrease. Because this decreased negative affect correlated with increased blood-glucose levels post-run, this suggests that long aerobic runs might decrease negative feelings in metabolically efficient runners. These findings warrant further investigation with a larger sample size.

TP17: INTERACTION BETWEEN AUTOMATIC AND REFLECTIVE PROCESSES IN THE PREDICTION OF ACCELEROMETER-DERIVED PA BEHAVIORS

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Grounded in dual process theories related to physical activity (PA) behavior, both reflective and automatic processes have been shown to predict PA. However, relatively little is known about the interaction or relative contributions of these two processing systems in relation to PA behavior, and even less is known about how individual factors alter these relationships. **PURPOSE:** To examine the relationships among automatic and reflective processes (i.e., PA intentions) across four different PA domains (i.e., exercise [EX], light [LPA] and moderate-to-vigorous intensity non-leisure time PA [MVPA], and sedentary behavior [SED]), and explore how individual factors modulate these associations. **METHODS:** Participants (≥18 years old) completed a computerized Single Category Implicit Association Test (SCIAT) measuring implicit attitudes towards PA and SED behaviors using images depicting the four different PA domains. Positive SCIAT scores indicated positive affective evaluation (AE) toward the target behavior. They also completed questionnaires measuring PA intention and PA self-efficacy (SES). Habitual PA was measured using an accelerometer. Multiple regression analysis was used to examine whether AE predicted unique variance in levels of PA after controlling for PA intentions and SES. **RESULTS:** Sixty-six participants (63% women; 92% students) were included in our final sample (M±SD: 23±8 y, 26.2±19.1 kg/m^2, 53.4±13 min/d and 505.3±315.1 min/d of MVPA and SED, respectively). AE of the different PA domains did not differ: EX=0.00±0.67, LPA=0.00±0.89, MVPA=-0.08±0.46, SED=-0.08±0.72. AE of EX was strongly and positively correlated with LPA (r=0.53, p<0.001). AE of EX and SES interacted to predict min/d of MVPA (β=-0.21; p=0.04) and total activity counts per day (a measure of total PA) (β=-0.26; p=0.01). Simple slope analysis revealed that at high SES, AE of EX was negatively correlated with both MVPA (β=-0.29, p=0.05) and total PA (β=-0.31, p=0.04). **CONCLUSIONS:** Our results, although somewhat unexpected, support the role of AE in relation to PA behavior and suggest that its effect may depend on self-regulatory resources such as SES. Caution is warranted in generalizing our findings to other samples as ours was comprised of young, healthy, and active adults.

TP18: REV IT UP: THE PSYCHOLOGICAL EFFECTS OF MYOFASCIAL RELEASE DURING RESISTANCE EXERCISE

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New technology has led to the advancement of and availability for personalized myofascial release before, during, and after exercise. Percussive therapy massagers are said to reduce inflammation and speed up muscle recovery, but are they well tolerated by individuals? **PURPOSE:** Examine the acute changes in affective states and enjoyment following resistance exercise utilizing myofascial release, relative to no myofascial release. **METHODS:** Participants [N= 18, 8 females; age (M ± SD); 20.3 ± 1.5 yrs; BMI (M ± SD); 24.5 ± 3.4] completed single arm biceps curls and single leg, leg extensions until functional-failure (i.e., ≤ 6 reps completed). All participants completed an active (i.e., use of percussion massage) and control (i.e., no percussion massage) session on separate days. All resistance exercise was performed at the participant's pre-determined 10 repetition maximum. **RESULTS:** While both active [(M ± SD); 109 ± 14] and control [(M ± SD); 107 ± 11] conditions resulted in high levels of enjoyment, post-exercise enjoyment was not different between conditions [P = .69]. Additionally, participants showed no differences in affective states between conditions, but reported significant pre-post affective changes. Specifically, Energy [Cohen's d = 1.29], Tension [Cohen's d = 0.75], and State Anxiety [Cohen's d = 0.60] increased, while Tiredness [Cohen's d = 0.74] and Calmness [Cohen's d = 0.98] decreased. **CONCLUSION:** It appears that percussive therapy utilized during resistance exercise was well tolerated by participants. Enjoyment levels and all measured affective states were

not different between conditions. Further, resistance exercise with and without the use of myofascial release resulted in increased energy and decreased tiredness levels. While unfavorable effects were observed for state anxiety, calmness, and tension, these effects were moderate and not dissimilar to other studies utilizing high intensity exercise designs. Overall, it appears the use of myofascial release during resistance exercise has no psychological impact on participants.

TP19: COMPARISON OF THE 'SEATTLE' AND 'INTERNATIONAL' CRITERIA ELECTROCARDIOGRAM INTERPRETATION IN AFRICAN AMERICAN COLLEGE ATHLETES

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PURPOSE: A 12-lead exercise stress test is a screening tool used to detect abnormalities that may predispose collegiate athletes to sudden cardiac death. Experts in the field have developed new standardized criteria to better interpret electrocardiogram (ECG) in athletes. Recent research suggests that African American athletes are more prone to cardiac abnormalities. The purpose of this study was to evaluate the sensitivity and specificity of the Seattle Criteria to the most recently created International Criteria in regard to ECG abnormalities in Division II African-American collegiate athletes. **METHODS:** Forty four African American male athletes (football, basketball, soccer) (age 22.2 $\pm$1.4 yrs; height 1.82 $\pm$0.1 m; weight 88.8 $\pm$ 14.9 kg) completed cardiovascular screening with a resting 12-lead ECG analysis which was read and interpreted, according to each criterion, by an expert in the field of exercise science. ECGs were classified as 'normal' and 'abnormal' according to the parameters of each criterion, and any abnormal condition was noted. The sensitivity and specificity of both criteria were computed. **RESULTS:** There was no significant difference in the sensitivity between both criteria (98.1%-100%). The International Criteria was more specific than the Seattle Criteria (91.2-94.1% vs. 87.4-88.2%). Applying the International Criteria when evaluating African American college athletes resulted in a significant decrease in abnormal ECGs and improvement of the positive predictive value of an abnormal ECG. **CONCLUSIONS**: These results demonstrated that following the International Criteria for ECG interpretation significantly reduced the total abnormal and false-positive ECG rates in African American collegiate athletes compared to the Seattle Criteria without compromising sensitivity. It is important to continue to conduct ECG research on athletes of different ethnicities and races in order to further define valid and reliable criteria for this underrepresented population.

TP20: RACIAL DIFFERENCES IN NIGHT-TO-DAY BLOOD PRESSURE RATIO AND BLOOD PRESSURE DIPPING IN HEALTHY YOUNG ADULTS

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BACKGROUND: Night-to-day blood pressure (BP) ratio and BP dipping pattern are prognostic of future cardiovascular events and morbidities. Prior studies have demonstrated racial disparities in night-to-day BP ratio and BP dipping in middle-aged and older adults, but when these disparities emerge remains unclear. Therefore, the purpose of this investigation was to determine whether racial disparities in night-to-day BP ratio and BP dipping exist in healthy young adults using ambulatory blood pressure monitoring (ABPM). **METHODS:** 41 adults (19M/22F) including 16 Black (age 21.4±0.6 yrs, BMI 25.4±4.3 kg/m^2, screening BP 108±10/66±10 mmHg; Mean±SD) and 25 White (age 21.2±0.7 yrs, BMI 25.2±3.8 kg/m^2, screening BP 106±9/62±7 mmHg) adults participated in this study. For ABPM (Suntech Oscar2), participants wore a 24-hour brachial cuff on their upper left arm which measured BP every 20 minutes during awake hours and every 30 minutes during sleep hours (self-reported). We defined daytime as 1000 to 2000 and nighttime as 0000 to 0600. Participants with at least 20 daytime and 7 nighttime readings (n=41) were included in the analysis. Primary outcomes included night-to-day BP ratio (nighttime/daytime BP) and nocturnal BP dipping (awake-asleep mmHg). We instructed participants to wear a waist-worn accelerometer (ActiGraph GT3X-BT) for seven days to assess moderate-vigorous physical activity (MVPA) and step count to account for ABPM differences due to physical activity. Statistical procedures included multivariate analysis of variance with Hotelling's trace, and Pearson's correlation (a priori α<0.05). **RESULTS:** Significant racial differences (Black vs White) existed for night-to-day BP ratios whereby Black participants had a higher brachial systolic BP ratio (0.92±0.06 vs 0.86±0.05, p<0.001), diastolic BP ratio (0.87±0.08 vs 0.78±0.10, p=0.002), central systolic BP ratio (p=0.003), and central diastolic BP ratio (p=0.002). Racial differences also existed for BP dipping whereby Black participants had a lower nighttime brachial systolic BP dip (7±6 vs 11±5 mmHg, p=0.008) and diastolic BP dip (11±8 mmHg vs 18±8 mmHg, p=0.017). Daily time spent in MVPA (7.5±3.0%) and steps (6581±3652) were not correlated with ABPM primary outcomes nor different between racial groups (p>0.05 for all). **CONCLUSIONS:** These preliminary findings suggest a racial disparity in night-to-day BP ratio and BP dipping in healthy young adults.

TP21: INFLUENCE OF ACUTE SUPPLEMENTATION WITH MITOCHONDRIAL ANTIOXIDANT MITOQ ON VASCULAR FUNCTION IN HEALTHY ADULTS

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Background: Cardiovascular disease (CVD) is characterized by endothelial dysfunction and heightened oxidative stress. Additionally, there are well documented racial disparities in endothelial function and CVD. MitoQ, a mitochondrial specific antioxidant, improves vascular function in rodents and healthy older adults by scavenging excess reactive oxygen species (ROS). However, the role of MitoQ in attenuating racial disparities in vascular function is unknown. Therefore, as part of an ongoing clinical trial (NCT04334135), we evaluated endothelial function and ROS in healthy adults pre- and post-acute MitoQ (or placebo) supplementation and performed a preliminary racial comparison. **Methods:** Seventeen participants (eight males, age: 28±10 years, BMI 25±4 kg/m^2, BP 110±12/66±6 mmHg, Mean±SD) were randomly assigned to placebo or MitoQ (100-160mg, depending on body mass). Participants reported as White, Black, or biracial based on parental race. Using a cross design, experimental sessions were separated by a ≥72-hour washout period. Measures were performed before and 60 minutes after ingestion of MitoQ or placebo capsules. We assessed brachial blood pressure (oscillometric) and brachial artery flow mediated dilation (FMD) via ultrasound. We placed an intravenous catheter to assess whole blood ROS levels via electronic paramagnetic resonance. To investigate treatment x time interactions, we performed 2-way ANOVA and ANCOVA. **Results:** Irrespective of treatment, systolic blood pressure decreased with time (p<0.01). We did not find treatment x time interactions for brachial FMD % (pre placebo: 7.1±4% to post placebo: 6.4±4% vs pre MitoQ: 6.0±4% to post MitoQ: 6.9±4%, p=0.61), brachial shear stress area under the curve (AUC) during reactive hyperemia (p=0.30), or brachial FMD normalized to shear AUC (p=0.46). Additionally, there was not a treatment x time interaction for blood ROS (p=0.67). We identified a trend for a treatment x race interaction (p=0.058) for [post-pre] ΔFMD whereby MitoQ resulted in a negative ΔFMD only in White adults. However, when we included pre-treatment FMD as a covariate for ΔFMD, this trend was attenuated (p=0.193). **Conclusion:** While additional data are needed, our preliminary findings indicate that acute MitoQ supplementation does not influence vascular function or oxidative stress in healthy adults.

TP22: THE IMPACT OF PERCEIVED DISCRIMINATION AND PERCEIVED STRESS ON CARDIORESPIRATORY FITNESS

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BACKGROUND: African Americans (AA) have the highest rate of cardiovascular disease (CVD) in the US, with 47% of AA experiencing CVD. Yet, the disproportionate burden of risk in AA is not fully understood. One potential explanatory factor for the increased CVD risk in AA could be greater perceived discrimination and perceived stress. Cardiorespiratory fitness (CRF) is an ideal measure of overall health and a predictor of CVD risk. Measured as maximal oxygen consumptions (VO_2max), CRF is the capacity of the circulatory and respiratory systems to provide oxygen to skeletal muscle mitochondria for energy synthesis during physical activity. Low CRF is a well-established independent risk factor of CVD mortality, and AAs have been shown to have lower CRF than non-Hispanic White individuals. Further, most of this research has focused on older adults, highlighting a gap in knowledge for young adults. Consequently, the purpose of this study will be to investigate the association between perceived discrimination, perceived stress, and CRF in young adults. METHODS: In Fall 2021, male and female young adults (aged 18-35 years,

n=100) associated with medium to large universities (University of North Carolina at Chapel Hill, Duke University and North Carolina Agricultural and Technical State University) who wear a smart watch capable of measuring VO_2max (including Apple Watch [version 3 or greater], Polar watch, or Garmin watch) will be recruited. Using an online questionnaire, participants will be asked to self-report their VO_2max (as a measure of CRF), demographic information, perceived levels of discrimination using the Lifetime Discrimination Scale (α=0.78), and perceived stress Global Perceived Stress Scale (α=0.78), respectively. The associations between perceived discrimination, stress, and VO_2max will be determined using multivariable linear regression. ANTICIPATED RESULTS: We hypothesize that students who experience more perceived discrimination and greater perceived stress will have lower VO_2max. Investigating perceived discrimination, stress and CRF will inform our understanding of CVD risk development in young adults. This information can be used to design proactive interventions for young adults at greater CVD risk. Future steps will assess the bi-directionality of the association between perceived discrimination, stress, and CRF.

TP23: ASSESSMENT OF LABORATORY DEVICES FOR ESTIMATING BODY COMPOSITION IN A HISPANIC POPULATION

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BACKGROUND: Body composition algorithms are typically validated using diverse populations without accounting for ethnicity. Yet, studies have observed variations in the distribution and composition of fat mass (FM) and fat-free mass (FFM) among ethnicities. Thus, potentially increasing the rate of error in FM and FFM values for minority populations. **PURPOSE:** The purpose was to determine the agreement between dual-energy x-ray absorptiometry (DXA) and multi-frequency bioelectrical impedance analysis (BIA) for estimating body fat percentage (BF%), FM, and FFM in a Hispanic population. **METHODS:** One-hundred eighty-one individuals (males: *n*=84; females: *n*=97) of Hispanic descent had body composition estimated via DXA and BIA. Participants completed all testing wearing compression gear and provided a urine sample to assess hydration status. Adequate hydration was considered at a urine specific gravity value <1.029. Agreement between DXA and BIA BF%, FM, and FFM was assessed using Pearson correlations, linear regression, and Bland-Altman analyses. Analyses yielded the standard error of the estimate (SEE), constant error (CE), 95% limits of agreement (LOA), and proportional bias for the entire group and within sexes. **RESULTS:** For BF%, BIA displayed similar CE±95% LOA for the sample (-3.17±5.45%), males (-3.2±5.5%), and females (-3.2±5.4%) compared to DXA. Correlation analyses indicated near-perfect associations (sample: *r*=0.96, males: *r*=0.93, and females: *r*=0.93); however, a moderate proportional bias was present for females (*r*=0.48). The sample (*r*=0.22) and males (*r*=-0.04) had trivial-to-no proportional bias. Regarding FM, BIA exhibited CE±95% LOA values of -1.4±4.2 kg for the sample, -1.9±4.6 kg for males, and -0.9±3.6 kg for females. All groups displayed near-perfect associations (sample: *r*=0.99, males: *r*=0.97, and females: *r*=0.99), despite a strong proportional bias for females (*r*=0.68) and moderate bias for the sample (*r*=0.36). No proportional bias was observed for males (*r*=-0.02). For FFM, males demonstrated the largest CE±95% LOA (1.6±4.6), compared to the sample (1.2±3.9 kg) and females (0.9±3.4 kg) when BIA was compared to DXA. Near-perfect associations were observed for all groups (sample: *r*=0.98; males: *r*=0.97; females: *r*=0.97). No proportional biases existed for the sample (*r*=-0.01) or males (*r*=-0.10); however, females exhibited a moderate, negative bias (*r*=-0.38). **CONCLUSION:** Due to the observed moderate-to-strong proportional biases within body composition estimates, the need for ethnic-specific algorithms is warranted, particularly for the Hispanic female population.

TP24: MEASURED AND PREDICTED RESTING ENERGY EXPENDITURE IN OVERWEIGHT BLACK AND WHITE YOUNG ADULT WOMEN

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BACKGROUND: Resting energy expenditure (REE) is the major determinant of total energy expenditure and is reported to be reduced in Black compared to White individuals. This study aims to assess and evaluate the relationship between REE and body composition (BC) measures in overweight Black and White young adult women and explore the accuracy of common REE prediction equations. **METHODS**: Weight (WT), height (HT), measured REE (REE_M; Fitmate GS, Cosmed USA Inc.), and BC (BC-418, Tanita Corp.) were assessed in Black (n=79) and White (n=96) non-hispanic women (age=22.2 ± 2.1; BMI≥25 kg/m^2) enrolling in a behavioral weight loss (BWL) program. In addition to REE_M, the accuracy of 4 common REE prediction (REE_P) equations was evaluated: Harris-Benedict, Mifflin-St. Jeur, Owen, and World Health Organization. **RESULTS**: Black women had significantly (p<0.05) higher WT, BMI, and % fat and significant correlations were observed between REE_M and all BC variables in both groups. No significant differences were observed in unadjusted REE_M (1534±240 vs. 1525±274 kcals/day; p=0.82); however, REE_M adjusted for WT was significantly lower in Black women (1492±201 vs. 1561±201 kcals/day; p=0.028). The Owen equation demonstrated the highest accuracy in both groups with ~63% of REE_P values within ±10% of REE_M. **CONCLUSIONS**: The observed difference in weight adjusted REE_M between the groups has implications for caloric intake and physical activity goal setting in BWL. Further research is needed to determine if the observed difference in REE_M impacts weight loss outcomes and weight loss maintenance. This work was supported by NIH R01DK103668 to JGL

POSTER PRESENTATION SESSIONS (P1–P260)

P1: ASSOCIATIONS BETWEEN CARDIOVASCULAR REACTIVITY AND AUTOMATIC EVALUATION OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR

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BACKGROUND: This study is part of a larger project examining the interaction between automatic and reflective processes in relation to PA behavior. Central to the dual-process theory is the concept of effort mobilization, or the amount of resources individuals mobilize to execute behavior. Greater effort may be required when there is conflict between behavioral automaticity and the goal or task being pursued. Cardiovascular (CV) responses to cognitive challenge, *CV reactivity,* are objective and reliable measures of effort mobilization but have yet to be evaluated during the automatic evaluation of PA behavior. PURPOSE: To explore the relationships among CV reactivity, automatic and reflective measures of PA behavior, and individual characteristics that influence these processes. METHODS: This pilot study includes 15 subjects from a larger project (47% women, age: 21±3 y, body mass index: 25.6±4.1 kg/m^2). A computerized Single Category Implicit Association Test (SCIAT) measured implicit attitudes towards PA behaviors (positive scores indicated positive affect toward the target behavior). HR and MAP were measured using a finger cuff during SCIAT assessments. Averages obtained during the test and change scores (expressed as a percentage of change from rest) were used to quantify CV reactivity. Habitual PA (min/d) was measured with an accelerometer. Reflective PA measures (e.g., intention, enjoyment) were collected via questionnaire. Bivariate correlations examined relationships among study variables (α=0.05). RESULTS: MAP during the test correlated with light PA SCIAT scores (*r*=-0.52, *p*=0.05). MAP change scores correlated with sedentary behavior SCIAT scores (*r*=0.59, *p*=0.02) and intention to perform exercise (*r*=-0.61, *p*=0.02). HR during the test correlated with intention to perform exercise (*r*=-0.75, *p*<0.01) and PA enjoyment (*r*=-0.70, *p*<0.01). CONCLUSIONS: Lower CV reactivity during the SCIAT was related to positive affect toward PA behavior and greater PA intention, suggesting that these subjects found PA stimuli to be less stressful (required less effort). Conversely, higher CV reactivity was related to negative affect of PA and positive affect of sedentary behavior, suggesting that both PA and sedentary stimuli were more stressful (required greater effort). By focusing efforts on these perceptions, future PA guidelines may be more successful in increasing PA levels and decreasing sedentary behavior.

P2: COMPARISON OF TRADITIONAL VERSUS NON-TRADITIONAL DISTANCE EDUCATION STUDENTS' MOTIVES FOR ENGAGING IN PHYSICAL ACTIVITY

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INTRODUCTION: Approximately 33% of undergraduates do not meet physical activity (PA) and public health guidelines and thus may not

experience the benefits of PA. Research indicates higher levels of intrinsic motivation, addressed within the framework of Self-Determination Theory (SDT), predicts greater levels of adherence to PA. Course-based PA interventions using SDT may facilitate intrinsic motivation among undergraduates. Global health events have led universities to increase use of online, distance education (DE), courses. DE courses are also a tool for non-traditional students, over 30 years, to earn a degree. DE course-based interventions have been shown to effectively promote PA. Research on the need to modify DE PA course-based interventions based on student ages is limited. The aim of the analysis was to assess motivational differences between non-traditional and traditional DE students in a PA course-based intervention. METHODS: Students in a 16-week DE PA course-based intervention completed an online survey as part of an ongoing research project. Measurements included the BREQ-3 and the MPAM-R. BREQ-3 scores are from 0 to 4 while MPAM-R scores are from 1 to 7, higher scores indicate higher levels of motivation. RESULTS: Participants (N=11; 63.6% White) ranged in age from 20 to 47 (30.8±9.7) years, 54.5% were employed full-time. Non-traditional students (n=6) were 37.9±6.9 years, traditional students (n=5) were 22.2±2.2 years. Traditional and non-traditional students scored highest on the MPAM-R appearance subscale (6.3±0.5,39±1.2, respectively). The BREQ-3 Identified Regulation subscale scored the highest among traditional and non-traditional students (3.5±0.6,2.5±0.9, respectively). No significant differences were observed at a p-value of 0.05; to examine potential differences present, the p-value was expanded to 0.10. A significant difference was observed (p=0.08) for Identified Regulation. The subscale of Introjected Regulation came close to reaching significance (p=0.11). No additional significant differences were observed. CONCLUSION: Results indicate there may not be a difference between traditional and non-traditional DE students' reasons for engaging in PA. It may not be necessary to modify DE course-based PA intervention based on ages of participants. Further research, with a larger sample, on the motivation behind PA behaviors of traditional and non-traditional DE students is warranted.

P3: ASSOCIATIONS BETWEEN SLEEP AND MENTAL HEALTH ACROSS THE COLLEGE TRANSITION

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Background: Approximately 60% of college students suffer from poor sleep quality and high variability in sleep duration. Similarly, poor mental health (e.g., anxiety, depression, and acute stress) is a growing problem in this population, as diagnoses of mental health disorders are on the rise in college students. The transition from high school to college is a period of dramatic environmental changes, social upheaval, and psychological stressors which often lead new college students to make poor choices with regard to their lifestyle behaviors. However, little is known regarding the potentially bidirectional relationship between changes in sleep and the development of mental health issues during the transition from high school to college, or whether other lifestyle changes (e.g., alcohol consumption) impact this relationship. Accordingly, the primary aim of this study is to identify how changes in sleep during the transition from high school to college impact mental health. A secondary aim is to examine how changes in other lifestyle-related behaviors such as alcohol consumption may mediate the association between changes in sleep and mental health. Methods: This prospective longitudinal study will assess changes in sleep, alcohol consumption, and mental health in a sample of 75 high school seniors aged 17-18 (50% female) at study entry. Baseline testing will occur in the spring semester of senior year in high school and follow up testing will occur during the first semester of college. Stress will be assessed using the perceived stress scale, as an acute marker of mental health. Characteristics of sleep will be measured via the Pittsburgh Sleep Quality Index and Sleep Hygiene Index. The alcohol use disorders identification test will be used to screen alcohol consumption. Aims will be assessed using linear regression. Anticipated Results: We anticipate that perceived stress will increase over the transition from high school to college and that changes in sleep quantity, quality, and variability will be associated with these increases. Lastly, we anticipate alcohol consumption as individuals enter the college setting to affect sleep quality and variability in sleep duration.

P4: TIME PERCEPTION CHANGES WITH AFFECTIVE VALENCE DURING CYCLING EXERCISE

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BACKGROUND: During exercise, the rate at which time appears to pass is distorted. This effect is often attributed to increases in physiological arousal. Psychological responses to exercise also play a role in time perception changes and can vary substantially from person to person. The purpose of this study was to see if time perception differed between exercise intensities of high and low affective valence. **METHOD:** A total of 23 healthy, untrained men and women (25.8 ± 4.2 years, 175.9 ± 9.1 cm, 78.0 ± 11.04 kg) completed a VO_{2peak} test on Velotron cycle ergometer, starting at 40 Watts (W) and increasing by 30 W every 3 min until exhaustion. During each stage, subjects completed a series of time estimation tasks (2, 3, 5, 7, and 10 seconds) and then reported their affect using the 11-point Feeling Scale. The scale goes from "*-5, very bad*" to "*+5, very good*" so that a greater value indicates more positive feelings. The time estimation ratio (actual time divided by estimated time) was calculated for the stage at which affect was lowest (LOW) and highest (HIGH). Affect values and time estimation ratios were compared between LOW and HIGH using paired-samples *t*-tests. The analyses were performed using SPSS version 27 with an alpha level of .05. **RESULTS:** Affect was significantly greater for HIGH (2.78 ± 1.51) than for LOW (-0.39 ± 1.70), $t(22) = 10.61$, $p < .001$, $d = 2.21$. Time estimation ratio during LOW (1.215 ± 0.319) was significantly greater than during HIGH (1.096 ± 0.276), $t(22) = 2.44$, $p = .023$, $d = .51$. **CONCLUSION:** Subjects experienced a significant and substantial change in affect throughout the course of the exercise test. These differences in affect were associated with changes in the subjective perception of time. During exercise at an intensity characterized by a lower affect (more negative feelings), chronological time was perceived to "fly by" faster than exercise at intensities characterized by a higher affect. This was possibly due to the greater distraction effect of unpleasant sensations of exercise, which would divert attention from the time estimation task per the attention allocation model. Time is distorted more when exercise is considered unpleasant or negative compared to when more positive feelings are elicited. This finding may be valuable for creating personalized exercise prescription programs that assist with long-term adherence.

P5: CONSISTENCY OF AFFECTIVE VALENCE ACROSS BOUTS OF MUSCLE-STRENGTHENING AND AEROBIC EXERCISE IN COLLEGE STUDENTS

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BACKGROUND**:** Affective response is assumed to be consistent in response to the same stimulus. However, there is little evidence to support this assumption. The purpose of this study was to examine the consistency in ratings of in-task affective valence across eight repeated, remotely supervised home-based aerobic (AE) and muscle strengthening exercise (MSE) sessions. METHODS: Participants (N=15, 20.4 ± 1.5 years old, 80% women) who reported engaging in less than 60 minutes per week of structured exercise were randomly assigned to the MSE (N=8) or AE (N=7). Each participant met virtually with a trainer for two 30-min circuit-training sessions per week for four weeks. The number, type, and order of exercises (as well as duration of rest intervals) performed each session were held constant. The Feeling Scale (FS) was used to assess affective valence at nine time-points: pre-session, every three exercises before rest (i.e., capturing seven measures of in-task valence), and post session. Two-way mixed intra-class correlation coefficients (ICC) were calculated with 95% confidence intervals for the seven in-task FS overall and by group. For everyone at each session, pre-exercise FS was compared to each in-task value to explore directional change in exercise-related FS (e.g., experiencing positive, negative, or no changes). RESULTS: The ICC for both groups overall was 0.822 (95% CI=0.777-0.862). The ICC for FS measured during AE was 0.852 (95%CI =0.793-0.902). During MSE, the ICC for FS was 0.764 (95%CI = 0.688-0.832). Across all sessions eight (53%) participants were consistently categorized as increasers and, zero participants were consistently categorized as decreasers or non-changers for all 8 days. The AE had 5 whereas MSE had 3 of the eight consistent increasers. CONCLUSION: This exploratory work represents an initial assessment of consistency in affective responses during repeated exposure to AE and MSE in a non-laboratory setting. However, this study represents only a short-term exposure to a novel, circuit-based (i.e., variety supportive) stimulus. Additional research is needed to understand consistency of in-task affective valence in response to repeated exercise of various modes, performed by a larger, more diverse sample over longer periods of time that would be representative of a typical training intervention.

P6: THE EFFECT OF COVID-19 ON PHYSICAL ACTIVITY PARTICIPATION ALONG THE ATLANTA BELTLINE
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BACKGROUND: Before COVID-19, the Atlanta BeltLine Partnership (ABP) hosted free fitness classes on the BeltLine's 22 miles of multi-use trails. The purpose of this cross-sectional study was to examine the impact of COVID-19 on physical activity (PA) participation along the Atlanta BeltLine. METHODS: In October 2020, an anonymous survey was emailed to ABP fitness class and homeowner workshop attendees and shared on social media. The survey included demographic and Beltline access questions, and the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985) to assess PA participation. It measured frequency of strenuous, moderate, and mild PA during a typical 7-day period before COVID-19 shelter-in-place orders and currently (Phase 2). Frequencies were multiplied by 9, 5, and 3 METs, respectively and summed for a weekly score. RESULTS: Participants were 137 adults who were about 41.7 years old (SD = 12.8) and mostly Non-Hispanic (66.4%), White (50.4%), females (52.6%). Most earned a bachelor's degree (35.8%), had an annual income between $50,000 - $99,999 (29.2%), and worked full-time (46.0%). Participants who visited the Atlanta BeltLine in 2020 (81.0%) did so to engage in personal PA (67.9%) and most visits occurred during the city's COVID-19 Phase 2 Response Plan (September - November 2020). Non-BeltLine visitors (n = 6; 4.4%) did not participate in the ABP's free online fitness classes. Participants who visited the BeltLine in 2020 were older than those who did not visit, $F(1, 95) = 2.86$, $p = .094$. Participants who did not visit the BeltLine in 2020 were also more likely to earn < $50,000, $\chi^2 = 5.10$, $p = .078$, and not be employed full-time, $\chi^2 = 3.05$, $p = .081$. Using age, income, employment status, and pre-COVID PA scores as covariates, ANCOVA revealed a significant group (visitors vs. non-visitors) x time (pre-COVID vs. current) interaction, $F(1, 81) = 4.21$, $p = .043$. Specifically, visitors reported relatively stable PA scores from pre-COVID to Phase 2 ($M = 59.4$, $SE = 0.0$; $M = 61.9$, $SE = 2.8$); whereas, non-visitors reported reduced PA scores during the same time period ($M = 59.4$, $SE = 0.0$; $M = 33.3$, $SE = 13.6$). CONCLUSIONS: The decrease in PA levels from pre-COVID to Phase 2 among non-visitors suggests the BeltLine was an important environmental resource for users to maintain their PA during the COVID-19 pandemic.
FUNDED BY: Atlanta BeltLine Partnership

P7: PRACTICING VISUALIZATION WHILE PERFORMING A SKILL ENHANCES SELF-EFFICACY, MOTIVATION, POSITIVE THINKING AND DECREASE ANXIETY
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BACKGROUND: The practice of visualization in sports is known to benefit performance. However, the psychological mechanisms underlying the mental practice benefits are still unclear. To assess the psychological benefits of visualization on skill performance, this study aimed to investigate whether the combination of physical and mental practices (visualization) enhances performance, and what psychological skills underly this effect. **METHODS:** Thirty participants were divided in 2 groups (15 visualization/dart group; and 15 only dart group) and required to perform **3 dart-throwing phases** (**pretest**: 10 trials; **Practice**: 6 blocks x 10 trials; **3 immediate Posttests [20 minutes after practice] in random order**: **Retention**: 10 trials - **Transfer:** 10 trials - **High-pressure**: 10 trials). Importantly, visualization group "visualized" the skill during the 1-min breaks between practice blocks, while the Dart only group read a nutrition paper during breaks to prevent visualization. Participants threw darts to a target positioned 1.73 m off the ground; and 2.37 m from the throwing line for **pretest; practice, retention and high-pressure posttests**, while a **transfer test** was performed from a 3.37 m line. Before practice, participants received instructions about dart-throwing skills. Between the practice and posttests phases, participants were assessed on their intrinsic motivation; self-efficacy, positive thinking, and pressure in order to identify potential mechanisms underlying the benefits of visualization on skill performance. **RESULTS:** To assess how visualization impacted motivation, competence; self-efficacy; anxiety and positive thinking a between-subjects MANOVA was utilized. On these preliminary results (30 participants data collected out of 56 expected), it was found a main effect of Self-efficacy p = 0.048 (32.12 points ± 4.44 points vs **36.35** points ± 5.91 points); Confidence p = 0.012 (25.5 points ± 3.57 points vs **32.76** points ± 4.12 points); Somatic anxiety p = 0.023 (41.97 points ± 5.18 points vs **30.89**points ± 4.55 points); and Positive thinking p = 0.043 (82.53 points ± 7.44 points vs **88.27** points ± 8.93 points) (visualization group results were depicted in bold). **CONCLUSION:** Results suggest that the combination of visualization and dart practice enhanced self-efficacy, competence, positive thinking and decreased anxiety facilitating skill performance.

P8: DETERMINING THE DIMENSIONALITY OF READINESS-TO-EXERCISE IN ADULTS PREPARING TO ENGAGE IN RESISTANCE EXERCISE
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Because readiness-to-exercise is a multidimensional concept, it is important to determine which factor is most important for guiding person-specific adjustments to the exercise workload (i.e., 'autoregulation'). Adapting exercise volume and intensity to match an individual's current condition may promote long-term exercise adherence by reducing unfavorable exercise experiences. To date, the structural features of multivariate, readiness-related items have not been examined using integral (i.e., pre-exercise) data. PURPOSE: Determine the dimensionality of readiness-to-exercise in a pre-resistance exercise context. METHODS: Adults (N=189, 62.4% women, 33±12 years, 87.8% Caucasian, 97.4% performing resistance exercise ≥ 2x/wk, 56.7% reporting this frequency ≥ 1 year), completed an anonymous survey that contained 51 items obtained from validated instruments measuring constructs previously determined to underlie readiness-to-exercise. Respondents indicated the degree to which they experienced each item using "right now" ratings on a 6-pt Likert Scale (1=definitely not, 6=extremely). Basic demographic information and typical exercise behaviors were also provided. Data suitability was assessed using Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity. Factors were retained if eigenvalues ≥ 1. A principal axis factor analysis (promax rotation) was then conducted to assess factor structure. RESULTS: The raw data were suitable for factor analysis (KMO = 0.89, Bartlett's Test of Sphericity <.001). Eleven factors were retained which explained 59% of the variance in the dataset. Based on item loading, the first three factors were interpreted as 'Activation' (*tired, drowsy, wide awake*; 29.1%), 'Tension' (*uneasy, nervous/on edge*; 7.4%), and 'Calmness' (*relaxed, composed, content*; 4.7%). The remaining eight factors each explained <3% of the model variance. CONCLUSIONS: When multivariate data from a pre-exercise context are mathematically modeled, feelings relating to activation (energy vs. fatigue) converge as the most important factor (i.e., explaining the most variance). While pre-exercise activation states have been associated with experiential aspects of exercise from a nomothetic perspective, it would also be useful to investigate if this structure and subsequent associations with target dependent variables can be replicated at the idiographic level to refine person-specific exercise modifications.

P9: PHYSICAL ACTIVITY IN WOMEN WITH PREGNANCY HYPERGLYCEMIA PARTICIPATING IN A PILOT TRIAL
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BACKGROUND: The purpose of this study was to describe self-reported physical activity (PA) levels, as well as stage of change, self-efficacy, social support for, and barriers to PA, among women with pregnancy hyperglycemia participating in a pilot randomized control trial (RCT) of a behavioral intervention to improve PA. **METHODS:** Participants (N=20) were women with pregnancy hyperglycemia, between 18-40 years of age, enrolled in the Project Wellness pilot RCT at the University of Tennessee Medical Center, Knoxville. At the baseline study visit (i.e., between 27-31 weeks gestation), participants responded to survey questions pertaining to self-reported PA, as well as their stage of change, self-efficacy, social support for, and barriers to PA during pregnancy. Descriptive statistics are presented. **RESULTS:** The mean age was 31.8 years (SD 4.2) and 85% were White. At baseline, 30% reported having met PA recommendations in the last month; 67% of those meeting PA recommendations reported only moderate intensity PA. Most participants (65%) reported that they 'currently exercised', and all reported that they intended to exercise in the next 6 months. Overall, 85% of participants: valued the benefits of PA, felt it was important, and felt guilty when they were not physically active. Forty-five percent reported 'extremely enjoying' their PA sessions; 65% were quite sure that they could get regular exercise,

but this number decreased to 45% when family, work, or social life takes a lot of their time. When feeling anxious, only 25% really felt confident that they could be physically active. When there were competing interests, 75% did not really engage in PA. Sixty-five percent were confident about being physically active during their free time without family or friend support. When their schedules were busy, this decreased to only 25% reporting confidence in being physically active. Sixty percent reported that their families would almost never take care of their children so they could be physically active, and 75% reported that their families would almost never take care of household tasks so that they could be physically active. **CONCLUSIONS:** Few participants were sufficiently active, but acceptance of and intentions for PA were high. Busy schedules, particularly childcare and household related responsibilities, stood out as barriers to PA.

P10: PERSONALITY AND MOTIVATION TO ENGAGE IN RECREATIONAL EXERCISE

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BACKGROUND: Human Personality traits have been shown to influence engagement in recreational exercise (RE). With some personality traits shown to be expressed in higher levels in populations engaging in RE, it is important to understand if personality has any influence on motivation to exercise. METHODS: Twenty-nine recreationally active university students (18 female, 6 males, 5 no response; aged 23 ± 1.98) at a Midwest fitness center completed inventories assessing personality traits and exercise motivation. Personality traits were determined using the Big Five Personality Test (IPIP) and the Exercise Motivation Inventory 2 (EMI2) for exercise motivation. IPIP assesses five traits: Agreeableness, Conscientiousness, Openness, Neuroticism, and Extraversion. EMI2 assesses factors of motivation for exercise (Affiliation, Social Recognition, Enjoyment, etc.). Pearson correlations were used to examine relationships between personality traits and exercise motivation. RESULTS: Few significant correlations were observed between assessments. Higher Agreeableness was significantly correlated with Ill Health Avoidance (r=0.55, p≥0.05) and Social Recognition (r=0.41, p≥0.05). Greater Conscientiousness and Neuroticism was correlated with increased Affiliation motivation (r=0.415 and r=0.518, respectively, p≥0.05) CONCLUSIONS: Most personality factors were not significantly associated with exercise motivation. The association between Agreeableness and Ill-Health Avoidance could indicate a desire to comply with positive health standards. Given that Neuroticism is commonly associated with negative emotion and people who are high in trait neuroticism exhibit more anxiety, depression, and self-doubt, the correlation with Affiliation may indicate desire to be around others to mitigate negative emotion. Additional research is needed in a much larger sample to better elucidate the links between personality and motivation to exercise; however, some personality factors may influence motivation to exercise.

P11: COMPARING THE EFFECTS OF HATHA YOGA AND VINYASA YOGA ON CREATIVE THINKING

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BACKGROUND: Meditation has been shown to stimulate the neocortex part of the brain, which is responsible for higher order thinking, thereby enhancing creativity. Hatha yoga is a yoga style that focuses on mindful breathing and meditation and Vinyasa yoga is a yoga style that focuses on body movements and power holding. The purpose of this study was the examine the acute effects of Hatha yoga and Vinyasa yoga on creative thinking. METHODS: College-aged females (19.8±1.5 yrs, 118.3±7.6 lbs, 62.7±0.6 in) were recruited into the study. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory three times and in a randomized, cross-over design, completed either a 30-minute video of Hatha Yoga, a 30-minute video of Vinyasa Yoga, or sat and watched a 30-minute video of a Ted talk, which served as the control session. The yoga trials were separated by a minimum of 48 hours to allow for recovery. Before and after each session, participants completed five tests of divergent creative thinking: the Alternative Uses Test, the Letter Test, a Critical Thinking Dilemma, and a Connect the Lines test. RESULTS: There were no significant differences in any of the five tests of creative thinking after either type of yoga or the control session (p>0.05). Additionally, there were no significant differences between either type of yoga or control conditions (p>0.05) in any of the tests of creative thinking. CONCLUSION: The findings of this study suggest that yoga, regardless of the type of yoga, does not improve divergent creative thinking after one session.

P12: ASSOCIATION BETWEEN PHYSICAL ACTIVITY (MIMS/DAY AND PEAK 30-MIN MIMS) AND COGNITIVE FUNCTION AMONG OLDER ADULTS: NHANES 2011-2014

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Background: The US National Health and Nutrition Examination Survey (NHANES) Physical Activity Monitor (PAM) data for 2011-2014 were recently released. Therein, physical activity (PA) was reported as a novel PAM metric known as Monitor Independent Movement Summary (MIMS) units. Currently, limited information exists regarding the relationship between cognitive function and habitual PA levels as quantified using MIMS metrics. **Purpose:** To determine the association between habitual PA and cognitive function using a nationally representative dataset of US older adults aged 60 years and above. **Methods:** The analytical sample comprised n=2516 individuals (mean age: 69.1± 0.2 years; 54.7% females). Cognitive function was assessed using the Digit Symbol Substitution Test (DSST). NHANES PAM data were collected using a tri-axial accelerometer (ActiGraph GT3X+; 80Hz) worn on participants' non-dominant wrist. Valid wear-time was considered ≥10h/day and ≥4 valid days. PA data were summarized as MIMS/day (the average of daily MIMS across all valid days), peak 30-minute MIMS (Peak-30_{MIMS}; the average of the highest 30 non-consecutive MIMS mins/day, averaged across all valid days). Peak 30_{MIMS} can be considered as a PA index of "best effort", as it is shaped by both the intensity and persistence of ambulatory behavior within a day, as well as its consistency (regularity) across valid days. Multivariable linear regression (accounting for survey sample weights) was performed to determine the relationship between DSST score and each MIMS metric separately, while adjusting for age, gender, race, education, body mass index and hypertension. **Results:** The means [SEs] of DSST score, MIMS/day and Peak-30_{MIMS} were 52.2 [0.6], 11308 [100.4] and 36.5 [0.2], respectively. Both MIMS/day and Peak-30_{MIMS} were positively correlated with DSST score (Pearson's r = 0.3 and 0.4, respectively). After adjusting for covariates, DSST score increased by 0.68 and 0.57 (β-coefficients) for each 1000-unit increase in MIMS/day, or each one-unit increase in Peak-30_{MIMS}, respectively (p-values<0.001). **Conclusions:** Our findings suggest that higher habitual PA (both daily accumulated and peak effort) is associated with better cognitive test performance in this US older adult population. Such information informs our understanding of the dose-response relationship between PA and cognitive function based on accelerometer-determined PA metrics.

P13: THE EFFECT OF MODERATE-VIGOROUS PHYSICAL ACTIVITY ON THE RELATIONSHIP BETWEEN PERCEIVED STRESS AND COVID-19

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BACKGROUND: It has been well established that regular physical activity (PA) provides numerous benefits, such as lowering incidence of cardiovascular disease, reducing anxiety, and depression. However, the COVID-19 pandemic caused many of the regular avenues for PA, such as gyms and walking trails, come to a screeching halt. This made it remarkably difficult to be physically active. Simultaneously, the tumultuous nature of the pandemic resulted in increased perceived stress (PS). This study aims to determine whether an increase in minutes spent doing moderate-vigorous PA (MVPA) modifies the relationship between PS and COVID-19 prevalence. **METHODS:** In December 2020, an online convenience sample of 746 adults aged 18 years or older residing in the US were recruited. Of the sample, 407 (38.9 ± 14.3 years old, 51% female, 77% White) provided data for the variables in question. Participants self-reported demographic information, COVID-19 diagnosis (yes/no), and total MVPA (mins per week). Logistic regression was used to assess the relationship between PS, MVPA, and COVID-19 prevalence. RESULTS: We adjusted the models for sociodemographic variables. Holding age, gender, race, education, and total PS constant, there was a non-significant decrease in the odds of having COVID-19 for a 1-minute increase in MVPA

(OR=0.99, 95%CI=0.99,1.00). Holding age, gender, race, education, and MVPA constant, there was a non-significant decrease in the odds of having COVID-19 for a 1-unit increase in total PS (OR=0.99, 95%CI=0.99,1.00). **CONCLUSIONS:** The results of this study demonstrate that an increase in MVPA does not modify the relationship between PS and COVID-19 in our sample. One possible explanation the results is that our sample was not active enough. An alternative explanation is that the mental health benefits gained from PA, regardless of volume, was insufficient at alleviating pandemic-related stress. This would provide further insight into the detrimental effects the COVID-19 pandemic had on the mental health in the United States.

P14: COMPARING DIARY LOGS TO AUTOMATED ALGORITHMS AND VISUAL INSPECTION FOR TOTAL-BEDTIME ESTIMATION IN POSTPARTUM WOMEN

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BACKGROUND: Automated methods for identifying in-bed and out-of-bed times to accurately identify sleep windows using wearable physical activity monitors with 24-hour wear protocols have the potential to reduce researcher and participant burden in analyses of sleep time. Traditionally, diary logs are used to estimate the window between in-bed and out-of-bed, going to bed and waking for the day, i.e., total bedtime. This exploratory analysis compared the van Hees and Tracy bedtime algorithms, and visual inspection (i.e., manual inspection of the actigraphy tracings by a trained observer), to participant diaries for the identification of total sleep time in postpartum women. **METHODS**: Participants (N= 5) came from the PETALS-2 study, and wore an ActiGraph wGT3X-BT device, initialized at 30 Hz, on the non-dominant wrist for 7-days at 6 months postpartum. Participants logged daily to-bed and wake times in a paper diary. The first day was dropped and the remaining days' times averaged for individual-level mean in-bed time, out-of-bed time, and total-bedtime; these were then compared across methods. Group mean differences (i.e., diary minus estimate) in in-bed times, out-of-bed times, and total-bed-time were calculated and equivalence testing used to compare the group mean total-bed-time from van Hees, Tracy, and visual inspection to the diary (reference), with an equivalence region of ± 30 min. **RESULTS:** The van Hees and Tracy algorithms and visual inspection estimated in-bed times were, on average, 13.8 min (SD 36.7), 3.6 min (29.0), and 13.2 min (36.9) later, respectively, than the diary. The van Hees and Tracy algorithms estimated out-of-bed times were 36.8 min (59.4) and 23.4 min (40.0) earlier than the diary, respectively, while visual inspection's out-of-bed time estimate was 0.8 min (13.6) later than the diary. Average total-bedtime for the van Hees [432 min (SD 45.2)], Tracy [454 min (47.5)], and visual inspection [466 min (41.7)] were not equivalent to the diary [480 min (75.2)]. **CONCLUSION:** The van Hees and Tracy bedtime algorithms, and visual inspection, may not adequately capture total-bedtime in postpartum women, as defined by traditional diary logs. Future analyses will compare these methods in a larger sample from the PETALS-2 study.

P15: AN EXAMINATION OF THE EFFECTS OF COVID-19 QUARANTINE ON MENTAL HEALTH IN COLLEGE ATHLETES

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Mental health has become an emphasis in the well-being of college athletes. Many athletes have reported abnormal levels of depression and anxiety, which may affect quality of life and total mental health. Therefore, the objective of this study was to examine the relationships between depression, anxiety, quality of life, and total mental health among college student athletes through a cross-sectional secondary data analysis. We further examined differences in these relationships among groups of gender and race, and between those that have been quarantined from exposure to the Coronavirus disease, COVID-19, and those that have not. From the primary study, a sample of 99 National Collegiate Athletic Association, NCAA, Division I college athletes completed self-report measures on the variables. Data was analyzed through one-way ANOVA and post hoc means using the Statistical Package for Social Sciences, SPSS. There was a significant inverse relationship between the variables of anxiety and depression on both quality of life and total mental health. Results showed a significantly higher impact of anxiety on total mental health for collegiate student athletes who have to quarantine for COVID-19 versus those that did not. There were no significant differences in the relationships between the other groups. These results suggest that while anxiety and depression have a significant impact on quality of life for the group, those that had to quarantine are at an increased risk of lower quality of life and total mental health.

P16: A COMPARISON OF STRESS LEVELS, ACTIVITY, SLEEP, AND HEALTH BETWEEN COUNTY AND UNIVERSITY LAW ENFORCEMENT

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BACKGROUND: Law enforcement experience stressors unique to their job such as working at night, risk of injury, and shift work. While duties and stressors are often similar, the stress of county (CLE) and university (ULE) law enforcement may differ. If not managed properly, stress can have downstream consequences on sleep and health. The purpose of this study was to compare stress levels, activity, sleep, and health markers between CLE and ULE. METHODS: 6 CLE (age: 40.0±10.1 yrs.; women=1) and 8 ULE (age: 38.4±6.4 yrs.; women=2) participated. The Operational- and Organizational-Police Stress Questionnaires were used to determine occupation-specific stress, both of which divide scores into a low, medium, or high stress categories. Participants wore wrist actigraphy watches (GT3X+) for 7 days to obtain activity and sleep measures. The health parameters assessed were body mass index (BMI), waist circumference (WC), and systolic (SBP) and diastolic (DBP) blood pressure. Values were compared using independent samples *t*-tests. Alpha was set at .05. RESULTS: CLE had significantly greater organizational stress than ULE (CLE: 3.92±0.89; ULE: 2.24±0.42); the effect size was large (*d*=2.41). However, both groups experienced stress in the medium category. There were no significant group differences on the other test variables. However, given the small sample size, we also considered effect sizes. CLE experienced medium and ULE experienced low operational stress (CLE: 3.38±1.34; ULE: 2.88±0.92); the effect size was medium (Cohen's *d*=0.44). CLE had higher DBP than did ULE (CLE: 86±6; ULE: 77±13 mmHg); the effect size was large (*d*=0.89). CLE also obtained more sleep per night (CLE:403±63; ULE: 369±29 min); the effect size was medium (*d*=0.69). There were only very small differences between groups for physical activity (CLE:11,496±3,041; ULE: 11,221±3,135 steps; *d*=0.09), BMI (CLE: 32.0±5.5; ULE: 31.9±4.7 kg/m2; *d*=0.02), SBP (CLE: 128±6; ULE: 125±18 mmHg; *d*=0.02), and WC (CLE: 98.9±15.7; ULE: 98.0±12.4 cm; *d*=0.06). CONCLUSION: Our findings suggest that CLE experience greater organizational stress than ULE. It is also possible that DBP and total sleep time differ between CLE and ULE. Findings such as these allows us to better address the stress and health needs of law enforcement.

P17: PERCEPTIONS OF THE EXERCISE IS MEDICINE ON CAMPUS INITIATIVE AMONG COLLEGE STUDENTS

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BACKGROUND: Many health benefits are evident with increased physical activity (PA) levels. However, research has shown a significant decline in PA among college students, with over half not meeting the recommended guidelines for PA. The Exercise is Medicine On Campus (EIM-OC) initiative incorporates both definitional parameters of the term, *medicine*, which refers to the science of treatment and prevention. How students define *medicine* may result in a misperception of EIM-OC initiatives if exercise is viewed as analogous to medicine. The purpose of this study was to examine how college students perceive the term *medicine*, perceive the EIM-OC initiative, and examine if there is a relationship between the perceptions of medicine and the EIM-OC initiative. METHODS: A sample of 200 college students (age 23.26.3 y, 64% female) at a large rural southeastern university completed an online survey about their perception of medicine, familiarity and perception of the EIM-OC initiative, and selected demographic factors. The proportion of participants who provided a response that fit into the a priori defined categories for *medicine* was calculated. The proportion of students who correctly identified what the EIM-OC initiative is referring to was also calculated. A Pearson chi-square test was used to examine if there is a relationship between students' perceptions of medicine and the EIM-OC initiative. RESULTS: Only 7.5% of students defined *medicine* as

having preventive and treatment aspects. Over half (54.5%) of students described *medicine* as having treatment and management aspects with no mention of prevention. Over one-third of students (38%) did not provide a definition that aligned with prevention or treatment. Notably, 73.5% of students indicated that the EIM-OC initiative refers to a therapeutic role for the prevention and management of chronic disease. There was no statistically significant relationship between students' perceptions of medicine and the EIM-OC initiative (chi-square=10.13, p=0.12). CONCLUSIONS: A low proportion of college students defined *medicine* as having preventive factors. Despite the absence of a significant relationship between the perceptions of medicine and the EIM-OC initiative, more effort is needed to educate college students about the preventive and treatment facets of medicine.

P18: NEGATIVE 24-HOUR MOVEMENT BEHAVIORS IN CANCER POPULATIONS: CLUSTERING OF PHYSICAL ACTIVITY, SEDENTARY BEHAVIOR, AND SLEEP

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BACKGROUND: Movement behaviors (MB) across the 24-hour day, including physical activity, sedentary behavior (SB), and sleep, have important health implications. The objective of this study was to examine the clustering of MBs to analyze its association with cancer. **METHODS:** In December 2020, we surveyed a convenience sample of 746 adults (aged $\geq$ 18 years) residing in USA. Participants self-reported moderate-to-vigorous physical activity (MVPA), SB, sleep, and cancer history. Z-scores were calculated for weekday (WD) SB, weekend (WE) SB, MVPA, and sleep. Cluster analysis was conducted using a two-step method including agglomerative hierarchical clustering with squared Euclidean distance and visual inspection to identify the number of clusters followed by K-means clustering. Clusters were labeled via distinguishing MBs z-scores (high: $\geq$ 0.5, low: $\leq$ -0.5). Partial eta-squared (η2) measured effect size (small: 0.01, medium: 0.06, large: 0.14, respectively) and ANOVA was used to compare group by cluster. **RESULTS:** 112 cancer participants (40 ± 14 yr., 45% female, 64% employed, 15+ cancer types) and 634 non-cancer participants (38 ± 15 yr., 61% female, 62% employed), with matched socio-economic factors, participated in the study. Cluster analysis identified five MB clusters (η2:0.054, p<0.001). Cluster 2 was characterized by high SB, very low MVPA, and very low sleep and had the most cancer participants (31% cancer). Three other clusters had significantly fewer cancer participants. Cluster 1 was characterized by low SB, low MVPA, low sleep (p=0.002, 16% cancer). Cluster 3 was characterized by high SB, some MVPA, high sleep (p<0.001, 11% cancer). Cluster 4 was characterized by high WD SB, low WE SB, low MVPA, high sleep (p<0.001, 10% cancer). Finally, cluster 5 was characterized by no SB, high MVPA, some sleep (p=0.070, 19% cancer) which tended to have fewer cancer participants. **CONCLUSIONS:** Lifestyle behaviors tend to cluster. Five 24-hour MB clusters were identified, with the largest number of cancer patients (31%) present in the most negative cluster (high SB, very low MVPA, and very low sleep). Considering negative MBs contribute to increased risk of cancer recurrence and adverse health outcomes, future research is warranted to identify feasible lifestyle interventions strategies targeting these co-occurring behaviors.

P19: POTENTIAL MEDIATING EFFECTS OF SOCIAL SUPPORT AND PHYSICAL ACTIVITY ON COGNITIVE FUNCTION AND MORTALITY RISK

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BACKGROUND: Low cognitive function has been shown to be an independent predictor of all-cause and cardiovascular disease (CVD)-related mortality. However, there is limited evidence examining the potential mediating effects of social support network size and physical activity on cognitive function and mortality risk. This study examines the potential mediating effects of social support network size and total physical activity volume (TPAV) on cognitive function and all-cause and CVD-related mortality risk in a large, nationally representative sample of U.S. older adults. **METHODS:** Study sample (N =2,550) included older adult (≥ 60 years of age) participants in the 1999-2002 National Health and Nutrition Examination Survey. Quartiles of cognitive function were created using Digit Symbol Substitution Test scores. Social support network size was determined using the number of reported close friends. TPAV was determined from self-reported domestic physical activity, transportation physical activity, and leisure time physical activity. The total weekly METs were determined for all three physical activity domains and quartiles of TPAV were created. **RESULTS:** Cox proportional hazards regression analysis revealed an approximate 3-fold increase in all-cause and CVD-related mortality risk in participants in the lowest quartile of cognitive function, compared to the highest quartile of cognitive function (Hazards Ratio [HR] 2.89; 95% Confidence Interval [CI] 2.33-3.59) and (HR 2.67; 95% CI 1.54-4.64), respectively. These relationships are independent of social support network size and TPAV. Linear and non-linear inverse dose-response relationships were also revealed between cognitive function and increased all-cause and CVD-related mortality risk, respectively (P for trend for both P < 0.0001). **CONCLUSIONS:** In a large, nationally representative sample of U.S. older adults, low cognitive function was associated with increased all-cause and CVD-related mortality risk. However, in contrast to previous evidence, both relationships were independent of social support network size and TPAV.

P20: CHARACTERISTICS ASSOCIATED WITH A POOR 24-HOUR ACTIVITY PROFILE IN UNIVERSITY STUDENTS

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BACKGROUND: University students often report insufficient moderate-to-vigorous physical activity (MVPA), high sedentary behavior (SED), and short/long sleep. Individually, these behaviors are associated with a range of adverse health outcomes. Persons who report two or more of these behaviors can be considered to have a poor 24-Hour Activity Profile (24-HAP) and may be at especially high risk for future health problems. The purpose of this investigation was to estimate the prevalence of poor 24-HAP among university students and to estimate the odds of having a poor profile across select demographic characteristics. **METHODS:** University students (n=652, 20.3±1.6yrs, 80% female) completed an online survey to assess demographics, sleep duration via the Pittsburgh Sleep Quality Index, SED via the Sedentary Behavior Questionnaire, and MVPA via the Cancer Leisure Physical Activity Questionnaire. Students were classified as having a poor 24-HAP if they met two or more of the following conditions: < 30 min/d MVPA, ≥600 min/d SED, <360min/d or >540min/d total sleep duration. Logistic regressions were mutually adjusted to predict the odds of having a poor 24-HAP by student sex, race/ethnicity, body type, and school year. **RESULTS:** Of the 652 participants, 52.9% had a poor MVPA profile, 30.4% had a poor SED profile, 31.7% had a poor sleep profile, and 32.2% were classified as having a poor 24-HAP. Females were more likely to have a poor 24-HAP compared to males [OR=1.94, (95% CI: 1.2, 3.1)]. Students who identified as Black non-Hispanic [OR=2.37, (95% CI: 1.3, 4.4)], Asian [OR=1.81 (95% CI: 1.1, 3.0)], and other race [OR=2.59, (95% CI: 1.3, 5.4)] were more likely to have a poor 24-HAP compared to students identifying as White-non-Hispanic. **CONCLUSIONS:** The prevalence of poor 24-HAP was higher among female students, those who identified as Black non-Hispanic, Asian, and other race. Future studies should incorporate larger sample sizes from diverse college and university settings and use objective measures to evaluate the validity of self-reported 24-Hour Activity Profiles.

P21: EFFECT OF HOME-BASED EXERCISE ON PHYSICAL ACTIVITY IN BREAST AND PROSTATE CANCER SURVIVORS: A META-ANALYSIS

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INTRODUCTION AND OBJECTIVE: Breast (BCa) and prostate cancer (PCa) are common but highly treatable. However, survivors are often burdened with prolonged side effects following treatments that lead to reduced total physical activity (TPA). Low TPA levels are associated with decreased quality of life and increased risk of all-cause mortality. Although exercise interventions are designed to increase TPA, the extent to which home-based exercise improves TPA levels in BCa/PCa is unclear. Therefore, the objective of this meta-analysis was to investigate the effects of home-based exercise on TPA in BCa and PCa survivors. All studies reporting pre-and post-intervention TPA values were eligible for inclusion. **METHODS:** Electronic databases were searched from inception to July 2021. Standardized mean differences (SMD) were calculated to account for differing TPA assessment types. Effects estimates were pooled using a 3-level model with restricted maximum likelihood estimation. The alpha was set at 5% for the pooled estimate and 10% for effect moderators. SMD of <0.2, 0.2,

0.5, and 0.8 were defined as trivial, small, moderate, and large respectively. **RESULTS:** Ten articles with 14 effects (n=630) met inclusion criteria. Overall, home-based exercise led to small improvements in TPA [SMD=0.49; 95% CI (0.26, 0.75); p<0.001]. TPA assessment was a significant effect moderator (p=0.069). Moderate improvements were reported with self-reported TPA [SMD=0.54; 95% CI (0.27, 0.80); p<0.001], whereas smaller, non-significant effects were seen with accelerometry [SMD=0.28; 95% CI (-0.07, 0.63); p=0.113]. Cancer type (p=0.133), intervention duration (p=0.109), age (p=0.130), and modality (p=0.245) were all non-significant effect moderators. **CONCLUSIONS:** Home-based exercise appears to increase TPA in BCa/PCa, presenting a plausible option for survivors living without access to supervised exercise facilities. However, moderator analysis indicated that the increase in TPA was greater when self-reported and may overestimate actual TPA. Given the small number of effect estimates (n=3) for objective measures, confirmational research is warranted to investigate differences between self-reported and objectively measured TPA.

P22: A PROFILE OF PHYSICAL ACTIVITY CONDUCTED AT AN URBAN BIKE PARK

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BACKGROUND: The built environment can play a significant role in providing a means of increasing leisure time physical activity (LTPA). Bicycle parks are growing in popularity across the United States; however, little research exists on who uses or how they use features of the park for physical activity (PA). The purpose of this study was to create a profile of physical activity among users of an urban bike park. METHODS: Baker Creek Preserve in Knoxville, TN is a newly built bicycle park with thirteen PA zones that include bicycle pump tracks, playground features, and a greenway. The System for Observing Play and Recreation in Communities (SOPARC) was used to measure gender, age, race/ethnicity, primary activity, and activity intensity of users. SOPARC scans were completed on four days during a week (M, W, Sa, Su) in April and July 2021 at four 1-h time periods per day (8a, 12p, 3p, 6p). A total of 416 scans were conducted across the thirteen PA zones. SOPARC count data were analyzed using SPSS for descriptive statistics of users and their associated energy expenditure. Chi-square tests were used to compare user groups to the Knox County census data. RESULTS: In total, 1367 individuals were observed using the bike park over the study period. PA zones with cycling features (N=9) were in use for 31.6% of scans with an average intensity of 4.13 METs. PA zones with playground features (N=3) were in use for 41.2% of scans with an average intensity of 3.07 METs. The greenway was in use for 79.7% of scans with an average intensity of 4.49 METs. Among users, 67.4% were male (p<.001, df=1), most were adults (57.9%), with 40.8% being youth. 7.6% of users observed were minorities (p=.12, df=3). Regarding park use by time of day, 7.8% of users were observed in the morning, 31.4% at noon, 38.6% in the afternoon, and 22.3% in the evening (p<.001, df=3). Regarding PA intensity, 67.4% of park users engaged in moderate-vigorous PA (p=.03, df=2). When users occupied PA zones, cycling was the primary activity most frequently observed for males (N=114, 63.3%) and females (N=62, 47.0%). CONCLUSIONS: Physically active visits are relatively high at Baker Creek compared to other park studies which indicates users are more likely to participate in MVPA. People mostly use the park as intended, to bike. Future research should investigate if a newly built bicycle park increases LTPA or simply provides an additional location for PA.

P23: NO CHANGES IN SYMPATHETIC NEURAL ACTIVITY OR TRANSDUCTION OVER SIX MONTHS RECOVERY FROM SARS-COV-2

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BACKGROUND: Otherwise healthy young adults recently infected with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have acutely elevated muscle sympathetic nerve activity (MSNA) compared with non-infected individuals. METHODS: Participants (n=9, 7M/2F, age 21.2±1.4 y) were tested three times following a positive SARS-CoV-2 polymerase chain reaction test (V1:47±15, V2:107±25, V3:170±19 days post-positive). Resting MSNA burst frequency, incidence, and total activity, heart rate (HR), systolic (SBP) and diastolic (DBP) blood pressure were measured at each visit. Data were collected for 5 min of supine rest. MSNA and HR were continuously measured and averaged over 5 min. Blood pressure was measured at the brachial artery at the first and fourth minute, then averaged. Sympathetic transduction to blood pressure was calculated as the absolute (mmHg) and relative (%) changes in mean arterial pressure (MAP) following a sympathetic burst and in response to sympathetic quiescence. RESULTS: Resting MSNA burst frequency (V1: 17±7, V2: 16±7, V3: 14±3 bursts·min^{-1}), incidence (V1: 31±12, V2: 28±13, V3: 25±4 bursts·100 heart beats^{-1}), and total activity (V1: 255±105, V2: 230±97, V3: 224±84 a.u.·min^{-1}) did not change across visits (p>0.05). SBP (V1: 135±11, V2: 127±8, V3: 121±11 mmHg, p=0.037) and DBP (V1: 77±7, V2: 71±7, V3: 67±6 mmHg, p=0.001) both decreased throughout recovery, while HR (V1: 57±9, V2: 60±6, V3: 57±8 bpm, p=0.163) did not change. The absolute (p=0.252) and relative (p=0.435) ΔMAP following an MSNA burst showed no significant changes over time Similarly, there were no changes in the absolute (p=0.169) or relative (p=0.127) ΔMAP following a non-bursting cardiac cycle. CONCLUSION: Despite cross-sectional data indicating elevated sympathetic activity following mild cases of COVID-19, longitudinal data suggests no change in sympathetic neural parameters over six months recovery. The diverging findings may indicate a) no effect of SARS-CoV-2 infection on sympathetic activity or, alternatively, b) prolonged recovery of autonomic function. However, the current results indicate clear reductions in DBP and SBP throughout six months of recovery from SARS-CoV-2. Given the lack of change in neural measures, changes in pressure are likely a result of other mechanisms.

P24: HOW TEACHER VERBAL PROMPTING AND DEMONSTRATED MODELING CORRELATE TO PRESCHOOLER'S PHYSICAL ACTIVITY LEVELS

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BACKGROUND: Previous research shows that preschool physical activity interventions that target teacher-led strategies, such as verbal prompting and demonstrated modeling increase preschoolers' physical activity levels. However, it is unknown which of these strategies promotes higher levels of physical activity throughout the preschool day. PURPOSE: The purpose of this study was to determine which teacher-led strategy, verbal prompting and/or demonstrated modeling, elicits higher levels of physical activity among preschoolers. METHODS: Participants included 117 preschoolers (61 boys, 56 girls) with a mean age of 3.77 years old and a demographic makeup of 86% African American, 5% Caucasian, 3% Hispanic and 6% Other. MANOVA's examined differences for light physical activity, MVPA, teacher verbal prompts and demonstrated modeling between segments in the preschool day. A forward stepwise linear regression evaluated whether teacher demonstrated modeling and teacher verbal prompting would affect preschooler's physical activity levels. RESULTS: There was a significant difference for teacher verbal prompting (p<.001) between segments of the preschool day showing that teachers gave significantly more physical activity prompts during work time compared to morning group (p = .014), outside time (p <.001) and read aloud (p <.001). Results also showed a significant (p = .032) difference in teacher demonstrations throughout the day, however, there were no significant differences between segments. Both light activity (p< .001) and MVPA (p< .001) showed significant differences between segments of the preschool day. During indoor time, on average. light and MVPA were highest during large group, work time, and morning group, where teacher demonstrated modeling occurred the most. Preschooler's MVPA (p=.005) and MVPA and light physical activity together (p=.036) were significant predictors of teacher demonstrated modeling but not teacher verbal prompting. CONCLUSION: Higher MVPA and light activity are associated with teacher demonstrated modeling during indoor time and should be encouraged among teacher-led strategies to increase physical activity among preschoolers.

P25: RESILIENT PEDAGOGY EXPERIENCES OF KINESIOLOGY FACULTY DURING COVID-19

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RESILIENT PEDAGOGY: EXPERIENCES OF KINESIOLOGY FACULTY DURING COVID-19

Samantha L. Johnson1, Jennifer L. Caputo1, Katie Spillios2, Astrid E. Mel3, Mary C. Stenson4, and Jessica K. Fleming5
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BACKGROUND: The COVID-19 pandemic required a rapid shift to emergency remote teaching (ERT). The purpose of this study was to characterize the experience of kinesiology faculty during the COVID-19 ERT. METHODS: A survey about pedagogy practices and support of faculty by their institutions during the COVID-19 pandemic was completed by kinesiology faculty at all ranks (N = 112). Responses for 39 Likert scale and multiple choice questions and 6 open-ended qualitative questions were analyzed. Open-ended response questions were analyzed using the thematic and content analysis method. RESULTS: Faculty surveyed had high confidence in their ability to change their pedagogy (68%) during the pandemic and they knew where to go for support (80%). Faculty felt supported by their institutions (79%), departments (77%) and professional organizations (47%). Most faculty noted their teaching load for the upcoming fall semester did not change (72.3%); however, 60% noted their overall work-related responsibilities had increased. To achieve the transition to ERT, 81% of faculty reported needing extra course preparation time, with only 19% reporting no extra time and 51% needing up to 5 extra hours per week per course. About a third of faculty are interested in continuing some form of online teaching. CONCLUSIONS: Overall, kinesiology faculty in this sample reported being supported and confident in their ability to pivot to online or altered face-to-face teaching despite little previous experience. However, the majority also indicated that the preparation for online courses did require extra time, which is notable for programs interested in leveraging the proportion of faculty interested in continuing online teaching to enhance flexibility in their programs.

P26: USING WEARABLE TECHNOLOGY FOR EARLY DETECTION OF COVID-19 IN DIVISION I COLLEGIATE FEMALE ATHLETES

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BACKGROUND: Currently, there is no standard of practice for early detection of COVID-19 in athletes prior to the onset of symptoms or knowledge of exposure. Respiratory rate (RR) and heart rate variability (HRV) are common metrics measured by some wrist-worn activity trackers and are used to monitor health, fitness and recovery in athletes. Abnormal variations in RR are observed in lower-respiratory infections (i.e., COVID-19), and preliminary data suggest that HRV may be linked to early detection of COVID-19 infection. Thus, wrist-worn activity trackers may be an effective, non-invasive method to detect COVID-19 infection prior to a positive test. PURPOSE: To determine the effectiveness of wrist-worn wearable technology for early detection of COVID-19 in Division 1 NCAA female athletes, through monitoring of RR, HRV, resting heart rate (RHR) and recovery scores. METHODS: Retrospective data from division I NCAA female athletes who tested positive for COVID-19 (N=33; age range: 18-24) during the 2020-2021 season (August 2020 to May 2021) were analyzed. Only those who had complete activity tracker (WHOOP, Inc) data (N=14) were used for these preliminary analyses. Baseline data (14 days) were used to standardize data from 14 days prior to a positive COVID-19 test result. Standardization was calculated by subtracting means and dividing by standard deviations for RR, HRV, RHR and recovery scores. These standardized results were then averaged for the total sample population by the number of days prior to a positive test result to determine average standard deviation from baseline each day prior to a positive test result for each metric. RESULTS: Three days prior to testing positive for COVID-19, deviations from the mean in the following metrics were observed: increase in RR (sd: 0.65-1.07), decrease in HRV (sd: 0.13-0.66), increase in RHR (sd: -0.03-1.0) and decrease in recovery score (sd: -0.54-0.02). CONCLUSION: For the first time, use of wearable technology may be used, as part of a multifaceted approach, for the early detection of a positive COVID-19 test through monitoring of RR, HRV, RHR and recovery scores. Many factors other than COVID-19 may influence these variables, however, in applied sport settings, these data may be important to the sports medicine team for overall team health and safety. This study was supported by WHOOP, Inc.

P27: ASSESSMENT OF ACSM'S EXERCISE PREPARTICIPATION SCREENING IN OLDER ADULTS AND THOSE WITH CHRONIC DISEASES

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BACKGROUND: The American College of Sports Medicine (ACSM) exercise preparticipation algorithm is designed to identify those at increased risk for adverse exercise-related cardiovascular events. It is recommended that individuals complete a health screening to identify the need for medical clearance prior to participating in an exercise program. With the potential for this preparticipation screening to be a deterrent to engagement in exercise, it is important to determine if the updated 11th edition reduces (as intended) the number of unnecessary medical referrals. This was previously investigated in a younger (19 ± 1 yrs) sample however, it is still uncertain if the updated guidelines are conservative enough to identify older or diseased individuals who may truly benefit from medical clearance. METHODS: Three hundred participants (≥ 40 yrs of age and/or diagnosed with cardiovascular, metabolic, renal and/or pulmonary diseases) will be assessed for the need of medical clearance. Participants will complete a self-reporting questionnaire to identify their risk factors (based on 9th edition and 11th edition criteria) and diagnosed cardiovascular, metabolic, renal and pulmonary diseases. They will also complete a biometric screening (resting heart rate (HR), resting blood pressure (BP), body mass index (BMI), waist circumference, and lipid profile). The need for medical clearance will be determined based on the criteria for the 9th and 11th editions of the ACSM Preparticipation Guidelines. Results will be analyzed using cross tabulation and chi-squared test to assess statistical difference between the 9th and 11th edition guidelines. ANTICIPATED RESULTS: It is hypothesized the updated 11th edition will result in a decrease in recommended medical referrals, which could increase exercise participation. Study funded by University of North Alabama student and faculty research grants.

P28: THE EFFECTS OF YOGA ON PERCEIVED ANXIETY, DEPRESSION AND SALIVARY CORTISOL LEVELS IN YOUNG WOMEN

Lillian Caryl Niehaus. *Elon University, ELON, NC.*

THE EFFECTS OF YOGA ON PERCEIVED ANXIETY, DEPRESSION AND SALIVARY CORTISOL LEVELS IN YOUNG WOMEN L. Niehaus, T.A. Madzima. Elon University, Elon, NC, 27244. BACKGROUND: Among some of the interventions that have been plausible for alleviating depression and anxiety, non-pharmacological interventions such as exercise, particularly exercise that focuses on mindfulness such as yoga could be impactful. Previous research has shown that the short-term practice of yoga can help alleviate both physiological and psychological distress and improve overall quality of life. PURPOSE: The purpose of this study is to examine the physiological and psychological effects that two 60-minute yoga classes have on women aged 18-30 years old. One of the yoga sessions, however, will go beyond a standard yoga class that focuses primarily on giving pose-to-pose ques. This alternative yoga group session (AYOGA) will integrate mindfulness and positive words of affirmation into the class. METHODS: This study is a randomized, cross-over design with 30 female participants aged 18-30 years old. During the course of this three-week study, participants are randomly assigned to one of three conditions: a standard yoga session (SYOGA), an AYOGA with a mindfulness focus, and a control session of no exercise intervention (CON). Participants are being asked to provide saliva samples to obtain an objective measure of cortisol levels before and after each yoga class. Participants are also asked to complete four questionnaires: The Beck Depression Index (BDI), Generalized Anxiety Disorder Questionnaire (GAD7), the General Self-Efficacy Scale (GSE), and the Rosenberg Self-Esteem Scale (RSE) to understand participants' levels of depression, anxiety, and general self-perception before and after each yoga session. Participants are only asked to provide one saliva sample and one set of the four questionnaires

during the control session. ANTICIPATED RESULTS: It is anticipated that AYOGA will display the lowest levels of anxiety and depression. In addition, we hypothesize that salivary cortisol levels will decrease to a greater extent after the classes in both SYOGA and AYOGA as compared to CON with AYOGA displaying the greatest decrease overall.
FUNDING: A grant of $890 has been provided by Elon University's Summer Undergraduate Research Program.

P29: INHERITABILITY OF THE "ATHLETE'S PARADOX": THE IMPACT OF MATERNAL EXERCISE ON OFFSPRING SKELETAL MUSCLE HEALTH
Polina Krassovskaia, Nicholas T. Broskey. *East Carolina University, Greenville, NC.*

BACKGROUND: Ectopic lipid in skeletal muscle (SM) has been linked to insulin resistance in individuals with metabolic diseases. The "Athlete's Paradox" describes that individuals with metabolic diseases have high intramyocellular lipid content, which is associated with low insulin sensitivity, but athletes have a similarly high intramyocellular lipid content and high insulin sensitivity. Thus, exercise training increases the oxidative capacity of SM via increased oxidation of intramyocellular lipids concomitant with improvements in insulin sensitivity. Exercise during pregnancy as a mode of transferring the benefits of exercise to the developing fetus has gained traction and offers promising results to combat metabolic derangements in rodent models; however, it is not certain if these benefits can be translated to humans. Umbilical cord-derived mesenchymal stem cells (MSCs) are of fetal origin and are precursors to the satellite cell niche of SM in infants. Thus, MSCs can be used as an *in vitro* model for infant cellular metabolism. Closer insight into the programming of offspring metabolic tissue would allow for a better understanding of the benefit that maternal exercise has on offspring health and may provide a potential early target for combating metabolic disease risk. The purpose of this study will be to determine if the "Athlete's Paradox" phenotype is retained in offspring of women who exercised during pregnancy. METHODS: Undifferentiated MSCs from women with obesity and gestational diabetes (GDM) will be cultured and compared to MSCs of women who are lean or exercised during pregnancy. At confluency, Oil Red O will be used to stain for lipid content. Radiolabeled glucose will be used to measure glycogen synthesis in the presence or absence of insulin as an index of insulin sensitivity. Insulin signaling proteins in the MSCs will also be measured in the basal and insulin-stimulated state. Results will be analyzed using unpaired t-tests, one-way or two-way repeated measures ANOVA, where appropriate. Factors tested will be group and treatment differences (i.e., insulin). ANTICIPATED RESULTS: We hypothesize that MSCs from women who exercised during pregnancy will retain the "Athlete's Paradox" phenotype and display higher lipid content and higher insulin sensitivity compared to MSCs from women metabolically impaired (obesity and GDM) in pregnancy.

P30: THE IMPACT OF SOCIO-DEMOGRAPHICS ON SPORT PREFERENCE
Crystal Adrianenna Fields, Gregg Rich, FACSM. *Georgia Southern University, Statesboro, GA.*

BACKGROUND: Socio-demographic factors pose a significant barrier to sport involvement, as social background variables possess correlations to individuals' level of sport participation. Those from a higher socioeconomic status (SES), for example, are most likely to actively participate in leisure sports versus those from a lower SES. This idea stems from research indicating that high-income families are more capable of affording sports equipment, sports fees, and other playing necessities when compared to lower-income families. In the same context, SES and sociodemographic factors also affect sport preference. Low-income adolescents socialized into sports that require less expensive (e.g., basketball, track and field, soccer) or team-provided (e.g., football) equipment are more likely to prefer those sports given their financial accessibility. On the contrary, higher-income adolescents who are socialized into more cost-prohibitive sports (e.g., wrestling, baseball, and golf) are more likely to prefer sports that require greater financial investment. The purpose of this study is to understand how intrapersonal, interpersonal, and structural constraints discourage or prohibit sport preference and participation during individuals' adolescent years, with active consideration of sociodemographic backgrounds upon stages of life change. This study intends to begin the process of addressing the lack of research on sport preference mechanisms during the period of transitioning into adulthood. METHODS: I plan to recruit Georgia residents between the ages of 20-25 for participation in this study. Each participant will complete a 10-minute survey. The influence of various factors will be surveyed in both past and current day contexts using 5-point Likert-type scales. Semi-structured interviews will be conducted with willing survey respondents to offer rich and robust data that supplements their survey responses. These interviews will be optional and last between 30- 45 minutes. A constant comparative thematic analysis method will be adopted to categorize and compare the qualitative data collected from each interview. ANTICIPATED RESULTS: It is hypothesized that sport socialization within low-income families will encourage preferences towards highly accessible sports (e.g., football, basketball, soccer, and track and field) due to the presence of strongly perceived structural constraints. It is also anticipated that there will be positive associations between both perceived structural constraints and intrapersonal constraints with sport preference among lower-income households. Consequently, in situations where quality of life and SES changes as one transition into adulthood, it is anticipated that sport preferences will change in a manner reflective of any changes in individuals' perceived constraints.

P31: IMPACT OF VACCINATION STATUS ON 24-H BEHAVIOR: A RESEARCH PROPOSAL
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BACKGROUND: With increasing COVID-19 vaccination rates, public spaces have become more accessible to fully vaccinated individuals, while some remain restricted for the unvaccinated. This may result in differences in 24-hour (24-h) activity behaviors. 24-h activity behaviors can be classified as the synthesis of three main behaviors: sedentary behavior (SB), physical activity (PA), and sleep. These activity behaviors are important indicators of chronic diseases such as cardiovascular disease and type 2 diabetes. The purpose of this proposed research study is to investigate the behavioral differences between fully vaccinated and unvaccinated populations over the 24-h day. METHODS: In Spring 2022

P32: THE IMPACT OF ORGANIZED SPORTS ON YOUNG ADOLESCENTS WITH AUTISM SPECTRUM DISORDER
Merytt Haney, Alexander Pomeroy, Lee Stoner, FACSM. *University of North Carolina at Chapel Hill, Chapel Hill, NC.*

BACKGROUND: Limited extracurricular opportunities exist for children with Autism Spectrum Disorder (ASD) in public schools due to limited effective training resources, which can result in social issues in classrooms in this population. These detriments may be able to be combated through specialized athletic involvement at an early cognitive development stage which promotes social skills through verbal interaction specifically for children with ASD. The objective of this study is to determine the feasibility of an 8-week organized team fitness intervention to increase parent-reported social skills related to verbal communication. in a sample size of 40, 6-12 year old with ASD. METHODS: We will collect data from Oak City Soccer, an established non-profit soccer program with trained in behavioral responses for children on the autism spectrum. There will be a sample of 80 children, 6-12 years old with ASD, with 40 in the intervention group and 40 in a control group. The intervention group will have trained instructors from Oak City Soccer planning constructive soccer activities each session, while the control group will have access to the same facilities, but only supervision. A survey will be conducted at baseline and at the end of 8 weeks where parents rate the social skills of their child. Survey questions will be on a Likert scale of 1-5, with higher scores indicating greater social skills. Social skill improvements will be measured with surveys of parents assessed ratings of their child's social interaction. ANTICIPATED RESULTS: We predict that our findings will display that through an extracurricular soccer skill-based program, children with ASD will have gained increased social skills by parent assessment. If the intervention shows feasibility, then similar programs could be used to facilitate the assimilation of students into mainstream classrooms.

P33: DOES THE ASSOCIATION BETWEEN CARDIORESPIRATORY FITNESS AND PERCEIVED STRESS DIFFER BY BIOLOGICAL SEX?
Alex McGowan[1], Kayla Brown[2], Qiana D. Bryan[1], Patricia Pagan Lassalle[1], Lee Stoner, FACSM[1]. *[1]University of North Carolina at Chapel Hill, Chapel Hill, NC. [2]North Carolina Agricultural and Technical State University, Greensboro, NC.*

BACKGROUND: Cardiorespiratory fitness (CRF), expressed as maximal oxygen consumption (VO_2max), provides an overview of an individual's functional systems integration and is a great predictor of cardiovascular disease (CVD) risk. Greater levels of CRF have been shown to enhance the ability to cope with perceived stress and decrease symptoms of burnout and depression. Additionally, perceived stress has been associated with increased CVD risk. However, the relationship of biological sex on the association between CRF and perceived stress is not well characterized. The purpose of this study will be to determine whether perceived stress is associated with CRF and if biological sex moderates the association between perceived stress and CRF. **METHODS:** In Fall 2021, adults (18 years or older, n=$\geq$50) associated with medium to large universities (University of North Carolina, Duke University, and North Carolina Agricultural and Technical State University students and employees) who wear a smartwatch (including Apple Watch [version 3 or greater], Polar watch, or Garmin watch) devices capable of estimating VO2max will be asked to self-report demographic information, their VO_2max, and levels of perceived stress. Perceived stress will be assessed using the validated Global Perceived Stress Scale (α=0.78). All data will be obtained using online questionnaires. The association between perceived stress (independent variable) and CRF (dependent variable/outcome) and effect measure modification by biological sex will be analyzed using multivariable regression. **ANTICIPATED RESULTS:** We hypothesize that decreased perceived stress will be associated with greater CRF. Further, this association will vary by biological sex, with females experiencing greater stress and impaired CRF. This study will inform whether the association between perceived stress and CRF varies by biological sex and contribute to our understanding of CVD risk development in females, an underrepresented and understudied group.

P34: PSYCHOLOGICAL SAFETY IN COLLEGIATE ATHLETICS: HOLISTIC EXAMINATION OF THE "STUDENT-ATHLETES"
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BACKGROUND: Sports are an integral part of society and culture. College athletes work year to year to maintain their place in their teams and subsequently face high levels of stress with the demands of a student-athlete . Attention of media outlets with athletes using their voices to speak on issues outside of the context of sport have further increase potential stress in college athletes. The NCAA stands by the term "student-athlete" which is a holistic conceptualization of the individual (e.g., athlete well-being, athletic performance, and the student). With that, and the shift of athletes focusing on issues that are not just between the lines of play, developing an environment (e.g., psychologically safe) that is conducive to these changes (e.g., athletes voicing concerns, athletes wanting to engage in the community) is essential to the positive development of student-athletes. Psychologically safe environments have been found to lead to positive outcomes at both the individual and team level, including performance and satisfaction. To that, the purpose of this study is to examine the construct of psychological safety and its influence on the outcomes team performance, athlete athletic satisfaction, organizational citizenship behavior and athlete psychological well-being. Psychological safety has been examined in the context of organizational teams and this study looks to build on develop the literature of psychological safety in the context of athletics. METHODS: A cross-sectional survey via Qualtrics will be used to measure participants' psychological safety, team performance, athletic satisfaction, organizational citizenship behavior and psychological well-being. Demographic information such as division affiliation, classification, sport type, gender and ethnicity will also be collected. We plan to recruit 300 total male and female NCAA collegiate athletes at Division 1, 2 and 3 programs in the United States. The participants will be recruited through contact with university administrators via electronic mail. Players under the age of 18 were excluded from participation. Results will be analyzed using a multivariate regression analysis. The analysis will be run in order to show its predictive impact of psychological safety on team performance, athletes' athletic satisfaction, organizational citizenship behavior and athletes well-being. ANTICIPATED RESULTS: It is hypothesized that high levels of psychological will positively influence the outcomes of team performance, athletic satisfaction, organizational citizenship behavior and psychological well-being.
Grant Information: Potential 2021 NCAA Graduate Student Research Grant

P35: THE ROLE OF ENGAGEMENT IN THE EFFECTS OF A DIGITAL DIABETES PREVENTION PROGRAM
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BACKGROUND: Although research has demonstrated that diabetes prevention programs (DPPs) can decrease the incidence of diabetes, traditional DPPs have limited access. As a result, these programs are severely underutilized despite federal policies that support national diabetes prevention efforts. Digital diabetes prevention programs (d-DPPs) offer great promise for increasing accessibility of diabetes prevention efforts. However, little is known regarding the degree to which engaging in d-DPPs impacts treatment effects. The purpose of this study is to evaluate the impact of participant engagement on changes in HbA1c and body weight resulting from a commercially available (d-DPP).
METHODS: This study will involve a secondary analysis of data from the Preventing Diabetes with Digital Health and Coaching for Translation and Scalability (PREDICTS) Trial. PREDICTS was a randomized clinical trial that tested the effects of a 12-month d-DPP on HbA1c and body weight. The d-DPP was compared to a small group education program in 599 adults with prediabetes. Participant engagement in the year-long d-DPP will be measured by the following criteria: a week where a) weight was logged, b) the lesson was completed, and c) there was at least one coach/group interaction or meal logged. Total weeks of engagement will be summed across the 52-week program. We will use scatterplots and Pearson correlations to examine the relationships between engagement, HbA1c and weight loss. Additionally, we will create categories of high, moderate, and low engagement and examine between group differences in HbA1c and weight loss. We will also use logistic regression to analyze the role of engagement in achieving 5% weight loss.
RESULTS: We expect positive relationships between engagement and reductions in HbA1c and body weight. That as, the more engaged a participant is in the intervention, the greater the changes an individual will experience in HbA1c and body weight. Similarly, we expect that the higher engagement group will have significantly larger changes in HbA1c and body weight as compared to the other categories of engagement. We also expect that engagement will be a significant predictor in achieving 5% weight loss. The results of this study will provide valuable insight into the impact of a commercially available d-DPP, which has the potential to vastly increase access and reach of diabetes prevention programming.
Grant and funding information: Omada Health, Inc.

P36: PRESS PLAY TO INCREASE ACTIVITY
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Background: Over the past decade, obesity levels have risen from 35.7% in 2010 to 42.4% in 2019 among adults over the age of 20. Individuals classified as obese based on body mass index (BMI) are at increased risk for morbidity from hypertension, type 2 diabetes, coronary heart disease, etc. Furthermore, the psychosocial health of obese individuals plays a crucial role in their overall well-being. With the continued increase in overweight and obese young adults, it is critical to examine potential lifestyle changes to improve the health of these individuals. The Center for Disease Control highlights physical activity as a fundamental lifestyle change for those individuals who are overweight or obese (in addition, healthy eating habits have also been identified). This study aims to increase daily steps by encouraging participants to listen to podcasts while being active. To the best of our knowledge, no study has used podcasts to increase activity among young adults. Furthermore, developing physical activity interventions using smartphone technology has been recognized as a feasible next step for physical activity interventions specifically for overweight, obese young adults. The purpose of this study is to explore the feasibility and acceptability of a physical activity intervention that encourages physical activity (primarily an increase in daily steps) while listening to podcasts. **Methods:** We plan to recruit 30 male and female participants between the ages of 18-25. Eligible participants will also be classified as sedentary (< 60 minutes of moderate-to-vigorous

activity/week), own a smartphone, and able to walk independently. To date, we have recruited 7 participants. Participants will attend a baseline session to sign an informed consent and receive an Inspire 2 Fitbit and Actigraph accelerometer to wear for 7 days. After baseline, participants will be randomized into either a Podcast group or a Walking group. Both groups will receive personalized steps goals (determined from their 7-day baseline Fitbit wear). Individuals in the Podcast group will be encouraged to increase their steps while listening to podcasts. Participants in both groups will attend bi-weekly (4 sessions total) check-ins with study staff to discuss the type of media (podcast vs. other) used during each session. After the 8-week intervention, participants will complete similar measurements at baseline and complete an evaluation of the study. **Anticipated results:** We hypothesize that the participants who are randomized into the podcast group will have a more significant increase in steps each week as compared to the control (no podcasts).

P37: FEASIBLE SEDENTARY BEHAVIOR SUBSTITUTION STRATEGIES TO REDUCE CARDIOVASCULAR DISEASE RISK IN ENDOMETRIAL CANCER SURVIVORS

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BACKGROUND: Among endometrial cancer (EC) survivors, the major cause of death is cardiovascular disease (CVD). Factors contributing to the heightened CVD risk include the cancer treatment and lifestyle behaviors. Conversely, CVD risk can be decreased through engagement in healthy lifestyle behaviors. Sedentary behavior (SB, ≤1.5 METs in seated/reclined position) reduction may be a feasible target for decreasing CVD risk in EC survivors. EC survivors have been reported to engage in high amounts of SB, a behavior which strongly associated with CVD mortality and morbidity. However, it is unknown what type and dose of SB interruption will be most feasible for EC survivors. Therefore, this study will investigate simple strategies to substitute SB (standing or walking) in EC survivors to investigate which type and dose reduces CVD burden associated with sitting. METHODS: The proposed randomized, controlled cross-over trial will recruit 20 EC survivors aged ≥50 years. Subjects will complete three SB conditions each lasting 2.5 hours. Two substitution conditions will interrupt sitting for 5 mins/hour via standing or walking because these are simple, cost-effective, potentially feasible strategies in real-world settings. The control condition will be uninterrupted SB. The primary outcome will be aortic arterial stiffness, measured using carotid-femoral pulse wave velocity (cfPWV) The cfPWV is the gold-standard noninvasive measure of CVD risk and has been reported to acute increase with exposure to prolonged sitting. Changes in cfPWV across the three conditions will be compared using a mixed model, with subject specified as random and time and condition as fixed effects. ANTICIPATED RESULTS: We anticipate that the findings of this study will facilitate the development of a feasible (low-cost and simple) and effective SB substitution recommendation for EC survivors. The findings will guide the development of an interventional study to test our recommended SB substitution strategy in EC survivors in the real-world.

P38: COMPARATIVE IMPACT OF PALM COOLING TEMPERATURES ON THERMAL AND PERCEPTUAL INDICES

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BACKGROUND: Palm cooling has proven beneficial to health and exercise performance, yet an optimal temperature has yet to be identified. METHODS: To identify a palm cooling temperature that offers optimal thermal and perceptual responses, twelve women and eight men did three multi-stage rowing ergometry workouts. In a randomized sequence, and as they wore fabricated palm cooling gloves equipped with a nylon mesh pouch for workouts, gel packs at one of three average temperatures (10.6, 12.6, or 14.9° C) were inserted into the pouches. Auditory canal, as well as left hand, temperatures (AUDT, LHT) were collected before, during and after workouts. In addition, rate of perceived exertion (RPE) was obtained midway, and at the end of workouts. Dependent variables were examined with three-way (condition, gender, time) ANCOVAs, with repeated measures for condition and time. Within-subject contrasts were our post-hoc, and alpha = 0.05 denoted significance. RESULTS: With statistically similar distances rowed among the conditions, AUDT results included three significant condition x time, interactions. Post-hoc analyses showed 12.6 > 10.6° C after the first and third stages, as well as at ten minutes post-exercise. In addition, 14.9 and 12.6 > 10.6° C after the fourth rowing stage and 15 minutes post-exercise. Finally, 12.6 > 14.9 and 10.6° C after stage eight. LHT results included four significant condition x time interactions. Post-hoc analysis showed 10.6 > 12.6 and 14.9 ° C after stage four, as well as at ten-, 15- and 20-minutes post-exercise. RPE results were not significant. CONCLUSIONS: Since high LHT values denote greater heat loss through the palm of the hand, 10.6° C had the most benefit. Greater heat losses at that temperature may explain lower AUDT values produced by that condition.

P39: COMPARATIVE IMPACT OF PALM COOLING TEMPERATURES ON ERGOGENIC AND CARDIOVASCULAR INDICES.

Neel L. Patel, Chris E. Colborn, Steve R. Soltysiak, Alex CS Shefflette, Elisabeth J. Dichiara, Alexandria C. Vanhoover, John F. Caruso. *University of Louisville, Louisville, KY.*

BACKGROUND: Palm cooling has proven beneficial to health and exercise performance, yet an optimal temperature has yet to be identified. METHODS: To identify a palm cooling temperature that optimizes ergogenic and cardiovascular responses, twelve women and eight men did three multi-stage rowing ergometry workouts. In a randomized sequence, and as they wore fabricated palm cooling gloves equipped with a nylon mesh pouch for workouts, gel packs at one of three average temperatures (10.6, 12.6, or 14.9° C) were inserted into the pouches. Per workout, distance rowed, heart rate (HR), systolic and diastolic blood pressures (SBP, DBP) were recorded before, during and after rowing. Distance rowed values were compared with two-way (gender, condition) ANCOVAs, with repeated measures for condition. Cardiovascular variables were compared with three-way (condition, gender, time) ANCOVAs, with repeated measures for condition and time. Within-subject contrasts were our post-hoc, and alpha = 0.05 denoted significance. RESULTS: Distance rowed results yielded non-significant differences. DBP results had a significant time-by-gender interaction, as women had significantly higher values than men at five and ten-minutes post-exercise. HR results included a significant condition x time interaction, with 10.6 < 12.6 and 14.9° C after rowing stage four, as well as at five, ten and 15-minutes post-exercise. SBP results included main effects for condition (10.6 < 12.6 and 14.9° C) and time. For time, our post-hoc showed post-bike and five-minutes post-exercise values were significantly higher than all others measured. CONCLUSIONS: HR and SBP outcomes imply 10.6° C, since it produced lower values for each variable despite similar distance rowed results as the other temperature conditions, may be optimal since it imposed less cardiovascular demand from rowing ergometry workouts.

P40: DETRIMENTAL SLEEP SCHEDULES IN FIREFIGHTERS

Makenzie Corgan, Sarah Brown, Paige Bramblett, Ben Lloyd, Lainey Hunnicutt, Caroline Smith, Ph.D., FACSM, Scott Collier, Ph.D., FACSM. *Appalachian State University, Boone, NC.*

The Firefighter (FF) occupation leads to poor sleep quality and architecture. Disturbed sleep in these occupations can lead to poor outcomes including a series of chronic diseases and illnesses such as CVD. **Purpose:** The aims were 1) to quantify the sleep of this occupation and 2) compare it to age-matched normative data. **Methods:** 10 male FF completed3 nights of polysomnography recordings (Sleep ProfilerTM) in their own bed or barracks. A rmAnova was used to determine differences in sleep values and a Bonferroni correction with significance set at $p \leq 0.05$. **Results:** Three important variables; deep sleep (FF: 2.7 +/-1.4 vs. 3.0 +/- 1.0 hrs), rapid eye movement (FF: 1.1 +/- 0.7 vs 1.1 +/- 0.5 hrs), and spindle duration (FF: 6.0 +/- 10.3 vs. 7.6 +/- 7.8 Hz.) for FF was statistically and/or clinically significant between sleep at home or in the barracks and between night and day shifts. All sleep results were significantly more deleterious when compared to normative data. **Conclusions:** These data demonstrate that firefighters show poor sleep quality and architecture. A firefighters' decreased sleep quality and architecture may be due to their effects of sleep shift. These results, when compared to age-matched normative data show clinical manifestations of disturbed sleep in the FF populations.

P41: COMPARISON OF PHYSIOLOGICAL AND PSYCHOLOGICAL RESPONSES TO INDOOR AND OUTDOOR EXERCISE IN A HOT ENVIRONMENT

Luke A. Willis, Andrew T. Singer, Brian Parr, FACSM. *University of South Carolina Aiken, Aiken, SC.*

BACKGROUND: Regular exercise can improve fitness and physical, mental, and emotional wellbeing. Research shows the influence of exercise environment on exercise benefits, implying that indoor and outdoor exercise have different effects on physical, mental, and emotional responses. This may be because even though people tend to exercise at a higher intensity outside, it may feel easier. Most of these studies compare indoor and outdoor exercise done in a comfortable environment. The responses to exercise may be different in more extreme temperatures. The purpose of this study was to compare the physiological (heart rate, body temp, blood lactate) and psychological (RPE) responses to indoor and outdoor exercise in a hot environment. METHODS: Subjects completed three 30-minute exercise sessions on a cycle ergometer set at the same intensity in three conditions: Indoor cool (I) in the fitness center, outdoor hot (O) on a covered porch, and indoor hot (S) in a temperature-controlled sauna. The HR, body temp, and RPE were recorded at rest and throughout exercise and blood lactate was measured at the end of exercise. RESULTS: The air temperature (O: 33.7±2.7 °C and S: 35.7±3.1 °C vs. I: 22.4±0.5 °C, $p<0.001$) and heat index (O: 38.5±4.2 and S: 45.0±8.1 vs. I: 22.3±0.5, $p<0.001$) were significantly higher in the two hot conditions (O, S) compared to indoors (I). The exercise intensity was matched between conditions (I: 82.9±33.5 W, O: 82.9±32.8 W, S: 83.3±33.5 W, $p=0.98$). The HR (O: 157.8±13.7 and S: 161.4±12.0 vs. I: 143.5±13.6, $p<0.05$), % max HR (O: 82.6±5.9% and S: 84.5±4.7% vs. I: 75.1±6.1%, $p<0.01$), body temperature (O: 36.8±0.4 °C and S: 37.5±0.4 °C vs. I: 36.2±0.2 °C, $p<0.001$), and RPE (O: 14.0±2.0 and S: 14.5±2.3 vs. I: 12.7±1.5, $p<0.05$) were significantly higher in the O and S conditions compared to indoors. The differences in postexercise blood lactate were not statistically significant (I: 5.1±1.8 mmol/L, O: 6.3±2.2 mmol/L, S: 4.3±1.2 mmol/L, $p=0.98$). CONCLUSION: This study shows that exercise at the same work rate leads to greater physiological and psychological responses consistent with higher intensity work in a hot environment, both indoors and outdoors. This suggests that some of the benefits of outdoor exercise may not apply to hot, humid conditions.

P42: FATAL AND NON-FATAL ILLNESS AND INJURY IN SPORTING OFFICIALS

Anne M. Mulholland, Hayley V. MacDonald, Jonathan E. Wingo, FACSM. *The University of Alabama, Tuscaloosa, AL.*

BACKGROUND: From 2003-2018, the Bureau of Labor Statistics reports 14 deaths of sport officials in the US. However, little is known about risk of injury or death during sport officiating, and the accompanying physiological and environmental factors that contribute to elevated risk. The purpose of this study was to establish a comprehensive database to identify types and causes of illness, injury, and death of sport officials and whether they differ by sport or environment. METHODS: Relevant key words were utilized with a popular search engine to systematically review online media sources from 2000-2019 for mention of a referee, sporting official, umpire, or similar who experienced a work-related illness, injury, or death. Chi-square tests were used to determine if fatality is independent from type of injury, sport, and the event location (indoor, outdoor), and if type of injury is independent from type of sport officiated. RESULTS: 145 events of injury, illness, and death were identified, among 134 persons. Sport officials were predominantly male (n=128; female, n=2; unknown, n=4), ranging in age from 20 to 80 y (mean±SD; 52±13 y) with 2 to 48 years (23±12 y) of officiating experience. Events were primarily musculoskeletal (n=55), cardiovascular (CV) (n=42), or head injury (n=30). Sixteen events (7 fatalities, all during soccer games) were intentional injury by another person; all others were presumed accidental in nature. Events occurred most frequently during baseball (n=30), soccer (n=25), American football (n=22), and ice hockey (n=22) games, primarily at the professional (n=69) and high school (n=26) levels. Fatalities (n=36) occurred more frequently during soccer games (n=13; $P<0.001$) and almost half of all fatalities were CV events (n=17; $P<0.001$); no musculoskeletal injuries were fatal. CV events occurred primarily while officiating basketball (n=14) and American football (n=12), while head injuries occurred most often while officiating baseball (n=11; $P<0.001$). Fatal events occurred at similar rates in indoor (16.7%) and outdoor (18.2%) settings ($P=0.83$). CONCLUSION: Soccer officials experience the highest frequency of violent injury and death. CV events occur most frequently while officiating American football and basketball; further investigation is warranted to determine if this correlates with health status and the high physiological demand of officiating American football and basketball.

P43: TIME COURSE OF DERMAL ANTHRACENE ABSORPTION UTILIZING INTRADERMAL MICRODIALYSIS

Dristen D. Trate[1], Killian D. Wustrow[1], Nelson R. Vineuza[2], Xinyi Sui[2], Morgan Demmler[2], Emiel A. DenHartog[2], Scott R. Collier, FACSM[1], Caroline J. Smith, FACSM[1]. [1]*Appalachian State University, Boone, NC.* [2]*North Carolina State University, Raleigh, NC.*

Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous pollutants frequently encountered through common daily occurrences, including smoking, vehicular exhaust, and industry sources, as well as occupational settings, such as firefighting. While inhalation is typically assessed as a major exposure route, limited data are available regarding dermal PAH absorption. **PURPOSE:** Utilizing the non-carcinogenic PAH, anthracene (ANT), we aimed to assess 1) the time course of dermal ANT absorption and 2) the effects of local skin temperature on the magnitude of dermal absorption. **METHODS:** Intradermal microdialysis (MD) fibers were inserted at two sites on the ventral forearm of 6 healthy participants (32 ± 5 yrs, 5 male, 1 female). MD fibers were perfused with 10% 2-hydroxypropyl-β-cyclodextrin with lactated Ringer's at a rate of 1 ul/min. A 2% ANT solution was applied to the skin over each site with overlying local heaters (LH) housing laser Doppler flowmeters for assessment of skin blood flow (SkBf). LH were clamped at 33°C during baseline SkBf and dialysate sampling. Following baseline, LH were set to 1) 43°C (Hot site, HT) and 2) 33°C as thermoneutral (TN) for the duration of the protocol. Dialysate samples were collected intermittently over 4 hours and 15 minutes, and SkBf, blood pressure and HR were recorded throughout the protocol. Atmospheric pressure chemical ionization tandem mass spectrometry was used to quantify ANT dialysate concentrations. **RESULTS:** No ANT was present in any baseline samples. From 1h30 to 1h 45 min, ANT was detected in 3 of 6 and 0 of 6 samples for the HT and TN sites, respectively. One HT sample was quantifiable at 317.5 ppm. Sampling from 4h to 4h 15 min, ANT was detected in all samples at the HT site and quantified in one (344.9 ppm). ANT was detected in only 1 of 6 samples at the TN site during this sampling period. SkBf was significantly higher at HT versus TN at both 1h 45 min (8.7 ± 5.7 and 29.2 ± 20.5 $CVC\%_{max}$, $P<0.05$) and 4h 15min (12.8 ± 8.3 and 42.8 ± 22.3 $CVC\%_{max}$, $P<0.05$). **CONCLUSIONS:** Dermal absorption of the PAH anthracene is increased when skin in heated versus thermoneutral conditions. Anthracene recovery is increased during longer periods of exposure when the skin is heated. This has important implications for individuals working and exercising in the heat. This data also suggests that microdialysis may be an effective method of assessing dermal absorption of PAHs.

P44: INTRADERMAL MICRODIALYSIS AS A NOVEL APPROACH FOR DERMAL POLYCYCLIC AROMATIC HYDROCARBON ABSORPTION ASSESSMENT

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Polycyclic aromatic hydrocarbons (PAHs) are environmental toxicants produced during incomplete combustion and are linked to adverse health outcomes including cancer. Dermal absorption of PAHs has been minimally investigated due to the complexities of *in vivo* sampling. Initial *in vitro* procedures can be developed and optimized before *in vivo* application to assess skin penetration as an exposure route. **PURPOSE:** Determine optimal procedures for PAH recovery utilizing microdialysis (MD) for recovery of the non-carcinogenic PAH Anthracene (ANT). **METHODS:** Initial *in vitro* testing utilized two different MD fibers (BASi, 30 KDa molecular weight cutoff; CMA, 55 KDa molecular weight cutoff) fully submerged in a 2% ANT solution. ANT recovery was quantified following alterations in the following variables: 1) duration of equilibration time when perfusion pumps were off (10 min, 20 min), 2) concentration of 2-hydroxypropyl-β-cyclodextrin (2β-CD) mixed with lactated Ringer's used as an excipient (0%, 5%, and 10%), and 3) perfusion rate (1.5 uL/min, 1.0 uL/min, or 0.5 uL/min). MD fibers were submerged in the ANT solution and dialysate samples were collected intermittently. All protocols were repeated in a counterbalanced order. Dialysate samples were analyzed

via atmospheric pressure chemical ionization tandem mass spectrometry. **RESULTS:** No ANT was detected in the CMA fiber samples under any conditions. Greatest ANT concentrations sampled from BASi fibers occurred during the 10 min Equilibration/1.0 ul/min perfusion rate/10% 2β-CD and 10 min Equilibration/0.5 ul/min perfusion rate/10% 2β-CD conditions, reporting 122.6 ppb and 209.0 ppb, respectively. ANT was detected but was lower than the limit of quantification under the 10 min Equilibration/1.0 ul/min perfusion rate/0% 2β-CD and 20 min Equilibration/0.5 ul/min perfusion rate/0% 2β-CD conditions. **CONCLUSION:** Careful consideration should be given to variables affecting substance recovery utilizing intradermal microdialysis. Under the conditions utilized, optimal procedures for ANT recovery utilized the BASi MD fiber under the 10 min Equilibration/10% 2β-CD with 0.5 ul/min or 1ul/min perfusion rate. Development of procedures for polycyclic aromatic hydrocarbon recovery in vitro using microdialysis are important for *in vivo* applications for dermal absorption assessment.

P45: SLEEP CHARACTERISTICS OF POLICE OFFICERS DURING NIGHT VS DAY SHIFTS

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BACKGROUND: Disturbed sleep can have a number of deleterious cardiometabolic consequences which are not fully understood. The disrupted sleep-wake cycles of shift workers, including police officers, can exacerbate these effects. PURPOSE: Examine the sleep characteristics of rural police officers in North Carolina and compare these data day shift control data to highlight the role shift work plays in sleep disturbance. METHODS: Sleep data was collected for 3 consecutive nights (during 6am-6pm or 6pm to 6am shifts in a counterbalanced design) from 7 police officers (1 Female, 6 Males) using the Sleep Profiler™- electroencephalography monitoring in their own beds. SPSS statistics (IBM, Armonk, NY; SPSS27). Paired T-tests were used to determine statistical significance between quality and architectural differences between shift schedules. A priori significance was set at $p \leq 0.05$. RESULTS: Total sleep time (D: 6.3 ± 0.4 vs N: 4.7 ± 1.1; p = 0.161) was similar between day and night shifts. Rapid eye movement (REM) total (D: 1.4 ± 0.2 vs N: 0.8 ± 0.3; p = 0.04), stage N3 (D: 1.6 ± 0.1 vs N: 0.8 ± 0.3; p = 0.018), and spindle duration (D: 2.9 ± 0.4 vs N: 14.7 ± 5.4; p = 0.038) were all statistically significant between shifts. CONCLUSIONS: The data demonstrates poor sleep architecture in night vs day shift police workers. These sleep disturbances may be a key contributing factor in increased cardiovascular disease. Severely reduced REM indicates less efficiency in memory storage and learning, reduced N3 is detrimental to cellular recovery, and higher spindle duration is indicative of more time in N2 rather than restorative deep sleep of N3.

P46: WORK RATE ADJUSTMENTS, CARDIOVASCULAR STRAIN, AND THERMAL STRAIN DURING HIGH-INTENSITY INTERVAL EXERCISE IN THE HEAT

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Heart rate (HR) and rating of perceived exertion (RPE) drift upward over time during exercise in hot conditions. As such, work rate must be lowered to maintain target intensity. PURPOSE: To characterize work rate adjustments during high-intensity interval training (HIIT) exercise in the heat based on target HR and target RPE and to test the hypotheses that 1) work rate must be lowered to a greater extent to maintain target HR than to maintain target RPE and 2) greater thermal and cardiovascular strain result from maintaining target RPE compared to target HR during HIIT in hot conditions. METHODS: 4 adults [3 men, (mean±SD) age=26±8 y] completed two 43-min trials on a cycle ergometer in 35 °C. Exercise intensity was prescribed based on a target HR (HR-based) or target RPE (RPE-based). After an 8-min warm-up at 70% HR_{max} or RPE of 12, subjects completed 5 rounds of HIIT (4 min of work at 90% HR_{max} or an RPE of 17 and 3 min of recovery at 70% HR_{max} or an RPE of 12). RESULTS: Change in power output from the first to the last high-intensity bout was not different between trials (HR-based=-61±33 W, RPE-based =-37±18 W; p=0.15). Since HR was essentially clamped during HR-based, on average HR increased over twice as much from the first to final high-intensity bout during RPE-based (15±5 beats/min) compared to HR-based (7±6 beats/min), although the difference was not statistically significant (p=0.08). The increase in rectal temperature over time (1.1±0.4 °C for HR-based and 1.1±0.5 °C for RPE-based) also was not different between treatments (p=0.29). CONCLUSION: These pilot data show that method of exercise prescription did not affect work rate adjustments, cardiovascular strain, or thermal strain during a HIIT workout in hot conditions. Although not statistically significant, work rate had to be lowered ~24 W (65%) more to maintain target HR than to maintain target RPE, which may have practical significance in terms of the metabolic stimulus of the exercise and potentially compromised training adaptations. On the other hand, maintenance of a higher metabolic intensity during the RPE-based trial resulted in 114% greater increase in HR over time which may have implications for reduced maximal oxygen uptake associated with cardiovascular drift.

P47: PULMONARY FUNCTION FOLLOWING ACUTE FORMALDEHYDE EXPOSURE IN YOUNG ADULTS

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Background: Formaldehyde (FA) is commonly utilized preservation agent contained within many household and industrial products, as well as in the solutions common to medical laboratories and mortuaries. Yet, FA is also a known carcinogen and pulmonary irritant. **Purpose:** To investigate the effects of FA exposure during a cadaver dissection laboratory on pulmonary function and biomarkers of inflammation. **Methods:** Students from two regional universities were recruited to perform pulmonary function testing and provided blood samples prior to and following a 90-min cadaver dissection laboratory session. Spirometry was measured by having subjects complete forced vital capacity (FVC) and maximal voluntary ventilation (MVV) maneuvers following American Thoracic Society guidelines. The NHANES III dataset was used to calculate percent predicted values. Plasma / serum concentrations of interleukin-6 or 15-HETE were analyzed using the enzyme-linked immunosorbent assay technique. Pre- and post-FA exposure data were subsequently examined using Student's *t* tests and Pearson's correlational analyses. **Results:** Before entering the laboratory, subjects (N=17; two males; 24±3yr; 24±4kg·m^{-2}) displayed normal pulmonary function, as indicated by the percent predicted values for FVC (97±10%), forced expiratory volume in one second (FEV_1; 96±11%), and MVV (102±16%). Subjects were exposed to 192 ± 124 ppb of FA over the course of the dissection period. Following the session, no changes were observed for any of the spirometric parameters examined (FVC, 0±3%Δ; FEV_1, 0±4%Δ; MVV, 0±0%Δ). Further, there were no correlations between the percent changes in FVC or FEV_1 and FA exposure concentrations as well as inflammatory biomarkers (r^2<0.06). No correlation of pulmonary function and interleukin-6 or 15-HETE was found. **Conclusion:** Acute exposure to FA over the course of a single dissection laboratory does not impair pulmonary function.

P48: IMPACT OF BODY POSITION ON MEASURING DIAPHRAGMATIC ENDURANCE IN YOUNG, HEALTHY INDIVIDUALS

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BACKGROUND: The diaphragm is the main inspiratory muscle of the body and important to overall respiratory health. Our lab developed a noninvasive and nonvolitional method to measure diaphragmatic endurance. The purpose of this study was to evaluate the potential effects of abdominal mass, manipulated by body position, on test outcomes. **METHODS:** Male and female participants (*n*=5, age: 26.2 ± 6.5) were tested on three separate days. All were of relatively healthy body mass indexes (25.07 ± 3.8). Day 1: anthropometric measurements were taken, and phrenic nerve stimulation familiarization was performed. Day 2: participants were placed in a 10-degree head up tilt. Day 3: participants were placed in a 10-degree head down tilt. Diaphragmatic endurance was measured on each day. The phrenic nerve was stimulated using point electrodes, causing hemi-diaphragmatic contractions. Electrical stimulation current was set at the highest intensity (mA) a person could tolerate. If too much concurrent brachial plexus activation was observed, the stimulation was decreased to an intensity that still produced a vigorous diaphragmatic contraction but reduced arm movement. A tri-axial accelerometer was placed on the participant's abdomen to capture the acceleration of twitch contractions. The endurance test consisted of 5 minutes of stimulation at a frequency of 5 Hz. The Endurance Index (EI) represents the percentage of diaphragm acceleration that remained after 5 minutes. **RESULTS:** While not statistically significant,

position differences did exist. Data reflected our hypothesis that EIs would be higher in the head up position with a mean value of 88.5% (5.3) compared to the supine and head down positions with mean values of 77.6% (8.0) and 78.6% (7.6), respectively. No main effect was found for body position with a repeated measures analysis of variance (Wilks Λ=.230, $F_{2,3}$=5.021, p=.110) There was a large effect size between head up and both supine (d=1.6) and head down positions (d=1.5). A small effect size was seen between supine and head down (d=.1). **CONCLUSIONS:** Body position has the potential to influence diaphragm endurance index. This suggests abdominal mass may be a confounding factor when performing the endurance test. Performing the test with a 10-degree head up tilt may reduce the impact of abdominal mass in young, healthy individuals. Additional testing is needed with a larger sample size.

P49: ACUTE ELECTRONIC CIGARETTE USE DOES NOT ALTER INDICATORS OF THORACIC GAS COMPRESSION

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Background: Electronic cigarette (EC) use has been shown to increase airway resistance, which may lead to alterations in thoracic gas compression volume during maximal expiratory maneuvers. Furthermore, changes to gas compression volume could potentially confound the measurement of forced expiratory volume in one second (FEV_1). **Purpose:** To investigate the acute effects of EC use on three separate indicators of thoracic gas compression volume. **Methods:** Ten (N=10) male adults participated in all testing procedures over the course of two laboratory visits. Participants inhaled from an EC with (EC+) or without (EC-) the nicotine cartridge in a randomized order. After each use of the EC (EC+ or EC-) participants completed pulmonary function testing. The area under the curve (AUC) between the maximal expiratory flow-lung volume loop and the maximal expiratory flow-mouth volume loop was quantified in each condition. The differences (Δ) in forced expiratory flow at 25% ($FEF_{25\%}$), 50% ($FEF_{50\%}$), and 75% ($FEF_{75\%}$) of forced vital capacity (FVC) between the lung volume and mouth volume loops were measured. Additionally, the Δ in volume between the maximal expiratory flow-lung volume loop and the maximal expiratory flow-mouth volume loop at peak expiratory flow (PEF), $FEF_{25\%}$, $FEF_{50\%}$, and $FEF_{75\%}$were also evaluated for both conditions. All values are expressed as mean ± SD. **Results:** The AUC between the lung volume and mouth volume loops was not different between conditions (EC+: 3.68 ± 1.42 $L^2 \cdot s$; EC-: 3.47 ± 1.44 $L^2 \cdot s$; $P > 0.05$). There were no significant differences in $\Delta FEF_{25\%}$, $FEF_{50\%}$, and $FEF_{75\%}$ between the two conditions (all $P > 0.05$). However, the ΔFEF decreased alongside lung volume, independent of condition ($P < 0.05$). Additionally, there was a reduction in the volume difference at $FEF_{50\%}$ and $FEF_{75\%}$ compared with PEF and $FEF_{25\%}$ ($P < 0.05$) but no differences were detected between conditions ($P > 0.05$). **Conclusion:** We observed no change in the volume of thoracic gas compression during the maximal expiratory maneuver following acute EC use. We interpret this to mean the thoracic gas compression volume does not change spirometry measurements (in particular, FEV_1) in relation to pulmonary function testing immediately after acute EC use. Funding provided by the Appalachian State University Office of Student Research and the University Research Council.

P50: METHOD OF TIDAL EXPIRATORY FLOW VOLUME LOOP CONSTRUCTION DOES NOT ALTER EXPIRATORY FLOW LIMITATION MEASUREMENT

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Background: Various methods exist to construct flow-volume loops (FVL) during exercise, and the method selected could alter the quantification of the mechanical constraints to exercise ventilation. Therefore, the purpose of this study was to investigate different methods of FVL construction on ventilatory parameters related to breathing pattern, operational lung volumes, and exercise flow limitation. **Methods**: Twelve (N=12) participants completed an incremental exercise test on a cycle ergometer. Inspiratory capacity maneuvers were performed each minute of exercise in order to measure operational lung volumes and assess ventilatory dynamics. FVLs were constructed using two techniques: 1) a single representative breath (TYP) selected from breaths measured during exercise and 2) a polar mean loop (i.e., the mean point for every 1° rotation) using 8-12 breaths during exercise (POLAR). Data from these loops were compared with the mean of all breaths collected during the stage (MEAN). Data were compared using repeated-measures analysis of variance. Values reported are mean ± standard deviation. **Results:** The TYP loop presented higher minute ventilation (V_E) compared with the POLAR loop (TYP: 54±3 $L \cdot min^{-1}$, POLAR: 52±3 $L \cdot min^{-1}$; $P = 0.024$) but neither was different form the MEAN minute ventilation ($P > 0.05$). The difference in V_E between TYP and POLAR was attributed to differences in the breathing frequency (TYP: 29±1, MEAN: 28±1; p=0.002), and in particular, inspiratory time ($P < 0.05$) between the two methods. Operational lung volume, as assessed via inspiratory capacity, was different between TYP and POLAR (TYP: 3.55±0.22 L; POLAR:3.52±0.22 L ; $P = 0.013$) However, despite the statistically different operational lung volumes, the technique for construction of the FVL did not alter the quantification of expiratory flow limitation ($P > 0.05$)**Conclusion:** These findings indicate that the technique used to construct exercise FVL alters quantification of breathing patterns via changes to breathing frequency and also impacts operational lung volumes. However, though statistically different, the differences likely are not clinically meaningful, especially considering that the method does not impact clinical indicators used in the assessment of mechanical limitations to ventilation.

P51: EFFECTS OF INTRAINDIVIDUAL MATERNAL EXERCISE OR NO-EXERCISE ON PREGNANCY AND BIRTH OUTCOMES

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BACKGROUND: Although exercise during pregnancy is associated with improved maternal and fetal health, some have cited inherent differences in participants as a reason for improved outcomes. Therefore, the purpose of this analysis is to utilize the strength of a single-subject design to compare differences in pregnancy and birth outcomes between exercise or no exercise intervention. METHODS: This was a secondary analysis to examine pregnant women (n=7) who participated in a randomized controlled trial twice, once they were randomized to 150 minutes/week of exercise and another pregnancy to non-exercising control. Skinfolds were completed at 16- and 36-weeks' gestation to estimate body fat percentage (BF%). Gestational age, diabetes (GDM) status, mode of delivery, weight gain (GWG), infant heart rate, sex, circumferences, weight, and length were collected via electronic birth records. Ponderal index (PI) and infant body mass index (iBMI) were calculated using standard formulas. RESULTS: Of the 7 women identified as participating in the study twice, 3 were randomized to control group first, while 4 were randomized to the exercise group first. There were no between-group differences in maternal skinfolds or GWG at 36-weeks. There were no differences between groups for BF% and both experienced an increase over time. There were no differences between groups for cases of GDM, mode of delivery, GWG, and infant sex. Although not significant, women tended to deliver closer to their due date in the exercise group. There were no between-group differences in infant heart rate; head, abdominal, or chest circumferences; reflexes; and Apgar scores at delivery. There were trends of higher PI (p= 0.13) and iBMI (p= 0.18) in the exercise-exposed infants relative to their non-exercise exposed siblings. Due to small sample size, there were no significant regression models related to exercise group and pregnancy or birth outcomes. CONCLUSION: Although this is a small sample, it further supports safe pregnancy and birth outcomes in the same women regardless of exercise or not during pregnancy. Furthermore, the potential increase in PI and iBMI of infants exposed to exercise in utero relative to their non-exposed siblings suggests further research is required regarding body compartments (i.e., bone and muscle mass). Thus, future research should examine the effect of maternal exercise on differences in offspring body composition outcomes between exercised and non-exercised siblings. FINANCIAL SUPPORT: This study was partially funded by the American Heart Association (AHA grant #15GRNT24470029) and East Carolina University.

P52: THE RELIABILITY OF ADULT FEMALE'S RECALL OF THEIR MENSTRUAL CYCLE CHARACTERISTICS DURING MID- TO LATE-ADOLESCENCE.

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BACKGROUND: Menstrual cycle characteristics (i.e. presence, regularity) can change appreciably across a female's lifespan. Menstrual cycle disturbances are particularly common during the

adolescent years and can have implications later in life. The Health and Reproductive Survey (HeRS) is a retrospective tool designed to collect reproductive history among females. In utilizing this tool, a more comprehensive understanding of menstrual cycle variation across the lifespan can be obtained.. **PURPOSE**: The purpose of this study was to determine the ability of women to reliably recall their menstrual cycle characteristics when they were 13-18 years of age. **METHODS**: This survey was assessed in a test-retest design across a 4-month span to determine recall reliability of survey responses and focused on questions pertaining to menstrual cycle regularity during mid- to late-adolescence. A Cohen's Kappa agreement was performed for the recall reliability of survey questions using the following cut points: 0 = chance; 0.1-0.2 = slight; 0.21-0.4 = fair; 0.41-0.6 = moderate; 0.61-0.8 = substantial; 0.81-0.99 = near perfect; 1 = perfect. Additionally, 95% Limits of agreement (LOA) determined the absolute error between values reported at baseline and 4-months. **RESULTS**: Of the 144 females (32.73 +/- 11.9 yrs of age) who completed the HeRS at both time points, 43% reported irregular cycles (>12 cycles or <10 cycles per year) and 18% reported physician diagnosis of disordered menstrual cycles during mid- to late-adolescence, which are higher than what are currently reported. Recall reliability of the 'average number of menstrual cycles per year' was within 1.5 years in 95% of the cases (LOA= -0.04+/-1.5 yrs), while recall of 'whether a cycle stopped for 2+ months' had moderate-substantial agreement (0.61). The ability to recall the 'longest length of time a cycle stopped' was more variable (95% LOA= 1.5 +/- 13.1 mo). There was moderate agreement (0.58) of one's 'ability to recall being diagnosed with a menstrual cycle disturbance' (e.g. amenorrhea), while the ability to recall use of (0.9) and form of (0.8) birth control revealed substantial-near perfect agreements. **CONCLUSION**: The findings of this study largely support the fidelity of utilizing the HeRS to retrospectively assess menstrual characteristics during the mid- to late-adolescent years.

P53: RELIABILITY OF HEART-TEMPLE PULSE-WAVE VELOCITY ASSESSMENTS DERIVED FROM A SIMPLE PHOTOPLETHYSMOGRAPHY DEVICE

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BACKGROUND: The purpose of this study was to determine the reliability of photoplethysmography (PPG) derived heart-temple pulse-wave velocity (htPWV) in a supine position. Pulse-wave velocity (PWV) is a common measure of arterial stiffness but traditional methods (tonometric and oscillometric) are limited to capturing non-continuous measurements. However, electrocardiogram (ECG) and PPG can be used in conjunction to continuously measure PWV at multiple arterial segments simultaneously. Measuring PWV continuously would enable a better understanding of novel arterial stiffness measures such as htPWV. Further, if shown to be reliable, htPWV may have implications for cerebrovascular health. METHODS: htPWV was assessed in healthy young adults (n = 30, 24.6 ± 4.8 y, 25.2 kg/m^2,18 F) using a PPG-ECG approach. A PPG sensor was placed on the temple and electrodes for a three-lead ECG were placed on the chest. PWV was calculated as distance (m) divided by transit-time (s). Distance was measured as the sum of the distance between the suprasternal notch and the location of the carotid pulse, and the distance between the location of the carotid pulse and the temple cuff. Transit time was calculated as the time between the peak of the QRS complex on the ECG and the peak of the second derivative of the PPG waveform. The second derivative peak was used as the ending point as it corresponded closely with the upstroke of the raw waveform. Two supine measurements were obtained five minutes apart and were used to calculate measurement reliability via intraclass correlation coefficient (ICC). RESULTS: htPWV had excellent (ICC>0.75) reliability (ICC=0.95, 95%CI: 0.93 - 0.99). The mean htPWV for the first measurement was 1.50 ± 0.23 m/s and the mean htPWV for the second measurement was 1.48 ± 0.21 m/s. CONCLUSIONS: PPG-ECG is a reliable, continuous method for measuring htPWV. This may be a useful strategy for assessing changes in arterial stiffness in a novel, and potentially clinically important arterial segment.

P54: PHYSICAL FITNESS, BUT NOT PHYSICAL ACTIVITY, IS ASSOCIATED WITH MENTAL HEALTH IN HEALTHY YOUNG ADULTS

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PURPOSE: The prevalence of mental health disorders is rising globally. Despite the popularity of exercise as a strategy to promote mental health in individuals with anxiety or depression, there is a paucity of literature on this topic in apparently healthy young individuals who are free from mental illness. **METHODS:** We characterized relationships between actigraphy-derived physical activity levels and cardiorespiratory fitness (VO_2max; via maximal graded exercise testing), with mental health assessed using psychometric questionnaires (Profile of mood states and Perceived stress scale) in apparently healthy young adults (26±4.3yrs; 22 females and 26 males). **RESULTS:** In females and males combined, relative VO_2max (33.5±8.1 ml/kg/min) was associated (P<0.01) with POMS (r=-0.454) and PSS (r=-0.510) scores, and relationships between fitness and POMS were preserved (P<0.05) after controlling for body fat (27.2±9.9%). Additionally, VO_2max was associated (P<0.05) with numerous POMS subcomponents (tension, anger, fatigue, depression, confusion; all=P<0.05). No relationships (P>0.05) were observed between physical activity profiles (sedentary time, light intensity time, moderate-vigorous intensity time, total steps, counts per day) with POMS or PSS scores, and only total steps was associated with relative VO_2max (r=0.331; P=0.021). Relationships between relative VO_2max and POMS scores were also observed in males (r=-0.407, P=0.039) and females (r=-0.490; P=0.021) individually, but VO_2max and PSS relationships were exclusive to males (r=-0.516, P=0.007). **CONCLUSIONS:** Independent of body composition, cardiorespiratory fitness, but not actigraphy-derived physical activity, is associated with mental health in apparently healthy young males and females. To maximize mental health benefits, exercise training interventions are advised to focus on eliciting improvements in cardiorespiratory fitness.

P55: CHARACTERIZATION AND STRATIFICATION OF RESTING BLOOD PRESSURE IN MALE CAREER FIREFIGHTERS

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Cardiovascular (CV) events are the leading cause of death in career firefighters, and uncontrolled high blood pressure (BP) is a leading risk factor for CV disease. The American Heart Association (AHA) recently updated BP categories to stratify individuals by disease risk. Characterization of BP status in career firefighters using these guidelines may provide insight as to the prevalence and severity of high blood pressure in this at-risk population. **PURPOSE**: To stratify resting BP levels in male career firefighters, and to explore biological and/or lifestyle BP correlates. **METHODS**: Twenty-four male career firefighters (34±8 yrs; 31±5 kg/m^2) were tested during morning hours (0700-0900) following a 12-hour fast. To characterize lifestyle habits, subjects completed the Pittsburgh Sleep Quality Index (PSQI) and Perceived Stress Scale (PSS) surveys. After 10 minutes of supine rest, resting BP was assessed via an oscillometric brachial cuff. Measurements were performed twice, and the mean value was analyzed. BP values were used to stratify risk of CV events based AHA guidelines (systolic, diastolic): normal = <120 and <80 mmHg, elevated = 120-129 and <80 mmHg, stage I hypertension = 130-139 or 80-89 mmHg, stage II hypertension = >140 or >90 mmHg. Pearson's correlations were used to assess the relationship of mean arterial pressure (MAP) with age and body mass index (BMI), and non-parametric Spearman's correlations were run to assess relationships of MAP with PSQI and PSS scores. **RESULTS**: Average systolic pressure was 131.2±10.8 mmHg, while diastolic (dia) pressure was 77.6±7.6 mmHg. As per the AHA guidelines, 5 subjects (21%) were classified as normal, 5 subjects (21%) as elevated, 10 subjects (41%) as stage I hypertensive, and 4 subjects (17%) as stage II hypertensive. Neither age nor BMI were associated with MAP (P>0.05). PSS score, but not PSQI score (P>0.05) was associated with MAP (r_s=-.50, P=0.014). **CONCLUSIONS**: In comparison to age- and gender-matched prevalence estimates (~25% via Center for Disease Control), we observed a substantially greater prevalence of hypertension in male career firefighters (~60%) that may underlie the inequitable burden of CV events in this population. The lack of relationship between BMI and BP, and the inverse relationship between BP and stress is counter to the literature and deserving of further inquiry.

P56: HEART RATE VARIABILITY AND AEROBIC FITNESS ARE INDEPENDENTLY ASSOCIATED WITH AORTIC STIFFNESS IN YOUNG ADULTS

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BACKGROUND: Aortic stiffening, indexed by carotid-femoral pulse wave velocity (cf-PWV), is associated with an increased risk of cardiovascular disease. Aerobic fitness, indexed by maximal oxygen uptake (VO_2max) and cardiac-parasympathetic modulation, indexed by vagal-mediated heart rate variability (HRV), have been shown to be inversely associated with cf-PWV. However, collinearity between VO_2max and HRV may be influencing the bivariate associations with PWV. PURPOSE: To determine if VO_2max and HRV are independently associated with cf-PWV in healthy young adults when included in a multivariate analysis. METHODS: Twenty-one men (24±5 years; 24±17% body fat) and 20 women (21±3 years; 34±7% body fat) recorded ultra-short (i.e., 60-s), post-waking supine HRV measures for 7 days via a Bluetooth heart rate monitor and cost-free smartphone application. The week average of the natural log of the root-mean square of successive normal RR interval differences (LnRMSSD) was recorded for analysis. Participants subsequently reported to the laboratory in a fasted state during morning hours for assessment of cf-PWV via applanation tonometry and VO_2max via a graded exercise test on a cycle ergometer. RESULTS: Men had greater ($P < 0.05$) VO_2max (39.5±6.4 vs. 28.1±5.9 $mL \cdot kg \cdot min^{-1}$) and LnRMSSD (4.4 ± 0.3 vs 4.1 ± 0.5) than women, whereas cf-PWV did not reach significance (6.2±0.8 vs. 5.8±0.5, $P = 0.06$). VO_2max, and LnRMSSD were associated ($P < 0.05$) with cf-PWV in men ($r = -0.50$ and -0.62, respectively) and women ($r = -0.58$ and -0.53, respectively). Standard least squares regression was performed to predict cf-PWV based on VO_2max, LnRMSSD, and sex. A significant model effect was observed ($P = 0.002$, $R^2 = 0.41$). VO_2max ($\beta = -0.44$), LnRMSSD ($\beta = -0.35$), and sex ($\beta = 0.70$) were significant predictors of cf-PWV ($P < 0.05$). Variance inflation factors were all <3.0. CONCLUSIONS: Aerobic fitness, self-recorded ultra-short HRV, and sex were independently predictive of PWV. Lifestyle factors targeted at increasing HRV or increasing aerobic fitness may augment arterial compliance in young adults, thereby reducing long-term risk for cardiovascular disease.

P57: AGREEMENT BETWEEN SINGLE- AND DOUBLE-POINT ESTIMATIONS OF PULSE WAVE VELOCITY

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BACKGROUND: Aortic pulse wave velocity (PWV) is a common measure of arterial stiffness, and an independent predictor of cardiovascular disease risk. Currently, the gold standard PWV measure, carotid-femoral pulse wave velocity (cfPWV), is taken using two arterial sites. A single-point method of PWV would be useful as it would decrease required operator training and subject burden. Therefore, the objectives of this study were to assess (1) overall, and (2) repeated measures (RM) agreement, between cfPWV and two test measures, which estimate aortic PWV from the brachial artery. METHODS: The criterion aortic cfPWV measure was obtained with carotid and femoral artery oscillometric cuffs. Brachial-based PWV was obtained using the Uscom BP+ device (PWV_{BP}) and the Mobil-o-graph device (PWV_{MOG}). Measurements were made in the supine, then semi-recumbent, then seated position. Postural change was used as a hemodynamic perturbation for ascertainment of RM agreement. Multi-level correlation was used to calculate overall agreement (independent of posture), and RM correlation was used to determine whether change (i.e., with change in posture) in the test measure agrees with change in the criterion. Strength of agreement was interpreted as the intraclass correlation coefficient (ICC), with estimates of <0.2, 0.2, 0.4, 0.7, and 0.9 representing negligible, weak, moderate, strong, and very strong agreement, respectively. RESULTS: Complete data was collected for 22 subjects (age: 26+/-5.4 years, 59% female). cfPWV increased approximately 1m/s from the supine to semi-recumbent, and from the semi-recumbent to seated posture. The overall and RM agreements between PWV_{MOG} and cfPWV were weak, with the ICC: 0.25, 95%CI [0.01, 0.46] and ICC -0.22, 95% CI [-0.49, 0.09], respectively. The overall agreement between PWV_{BP} and cfPWV was weak (ICC 0.34, 95% CI [0.11, 0.54]) and the RM agreement was negligible (ICC 0.17, 95% CI [-0.14, 0.44]). Limits of agreement plots indicated bias, with both single-point methods producing lower PWV than the criterion. CONCLUSIONS: The preliminary results show the PWV_{MOG} weakly but significantly agreed with cfPWV, whereas PWV_{BP} weakly and non-significantly agreed with cfPWV. RM agreement was negligible to weak, likely because both single point-measures changed minimally with postural change, whereas the criterion device recorded expected increases in PWV with more upright posture.

P58: AUGMENTATION INDEX AND PULSE WAVE VELOCITY AFTER DELIVERY IN WOMEN WITH AND WITHOUT AN ADVERSE PREGNANCY OUTCOME

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Adverse pregnancy outcomes (APOs), such as preterm birth, gestational diabetes, and hypertensive disorders of pregnancy, are associated with higher maternal risk of cardiovascular disease years later. Research is limited regarding sensitive measures of vascular function in the early years following delivery. **Purpose:** To determine if women with a history of APO have differential wave reflection and arterial stiffness in the 6 months to 3 years following delivery. **Methods:** Seventy-nine women (mean age=32.7±0.6 years; 58 White/19 Black/1 Asian; 31 [39.2%] with a past APO) who delivered a singleton infant 6 months-3 years ago were included. Women were excluded if they were smokers, had diabetes, or used protease inhibitors. Following an overnight fast, participants completed a single study visit where brachial blood pressure was measured using an oscillometric cuff and applanation tonometry. Wave reflection (augmentation index; AIx) and central arterial stiffness (central pulse wave velocity; cPWV) were assessed. History of APO was determined via self-report. Wilcoxon rank-sum tests or t-tests were used to test for differences in means between APO groups. **Results:** Body mass index was higher in women who had an APO (31.8±1.4 vs 26.5±1.1 kg/m^2, $p<0.01$). There was no difference in AIx (18.3±1.5 vs 16.9±1.9%; $p=0.577$), cPWV (6.02±0.29 vs 5.99±0.20 m/s; $p=0.913$), or brachial systolic blood pressure (116.5±3.3 vs 109.0±1.7 mmHg; $p=0.101$) between those with versus without APOs. Brachial diastolic blood pressure was significantly higher in women who had experienced an APO (75.9±2.6 vs 68.3±1.5 mmHg; $p<0.01$). AIx tended to be higher in women over age 30 years with a past APO (21.5±1.8 vs 17.1±1.9%; $p=0.059$). **Conclusions:** Women with and without APOs exhibited similar AIx and cPWV, though a trend towards higher AIx emerged in women over 30 with a past APO. Future research should evaluate differences in AIx and cPWV at more distant time points after delivery.

P59: THE TIME-COURSE OF BLOOD PRESSURE CHANGE IN ADULTS DURING PROLONGED SITTING: A THREE-LEVEL META-ANALYSIS

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BACKGROUND: Acute bouts of prolonged sitting have been found to detrimentally impact the cardiovascular system, including acute increases in blood pressure (BP). Repeated increases in BP can damage the heart and blood vessels. While the responses to prolonged sitting have been reported independently in many studies, a multi-level meta-analysis that can consider non-independence of measurements and effect sizes of blood pressure change during prolonged sitting has not been explored. Therefore, we conducted a meta-analysis to track BP change during uninterrupted prolonged sitting. METHODS: Four databases were searched through September 2021. Inclusion criteria were sitting trials > 1 hour, adults (18+ years old), and brachial measurements of either mean arterial pressure (MAP), systolic BP (SBP), diastolic BP (DBP) obtained at a minimum of three time points in the seated posture. Trials with interruption strategies were eligible if they included an uninterrupted prolonged sitting control condition. A random-effects 3-level meta-analysis was conducted to account for the potential interdependence of multiple data points from the same participants and the same trials. RESULTS: Twenty-four articles (28 trials, *n = 465*) met inclusion criteria. Prolonged uninterrupted sitting resulted in significant increases of all BP indices; MAP ($\beta = 0.60$ mmHg/hr, 95% CI: 0.18, 1.02, $p = 0.004$), SBP ($\beta = 0.60$ mmHg/hr, 95% CI: 0.30, 0.90, $p < 0.001$), and DBP ($\beta = 0.48$ mmHg/hr, 95% CI: 0.18, 0.72, $p < 0.001$). In trials where

sitting was interrupted with either standing, aerobic-, or simple resistance exercise, there were non-significant effects of time on MAP (β = 0.06 mmHg/hour, 95% CI: -0.24, 0.36, p = 0.750), and small significant decreases in SBP (β = -0.24 mmHg/hr, 95% CI: -0.42, -0.06, p = 0.018) and DBP (β = -0.24 mmHg/hr, 95% CI: -0.42, 0.06, p = 0.004). Significant heterogeneity between studies was observed for all outcomes (MAP, SBP, DBP: I^2 > 85%, p < 0.001). CONCLUSIONS: All BP indices increased progressively with uninterrupted sitting. Over time, prolonged-sitting-induced increases in BP could lead to decreased elasticity in arteries, left-ventricular hypertrophy, or other cardiovascular diseases and symptoms. While considerable heterogeneity was observed (potentially due to variability in age and baseline BP status), results suggest that detrimental increases in BP can be avoided by regularly interrupting sitting.

P60: CARDIAC AUTONOMIC ACTIVITY ACROSS THE MENSTRUAL CYCLE IN NATURALLY CYCLING FEMALES

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Background: Assessment of autonomic nervous system (ANS) function through measures of heart rate variability (HRV-parasympathetic tone) and systolic time intervals (STI-sympathetic activity) can serve as noninvasive indices to determine health status and day-to-day physiological readiness for exercise. As the use of noninvasive measures become increasingly prevalent in research and guided training, it is important to know if menstrual cycle phase influences these metrics. Therefore, the purpose of this study was to determine the impact of menstrual cycle phase on autonomic function as indicated by HRV and STI. **Methods:** Seventeen naturally cycling females (age, 24±5yrs; ht,163.3±7.3cm; mass, 71.3±24.4kg, body fat, 22.7±9.3%) visited the laboratory on days 5 (early follicular; EF), 13 (late follicular; LF), and 20 (mid-luteal; ML) of their menstrual cycle; day 0 was defined as the onset of menstruation. HRV and STI were measured in a seated position for 6-minutes using electrocardiography and impedance cardiography, respectfully. HRV analysis was performed on the last 5-minutes of each segment where heart rate (HR), root mean square of successive R-R intervals (rMSSD), high frequency power (HF), and sample entropy (SampEn) was assessed. STI analysis was performed during a 30-second window within the last 5-minutes of the segment and used to indicate the pre-ejection period (PEP) of the heart. HRV measures were log transformed (ln) due to a normality violation, as indicated by a Shapiro-Wilk test. Separate repeated measures ANOVAs were used to determine differences for each HRV and STI metric across EF, LF, and ML. **Results:** There were no significant differences in HR [bpm; EF, 73±12; LF, 69±13; ML, 73±11; p=1.0], lnrMSSD [ms; EF, 3.7±0.5; LF, 3.7±0.5; ML, 3.64±0.5; p=0.88], lnHF [ms^2; EF, 6.3±1.2; LF, 6.3±1.1; ML, 6.2±1.0; p=0.97], SampEn [EF, 1.4±0.4; LF, 1.5±0.4; ML,1.6±0.3; p=0.35], or PEP [ms; EF, 1.2±0.1; LF, 1.2±0.1; ML, 1.2±0.1; p=0.33] across the menstrual cycle. Conclusion: Measures of HRV and STI did not differ across the menstrual cycle in naturally cycling females. However, it should be noted that menstrual cycle phase was not confirmed with multiple methods (i.e., basal body temperature, hormone levels, ovulation tests). Given the significant inter-individual variation in menstrual cycle in females, future research should take a multilevel approach to confirm menstrual cycle phase.

P61: ACTIGRAHY-DERIVED SLEEP QUALITY AND BLOOD PRESSURE REACTIVITY IN YOUNG APPARENTLY HEALTHY ADULTS

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BACKGROUND: Insufficient sleep is associated with hypertension, the leading risk factor for cardiovascular disease. Blood pressure (BP) responses to physical stressors such as exercise, have prognostic value in predicting future hypertension risk. However, it is unclear whether sleep is associated with BP responses to physical stressors. Thus, the present investigation sought to assess the relation between habitual sleep quality and BP responses during isometric handgrip (HG). METHODS: A total of 49 healthy adults (30 female, age: 23.0±3.3 yrs, BMI: 25.5±3.8 kg/m^2, resting BP: 107±10 mmHg, Mean±SD) participated in this study. Objective sleep quality, including sleep duration and efficiency, were assessed using wrist-worn Philips Actiwatch Spectrum PLUS accelerometers. Participants wore the devices for a minimum of a six-day observation period (7.4±0.8 days). Maximal HG force was obtained by calculating the average of three maximal voluntary contractions (MVC). Beat-to-beat BP via finger photoplethysmography (Finometer) and heart rate (electrocardiogram) were continuously assessed during a 10-minute baseline and a two-minute HG at 40% MVC. We split participants into quartiles based on the sleep duration and efficiency, respectively. Statistical analyses included Pearson's correlation and ANOVA, and significance was set as p<0.05. RESULTS: There were no associations between sleep duration or efficiency and peak (minute two) Δ systolic BP, Δ diastolic BP, or Δ mean BP (p>0.05 for each). Although there was a large difference between quartiles, for sleep duration (Q1:5.9±0.54hrs, Q2:7.1± 0.3hrs, Q3:7.7 ± 0.1hrs, Q4:8.4 ± 0.6hrs p<0.001), and efficiency (Q1:77±5.0%, Q2:84±1.3%, Q3: 88±1.0%, Q4: 91±1.3%, p<0.001), there were not differences between sleep duration quartile groups for peak Δ systolic BP (Q1: 36±14, Q2: 31±24, Q3: 33±16, Q4: 36±15 mmHg, p=0.467), Δ diastolic BP, or Δ mean BP (data not shown, p>0.05 for both). Also, there were no differences between sleep efficiency quartile groups for peak Δ systolic BP, Δ diastolic BP, or Δ mean BP during HG (p>0.05 for each). CONCLUSION: These preliminary data indicate that actigraphy-derived habitual sleep duration and efficiency do not appear to be associated with BP responses to HG exercise in healthy adults. ACKNOWLEDGEMENTS: Funding for this project was provided by NIH grants K01HL147998 and UL1TR003096 (CCTS Pilot), and the 2020 Auburn University School of Kinesiology Seed Funding Competition.

P62: SHORT-TERM SALT LOADING DOES NOT INFLUENCE HEART RATE VARIABILITY DURING SUBMAXIMAL EXERCISE AND RECOVERY

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Introduction: Heart rate variability (HRV) is the change in time intervals between consecutive heartbeats and represents autonomic control of hemodynamic responses. Dietary salt consumption may affect HRV by altering hemodynamic responses during dynamic exercise. Additionally, acute exercise reduces HRV as the body increases heart rate to meet physiological demands. However, it is unclear if dietary salt influences HRV during dynamic exercise. Therefore, this analysis aims to assess the effects of a short-term high salt load (HS) on HRV measures at rest, during submaximal exercise, and during recovery from exercise**. Methods:** Using a randomized, crossover, blinded design, 20 young adults (Females = 9, age: 24 ± 4 yrs, blood pressure: 110 ± 10/64 ± 8 mmHg) consumed HS (3900 mg sodium) or placebo (PLA; dextrose) capsules with their habitual diets for 10 days each separated by ≥ two weeks. On day 10 of the interventions, we assessed participants' electrocardiograms for 10 minutes of rest, 50 minutes of cycling at 60% VO_{2max}, and 5 minutes of recovery. We quantified HRV using normal RR intervals to assess the standard deviation of normal-to-normal RR intervals (SDNN) and the natural log of root mean square of successive NN interval differences (LnRMSSD). We visually inspected RR intervals and analyzed them using the Labchart 8.1.19 HRV module and included RR intervals if they fell within acceptable resting and maximal physiological parameters. We ran statistical analyses in Jamovi 2.0.0.0 using repeated measures two-way ANOVA with significance set to p < 0.05**. Results:** Acute exercise reduced the average RR interval (p < 0.001 for time) but there was no main effect of diet or interaction (PLA vs HS; baseline: 1092 ± 201 vs. 1095 ± 184 ms, exercise: 420 ± 53 vs 416 ± 37 ms, recovery: 904 ± 133 vs. 936 ± 159 ms). Similarly, acute exercise reduced SDNN (p < 0.001) and there was no diet or interaction effect (PLA vs HS, baseline: 88.8 ± 42.5 vs. 109.4 ± 52.7 ms, exercise: 47.3 ± 32.4 vs. 61.4 ± 35.4 ms, recovery: 104.9 ± 32.0 vs. 110.3 ± 29.2 ms). These findings were consistent with LnRMSSD as there was a significant time effect (p < 0.001) but no diet or interaction effect (PLA vs HS, baseline: 86.0 ± 8.7 vs. 89.6 ± 10.8, exercise: 72.8 ± 20.2 vs. 78.0± 23.8, recovery: 83.7 ± 12.9 vs. 87.2 ± 12.3). **Conclusions:** As expected, HRV was significantly reduced by acute exercise. However, a short-term high salt load did not affect baseline, exercise, or recovery HRV measures in healthy young adults. **Funding:** American College of Sports Medicine Foundation Doctoral Student Research Grant 17-00521 (Babcock), Supported by NIH grants R01HL128388, P20 GM113125, and K01HL147998

P63: ABSOLUTE PEAK OXYGEN CONSUMPTION IS INDEPENDENTLY CORRELATED WITH FAT-FREE MASS IN YOUTH SOCCER PLAYERS

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BACKGROUND: It has been suggested that the relationship between body mass (BM) and peak oxygen consumption (VO_{2peak}) is explained by fat-free mass (FFM) and not fat mass (FM). However, most of the research has occurred in children and adults with obesity, and hence, little is known about these relationships in youth athletes. Therefore, the purpose of the study was to determine the extent of variation in absolute VO_{2peak} that can be independently explained by BM, FM, and FFM in youth soccer players. METHODS: A sample of 20 young male soccer players (age = 13.7 ± 0.8 years, height = 167.0 ± 7.9 cm, weight = 56.2 ± 8.4 kg) participated in this study. Absolute VO_{2peak} was determined from a maximal graded exercise test on a treadmill. Dual-energy x-ray absorptiometry was used to measure FM and FFM. Pearson correlation procedures were used to determine the relationships between absolute VO_{2peak} and the body composition metrics. Stepwise regression was used to determine which body composition metric (BM, FM, or FFM) explained the greatest variation in absolute VO_{2peak}. RESULTS: The average absolute VO_{2peak}, FM, and FFM was 3.1 ± 0.6 L/min, 11.1 ± 2.9 kg, and 46.0 ± 6.9 kg, respectively. Significant correlations were found between VO_{2peak} and BM ($r = 0.88$, $p < 0.001$), FM ($r = 0.46$, $p = 0.02$), and FFM ($r = 0.90$, $p < 0.001$). Stepwise regression showed that only FFM significantly explained the variance in absolute VO_{2peak} ($R^2 = 0.81$, $p < 0.001$). CONCLUSIONS: The results of this study suggest that FFM explains the relationship between BM and absolute VO_{2peak} in youth soccer players. FM does not display an independent relationship with VO_{2peak}. Therefore, fatness and absolute VO_{2peak} appear to be independent qualities in male youth soccer players. Further research is needed to verify these findings and clarify the relationship between body composition and oxygen consumption in youth athletes.

P64: COLD PRESSOR TEST BLUNTS REACTIVE HYPEREMIA DURING PASSIVE LIMB MOVEMENT

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Introduction: The cold pressor test (CPT) augments sympathetic outflow, causing systemic vasoconstriction. While CPT-stimulated sympathetic activity is known to impair brachial artery reactive hyperemia, less is known about its impact during passive limb movement (PLM). PLM is a lower limb microvascular function assessment often associated with local, nitric oxide (NO)-mediated vasodilation. **Purpose/Methods:** This study sought to measure hemodynamic responses to PLM, as assessed by Doppler ultrasound, in the seated upright position under a controlled, non-water, condition (CON) versus CPT (hand in ice water) conditions. Young healthy adults (3M/6F; 21±2yrs; 24.51±3.08kg/m^2) participated in this study. The order of CON and CPT conditions was randomly assigned. In each condition, femoral artery blood velocities and diameters were continuously measured during the 60 seconds of passive leg movement (1 Hz). Total, anterograde and retrograde blood flow (BF), mean arterial pressure (MAP), and vascular conductance (VC) were calculated offline. Student's t-tests were performed to analyze differences between conditions. Data are reported as mean ± standard deviation. **Results:** The total BF response to PLM, calculated as the 60 second area under the curve, was significantly reduced during CPT (171±207ml/min) compared with CON (237±193ml/min) ($p=0.04$). Anterograde BF during PLM tended to be lower during CPT compared with CON (CON: 293±206ml/min; CPT: 193±186ml/min; $p=0.06$), while retrograde BF (CON: -20±46ml/min; CPT: -22±52ml/min) during PLM was not different between conditions ($p=0.93$). MAP during PLM was significantly elevated during CPT compared with CON (CON: 76.73±10.86mmHg; CPT: 93.19±8.68mmHg; $p=0.0001$). There was a significant reduction in VC during PLM in the CPT condition compared with CON (CON: 3.14±2.26 m/min/mmHg; CPT: 1.87±2.52 m/min/mmHg; $p=0.004$). **Conclusion:** Initial results suggest a sympathoexcitatory stimulus (CPT) impairs the hyperemic response to PLM. The microvascular assessment of lower limb, NO-mediated vasodilation may be influenced by varying levels of sympathetic tone and should be considered when measuring lower limb vascular function in a variety of diseased populations.

P65: CAFFEINE ABSTINENCE IN HABITUATED USERS: CARDIOVASCULAR AND PERCEPTUAL RESPONSES TO EXERCISE WITH BLOOD FLOW RESTRICTION

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BACKGROUND: Since caffeine affects blood pressure (BP), studies using blood flow restriction resistance exercise (BFR-RE) commonly require caffeine abstinence. For habitual users, effects may be attenuated, and it is unknown if abstinence alters responses to BFR-RE. **PURPOSE**: Compare cardiovascular and perceptual responses to BFR-RE when habitual users consume or abstain from caffeine. **METHODS**: 11 participants completed a 3 visit within-subject study. Visit 1 consisted of familiarization, a one repetition maximum (1RM) test, and caffeine intake assessment. Visits 2-3 consisted of dominant arm BFR-RE [3 sets of bicep curls to failure with 30% 1RM, 40% arterial occlusion pressure (AOP), 30s inter-set rest]. Visits 2-3 were 1h after typical dose, one with caffeine (CAFF) and one without (ABS) (counterbalanced). Heart rate (HR), systolic (SBP) and diastolic (DBP) BP, and AOP were measured pre- and post-exercise and ratings of perceived exertion (RPE-E) and discomfort (RPE-D) after each set. Exercise volume (VOL) per set was calculated as load (kg) x reps. Bayesian RMANOVA were used to find the most probable model for SBP, DBP, HR and AOP (results are mean±SD). BF_{10}=most probable alternative model versus the null. Bayesian paired t-tests were used to compare RPE-E, RPE-D, and VOL within each set (results are mean difference±SD). **RESULTS**: Main effects of time and condition for SBP (mmHg, BF_{10}=17774.82) and DBP (mmHg, BF_{10} =298.2) indicated CAFF (SBP=121.4±11.0, DBP=84.4±10.2) was greater than ABS (SBP=116.7±10.6, DBP=80.8±9.1), and post (SBP=123.5±9.6, DBP=86.7±11.0) was greater than pre (SBP=114.6±10.6, DBP=78.5±6.2). A main effect of time indicated AOP (mmHg, BF_{10}=1.461e+6) increased pre (134.9±17.8) to post (154.3±19.6). Moderate evidence of a main effect of time indicated HR (bpm, BF_{10} =3.3) increased pre (77.9±10.1) to post (84.0±13.6). Anecdotal evidence indicated no difference in RPE-E (AU) between CAFF and ABS for sets 1 (0.1±1.0) and 2 (0.0±0.8, BF_{10} both<.3) and weak evidence for set 3 (0.5±1.1, BF_{10}=1.2). Anecdotal evidence indicated no difference in RPE-D (AU) between CAFF and ABS for sets 1 (0.1±1.4), 2 (0.5±1.8), and 3 (0.2±1.7, BF_{10} all<.5). Anecdotal evidence indicated no difference in VOL (AU) for sets 1 (8.5±27.5), 2 (1.5±7.4), and 3 (0.8±8.0, BF_{10} all<.5). **CONCLUSION**: In habitual users, caffeine may increase BP, but other cardiovascular and perceptual responses to BFR-RE may not be impacted.

P66: COMPARING THE RESTING CARDIOVASCULAR RESPONSE TO COMMONLY USED BLOOD FLOW RESTRICTION DEVICES

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BACKGROUND: Alone, blood flow restriction is used as a tool to decrease muscle atrophy or recovery time. However, it is unknown whether devices used in clinical or research settings elicit a similar stimulus when using similar protocols. Thus, the purpose was to compare cardiovascular responses between a commonly used research device (RES) and clinical device (CLIN). **METHODS:** Over one visit, 15 individuals' cardiovascular responses to blood flow restriction using CLIN and RES devices were measured on the right arm in a randomized and counterbalanced order. After 5 min of supine rest, arterial occlusion pressure (AOP) was measured, then during a second 5 min rest, a near-infrared spectroscopy device was placed at the muscle belly of the forearm to measure tissue deoxygenation (HHb, μm) and tissue saturation index (TSI, %). A pulse oximeter on the index finger measured heart rate (bpm) and % oxygen saturation. 0-10 scale ratings of perceived discomfort (RPE-D, AU) were also assessed. Blood flow (ml/min) was measured using pulsed wave Doppler ultrasonography at the brachial artery proximal to the antecubital space. All variables were assessed twice at 0% AOP and once at 50% AOP. Measures were spaced 1 min apart. Change scores (50% AOP - 0% AOP) presented as the mean ±SD were compared using Bayesian Paired Samples T-Tests (JASP). **RESULTS**: AOP differed between RES (157.27 ±21.82) and CLIN (143.73 ±15.47; BF_{10}= 12.78). However, weak to moderate evidence suggests that blood flow volume (RES: -33.71 ±38.57; CLIN: -29.96 ±36.73; BF_{10}= .34), TSI (RES: -5.72 ±5.99; CLIN: -4.99 ±6.40; BF_{10}= 0.37), heart rate (RES: -.23 ±2.50; CLIN: -1.23 ±2.43; BF_{10}= 0.789), and oxygen saturation may not differ between the devices (RES: -.47 ±.79; CLIN: -.63 ±.61; BF_{10}= 0.318). Weak to moderate evidence also suggests

HHb for channel 1 (RES: 15.79 ±6.17; CLIN: 14.97 ±7.15; BF_{10}= 0.311), channel 2 (RES: 15.64 ±5.45; CLIN: 14.63 ±6.57; BF_{10}= 0.341), and channel 3 may not differ (RES: 14.82 ±4.86; CLIN: 13.91 ±6.03; BF_{10}= 0.329) between devices. Weak evidence also suggests RPE-D may not differ (RES: 1.03 ±1.11; CLIN: 1.30 ±1.46; BF_{10}= 0.529). **CONCLUSION**: AOP measurements were different between devices possibly due to device differences such as cuff width, material, and assessment of AOP. Interestingly, this may not lead to a difference in cardiovascular responses when using a relative pressure protocol at 50% AOP for each device.

P67: RELATION BETWEEN TISSUE OXYGENATION AND WALKING IMPAIRMENT QUESTIONNAIRE SCORES IN PAD PATIENTS

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BACKGROUND: Peripheral artery disease (PAD) is a condition affecting blood flow to the extremities that starts as early as 40 years of age. Symptoms include poor oxygenation in the tissues, endothelial dysfunction, and pain while walking. This pain greatly reduces physical activity in most individuals with PAD, which further contributes to their risk of adverse cardiovascular events. Walking performance is subjectively assessed via the Walking Impairment Questionnaire (WIQ) in PAD patients; however, the relation between changes in tissue oxygenation (StO_2) and changes in WIQ scores is unknown. PURPOSE: The goal of this study was to examine the relation between measures of StO_2 and subjective measures of walking performance via the WIQ. METHODS: Six patients (71±9 yrs) completed a vascular occlusion test, 6-minute walk test (6MWT), and the WIQ before and after a 4-week stretching intervention. StO_2 was measured using near-infrared spectroscopy (NIRS). Reperfusion following the occlusion protocol was measured as a slope of StO_2 over time. Patients were fitted for an ankle dorsiflexion splint which stretches the calf muscles. Degree of stretching was measured by a subjective scale of discomfort. Patients wore the dorsiflexion splint for 30 minutes per day for 4 weeks. Data were analyzed by paired t-tests and changes in values were analyzed with Pearson Product Correlations. Significance was accepted at $p<0.05$. RESULTS: Due to the small sample size there were no significant differences in pre to post values of StO_2 reperfusion (Pre:0.82±0.58; Post: 0.98±0.49), 6MWT distance (Pre: 433±62m; 454±75m), and WIQ distance (Pre: 50.8±28.7; Post: 61.3±32.5), speed (Pre: 57.8±15.8; Post: 62.5±15.8), and stair climbing scores (Pre:67.4±15.0; Post:66.7±17.7). However, when doing correlations with the percent changes in measurements, there was a significant correlation between the change in reperfusion following the occlusion test and change in WIQ distance scores (r=0.853). CONCLUSIONS: Changes in microvascular reactivity, induced by muscle stretching, may play a role in decreasing pain associated with PAD, allowing for individuals to increase walking distance before the onset of pain. This may improve compliance of PAD patients to walking or exercise prescriptions.

P68: VITAMIN D RECEPTOR EXPRESSION DURING RECOVERY FOLLOWING SEVERE SKELETAL MUSCLE INJURY

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BACKGROUND: The vitamin D receptor (VDR) is implicated in a host of immune system functions and more recently in skeletal muscle growth. While studies have shown a concomitant increase in VDR expression during strength training, none have quantified the amount of time that a single event of muscle injury has on VDR expression levels. Here, we quantified VDR gene levels over 4 weeks following significant injury in an attempt to gain insight on potential immune response targets to improve muscle recovery. METHODS: Tibialis anterior muscles from male C57Bl/6 mice (n=4-5/group) were injected with a 2% barium chloride ($BaCl_2$) solution to initiate degeneration and regeneration processes. Regenerating muscles were then harvested at 1, 5, 10, or 28 days post-injury and VDR gene expression was compared to uninjured, control muscles. Several markers of oxidant stress were also quantified (previously published). The significance of differences was measured using t-tests. RESULTS: There was a slight, but insignificant increase in VDR expression 1 day post-injury (2.96-fold change, p = 0.14). However, VDR expression spiked 5 days post-injury (48.1-fold change, p = 0.01) and remained significantly elevated at 10- and 28-days post-injury (19.5- and 20.9-fold change, respectively). Total protein oxidant stress was also evident at 10 days after injury (p< 0.05). Markers of inflammation including interleukin 1 beta (IL1β), tumor necrosis factor alpha (TNFα), and interleukin 6 (IL6) were elevated 5 days post injury (p$lt; 0.05). CONCLUSION: Skeletal muscle damage appears to cause a substantial increase in induction of VDR within 5 days of injury and continues to remain elevated 28 days post injury. This appears to indicate that muscle damage may have a long-lasting effect on VDR expression which may provide oxidative stress protection and help normalize muscle regrowth following skeletal muscle injury.

P69: ALTERED AUTOPHAGY AND ENDOPLASMIC RETICULUM STRESS RESPONSE TO MECHANICAL OVERLOAD IN CACHECTIC APCMIN MICE

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BACKGROUND: Cachexia is a pernicious multi-organ syndrome that affects individuals with progressive stages of cancer. Tumors induce a catabolic state, targeting skeletal muscle. The endoplasmic reticulum (ER) and autophagy assist in maintaining skeletal muscle homeostasis. Cancer cells elicit ER stress, triggering unfolded protein response (UPR), but inhibiting ER stress activates protein degradation and autophagy, exacerbating muscle-wasting conditions. UPR mediates mechanical stress-induced adaptation in skeletal muscle; however, the changes in UPR and autophagy in cachexia are unknown. This study examined whether ER stress and autophagy responses to mechanical overload would differ between healthy and cachectic mice. METHODS: ApcMin (Min, n=5) mice and age-matched wild-type (WT, n=5) mice were used. Synergist ablation (SA) was performed on the left leg, whereas the right leg served as an internal control. After seven-day mechanical overload, plantaris muscles were excised. The tissues were homogenized, and routine western blotting was performed using 80~120 µg of the total protein. Student's t-test (WT vs. Min) and two-way ANOVA (genotype x treatment) were used for statistical analysis. The coefficient of determination (r^2) was used to examine a significant correlation. RESULTS: Min mice showed smaller body weight (BW, 34.2 ± 1.2 g vs. 25.7 ± 0.7 g, for WT and Min mice, respectively, $p<0.05$). Min mice lost 9.8% of BW compared to their peak BW. Likewise, control plantaris weight in Min mice was smaller than that of WT mice (15.1 ± 0.3 mg vs. 18.7 ± 0.6 mg, respectively). Mechanical overload increased the plantaris weights, but WT mice displayed more percent change than Min mice (43.3 ± 5.8% vs. 21.3 ± 4.6%, $p<0.05$). Western blot analysis showed that Min mice had reduced phosphorylated state of p70S6K after mechanical overload than WT mice (1.9-fold vs. 4.2-fold, $p<0.05$). The levels of phosphorylated eukaryotic translation initiation factor 2 (p-eIF2α) and Beclin, indicators of UPR and autophagy activation, were decreased in Min mice. There was a significant correlation between p70S6K and eIF2α ($p<0.01$) and between p70S6K and Beclin ($p<0.05$). The slopes of the regression curve in Min mice were smaller than WT mice ($p<0.05$). CONCLUSIONS: These results suggest that autophagy and ER stress responses following mechanical overload attribute to a reduction of anabolic response pathways in cachectic mice.

P70: THE EFFECTS OF ACUTE AEROBIC VS ACUTE RESISTANCE EXERCISE ON COGNITION

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BACKGROUND**:** Exercise has been shown to increase memory through increases in brain-derived neurotropic factors (BDNF's), P300 components, exercise-induced arousal, and catecholamines. Although there have been previous studies on exercise, the research on acute exercise is still lacking. Resistance exercise has shown to improve immediate recall and cognition. Similarly, aerobic exercise has shown increases in neurological factors related to memory and cognition. Although the benefits of exercise are well documents, the differences in the immediate effects of aerobic versus anaerobic exercise are largely unknown. Thus, the purpose of this study is to determine the differences in cognitive performance following acute aerobic and anaerobic exercise. METHODS: Twelve college-aged females, ages 18-22, completed a 7-set, 60 image Stroop Test pre- and post-exercise to assess cognitive function. Anaerobic exercises included 3 sets of 12 repetitions at 60% of their 10-repitition maximum on the Lat Pulldown and Seated Leg extension. The aerobic exercise included a 15-minute treadmill run at 60% of age-predicted heart rate maximum. RESULTS:

No differences were found between exercise types and cognition (p>0.05). However, a practice effect was found between the first and last pre-exercise Stroop Test (p<0.05) and pre- and post-exercise (p<0.05). CONCLUSION: Previous research has shown the neurocognitive benefits of exercise, both aerobic and anaerobic. The current study confirmed this exercise-dependent improvement in cognitive function. Moreover, the current study suggests that acute exercise, regardless of modality, aids in improving cognition.

P71: IS NEGATIVE AS EFFECTIVE AS POSITIVE WORK IN THOSE WITH NEUROLOGICAL CONDITIONS: A META-ANALYSIS

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BACKGROUND: Eccentric resistance training (ERT) is a unique exercise modality in that individuals can complete greater volumes of muscular work without a proportional uptake of oxygen or expenditure of energy. In this way, ERT may be an optimal training tool for individuals with diminished exercise capacity, such as those with neurological deficits (e.g., cerebral palsy, multiple sclerosis, Parkinson's disease, stroke). Though much is known on ERT, little is available to evaluate the impact of negative work on functional outcomes in a population with neurological conditions. METHODS: This meta-analysis followed PRISMA search guidelines (Preferred Reporting Items for Systematic Reviews and Meta-analyses) and served to evaluate the efficacy of ERT against conventionally applied therapeutic modalities and full range of motion weightlifting. Primary outcomes of interest included walking speed (m/s), dynamic balance (Timed Up and Go), and muscular strength (maximum voluntary isometric contraction). Inclusion criteria were (1) peer-reviewed publications, (2) available in English, (3) case-control (activity-based prescription + matched neurological condition) design, (4) sample size was greater than two, and (5) at least one dependent variable of interest was assessed. ES were nested within studies to account for non-independence due to multiple effects coming from a single investigation. RESULTS: Twelve studies of human subjects (n=297) and 47 standardized mean differences (SMD) were included in a three-level model with restricted maximum-likelihood parameter estimation. The multilevel model revealed a small, albeit non-significant effect on performance when comparing traditional therapy or weightlifting and ERT (SMD: 0.136; 96; 95% CI: -0.0002, 0.050). Furthermore, the SMD were homogenous in nature with the variability being predominantly explained by sampling error, Q(df 46)=19.17, p=0.99, I^2=0.01%. CONCLUSIONS: There appears to be no difference between the efficacy of ERT and traditional therapy or weightlifting on measured outcomes. In this way, ERT is as effective as traditional therapeutics and full range of motion weightlifting. Practitioners working with populations with neurological conditions may consider supplementing or replacing traditional strengthening activities with ERT as clients can complete greater volumes of work with lower metabolic demand.

P72: AT-HOME EXERCISE IMPROVES CARDIORESPIRATORY FITNESS IN BREAST AND PROSTATE CANCER SURVIVORS: A META-ANALYSIS

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Introduction and Objective: Cardiorespiratory fitness (CRF) is associated with lower all-cause mortality and reduced chronic disease risk, which is important for Breast (BCa) and prostate (PCa) cancer survivors in the prevention of secondary disease and recurrence. Exercise increases CRF (measured via volume of oxygen (VO2) assessment); however, the extent to which home-based exercise improves CRF in BCa/PCa is unclear. The objective of this meta-analysis was to investigate the effects of home-based exercise on CRF in adult (>18 year) BCa/PCa survivors. Methods: Electronic databases were searched from inception to January 2021. Studies reporting pre- and post-intervention VO2 values were eligible for inclusion. Standardized mean differences (SMD) were calculated to account for differing assessment types. Effects estimates were pooled using a 3-level model with restricted maximum likelihood estimation. The alpha-level was set at 5% for the pooled estimate and 10% for effect moderators. SMD of <0.2, 0.2, 0.5, and 0.8 were defined as trivial, small, moderate, and large respectively. Results: Seven articles with 14 effects (n=312) met inclusion criteria. Overall, home-based exercise led to small improvements in CRF [SMD= -0.02 to 1.94; majority = positive/beneficial 93%]. The pooled effect revealed a small improvement in CRF (SMD= 0.45, 95% CI: -0.01 to 0.91, p=0.056). Both aerobic (SMD= 1.27, 95% CI: 0.51, 2.02, p= 0.001) and strength (SMD=0.89, 95% CI: 0.15, 1.64, p= 0.018) training resulted in large, significant (beneficial) increases in CRF whereas a small, non-significant increase was observed in combined (p= 0.286). Neither measurement type, cancer type, study duration, participant age or VO2 unit expression were significant effect moderators. Conclusions: Following home-based exercise training there was a small (SMD=0.45) improvement in CRF significant at the p= 0.056 level. Aerobic exercise training had the largest (SMD= 1.27) improvement in CRF followed by strength training (SMD= 0.89), and then combined (SMD= 0.28). Therefore, if the primary goal of the exercise training is to improve CRF, future studies should utilize aerobic exercise such as walking for BCa/PCa survivors at home.

P73: WEARABLE ACTIVITY TRACKERS DO NOT INCREASE PHYSICAL ACTIVITY IN INDIVIDUALS WITH DOWN SYNDROME

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BACKGROUND: Virtually anyone can benefit from physical activity, but despite its well-known benefits, physical inactivity remains a primary contributing factor to poor health within industrialized countries. Wearable physical activity monitors, such as those with screens, have become common place in physical activity promotion. Wearing physical activity trackers increase daily step count, moderate and vigorous intensity exercise, and energy expenditure in adults. This calls into question if wearable physical activity trackers may be useful for increasing physical activity in individuals with chronic special conditions, such as those with Down syndrome. The aim of the current study was to assess step count of individuals with Down syndrome when wearing an activity monitor that provided real-time feedback (FB) versus a control condition (CON; monitor without a screen). **METHODS:** In this within-subjects counterbalance design, participants (n= 6) completed both conditions (FB and CON). The CON condition required seven days of the ankle accelerometer, whereas FB required seven days with the ankle and wrist monitors. Minutes active, sedentary behavior and step count were compared between conditions using Wilcoxon Signed rank tests. **RESULTS:** There was no significant difference between conditions for minutes active (FB = 244.333 ± 70.532 minutes; CON = 227.381 ± 54.165 minutes; z = -1.069, p = 0.285), sedentary behavior (FB = 0.830 ± 0.049%; CON = 0.842 ± 0.038%; Z = -1.069, p = 0.285), or step count (FB = 3192 ± 1112 steps; CON = 3172 ± 712 steps; z = -0.535, p = 0.593)**.** **CONCLUSIONS:** Daily step count, activity, and sedentary behavior appear to be unaffected by the activity tracker worn by participants with Down syndrome. Other avenues should be explored to increase levels of physical activity in individuals with Down syndrome.

P74: HOME-BASED EXERCISE IMPROVES QUALITY OF LIFE IN BREAST AND PROSTATE CANCER SURVIVORS: A META-ANALYSIS

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Introduction and Objective: Breast (BCa) and prostate (PCa) cancer are the most common malignancies. While survival rates are high, many survivors experience decreased quality of life (QoL) during and after treatment. Supervised and group exercise improves QoL in cancer survivors. However, those living in a rural community and those with restrictions due to the COVID-19 pandemic can experience decreased access to exercise facilities. Home-based exercise may provide a feasible alternative for cancer survivors. The objective of this meta-analysis was to consolidate the literature investigating the effects of home-based exercise on QoL in BCa/PCa survivors. All study types were eligible for inclusion. **Methods:** Electronic databases were searched from inception to July 2021. Effect sizes were calculated using pre- and post-QoL values for the exercise group(s) for each article. To account for the use of different QoL measures between-studies, standardized mean differences (SMD) were calculated. Effects estimates were pooled using a 3-level model with restricted maximum likelihood estimation. An SMD of <0.2, 0.2, 0.5, and 0.8 was defined as trivial, small, moderate, and large respectively. **Results:** Seventeen articles with 23 effects (n=639) met inclusion criteria. Home-based exercise led to small improvements in QoL [SMD=0.30, (95% CI 0.01,

0.60), p=0.042]. The QoL measurement type was a significant effect moderator (p=0.002), with the largest increase in QoL for the European Organization for Research and Treatment of Cancer QLQ-C30 [SMD=0.71 (95% CI 0.38, 1.03), p<0.001]. Neither intervention duration (p=0.148) or type (p=0.795), cancer type (p=0.483), or age (p=0.279) were significant effect moderators. **Conclusions:** Home-based exercise improves QoL in BCa/PCa survivors, independent of cancer type, intervention duration and type, or age. Therefore, home-based exercise is an efficacious alternative option to improve QoL for BCa and PCa survivors who live in rural communities, who lack access to supervised training, or who cannot use gym facilities due to lasting pandemic safety restrictions.

P75: RISEDRONATE USE TO ATTENUATE COMPARTMENTAL BONE LOSS FOLLOWING SLEEVE GASTRECTOMY: A PILOT RANDOMIZED CONTROLLED TRIAL

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Background: Sleeve gastrectomy (SG) is associated with bone mineral density (BMD) loss at the hip and spine, which may predispose patients to fracture. Bisphosphonates may be effective in mitigating SG-related bone loss. We previously showed that the bisphosphonate risedronate can blunt dual x-ray absorptiometry (DXA)-derived areal BMD loss among 24 SG patients. We extend those findings to examine quantitative computed tomography (QCT) derived volumetric BMD (vBMD) at cortical and trabecular compartments. **Methods:** The 6-month pilot study (NCT03411902) randomized 24 SG patients into once-monthly 150mg risedronate (n=11) or placebo (n=13) groups. Hip and spine QCT scans were performed at baseline, and 6- and 12-months post-SG to examine bone loss. Cortical and trabecular vBMD of total hip, femoral neck, and trochanter, and trabecular vBMD-only of lumbar spine (L1-L4) were quantified using QCTPro (Mindways Software, Inc., Austin, TX). Treatment effects of each outcome were estimated using a mixed linear model adjusted for baseline characteristics. **Results:** Baseline average age was 55.7±6.7 years and BMI was 44.7±6.3 kg/m^2. 83% of participants were women (62.5% postmenopausal). Weight loss at the 6-month mark was -16.3 kg (-20.0, -12.5) for the risedronate group and -20.9 kg (-23.7, -18.1) for the placebo group. No significant differences were observed in vBMD outcomes between groups at 6- or 12-months. However, 6-month trends show reduced trabecular vBMD (mg/cc) loss at the total hip [-5.6 (-15.2, 4.0) vs -9.0 (-15.8, -2.1)], and femoral neck [3.7 (-8.8, 16.1) vs -5.6 (-14.4, 3.2)] following risedronate vs placebo use. In contrast, the placebo group experienced greater increases in cortical bone than the risedronate group at the total hip [13.9 (2.3, 25.5) vs -0.9 (-18.6, 16.9)] and femoral neck [15.7 (-6.6, 37.9) vs -15.4 (-47.5, 16.7)]. No general trends were observed at the spine. **Conclusion:** Results do not indicate that risedronate significantly affects vBMD change at the hip and spine among SG patients. However, differential trends in trabecular and cortical compartments warrant further study.

P76: COMPARING THE EXERCISE RESPONSE AND IMMEDIATE RECOVERY BETWEEN TWO DIFFERENT BLOOD FLOW RESTRICTION DEVICES

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BACKGROUND: It is unknown if the exercise response to a common clinical (CLIN) blood flow restriction (BFR) device differs from a common research device (RES). The purpose of this study was to compare the BFR exercise response between devices. METHODS: On the first of two visits, 15 individuals had maximal strength (1RM) assessed. Visit 2 consisted of 4 sets (S1, S2, S3, S4) of bicep curls at 30% 1RM and 50% arterial occlusion pressure (AOP), one arm with CLIN and the other with RES. Device and arm order were counterbalanced. After a 5min rest, pre-exercise AOP (mmHg) was measured. Muscle thickness (MT, cm) at 70% of the upper arm and maximal isometric force (N) were assessed pre-exercise (Pre), immediately (Post), 5min (Post5), and 10min (Post10) after. Tissue saturation index (TSI, %) for sets was measured at the forearm. Ratings of perceived exertion (RPE) and discomfort (DIS) were assessed pre-exercise and after each set for RPE and 20 sec after each set for DIS. AOP was compared with a Bayesian paired t-test. All others were compared with Bayesian RMANOVA. Results presented as mean±SD. BF_{10}=likelihood of the best model vs the null. RESULTS: AOP (RES=144.4±19.8; CLIN=138.3±25.8) did not differ (BF_{10}=0.795). A time effect (BF_{10}=1.942e+21) suggests force decreased Pre (230.7±77.9) to Post (145.2±50.5; BF_{10}=2.088e+8), increased Post to Post5 (190.6±69.5; BF_{10}=688721.630) and did not differ Post5 to Post10 (194.5±68.9; BF_{10}=0.433). A time effect (BF_{10}=1.566e+17) suggests MT increased Pre (4.0±.8) to Post (4.5±.9; all BF_{10}=1.646e+10), decreased Post to Post5 (4.4±.9; BF_{10}=80.411), and Post5 to Post10 (4.4±.9; BF_{10}=0.268) did not differ. A time+condition model (BF_{10}=435.966) suggests TSI increased from S1 (53.6±9.7) to S2 (56.9±10.8; BF_{10}=322.137) but did not differ across S2, S3 (57.5±9.8), and S4 (57.6±9.3; all≤BF_{10}=.341). CLIN (55.2±8.8) TSI was lower than RES (57.6±11.1; BF_{10}=12.358). A time effect (BF_{10}=7.776e+66) suggests RPE increased Pre (0±0) to S1 (7±2; BF_{10}=1.534e+13), S1 to S2 (8±2; BF_{10}=3.361), S2 to S3 (8±1; BF_{10}=4.209), and S3 to S4 (9±1; BF_{10}=6.491). A time effect (BF_{10}=4.703e+30) suggests DIS increased Pre (0±0) to S1 (5±3; BF_{10}=1.427e+7), S1 to S2 (5±2; BF_{10}=2.662), but did not differ from S2 to S3 (6±2; BF_{10}=0.436) or S3 to S4 (6±2; BF_{10}=0.437). CONCLUSIONS: Overall the exercise response may not differ between devices, but tissue saturation index may be greater with the research device.

P77: RELIABILITY OF MANUAL VS AUTOMATIC ULTRASOUND ANALYSES

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BACKGROUND: Brightness-mode (B-mode) ultrasonography has become a popular imaging modality. Ultrasonography may be employed to examine skeletal muscle architecture (i.e., pennation angle [PA] and fascicle length [FL]), which may provide unique insights to muscle function. Unfortunately, manually analyzing ultrasound scans is a time-consuming task. An automated analysis software program has been recently published, which may be a useful tool to increase reliability and speed of ultrasound muscle architecture analyses. The purpose of this project was to compare the reliability of manual versus automatic ultrasound analyses of muscle architecture. **METHODS:** Twenty-three participants (23 ± 4 yrs) completed one laboratory visit which consisted of two separate data collection trials separated by 10 minutes. During each trial, participants had measures of the vastus lateralis (VL) PA and FL assessed with a B-Mode ultrasound imaging device. Ultrasound image settings were held constant (i.e., depth = 6 cm, frequency = 12 mHz, gain = 52 dB) for each participant. Muscle architecture images were taken by scanning the length of the VL longitudinally, in conjunction with the extended field of view algorithm. All images were manually analyzed in an open-source imaging program, ImageJ, after pixel scaling. The automatic analyses were completed using the Simple Muscle Architecture (SMA) 17 macro function in FIJI. Both manual and automatic analyses were completed on the same image for trial 1 and trial 2, respectively. Test-retest reliability statistics (i.e., intraclass correlation coefficient [ICC] model 2, 1, standard error of measure expressed as a percentage of the mean [SEM%], and the minimal differences [MD] values needed to be considered real) were calculated for each variable. **RESULTS**: Manual analyses for PA ($ICC_{2,1}$ = 0.75, SEM (%) = 9.61%, MD = 5.18) were more reliable than automated PA analyses ($ICC_{2,1}$ = 0.27, SEM (%) = 28.27%, MD = 13.39). Similarly, manual analyses for FL ($ICC_{2,1}$ = 0.86, SEM (%) = 8.05%, MD = 1.62) were more reliable than automated FL calculations ($ICC_{2,1}$ = 0.16, SEM (%) = 26.90%, MD = 5.89). **CONCLUSION**: The outcomes of this study suggest that this specific automated analysis tool may be less reliable when compared to our manual ultrasound analysis technique when measuring muscle architecture of the VL.

P78: INJURIES AND STRENGTH AND CONDITIONING PRACTICES IN COLLEGIATE TENNIS

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BACKGROUND: Little is known regarding the relationship between injury rates and strength and conditioning practices in collegiate tennis. **METHODS:** College tennis team coaches were surveyed on their injury rates and strength and conditioning practices over the past year. Coaches reported the number of ankle sprains, ankle fractures, thigh muscle strains, knee ligament strain, groin muscle strain, amongst others. Coaches were also surveyed (yes/no) on whether

their training program included training related to upper body or lower body "strength", "power", "muscle growth", and "maximal eccentric exercise". Separate regression analyses were ran in the upper and lower body to examine the relationship between total injuries and participation in training focused on strength, power, growth and maximal eccentric exercise. **RESULTS:** A total of 111 coaches were surveyed. The most frequent injury observed were ankle sprains (144 injures), followed by paraspinal muscle strains (126 injuries), 95 internal or subacromial impingements, 82 thigh muscle strains, 75 groin muscle strains, and 68 abdominal muscle strains. When pooled, there were a total of 355 lower body injuries and 260 upper body injuries reported. Strength and conditioning practices explained 9.9% of the variance of injury rates in the upper body (R^2= 0.099). The only significant predictor of upper body injury was participation in training related to upper body muscle growth (β= 1.613, p = 0.013). In addition, strength and conditioning practices explained 11.1% of the variance of injury rates in the lower body (R^2= 0.111). The only significant predictor of lower body injury was participation in training related to lower body muscle growth (β= 1.687, p = 0.038). **CONCLUSIONS:** Results of the present study suggest that a focus on upper and lower body muscle hypertrophy may increase risk of injury in the sport of tennis. Future research should examine ways to reduce injuries in tennis and relationship between strength and conditioning exercises and injuries.

P79: EFFECT OF TRANSDERMAL MAGNESIUM CHLORIDE ON MAXIMAL ISOMETRIC HANDGRIP STRENGTH

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Magnesium (Mg) appears to enhance athletic performance, with acute oral supplementation leading to increases in maximal strength. Alternative Mg application methods have been developed but little data is available as to their effectiveness on altering muscle function. **PURPOSE:** Compared to placebo, to examine if transdermal magnesium chloride ($tMgCl_2$) increases 1) forearm flexor maximal isometric force and 2) total work performed during a fatigue protocol. **METHODS:** In a double-blind, randomized crossover design, healthy resistance trained participants (n=40, age 22±3y, 50% female) completed maximal isometric forearm flexor contractions. Participants performed a sub-maximal warm up followed by 2 sets of 3 maximal isometric contractions (Pre) with 1 min of rest between attempts and 3 min between sets. The highest value between both sets was used as the maximal force measure. $tMgCl_2$ or placebo was applied to cover the forearm flexor and absorbed for 60 min, followed by a third set (Post) of maximal isometric contractions. A fatigue protocol consisting of 3 sets of isometric holds to failure at ~50% peak force was then performed. Condition and limb dominance were block-randomized. Data were analyzed using a linear mixed model with time and condition as fixed factors and subject as a random factor using Jamovi 1.6.23 statistical software. **RESULTS:** For maximal isometric force, there was no interaction (p=0.290) or condition effect (MD = -0.5 kg ± 0.5, p=0.241). There was a non-significant decrease in maximal force 1.2% ± 0.07 over time (Pre: 41.2 kg ± 13.4, Post: 40.4 kg ± 13.4, p=0.07). Independent of condition, 53.8% of the maximal isometric force came from the second set of handgrip contractions, and 41.3% of the max force production came from repetition 1 among sets. During fatigue protocol, time to fatigue was 68.9 sec on set 1, with decreases of 49.3% (p<0.001) and 62.4% (p<0.001) on the subsequent efforts. There was no difference in total time between conditions (MD = 2.1 sec ± 1.8 p=0.240), nor was the interaction significant (p=0.762). **CONCLUSIONS:** Under the current conditions, $tMgCl_2$ does not significantly alter maximal forearm flexor force or total work during a fatigue protocol. The slight decrease in force may be related to interneural potentiation that does not occur in the third set. Increased $tMgCl_2$ dose or determining absorption rates should be considered in future studies.

P80: TRANSDERMAL MAGNESIUM CHLORIDE DOES NOT IMPROVE RECOVERY OF MAXIMAL ISOMETRIC HANDGRIP FORCE FOLLOWING FATIGUE

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BACKGROUND: Magnesium (Mg) supplementation can improve recovery of maximal muscle force in the days following fatiguing exercise. However, the ability of Mg to enhance recovery during or immediately following strenuous activity has received far less attention. With new forms of Mg supplementation now available, this study examined if transdermal Mg chloride ($tMgCl_2$) improves muscle endurance during a fatigue protocol (FP). Additionally, the role of $tMgCl_2$ on short-term recovery of maximal isometric handgrip force (MIHF) was determined. **METHODS:** 40 healthy, recreationally active subjects (age 22±3 y, 50% female) with resistance training experience completed a double-blind, placebo-controlled randomized crossover trial with familiarization. Treatment and limb dominance sequencing were randomized and counter-balanced. MIHF was evaluated with handgrip dynamometry. The FP consisted of 3 sets of isometric holds to failure at ~50% MIHF with one minute (min) of rest. Recovery of MIHF was assessed immediately after the FP and every 45 seconds (s) for 4.5 min. MIHF was normalized to baseline and expressed as a percentage. Isometric hold time during the FP and recovery of MIHF were analyzed using a linear mixed model with time and condition as fixed factors and subject as a random factor. Area under the curve (AUC) for MIHF recovery was analyzed using a paired-samples t-test. **RESULTS:** Time to failure for set one of the FP was 68.9s, with decreases of 49.3% (p<0.001) and 62.4% (p<0.001) at the second and third set, respectively. There was no difference in time to failure between conditions [MD = 2.1s; 95%CI (-1.4, 5.7); p=0.240] or interaction effect present (p=0.762). Immediately following the FP, MIHF decreased to 58.6% of baseline, steadily recovered to 64.7% at 45s, 71.3% at 135s, and 77.6% at 270s, but force remained suppressed relative to starting values (all p<0.001). There was no difference in recovery between conditions [MD=0.5%; 95%CI (-0.8, 1.9); p=0.457] or interaction effect (p=0.743) present. There was also no condition effect on MIHF recovery AUC [MD=60 kg·s; 95%CI (-837, 957); p=0.896]. **CONCLUSIONS:** These results suggest that $tMgCl_2$ does not improve muscle endurance, nor did it hasten MIHF recovery after a FP. Under the present conditions, $tMgCl_2$ does not enhance muscle function, with additional outcomes and direct comparisons between Mg supplementation type still being required.

P81: DECLINES IN ISOMETRIC STRENGTH FOLLOWING ISOKINETIC FATIGUE: THE INFLUENCE OF ECHO INTENSITY

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BACKGROUND: Image-based muscle quality may be quantified using echo intensity (EI). EI is has been suggested as being able to detect proportions of contractile vs. non-contractile muscle tissue (i.e., muscle quality). The quality of skeletal muscle may influence performance, and associations between EI and muscle function have previously been shown. Though, this relationship is yet to be fully understood. Therefore, the purpose of this study is to examine the influence of EI on strength impairments following a fatiguing bout of muscle actions. METHODS: Eight subjects (mean±SD age = 20±2 yrs; BMI = 25.5±3.7 kg/m^2), completed 2 visits to the laboratory. On the first visit, subjects completed musculoskeletal ultrasound imaging and were familiarized with our maximal strength and fatigue assessments. 2-7 days later, subjects returned for additional strength testing, a bout of isokinetic fatigue, and follow-up strength testing. B-mode ultrasound was used to image the vastus lateralis (VL) at 50% muscle length. Using ImageJ, the VL cross-sectional area was traced. EI was quantified as the mean pixel brightness within the selected portion of the image. Maximal strength was assessed on an isokinetic dynamometer where subjects completed isometric maximal voluntary contractions (MVC). Next, subjects completed 50 maximal, isokinetic muscle actions (120°/sec) to serve as a fatigue trial. Following the fatigue trial, participants performed additional MVCs. Peak torque (PT) was calculated at the highest 500ms epoch during isometric MVCs. Isometric PT percent decline was calculated as %Decline=(final-PT-pre-PT)/pre-PT. Pearson's correlation coefficient (r) determined the association between EI and %Decline. A linear regression model determined the effect of EI on %Decline. R^2 determined the amount of shared variance. An alpha level of p<0.05 determined statistical significance. RESULTS: There were no associations between EI and %Decline (r=0.66, p=0.109). The results of the linear regression model suggest that EI explains 43% of the variance in %Decline, though not significant (F=3.78, R^2=0.431, p=0.109). CONCLUSION: These findings do not reveal statistically significant relationships between EI and %Decline. However, the trend seems to suggest that a meaningful relationship between muscle quality and isokinetic fatiguability may exist and may be revealed with increased statistical power.

P82: THE ROLE OF MUSCLE QUALITY AND SEX ON SKELETAL MUSCLE FATIGUABILITY

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BACKGROUND: Skeletal muscle fatigue is a complicated process with mechanisms deriving from both central and peripheral factors. Ultrasound echo intensity has been proposed as a unique metric of image-based muscle quality. Previous works have suggested associations may exist between muscle function and quality, but this relationship is poorly understood. The purpose of this study was to examine the influence of echo intensity on performance during a bout of isokinetic muscle actions. METHODS**:** Eight subjects (four women, mean±SD age = 20±2 yrs; BMI = 25.5±3.7 kg/m^2), completed 2 visits to the laboratory. On the first visit, subjects completed musculoskeletal ultrasound imaging and were familiarized with our fatigue assessment. 2-7 days later, subjects returned for a bout of isokinetic fatigue testing. B-mode ultrasound was used to image the vastus laterals (VL) at 50% muscle length. Using ImageJ, the VL cross-sectional area was traced. EI was quantified as the mean pixel brightness within the selected portion of the image. Subjects completed 50 repeated, maximal, isokinetic muscle actions (120°/sec) to serve as a fatigue trial. Isokinetic peak torque was analyzed offline using custom LabVIEW software by selecting individual torque peaks from each muscle action. initial isokinetic peak torque was calculated by averaging the highest three of the first five contractions. Final isokinetic peak torque was calculated by averaging the highest three of the last five contractions. Isokinetic peak torque % decline was calculated by %Decline=(initial-PT-final-PT)/initial-PT. Pearson's correlation coefficient (*r*) determined the association between EI and %Decline. A linear regression model determined the effect of EI on %Decline. An additional linear model was used to control for sex. R^2 determined the amount of shared variance. An alpha level of $p<0.05$ determined statistical significance. RESULTS: There were no associations between EI and %Decline (r=0.401, p=0.373). The results of the linear regression model suggest that EI explains 16% of the variance in %Decline, though not statistically significant (F=0.958, R^2=0.161, p=0.373). When accounting for sex, EI explained 66% of the variance in percent decline (F=3.841, R^2=0.658, p=0.117). CONCLUSION: Our findings suggest that echo intensity is not associated with %Decline of isokinetic peak torque. However, when adjusting for sex, a significant relationship is found.

P83: ABSTRACT WITHDRAWN

P84: THE INFLUENCE OF MUSCLE SIZE AND QUALITY ON VERTICAL JUMP PERFORMANCE

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BACKGROUND: Muscle size is thought to be associated with muscle function. However, many factors influence muscle size which may not influence function (i.e., non-contractile tissue). Image-based muscle quality, assed via B-mode ultrasound echo intensity, is thought to provide unique insight to the proportion of contractile vs. non-contractile tissue. Muscle size and quality may provide separate and unique insights to muscle function. The purpose of this study was to compare the relationships between muscle size and quality on vertical jump performance metrics. METHODS: Eight participants (mean ± standard deviation [SD] age = 20 ± 2 yrs; BMI = 25.5 ± 3.7) completed one laboratory visit to have images of vastus lateralis (VL) muscle size taken and to perform a counter movement vertical jump. Cross-sectional area images were acquired with a B-Mode ultrasound device at 50% of the length of VL while participants were supine on an exam table. Ultrasound images were downloaded and analyzed offline with an open-source imaging program, ImageJ. After scaling from pixels to cm, investigators used the polygon tool to select as much of the VL as possible. Echo intensity was calculated as the mean pixel brightness of the selected area of the VL. After a brief warm up, participants had a linear position transducer secured at the waist while they performed a counter movement vertical jump. During this task, participants were instructed to jump as high as they could and performed two jumps separated by two minutes of rest. Vertical jump average power, average velocity, and height were measured with the linear position transducer. Pearson product-moment correlation coefficients (r) were used to determine the association between muscle size and muscle quality with vertical jump performance (i.e., separate average power, average velocity, and height). RESULTS: There was a positive, statistically significant association between muscle size and vertical average jump velocity (r = 0.707, p = 0.04). However, there were no other associations found between measures of muscle size (r = 0.563, p = 0.14) or muscle quality (r < -0.58, p > 0.13) with vertical jump velocity or power. CONCLUSIONS: The results of this study suggest a strong relationship between muscle size and vertical jump velocity exists, but this may not be the case for average power or associations between muscle quality and vertical jump performance.

P85: INFLUENCE OF ULTRASOUND FREQUENCY ON TEST-RETEST RELIABILITY OF MUSCLE ARCHITECTURE

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INFLUENCE OF ULTRASOUND FREQUENCY ON TEST-RETEST RELIABILITY OF MUSCLE ARCHITECTURE Abbey T. Jordan[1], Kealey J. Wohlgemuth[1], Malia M. Blue[2], Jacob A. Mota[1] [1]University of Alabama, Tuscaloosa, AL; [2]University of North Carolina at Chapel Hill, Chapel Hill, NC **BACKGROUND:** Muscle architecture is a valuable contributor to whole muscle function. Ultrasonography is a popular technique used to measure muscle architecture variables (i.e., pennation angle [PA] and fascicle length [FL]). Unfortunately, there is not a consensus on ultrasound image settings in the literature. Understanding the reliability of these ultrasound-based measurements between different ultrasound settings may be critical for investigators using similar techniques in longitudinal-based studies. Therefore, the purpose of this project was to examine the reliability of PA and FL assessed at different ultrasound frequencies. **METHODS:** Twenty-three participants (23 ± 4yrs) completed one laboratory visit to have measures of the vastus lateralis (VL) muscle architecture assessed with a B-Mode ultrasound imaging device. Longitudinal scans were taken to assess muscle architecture of the VL. An open-source imaging program, ImageJ, was used to analyze all images after scaling from pixels to centimeters. Test-retest reliability statistics (intraclass correlation coefficient [ICC] model 2,1, standard error of measure as a percentage of the mean [SEM%], minimal differences to be considered real [MD]) were calculated for each variable. **RESULTS:** Reliability of PA at 10 MHz ($ICC_{2,1}$= 0.859, SEM (%) = 10.466, MD = 5.66) is similar to 12 MHz ($ICC_{2,1}$ = 0.747, SEM (%) = 9.607, MD = 5.176). Reliability of FL at 10 MHz ($ICC_{2,1}$ = 0.828, SEM (%) = 9.796, MD = 1.906) is similar to 12 MHz ($ICC_{2,1}$ = 0.857, SEM (%) = 8.045, MD = 1.621). **CONCLUSION:** The outcomes of this study suggest that ultrasound frequency does not impair the test-retest reliability statistics for VL muscle architecture variables.

P86: COMPARISON OF THE BIODEX DYNAMOMETER AND KINEMATIC ANALYSIS FOR MEASURING INDIVIDUAL QUADRICEPS MUSCLE TORQUE

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Background: Although much is known about the causes of isolated skeletal muscle strength loss after contraction-induced muscle injury, no studies have examined the extent to which individual muscles in a muscle group (e.g., quadriceps) experience differential injury and strength loss following this type of injury. To address this gap, we first sought to examine the validity of two methods (i.e., Biodex dynamometer & kinematic analysis) to measure the strength of individual quadriceps muscle torque produced by electrical stimulation. **Methods:** 7 young adults (30.3±3.9 y/o) were enrolled. On Day 1, their peak isometric torque during a maximal voluntary contraction (MVC) was assessed followed by peak isometric tetanic torque produced by electrical stimulation (20 & 80 Hz) of the vastus medialis, rectus femoris and vastus lateralis muscles using the Biodex. After 15 min, peak concentric torque created by electrical stimulation of individual quadricep muscles was estimated via kinematic analysis (i.e., Vicon) of a weighted leg (5% of body weight). Peak concentric torque (T) was calculated as $T=I\alpha+T_{wt}$, where I is the leg-foot-weight segment's moment of inertia about the knee, α is angular acceleration of the same segment, and T_{wt} is torque induced by segment's gravity. I and α were obtained based on the anthropometric model and the collected kinematic data, respectively. This procedure was repeated on Day 2 (<7 days from Day 1). **Results:** The sum of the 20 & 80 Hz torque for three quadricep muscles was 18.2%±5.2% and 38.8±7.1% of the MVC, respectively. For all conditions, the mean isometric torques collected on the Biodex on Day 1 was comparable to Day 2. Moreover, the mean Biodex concentric torque for Day 1 was not significantly different from Day 2. The mean Biodex isometric torque

was strongly correlated with the mean kinematic-based torque ($r=0.90$, $p<0.001$). Both Biodex and kinematic analysis showed a strong test-retest reliability (Biodex ICC=0.95 [95% CI: 0.90-0.97]; Vicon ICC=0.98 [95% CI: 0.96-0.98]). The reliability of both methods to measure individual muscle torque was further supported by the Bland-Altman results with only 1 out of 42 difference points apiece falling outside the lines of agreement. **Conclusion:** Both the Biodex dynamometer and Vicon motion capture analysis were reliable and may be useful methodologies for measuring the individual quadricep muscle torque produced by electrical stimulation.

P87: EFFECTS OF EXERCISE MODALITIES ON TUMOR GROWTH AND SKELETAL MUSCLE FUNCTION IN TUMOR BEARING MICE

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BACKGROUND: Cancer cachexia is a complex metabolic and wasting disease that affects up to 80% of cancer patients and results in death in up to one-third of patients. Research has shown that leisure based physical activity can have a positive impact on chronic diseases such as diabetes, heart disease, etc. That being said, little research has been done examining different modalities of exercise and its effects on preserving muscle function and reducing tumor growth in cancer cachectic patients. Therefore, the purpose of this study is to examine the differences between exercise modalities on tumor growth and skeletal muscle function in tumor bearing mice. **METHODS:** To examine the effect of exercise modalities on skeletal muscle function and tumor growth, male LC3 Tg+ mice underwent a 4-week period of tumor bearing ($5x10^5$ LLC cells in flank). Following inoculation, mice were placed into four different training groups (Low Intensity Treadmill Running (LITR), High Intensity Treadmill Running (HITR), Leisure Based Wheel Running (LBWR), and Sedentary). Distance ran during the four weeks was used to compare the three modalities of exercise. Grip strength and tumor growth characteristics were measured to examine the effects of exercise in cancer cachexia skeletal muscle wasting. **RESULTS:** When comparing distance ran across the three modalities of exercise, the LBWR group ran significantly more than the LITR and HITR groups. Interestingly, the LITR and HITR saw a better response in both tumor growth inhibition and skeletal muscle function. The LITR and HITR groups both had significantly higher grip strength measures compared to the sedentary and LBWR groups. While not significant, the LITR and HITR groups also saw better preservation of grip strength compared to the sedentary and LBWR groups. The same trend is seen for reduced tumor growth. While not significant, estimated tumor volume and estimated tumor mass were considerably smaller for the LITR and HITR groups compared to the sedentary and LBWR groups. **CONCLUSION:** These data indicate that while the LBWR group was significantly more active, that intensity and structure of exercise may play an important factor in preserving muscle function and reducing tumor growth. Therefore, while leisure-based activity still exerts a modest protective effect, structured exercise appears to provide a greater protective effect for muscle preservation and tumor growth inhibition.

P88: EFFECTS OF GRADED PROTEIN INTAKE WITH RESISTANCE TRAINING ON SKELETAL MUSCLE OUTCOMES IN OLDER ADULTS

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BACKGROUND: It is well established that the aging process induces a loss of skeletal muscle (SM) size and quality, and anabolic resistance (AR) is commonly implicated in this process. AR is defined as blunted muscle protein synthesis rates in response to common anabolic stimuli. As such, many trials have examined resistance training (RT) and increases to protein (PRO) intake, two potent anabolic stimulators. RT has been shown to attenuate, or in some instances reverse the age related deterioration of SM. Additionally, enhanced PRO intake has been shown to augment benefits to SM outcomes seen from RT alone. While promising results have been reported, the ideal paradigm of PRO intake in conjunction with RT remains to be revealed. Therefore, the purpose of this study is to examine the effects of graded PRO intake combined with a 10-week (wk) RT intervention on lean soft tissue mass (LSTM), SM tissue thickness, and strength outcomes. METHODS: Up to 20 participants over 55 years will be recruited for this study. All participants will undergo a 10-wk progressive RT intervention, performing 3 sessions per wk; and will be randomized to one of two groups: a constant PRO intake (CP) or graded PRO intake (GP). The CP group will be asked to consume 0.8-1.0 g of PRO per kilogram (kg) of body weight per day. The GP group will be asked to consume PRO in a graded manner that increases throughout the 10 wks of the study, beginning at 0.8 g/kg/day at wk 1 and reaching a peak of 2.2 g/kg/day. The GP group will be provided a whey protein (WP) supplement to assist in achieving desired PRO intake levels. DXA scans will be used to assess total and regional LSTM, and ultrasonography will be used to assess vastus lateralis (VL) tissue thickness at baseline and wk 10. Isokinetic dynamometry to assess peak torque of the knee extensors and flexors, and 3 repetition maximums (3RM) of the leg press and leg extension will constitute strength measures, taken at baseline, wk 5, and wk 10. Data will be analyzed using either one-way or two-way between measures ANCOVAs with baseline values as covariates. ANTICIPATED RESULTS: It is hypothesized that graded PRO intake + RT will produce greater increases in DXA derived LSTM, VL thickness, and strength measures than will constant PRO intake + RT. This study is being funded by the Wake Forest University Translational Science Center and the Department of Health and Exercise Science.

P89: RECONDITIONING EXERCISE FOR COVID-19 PATIENTS EXPERIENCING RESIDUAL SYMPTOMS

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BACKGROUND: In December of 2019, a novel coronavirus disease began in Wuhan, China and spread rapidly around the world becoming what is known as COVID-19. Symptoms such as fatigue, reduced physical function and dyspnea have been reported months after patients have thought to have cleared the virus. This condition of lasting symptoms is referred to as Long COVID. Pulmonary, neurological, cardiac, musculoskeletal and cognitive deficits resulting from the disease can negatively impact a patient's physical function. Given previous research has supported the use of exercise as a rehabilitation tool to improve physical function in patients with diseases and conditions affecting these various systems, the primary purpose of this study is to determine if a structured exercise program will improve physical function in Long COVID patients. METHODS: This is a wait-list control pilot study. Patients with a positive polymerase chain reaction test for COVID-19 within the previous 2 to 6 months will be randomized to either an immediate treatment group or a wait list control group. The immediate treatment group will participate in a center-based, thrice weekly, three-month exercise program consisting of both aerobic and resistance exercises. The wait list control will receive usual care for three months, then participate in the exercise program. Tests of physical function will be administered prior to and following the three-month exercise program and include exercise capacity from a graded exercise test, 6-minute walk distance and the Short Physical Performance Battery. Secondary outcomes include measures of lung, cardiac, musculoskeletal and cognitive function. Analysis of covariance with baseline measures as the covariate will be used to compare outcomes between the two groups. ANTICIPATED RESULTS: Based on research showing the benefits of exercise in patients with diseases affecting various systems of the body, we anticipate the three-month exercise program will improve physical function in Long COVID patients as compared to the control group.

P90: HOW BODY POSITION ON EQUINE AFFECTS RIDER HEART RATE AND BLOOD OXYGEN LEVELS

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BACKGROUND: The topic being investigated is how different body positions on the horse will affect various physiological aspects of the body such as heart rate and blood oxygen levels. The rider's heart rate and blood oxygen levels will increase and decrease based on how hard the rider is working and how much the rider is breathing. The study is being conducted to help equestrians find an ideal position so they can ride more efficiently. METHODS: Advanced horseback riders who have been riding more than 5 years will be asked to ride a few laps of the arena at a trot in various positions including two point, posting trot and sitting trot. Each rider's heart rate and blood oxygen levels will be taken before and during their ride. To monitor the oxygen levels and heart rate while riding the rider will wear a pulse oximeter on their thumb. Each rider will ride the horse that they are most comfortable with. Changes in heart rate and pulse oxygen from beginning to the end of the ride will be compared for each position using ANOVA testing on Microsoft Excel. EXPECTED RESULTS: It is expected that the best position for the rider would be the posting trot position, a slight arch at the lower back with shoulders open and back and moving up and out of the saddle for every other stride coming up when the horses front leg is on the outside. Posting trot allows the rider to use their body to

move the horse without putting a lot of strain on their body. Sitting trot works the body but not in the same way as posting trot. It is believed that sitting trot will keep constant heart rate and oxygen levels, neither will drop or have a big jump. Posting trot will increase the heart rate and keep the oxygen levels the same. In conclusion it is believed that the posting trot with a slight arch at the lower back with their shoulders open is the best position for the rider to effectively use their body to ride the horse and get the most physical fitness out of their ride.

P91: IMPACT OF PRIOR AEROBIC EXERCISE ON ARTERIAL STIFFNESS DURING PROLONGED SITTING IN ACTIVE HEALTHY ADULTS

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BACKGROUND: It is well established that sedentary behavior (SB) increases the risk of cardiovascular disease (CVD), which is the leading cause of death annually. Acute bouts of prolonged sitting have been shown to increase arterial stiffness (AS) which is an independent risk factor for CVD. Currently, the use of sitting interruption strategies has produced mixed results. One option that has shown promising results in decreasing AS is an acute bout of aerobic exercise. However, it is unknown if aerobic exercise is a strong enough stimulus to attenuate increases in AS across a prolonged sitting bout. Therefore, the purpose of this study is to evaluate the effects of prolonged sitting with and without a prior bout of moderate-intensity aerobic exercise on brachial-femoral (bfPWV) pulse wave velocity and on femoral-ankle (faPWV) pulse wave velocity. METHODS: In the spring of 2022

P92: IMPACT OF IN VITRO METFORMIN ON OFFSPRING MITOCHONDRIAL BIOENERGETICS WITH MATERNAL EXERCISE OR GESTATIONAL DIABETES

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BACKGROUND: The prevalence of gestational diabetes mellitus (GDM) is increasing, and offspring exposed to GDM *in utero* have an increased risk of long-term health consequences. Exercise has been shown to ameliorate conditions associated with metabolic dysfunction in part via improvements in mitochondrial function. Current data in rodent models of pregnant dams suggest these mitochondrial outcomes can be transferred from the mother to the developing fetus through exercise. However, when lifestyle modifications are not sufficient to treat GDM, metformin is commonly prescribed. Metformin freely crosses the placenta and reaches concentrations in fetal circulation that are equal to that of maternal circulation. Like exercise, metformin also elicits effects on the mitochondria by decreasing efficiency via decreases in the net proton motive force. Metformin has been shown to attenuate the mitochondrial adaptations from exercise when combined; however, this has not been tested in pregnancy. Umbilical cord derived mesenchymal stem cells (MSCs) give rise to several tissues originating from the fetal mesoderm and serve as a robust model of offspring cellular outcomes. The purpose of this study is to investigate the impact of *in vitro* metformin exposure on mitochondrial outcomes in MSCs that are from healthy women, who exercise or are exposed to metabolic disease *in utero*. METHODS: MSCs will be cultured from umbilical cord Wharton's Jelly from pregnant women who were sedentary, exercised, or diagnosed with GDM and not on metformin. Cells from each group will be treated with media conditions containing metformin and without. Mitochondrial efficiency will be measured in permeabilized MSCs through a series of mitochondrial diagnostic assays that will measure the rate of oxygen consumption (JO_2) and/or the rate of ATP generation (JATP) with the addition of various substrates, enzymes, and inhibitors. Statistical analysis will be performed in GraphPad Prism by using two-way ANOVA and presented as mean $\pm$ SEM to determine differences between groups.
ANTICIPATED RESULTS: We hypothesize that MSCs from sedentary, exercised, and GDM pregnancies that are treated with metformin *in vitro* will have lower mitochondrial efficiency compared to those not exposed to metformin within each respective group. These results will lead to further investigation into the impact of metformin treated GDM on offspring mitochondrial outcomes.

P93: IDENTIFYING SEDENTARY BEHAVIOR INTERRUPTION STRATEGIES TO REDUCE CARDIOVASCULAR DISEASE RISK IN BREAST CANCER SURVIVORS

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Background: Breast cancer survivors have compromised immune systems, which puts them at heightened risk for a recurrent events and cardiovascular disease (CVD). One viable therapy for improving the immune system is exercise. It does this by enhancing vascular endothelial function and increasing NK cell count and activity. However, exercise uptake and adherence are low. Alternatively, substituting sedentary behavior (SB), defined as low-intensity behavior in a seated or reclined posture, with low intensity activities may be a suitable alternative. The aim of the proposed study is to determine whether substituting SB with 5 min walking, either once or twice per hour, increases NK cell activity in breast cancer survivors. **Methods:** Twenty middle-aged breast cancer survivors, aged 18 to 45 years, will be recruited. Data will be collected through a randomized, controlled crossover trial incorporating two experimental conditions. Each condition will consist of a 2.5-hour bout of sitting without (control) or with SB substitution (walking 5 minutes once per hour or walking for 5 minutes twice per hour). Changes in endothelial function will be measured via flow mediated dilation. Peripheral blood mononuclear cells will be isolated and NK cells will be analyzed via flow cytometry. Changes in flow mediated dilation and NK cells across the three conditions will be analyzed using separate mixed models, with subject specified as random and time and condition as fixed. **Hypothesized findings:** We hypothesize that, compared to the control group, NK cell activity will increase for the two walking substitution conditions compared to the control condition (uninterrupted sitting). Additionally, we hypothesis that the increase in NK cell activity will be greatest for the twice per hour walking condition. Recommending SB substitution with walking may be a simple, and cost-effective strategy to increase NK cell activity and potentially reduce CVD risk in breast cancer survivors.

P94: EFFECT OF CENTRAL VERSUS PERIPHERAL ADDED MASS ON BIPEDAL HOPPING

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PURPOSE: The purpose of this study was to compare the effect of increasing mass centrally or peripherally on bipedal hopping.
METHODS: Ten females and five males were randomly assigned to either a trunk (TR) (N=5), thigh (TH) (N=5) or shank (SH) (N=5) group. Mass was increased by wrapping small bags of sand at half the length of the trunk, thigh or shank, depending on the assigned group. Each participant performed 2, 30 second trials of hopping with no increased mass, 10% of trunk, thigh or shank mass, and 20% of trunk, thigh or shank mass added. Participants hopped on two Bertec force plates. The amount of time in which force was greater than body weight was considered half the period of the hop. Therefore, hopping frequency was computed as the inverse of twice the half period of each hop. Center of mass (COM) displacement was estimated by double integrating force. Stiffness was computed at the ratio of peak force to COM displacement. Mean frequency and stiffness were computed for each trial in each condition. These data points were then used in a 3 (groups) x 3 (conditions) x 2 (trials) mixed factorial ANOVA to evaluate effects of added mass and mass location on hopping frequency and system stiffness.
RESULTS: Mixed factorial ANOVA revealed a significant main effect of loading condition on frequency ($F(2,24) = 5.124$, $p = 0.014$) and a significant group by condition interaction ($F(4,24) = 3.969$, $p = 0.013$). Pairwise comparisons showed that frequency with 10% segment mass added was significantly greater than in the 20% mass added ($p = 0.011$). Additionally the shank group hopped with significantly higher frequency with 10% shank mass added compared to no mass added ($p = 0.037$). No main effects or interaction effects were found for stiffness.
CONCLUSION: This study demonstrates that adding mass to the shank has an effect on hopping frequency, while adding mass to the thigh and trunk does not. Because the amount of mass added was a percentage of segment mass, differences found in the shank group were due to the least change in mass. These results have applications in rehab, return to sport and load distribution in training.

P95: SAME DAY RESISTANCE TRAINING EFFECTS ON COUNTERMOVEMENT JUMP PERFORMANCE

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Background: Minimal research exists examining performance indicators following a same-day resistance training session. Thus, the purpose of this study was to determine the effect of a same-day resistance training session on countermovement jump (CMJ) performance and the concentric phase vertical ground reaction forces (VGRF). Methods: Nine National Collegiate Athletic Association Division I male soccer players (19-23 yrs, 76.6±6.5 kg, 1.83±.2m) who were active in an off-season strength program participated in two-afternoon CMJ sessions (48 hours apart). One session (random order) followed (4-6 hrs) a morning resistance training session (RTS), while the second occurred in the afternoon of a rest day (RD). The training session consisted of 6 sets (2 sets per exercise) of 10 repetitions at 80% of 1 repetition maximum for back squat, front squat, and forward lunge. Five CMJ trials with arms akimbo were completed with one-minute rest between trials. VGRF under both feet were recorded and were used to compute jump height, propulsion time, countermovement depth, as well as mean power, peak power, peak force, and work occurring during the concentric phase. Results: Jump height was nearly identical (P=.672, d=.15) between RTS (.251± .042m) and RD (.246±.064m) sessions. Propulsion time (P=.672, d=.20), countermovement depth (P= .304, d=.18), mean power (P=.946, d=-.02), peak power (P=.656, d=.096), peak force (P=.543, d=-.112), and work (P=.717, d=.08) were statistically equal between sessions. Conclusion: These results do not support the belief that same-day strength training will decrease athletic performance. With the minor effects that same-day training had on CMJ performance in this study, coaching staffs may not need to be hesitant when it comes to strength training on the day of a game or practice. Future research should further explore same-day resistance training on other athletic performance indicators such as sprint speed or agility.

P96: EFFECT OF WALKING SPEED ON THE MAGNITUDE AND DISTRIBUTION OF PLANTAR GROUND REACTION FORCES

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BACKGROUND: Vertical ground reaction forces (vGRF) while walking are typically measured on a force plate and in a laboratory setting. However, wearable technology has allowed for the assessment of the distribution and magnitude of vGRF in real-world conditions. Previous research has shown that in-shoe wearable vGRF sensors are valid instruments. However, research has primarily focused on the use of single sensor pressure based-insoles. Unlike the single-sensor insoles, the newer three-sensor insoles can be used to quantify vGRFs for specific compartments or locations of the foot during walking. Thus, the purpose of this study was to examine the effect of walking speeds on the magnitude and distribution of vGRFs using the three-sensor in-shoe wearable sensors. **METHODS:** Twenty healthy college-aged participants (mean age = 21.65 years ± 3.20 years) wore the same brand and style of running shoe with the appropriate size pressure-based insole placed inside each shoe. The three-sensor device connected with the corresponding app via Bluetooth prior to calibrating the sensor for each participant. Next, each participant completed a walking trial on a treadmill with one-minute intervals at increasing speeds of 1.0 mph, 2.0 mph, and 3.0 mph. Peak and average vGRFs of the lateral, medial, and heel subareas in addition to total vGRFs were collected in the last 30 seconds of each walking condition. A repeated measure analysis of variance (ANOVA) or Friedman's ANOVA were performed to determine differences in total average vGRFs across the three speeds. To further investigate significant differences between magnitude and distribution of vGRFs, paired sample *t*-tests or Wilcoxon tests with dependent measures for lateral, medial, and heel subareas were performed ($p < 0.05$). **RESULTS:** Greater vGRFs were observed for lateral medial, and heel subareas ($p < 0.001$) as walking speed increased. The peak and average values revealed the heel subarea had consistently higher vGRFs than either the lateral or medial subareas ($p < 0.05$). **CONCLUSIONS:** Higher heel subarea vGRF indicates a more distributed center of pressure anterior to the calcaneus while walking at submaximal speeds. Furthermore, the three-sensor insole allows for location specific collection of vGRF, which can provide further insight into the role of plantar anatomy, and suggests possibilities for improved gait compared to a single-sensor device.

P97: SINGLE-SUBJECT ANALYSIS OF PHASE-SPECIFIC FORCE AND TIME VARIABLES DURING VERTICAL HOPPING IN CHRONIC ANKLE INSTABILITY

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BACKGROUND: Altered lower limb movement dynamics are associated with chronic ankle instability (CAI), but are often presumed by the homogeneity of CAI cohorts with aggregate group comparisons. Single-subject analyses could reveal unique patient-specific movement adaptations within a heterogeneous cohort of CAI in which aggregate group analyses might identify null findings. This study compared phase-specific force and time variables during single limb vertical hopping in participants with and without CAI using a single-subject analysis approach. **METHODS:** Individuals with CAI (n=25; 13M, 12F; age: 24±3y; height: 168.3±12.9cm; mass: 72.2±15.2kg) and matched controls (n=25; 13M, 12F; age: 25±4y; height: 172.5±6.1cm; mass: 70.8±9.7kg) completed 3 trials of 5 consecutive single limb vertical hops on a force platform. Participants with CAI completed the hopping task on the affected limb and matched controls used their preferred limb. Vertical ground reaction force data was used to identify eccentric and propulsion phases for the middle 3 hops of each trial (e.g. 9 total hops analyzed). Peak force, time to peak force, and phase time were computed for eccentric and propulsion phases. The Model Statistic procedure (α=0.05) and Cohen's D effect sizes (d) was used to test for significant differences between each participant with CAI to an aggregate group mean of the control group. **RESULTS:** A total of 10 CAI participants exhibited less peak propulsive force (CAI_{range}: 15.16-21.07 N/kg; mean difference: 4.38±1.99 N/kg; d=0.80-3.39), 8 CAI participants displayed longer time to peak propulsive force (CAI_{range}: 0.06-0.43 s; mean difference: 0.11±0.05 s; d=1.58-8.03) and longer propulsion phase time (CAI_{range}: 0.22-0.56 s; mean difference: 0.15±0.12 s; d=0.82-4.21) compared to controls. Additionally, 10 CAI participants displayed less time to peak eccentric force (CAI_{range}: 0.07-0.11 s; mean difference: 0.04±0.02 s; d=1.00-2.91) than controls. **CONCLUSION:** Individuals with CAI displayed differences during the propulsion phase of repetitive hopping on the affected limb. This single-subject analysis approach could help further understand patient-specific impairments associated with CAI during dynamic tasks.

P98: CAN RECUMBENT EXERCISE IMPROVE GAIT AND ARTERIAL STIFFNESS OUTCOMES? - A LONGITUDINAL CASE STUDY

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Unilateral deficiencies in leg function may compromise the utility of upright and bipedal exercise, but recumbent exercise modes in such individuals provide a plausible alternative for fitness improvements. The purpose of this case study was to examine how longitudinal recumbent exercise may affect gait and arterial stiffness outcomes. **METHODS**: A 69-year-old female with history of left femur fracture participated in a supervised 6-week (2x per week) exercise program on the recumbent cross trainer (ReCT) at level 1 resistance. Gait outcomes were obtained prior to and one month into the intervention with the GAITRite system. Preceding each exercise bout, the participant completed (n = 3) sagittal plane dynamic mobility drills of the hip, knee and ankle. The initial exercise pace was guided by the participant's rating of perceived exertion (RPE). Targeted and externally focused verbal instructions were utilized to optimize the transfer to gait. Resting blood pressure (brachial and aortic) and carotid-femoral pulse wave velocity (cf-PWV) was evaluated prior to and 6 weeks into the intervention using pulse wave analysis and pulse wave velocity. Time was progressed 5-10% each week as tolerated. Intra-intervention pain was monitored with the short-form McGill Pain Questionnaire 2 (sf-MPQ2). **RESULTS:** After 6 weeks, 20 minutes of continuous exercise at an RPE of 12-14 was well-tolerated. The intervention increased gait velocity (FW: +13.1 cm/sec; BW: +23.6 cm/sec), increased bilateral step length (FW: +5.27cm(L), +5.76cm (R); BW: +8.03cm (L), +17.55cm (R) while double support percentage was reduced (FW: -3.15%(L), -3.95% (R); BW: -6.5%). The stance % of each FW gait cycle was also reduced (L: Pre: 68.2% vs. Post: 67.5%; R: Pre: 68.95% vs. Post: 66.7%). Reductions in brachial and

aortic systolic (-12mmHg) and diastolic (-11mmHg) pressures were similar, and cf-PWV was reduced from 9.3 m/s to 7.4 m/s. sf-MPQ-2 outlined subjective improvements in perceived exhaustion, superficial tenderness, and fear of falling. **CONCLUSION:** These findings provide preliminary support for the longitudinal use of recumbent NCT exercise for gait retraining. Furthermore, these findings support the pursuit of larger scaled investigations for attenuating arterial stiffness in the elderly with compromised postural control.

P99: INFLUENCE OF A WARM-UP PROTOCOL INVOLVING THE KINETIC CHAIN ON ATHLETES' HIP AND SHOULDER ROTATIONAL ISOMETRIC STRENGTH: A PILOT STUDY

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Athletes are at risk for developing injuries if they do not properly stretch or partake in a warm-up prior to engaging in exercise. Previous research has found decreased rotational strength to be associated with increased injury susceptibility. Providing more information on which warm-up style best benefits the hip and shoulder rotational isometric strength could assist coaches and clinicians in preventing injuries and helping athletes compete at a competitive level. Purpose: To investigate the effects of a full body warm-up on an athlete's hip and shoulder rotational isometric strength. Methods: Six active college-aged individuals (20.67±0.47yrs; 171.70±9.60cm; 73.12±12.77kg) agreed to participate in this study. A handheld dynamometer was used to test participant's hip and shoulder isometric strength prior to the warm-up protocol (pre-warmup) and after the warm-up protocol (post-warmup). Shoulder rotational isometric strength was assessed in the supine position while hip rotational isometric strength was assessed in the seated position. Warm-up protocol was randomly assigned to participants upon arrival to the lab. Participants in the control group remained seated for ten minutes between measurements. Participants selected for the kinetic chain protocol were given exercises that engage musculature of the lumbopelvic-hip complex as their warm-up protocol. Participants selected for the combination protocol were given exercises that engage musculature of the upper and lower extremities as their warm-up protocol. Three measurements were recorded and averaged for analysis for both the pre-warmup and post-warmup measurements. Results and Conclusion: A within-subjects repeated measures ANOVA revealed a significant difference between the selected warm-up and right shoulder internal rotational strength ($F(2,3)=24.63$, $p=0.014$). The combination protocol resulted in a slight increase in right shoulder internal rotational strength compared to the intervention and control protocols. No other measurements of strength elicited any differences. The combination warm up protocol took the glenohumeral joint through its full range of motion, specifically targeted musculature of the upper extremity and possibly influencing the isometric strength of the internal rotators on the right side. These findings should be tested on a larger scale to determine if these results are generalizable to all active college-aged individuals.

P100: CHARACTERIZING PRIMARY STABLIZERS OF THE FOOT AND ANKLE THROUGH FOOT ORTHOTIC APPLICATION DURING DYNAMIC TASK

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BACKGROUND: Foot orthoses are devices made to insert into the shoes to provide cushion and off-loading of foot structures. They are either prefabricated or custom-made. The general difference between custom foot orthotics (CFO) and non-custom foot orthotics (NCFO) is that CFO's are designed specifically for the contour of a patient's foot and to treat specific pathologies in the foot and ankle primarily based on mechanical dysfunction or postural deformity. NCFO's are worn to provide stability and postural support for the foot and its surrounding muscles. The first goal of the project was to examine the etiology of distal lower extremity injury associated with foot orthotic modality in field and court sports by comparing changes in lower extremity neuromuscular stability. The second goal was to examine the interaction between athletic footwear, NCFO and playing surfaces with the most prevalent distal lower extremity pathologies directly associated with foot orthotic modalities. METHODS: The Tibialis Anterior (TA) and Medial Gastrocnemius (MG) were the two muscle groups of interest along with kinetic and kinematic variables of the lower extremity across four conditions. Two separate experiments were conducted during this study to test 2 hypotheses. Both hypotheses are supported by the preferred movement pathway theory, which indicates that foot orthotics do not significantly change skeletal alignment of the body but rather alter input signals through mechanoreceptors in the skin and muscle originating from the plantar region of the foot. This causes change in "muscle tuning" of the lower extremity, thereby producing a change in muscle activity with the goal of dampening soft tissue vibrations within the lower extremity. RESULTS: Normal distribution Electromyography (EMG) parameters was checked with a Shapiro-Wilk test and analyzed by way of two-way ANOVA and Paired T-TEST. A measurable difference was seen amongst the TA on different surfaces. Muscle tension amongst the TA considerably reduced on turf surfaces as opposed to the court platform while simultaneously peak forces increased within both platforms. Correlating to muscle effort managing the most common distal lower extremity injury across all platforms with orthotics. In the MG there was a higher instance of muscle tension in the turf conditions in relation the peak forces generated, however on court the peak forces remained higher, and the mean effort showed no difference in reduction need to efficiently change direction. CONCLUSIONS: The energy of work needed to complete the movements within the study varied amongst all groups and showed measurable trends in conditions involved or uninvolved with orthotics regardless of the surface that the tasks were completed upon. A range of 15% to 90% of overall effort was required throughout the duration of this study.

P101: SHOULDER RANGE OF MOTION DIFFERENCES IN MASTERS OLYMPIC WEIGHTLIFTERS

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BACKGROUND: While shoulder range of motion (ROM) has been studied in various overhead athletes, there is a dearth of studies examining Olympic weightlifters, despite the quantity of shoulder ROM needed to perform the two Olympic lifts. Thus, the purpose was to examine shoulder external rotation (ER), isolated internal rotation (IIR) and total arc of motion (TAOM) with regards to bilateral symmetry and normative data in Masters Olympic weightlifters. **METHODS:** Men (n= 27, 35-76yrs) and woman (n=21, 35-69yrs) competitors from the 2017 National Masters Championship volunteered for bilateral active shoulder goniometric ROM assessment. Measurements were taken supine with the test arm in 90° elbow flexion and 90° shoulder abduction. Participants actively rotated their shoulder until scapular motion was initiated at which point the measurement was taken. Three trials were taken for both directions on both the dominant and nondominant limbs and the average was used for data analysis. Rotation direction and limb order was randomized between participants. TAOM was computed as the sum of IIR and ER. Additionally, the difference between each participant's ROM and age-matched normative data was computed. **RESULTS:** Post hoc analysis of a IIR limb by sex interaction (P=.022) IIR revealed the nondominant shoulder to have significantly greater ROM for both the men (P<.001, d=.98, 11.2±14.1° and women (P<.001, d=1.3, 19.3±7.9°), with the difference for the women to be statistically greater (P=.022, d=.69) than the men. Frequency analysis yielded 81.0% of the women and 85.2% of the men demonstrated greater nondominant IIR ROM compared to dominant. Additionally, the dominant limb for the men (66.4±10.5°) was significantly greater (P=.018, d=.70) than the women (57.7±14.0°). There were no significant limb or sex differences (P≥.209) between for ER. TAOM was significantly greater (P<.005, d=.81) for the nondominant (156.9±21.5°) compared to dominant (139.3±20.9°) shoulder. When compared to the normative data, across both sexes, the dominant shoulder demonstrated significantly less ER (P=.002, d=.47) and the nondominant demonstrated greater IIR (P<.001, d=-1.1) ROM. **CONCLUSION:** Based on the bilateral nature of Olympic weightlifting, the bilateral IR asymmetry was an unexpected finding and warrants further investigation to determine potential explanations, as well as confirm existence in an additional cohort.

P102: UPPER BODY MUSCLE EXCITATION DURING SPRINTING

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BACKGROUND: Adequate arm swing from the shoulder girdle muscle group is vital in technique during acceleration and maximal speed of sprinting phases. Arm swing can alter lower extremity muscle activation and stride efficiency. Due to the lack of literature involving the effects of upper body muscle activity on sprint acceleration, the purpose of this study was to examine electromyography (EMG) of the shoulder girdle to determine muscle contribution in sprint propulsion. METHODS: Seven participants (20.86 ±0.90 yrs.; 1.72±0.09 m; 71.67±14.16 kg) were recruited to participate. Surface EMG was used

to measure peak and mean activation of the triceps brachii, biceps brachii, upper trapezius, and anterior deltoid during 40-m sprints on an outdoor track under two conditions: split starts and block starts. Muscle activity was recorded as a percentage of maximum voluntary isometric contraction (%MVIC) during three phases of each sprint: 0-10 m, 10-30 m, and 30-40 m. RESULTS: A within-subjects repeated-measures ANOVA was executed to determine differences in mean and peak muscle activation across condition and sprint phase. A statistically significant main effect of phase was revealed for mean activation ($F_{2,12}=6.58$, $p=.01$). Post-hoc pairwise comparisons showed a statistically significant decrease in mean muscle activation between phase one and three ($p=.03$) and between phases two and three ($p=.02$). Additionally, a statistically significant main effect of phase was revealed for peak activation ($F_{2,12}=10.63$, $p<.01$). Post-hoc pairwise comparisons showed a statistically significant decrease in peak muscle activation between phase one and two ($p=.02$), phase one and three ($p=.02$), and phase two and three ($p=.02$). There were no significant differences in mean ($F_{3,18}=0.93$, $p=0.50$) or peak ($F_{3,18}=1.74$, $p=0.30$) activation between the four muscles analyzed or between split and block start conditions ($F_{1,6}=0.16$, $p=0.70$), and no significant interaction effects were detected. CONCLUSIONS: Initial excitation of the shoulder girdle muscles during phase one of the sprint may account for both the significant peak and mean activations, however, shoulder muscle excitation during phases two and three reaches a steady state of activation. Therefore, muscle activation of the shoulder girdle may contribute most to propulsion during acceleration of the sprint and minimally so during maintenance of speed.

P103: CENTER OF MASS DYNAMICS AND PERFORMANCE OF VERTICAL HOPPING IN FEMALES WITH CHRONIC ANKLE INSTABILITY

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BACKGROUND: Chronic ankle instability (CAI) is a condition involving subjective feelings of the ankle 'giving way', pain, and decreased self-reported function. Single limb hopping tests are used to identify motor-behavioral impairments of the lower limb that are associated with CAI, but are often limited by rudimentary metrics. The current study aimed to evaluate center of mass (COM) dynamics to further understand performance of single limb vertical hopping in females with and without CAI. **METHODS:** Females with CAI (n=11; age: 25±4 y, height: 162.6±13.6 cm, mass: 69.6±15.6 kg) and controls (n=11; age: 25±5 y, height: 170.4±5.1 cm, mass: 65.8±4.1 kg) completed 3 trials of 5 consecutive single limb vertical hops on a force platform. Mathematical integration of vertical ground reaction force data was used to estimate vertical COM velocity and vertical COM position during the hopping trials. Time to completion, hop height, ground contact time, reactive strength index (RSI), vertical COM depth, and vertical stiffness were compared between groups with an unpaired t-test ($p<0.05$) and effect sizes (ES). **RESULTS:** Significantly less RSI ($p=0.045$; ES=0.76; CAI: 0.12±0.05 vs. Control: 0.16±0.06) and less vertical stiffness ($p=0.014$; ES=1.09; CAI: 99.32±17.83 vs. 132.91±43.56 N/kg/m) were observed in the CAI group. **CONCLUSION:** Lower RSI scores and reduced vertical stiffness suggests a more compliant lower limb and highlights a less efficient transfer of lower limb mechanical output during repetitive hopping in females with CAI.

P104: EXAMINING PERCENT ACTIVATION CHANGES IN DIFFERENT PHASES OF THE SWING IN COLLEGIATE SOFTBALL PLAYERS

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Swinging a bat is a complex movement designed to maximize bat velocity along with making contact with a ball thrown by an opposing pitcher. There are a limited number of studies examining this movement pattern in female softball players. **PURPOSE:** The purpose of this study examined percent activation differences in electromyography of stride leg musculature (gluteus maximus (GM), vastus medialis (VMO), semitendinosus (H), tibialis anterior (TA), medial gastrocnemius (MG)) within different phases of the swing in collegiate softball athletes. **METHODS:** Thirteen (age: 19.5± 1.3years, height: 171.3± 9.1cm, mass: 73.1± 8.1kg) collegiate softball players participated in the current study. Each participant completed an on-deck warm-up to mimic actions completed prior to an at bat situation. Participants were asked to swing a bat at a ball placed on a tee within one of nine locations within each person's respective strike zone. Each attempt was separated by a period of 20 seconds to allow investigators time to readjust the tee in another location of the strike zone. Each swing attempt was broken down into three distinct (stride, transition, swing) phases to analyze percent activation of the stride leg. A 1 X 3 repeated measures ANOVA with an alpha level of $p<0.05$ was used to examine possible differences of stride leg musculature percent activation within the three phases of the swing. **RESULTS:** Significant main effect differences were seen in percent activation of the GM, H, MG, and VMO over the three phases of the swing ($p<.05$). The greatest percent activation differences across phase were seen during the swing phase of the GM (100.16 ± 25.53%), H (89 ± 10.01%), and MG (183.35 ± 30.93%) compared to stride phase percent activation of the GM (33.82 ± 7.2 %), H (31.5± 4.54%), and MG (26.14 ± 4.77%) ($p<.05$). **CONCULSION:** Sport and strength coaches can use this data to understand sequencing of the lower extremity throughout the various phases of the swing. From there, exercises that are rotational in nature can be implemented in those distinct phases to maximize bat velocity.

P105: ANKLE ANGULAR VELOCITY AND ACCELERATION ARE RELIABLE MEASURES WITH POSITIVE CORRELATIONS TO POST-STROKE CLINICAL OUTCOMES

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BACKGROUND: Current biomechanical measures of ankle dorsiflexion (DF) during post-stroke walking have limited potential for clinical translation and weak associations with clinical measures of walking function. The purpose of this study was to determine whether ankle angular velocity (AAV) and acceleration (AAA) have test-retest reliability and stronger linear associations with clinical measures of walking function in persons post-stroke compared to current biomechanical measures of ankle DF, peak foot clearance (PFC) and peak DF angles (PDA). METHODS: Retrospective analyses were performed using 62 chronic (>6 months) stroke individuals (18-85 years). Clinical assessments included: lower extremity Fugl-Meyer (FMA-LE), Dynamic Gait Index (DGI), and six-minute walk test (6MWT). Participants performed three 30 second trials at their self-selected walking speed (SSWS) on an instrumented split-belt treadmill. PFC, PDA, peak AAV, and peak AAA during the first half of paretic swing were calculated for each stride and averaged across strides and trials. Spearman's correlation was used to quantify the relationship between clinical assessments and PFC, PDA, AAV, and AAA. An intraclass correlation coefficient (ICC) was used to quantify test-retest reliability of AAV and AAA with a two-way mixed effect model (n=23). RESULTS: AAV was positively associated with clinical measures (DGI, r=0.51; FMA-LE, r=0.56; 6MWT, r=0.59; SSWS, r=0.63)($p<0.001$). Similar positive correlations were observed between AAA and clinical measures (DGI, r=0.57; FMA-LE, r=0.55; SMWT, r=0.69)($p<0.001$), (SSWS, r=0.79)($p<0.001$). PFC had a positive correlation (SSWS, r=0.70)($p<0.001$), moderate correlations (DGI, r=0.46; 6MWT, r=0.57)($p<0.001$), and a weak correlation (FMA-LE, r=0.37)($p=0.003$) with clinical measures. DF had a weak positive correlation (FMA-LE, r=0.39; SMWT, r=0.30)($p<0.019$) with clinical measures. AAV (ICC=0.968) and AAA (ICC=0.947) demonstrated excellent test-retest reliability (ICC 0.9 to 1). CONCLUSION: AAV and AAA can be used post-stroke as task-specific measures of ankle DF during walking, as they are valid and reliable measures, and demonstrated stronger correlations to clinical measures. PFC and PDA are confounded by other motor control deficits post-stroke, such as hip and knee contributions and soft tissue contracture respectively, possibly indicated by variability in correlation strength across clinical measures. Future work should validate other methods of obtaining AAA (i.e. with accelerometers) in a similar manner.

P106: THE EFFECT OF A STABILIZATION PERIOD ON GAIT PARAMETERS WHILE DUAL TASKING

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BACKGROUND: Most studies on dual tasking suggest an impairment in the motor task will occur while the performance of the cognitive task is maintained; however, most studies do not provide a stabilization period for the motor task before introducing the cognitive task. Therefore, the purpose of this study is to investigate the effects of a stabilization period on gait parameters while dual tasking. METHODS: College age females (21.3±0.5 yrs, 138.7±17.9 lbs, 66.8±2.6 in) were recruited into the study. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory two times and completed three tests: a gait stabilization assessment on a treadmill using the OptoGait, a treadmill walking test where participants immediately had to perform a cognitive task on their cell phones without a stabilization period, and a treadmill walking test where participants were allowed a gait stabilization period before starting the cell phone task. The duration of the stabilization period was obtained during the gait stabilization assessment and gait was considered stabilized at the time point where stride-to-stride variability became < 4% for a minimum of three strides. RESULTS: Step length ($p=0.59$), stride length ($p=0.75$), step time ($p=0.29$), and gait cycle ($p=0.97$) were not significantly different between the tests where a stabilization period was allowed and the test where there was no stabilization period. CONCLUSION: These results suggest that a stabilization period before a dual task test does not affect gait parameters while treadmill walking. These findings could implications when developing methodology for dual tasking studies in the future.

P107: PHASE-SPECIFIC FORCE AND TIME METRICS OF VERTICAL HOPPING IN CHRONIC ANKLE INSTABILITY

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BACKGROUND: Single limb hopping tests are used to identify motor-behavioral impairments of the lower limb that are associated with chronic ankle instability (CAI) but are often limited by performance-based metrics. This study compared phase-specific force and time metrics during single limb vertical hopping in participants with and without CAI. **METHODS:** Twenty-five participants with self-reported CAI (13M, 12F; age: 24±3y; height: 168.3±12.9cm; mass: 72.2±15.2kg) and 25 controls (13M, 12F; age: 25±4y; height: 172.5±6.1cm; mass: 70.8±9.7kg) completed the study. A total of 3 trials consisting of 5 consecutive single limb vertical hops were completed on a force platform. Individuals with CAI performed the hopping task on their affected limb while controls used their preferred limb. Eccentric and concentric phases were identified for each vertical hop from vertical ground reaction force data and the middle 3 hops were analyzed. Peak vertical force, time to peak vertical force, vertical impulse, and phase time were obtained for eccentric and concentric phases and compared between groups with an unpaired t-test ($p < 0.05$) and Cohen's D effect sizes (d). **RESULTS:** Concentric phase time ($p=0.041$; CAI: 0.23±0.09s vs. Control: 0.19±0.0s; $d=0.53$) and time to peak concentric vertical force ($p=0.020$; CAI: 0.08±0.19s vs. Control: 0.03±0.02; $d=0.71$) were significantly longer in the CAI group with moderate-magnitude differences. While not significant ($p=0.066$), a moderate-magnitude difference ($d=0.45$) was observed for concentric vertical impulse between CAI (3.04± 0.56 Ns/kg) and controls (3.40± 0.91 Ns/kg). **CONCLUSION:** Individuals with CAI demonstrated difficulty transitioning from eccentric to concentric phases, which could reveal a less efficient transfer of lower limb mechanical output from the affected limb during repetitive vertical hopping.

P108: PSYCHOLOGICAL EFFECT AND RESILIENCY DUE TO LONG-TERM ABSENCE INJURIES IN COLLEGIATE ATHLETES

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BACKGROUND: In the span of five academic years, 23,710 injuries were reported to the National Collegiate Athlete Association (NCAA) participating schools. These injuries can be attained with practices, strength training workouts, and/or games. When injuries occur, negative psychological effects can occur, such as anxiety and decreased quality of life (QOL). The primary purpose of this cross-sectional study was to determine the overall mental wellness of athletes who have had long-time absence injuries in collegiate sports and to evaluate the resiliency response of these athletes. METHODS: An electronic survey assessing rate of injury among sports, psychological responses to injury and QOL was distributed to athletes at one NCAA Division III school for three weeks in spring 2021. RESULTS: Most participants were white (89.7%), female (55.9%), and 82.3% of all participants experienced injuries during their collegiate career. However, 41.1% reported long-term injuries (more than 4 weeks) that had significant impacts on symptoms of anxiety and depression with 90% indicating moderate to high risk for poor mental wellness and decreased QOL with 31.7% indicating neutral to highly dissatisfied QOL. Many participants reported that the best way to support them during injuries was through the support of athletic trainers. CONCLUSIONS: Further research is needed to better understand the psychological impact of long-term injuries on college athletes as well as optimal forms of support for these athletes.

P109: ASSESSMENT OF EXERCISE-INDUCED INJURIES AMONG CAREER FIREFIGHTERS

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Background: Firefighting is comprised of strenuous occupational tasks that require adequate physical fitness levels to meet essential demands. The National Fire Protection Association (NFPA) recommends that firefighters perform regular exercise while on-duty to meet these demands. Despite the fitness and occupational benefits, physical training has been shown to induce a substantial number of injuries to firefighters that carry financial and personal health consequences. Unfortunately, there is limited research elucidating potential intrapersonal, interpersonal, and institutional risks factors associated with exercise training-related injury occurrence. Therefore, the purpose of this study is to describe the prevalence of exercise-induced injuries and identify risk factors associated with these injuries among structural firefighters. METHODS: A cross-sectional design will be used to determine the prevalence/incidence of exercise-induced injuries among career firefighters, as well as to determine their perceptions about exercise-related injury risk factors. The target sample includes approximately 2,000 male and female career structural firefighters in the United States. Initially, focus groups will be used to guide survey development and ensure its validity for the target population and intent. Subsequently, data will be collected through electronic survey responses sent via email to participating fire departments. Qualtrics software will be used to develop and administer the electronic survey and descriptive statistics will be used to display measures of central tendency and dispersion in subject responses. Logistic regression analysis will be used to predict injury status given intrapersonal, interpersonal, and institutional factors reported as cause of injury. ANTICIPATED RESULTS: We hypothesize that the injury rate will be about 20% and several intrapersonal, interpersonal, and institutional factors will be associated with exercise-induced injuries.

P110: WHOLE BODY VIBRATION AND BLOOD FLOW RESTRICTION FOR MUSCLE RECOVERY FOLLOWING EXERCISE-INDUCED MUSCLE DAMAGE

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BACKGROUND: Combined, whole-body vibration and blood-flow restriction (WBV+BFR) may elicit a reparative response in skeletal muscle, but it is unknown if it improves recovery from muscle damage. PURPOSE: To evaluate the effects of WBV+BFR on muscle recovery following unaccustomed resistance exercise. METHODS: To date, 16 participants completed 100 maximal unilateral eccentric knee extensions with each leg, followed by WBV+BFR on one leg (3 sets of 4 min, 1-3 mm at 30 Hz, 80% arterial occlusion pressure applied, 3 min inter-set rest), but not the other (CON). Pre-exercise and for 3 consecutive days after, measures of maximal voluntary contraction torque (MVC), muscle thickness (MT), and muscle soreness (MS) were assessed via dynamometry, ultrasound, and visual analog scale, respectively, followed by WBV+BFR (except day 4). Discomfort (0-10) was assessed during WBV+BFR. Bayesian RMANOVA were used to find the most probable model for each variable. Data are presented as mean ± SD. BF_{10}= likelihood of most probable alternative model vs the null. RESULTS: A main effect of time (BF_{10}=2249.0) indicated MVC (Nm) decreased from pre (193.6 ± 61.3) to post-exercise (163.5 ±

50.3, BF_{10}=1557.4), and remained below pre at day 2 (177.3 ± 57.6, BF_{10}=14.3) while still higher than post-exercise (BF_{10} =101.1). There was weak evidence that day 3 MVC (178.1 ± 53.7) was lower than pre (BF_{10}=1.9), and anecdotal evidence that day 4 (185.5 ± 65.6) did not differ from pre (BF_{10}=.4). For MT (cm) at 60% thigh length, the most probable model was the null (BF_{10}=.7). There was strong evidence of a main effect of time at 70% MT (BF_{10}=28.1). There was weak evidence that 70% MT increased from pre (3.4 ± .8) to day 2 (3.5 ± .8, BF_{10}=2.6), moderate evidence that day 3 was higher than pre (3.5 ± .8, BF_{10}=8.2), strong evidence that day 4 (3.5 ± .8) was higher than pre (BF_{10}=12.8), and anecdotal evidence that days 2-4 did not differ (all BF_{10}<.5). A main effect of time (BF_{10}=28526.5) indicated that MS (AU) increased from pre (1.0 ± 2.6) to day 2 (16.7 ± 17.1, BF_{10}=1888.1), remained above pre at day 3 (13.6 ± 19.6, BF_{10}=33.1), and moderate evidence that day 4 (7.5 ± 12.8) was higher than pre (BF_{10}=5.3). Discomfort (AU) differed across days (BF_{10}=22.1), (day 1=3.5 ± 2.2, day 2=3.2 ± 2.4, day 3=3.0 ± 2.4), where day 3 was lower than day 1 (BF_{10}=16.1). CONCLUSION: Currently, WBV+BFR does not appear to improve recovery compared to CON.

P111: THE EFFECTS OF RESISTANCE TRAINING AND PROTEIN SUPPLEMENTATION IN TRANSCATHETER AORTIC VALVE REPLACEMENT PATIENTS

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BACKGROUND: Many transcatheter aortic valve replacement (TAVR) patients develop low muscle mass which increases mortality. The purpose of this study was to determine the effects of a combination of resistance training with protein supplementation (RT+PRO) or protein supplementation alone (PRO) on muscle mass, strength, and quality of life (QoL) in TAVR patients. **METHODS:** Twenty-two TAVR patients (75.7±6.5 years) were stratified by gender and arm curl performance into one of two groups: digitally supervised home-based RT and protein supplementation (RT+PRO; n=11) or protein supplementation only (PRO; n=11) for 12 wks. Participants in RT completed a whole-body RT program 2x/wk of 12-15 repetitions for 1 to 3 sets and both groups consumed 75g of whey protein/day. Participants were tested pre and post intervention on anthropometrics, body composition via hand-foot bioelectrical impedance analysis, muscular strength via handgrip dynamometer, push-pull leg dynamometer, 30-second chair stands, 30-second arm curls, and subjective QoL. Two-way repeated measures analysis of variance was used to analyze data. Significance was accepted at $p<0.05$. **RESULTS:** All participants in RT+PRO completed all RT sessions; adherence to protein consumption over 12 weeks for both groups averaged ~93%. Participants in RT+PRO experienced a significantly greater improvement in 30-second chair stand repetitions (RT+PRO Pre: 11±3, Post: 13±3; PRO Pre: 12±2, Post: 12±3 reps;), time to complete 5 sit-to-stands from a chair (RT+PRO Pre: 12.3±3.8, Post: 9.6±2.7; PRO Pre: 11.2±2.4, Post: 10.9±2.9 secs), and QoL score (RT+PRO Pre: 63.7±12.9, Post: 74.0±14.6; PRO Pre: 69.7±13.6, Post: 69.2±16.1 units), compared to non-exercise PRO group. There were no changes in body composition measures for either group. **CONCLUSION:** Although RT+PRO did not improve muscle mass, the digitally supervised home-based RT+PRO significantly improved measures of strength and QoL in TAVR patients over 12 weeks compared to a non-exercising PRO group. The convenient nature of home-based RT should be pursued as a method for cardiac rehabilitation to increase both patient participation and benefits from exercise if TAVR patients are faced with barriers such as transportation and lack of reimbursement from insurance companies. Product for this study was donated from Dymatize Nutrition.

P112: COMPARATIVE CASE STUDY OF BLOOD FLOW RESTRICTION TRAINING FOR INJURED VS. HEALTHY ATHLETE

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BACKGROUND: Blood Flow Restriction (BFR) training in combination has shown to correlate improved muscle hypertrophy with rehabilitation exercises. The purpose of this study is to analyze the effects of BFR incorporation to a patient's anterior crucial ligament (ACL) reconstruction rehabilitation and muscle hypertrophy compared to a non-injured athlete in the same sport over five (n=5) weeks. **METHODS:** Two (n=2) athletes volunteered for the study. One athlete had ACL surgery while the other subject was healthy. The study was approved by the Institutional Review Board at Truett McConnell University and the operating orthopedic surgeon. Measurements for the study assessed quadriceps muscle mass, lower body lean muscle mass (LMM), and patient-reported outcomes (PROs). A tape measure (Patterson Medical, IL, USA) assessed quadriceps muscle girth 10.2 and 15.2 cm above the patella. The InBody 770 (Seoul, SK) assessed overall and lean muscle mass differences. The 12-Item Short Form Survey (SF-12) and the Lower Extremity Function Survey (LEFS) were used to assess mental health, physical health, and patient perception of improvement in the knee. BFR (Owens Recovery Science, TX, USA) Personal Tourniquet System (PTS) (Delfi, Vancouver, CA) followed lower body PTS protocols of 5-6 exercises per therapy session for 2-3 times per week. BFR protocol consisted of 20-30% of 1-repetition max (1-RM) of 80% limb occlusion pressure (LOP) at the thigh below the groin. Sets consisted of 30/15/15/15 repetitions with 30 seconds rest between sets. **RESULTS:** In the ACL patient, right leg LMM began at 6.55 kilograms (kg) and increased to 6.81 kg. Right leg circumference increased by 4 cm and 3.1cm at 10cm and 15 cm above the patella respectively. The SF-12 physical and mental health scores improved from 35 to 53 and 54 to 58 (the US average is 50 is for both mental and physical heath). The LEFS improved by 17% points. In the healthy athlete, right leg LMM was 7.67 kg at baseline and increased to 7.86 kg. Right leg circumference increased by 2.8 cm and 2.5 cm at 10 cm and 15 cm above the patella respectively. SF-12 and LEFS scores improved minimally. **CONCLUSIONS:** Based on the comparative case study, BFR therapy can increase the rate of muscle hypertrophy in the body and improve patient outcomes in injured athletes and maintain LMM needed for sports performance.

P113: UNILATERAL CONTRIBUTIONS TO BILATERAL ECCENTRIC HAMSTRING EXERCISE - A PRELIMINARY CASE SERIES ANALYSIS

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Recent evidence has questioned the utility of eccentric (ECC) exercise in the prevention of hamstring (HS) strains. Inter-leg recruitment strategies influence the intervention's success **PURPOSE:** To examine whether bilateral eccentric exercises display asymmetric recruitment strategies **METHODS:** Prior to maximum voluntary contractions (MVC), ten trained college-aged participants performed dynamic mobility drills. Isometric dynamometry measured participant's peak torque (pTorq) for the gluteus maximus (Gmax) and medial gastrocnemius (MG) in prone. The pTorq was obtained for the knee in seated posture with isokinetic dynamometry set at 60°/sec and 120°/sec to measure concentric (CON) and ECC pTorq of the quadriceps (Q) and HS. Ipsilateral strength ratios (CON60°Q/ECC120°HS) were compared bilaterally with paired *t*-test. Surface electromyography (sEMG) during ECC exercise was bilaterally recorded from the MG, semitendinosus (ST), biceps femoris (BF) and GMax and was normalized to pTorq output during MVCs (%MVC). ECC exercise variations included (n = 3) reps of the Nordic Hamstring Exercise (NHSE), NHSE at 7° decline (NHSE7°) and Razor Curl in randomized order. Separate 3-way (variation, rep, side) RMANOVAs were conducted on each muscle. **RESULTS:** Contralateral differences in strength ratios were not detected, *MD* = 0.06 ft-lbs; *95%* CI: -0.31 to 0.18, d = 0.15. Data suggested an interaction between variation, rep, and side for the MG; $F(1.75, 15.76) = 3.07$, $n^2 = 0.254$. A large main effect of side was detected for Gmax; $F(1, 9) = 11.58$, $n^2 = 0.563$. The participant R Gmax (*95% CI*: 31.07% to 84.25%) had greater %MVC than L (*95% CI*: 20.98% to 57.45%), a *MD* = 18.44% (*95% CI*: 6.18% to 30.71%). A large main effect of exercise variation was detected for ST, $F(1.17, 10.51) = 3.23$, $n^2 = 0.264$ and BF, $F(1.42, 12.78) = 4.48$, $n^2 = 0.332$. The Razor curl mEMG was reduced in ST and BF vs. NHSE7°; ST [*MD* = -7.29% (*95% CI*: -13.00% to -1.58%)], BF [*MD* = -17.00% (*95% CI*: -30.57% to -3.42%)]. **CONCLUSIONS:** Data suggests recruitment strategies bias the R GMax across eccentric exercise variations. Furthermore, these findings support the pursuit of larger scaled investigations to examine recruitment strategies during eccentric HS exercise.

P114: INCREASED MASS INFLUENCES HOPPING STIFFNESS

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BACKGROUND: The purpose of this study was to evaluate the influence of added mass on human hopping. Given the effect of increased mass on a linear spring, it was hypothesized that system

stiffness and center of mass (COM) displacement amplitude would increase and decrease, respectively. **METHODS:** A total of 14 volunteers between 18 and 40 years of age (mass = 77.87 kg, sd = 11.31 kg; height = 1.72m, sd = 0.07 m) performed two 20 second trials of bipedal hopping at preferred frequency under 3 loading conditions. Loading conditions consisted of no added mass, 10% body mass, and 20% body mass added. First, participants performed unweighted hopping. Conditions involving 10% and 20% added body mass were ordered randomly. Mass was added via a weighted vest on the trunk. Ground reaction force (GRF) was measured via two Bertec force plates. GRF was integrated twice to obtain displacement of the center of mass. System stiffness was estimated by taking the ratio of force to peak displacement. A 1 (group) x 3 (conditions) x 2 (trials) factorial ANOVA was used to estimate the influence of loading condition on system stiffness and COM amplitude. **RESULTS:** There was a significant loading condition by trial interaction ($F_{(2, 2560.40)}$ = 20.8598, $p < 0.001$) on stiffness. Post hoc analysis showed stiffness decreased between the first and second trials in the 20% mass added condition ($p = 0.0007$). There was no effect of condition or trial on COM amplitude. **CONCLUSIONS:** This study provides evidence that adding enough mass to the trunk may lead to decreased stiffness over multiple hops and trials. Given the extra mass and number of hops this change in stiffness could be due to fatigue. In general, these results suggest that large amounts of mass must be added to the system to alter spring-mass parameters. These results may inform future clinical applications in obesity management or sport rehabilitation.

P115: DO COMPRESSION PANTS INFLUENCE MUSCLE OSCILLATION, MUSCLE ACTIVATION TIME, AND OXYGEN CONSUMPTION DURING RUNNING?

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BACKGROUND: In recent years, compression clothing has become a billion-dollar market. Despite this boom in popularity, there is a relatively small amount of research investigating its effect on physiological variables during exercise. The purpose of this study was to compare muscle oscillation, muscle activation time, and oxygen consumption while wearing compression pants vs. a control garment during running. **METHODS:** Participants (n=11; 1.7±0.1m; 74.3±12.6kg; 26.7±12.7yr; 5F, 6M) ran in compression pants (20-25 mmHg) and a control garment (CON). Participants ran 6 min at: preferred speed (PS), preferred speed minus 10% (PS-10%), and preferred speed plus 10% (PS+10%). Muscle activity of the rectus femoris, biceps femoris, gastrocnemius, and tibialis anterior was measured through electromyography (EMG). Muscle Oscillation (MO) was measured with accelerometers attached to the thigh and shank. EMG, MO, stride frequency (SF), and rating of perceived exertion (RPE) were measured during the last minute of each condition. Rate of oxygen consumption (VO_2) and heart rate (HR) were recorded and averaged over the final 3 minutes of for each condition. MO was assessed over the 0-60 Hz range by averaging power across 10 Hz bins per leg segment. EMG data were processed by removing any zero offset, rectifying, and averaging activation time over 5 strides. Dependent variables (Muscle activation time, MO, VO_2, HR, RPE, SF) were each compared between conditions using 2 (garment) X 3 (speed) repeated measure ANOVAs (α=0.05). **RESULTS:** MO or activation time were not influenced by the interaction of garment and speed for any frequency bin assessed (p>0.05). MO up to 40 Hz was lower during compression pants vs. control garment (p<0,05). Muscle activation time for each muscle was shorter while wearing compression pants for RF, BF, & GA (p<0.05). VO_2, RPE, SF, nor HR were influenced by garment (p>0.05). **CONCLUSION:** Wearing compression pants resulted in a reduction in MO and activation time; however, these changes did not translate into a reduction of VO_2.With a reduction in muscle activation time it is possible there may be less fatigue for the runner and VO2 may be affected on longer running bouts. However, more research is needed to test this hypothesis.

P116: LEG STIFFNESS AND PITCH TYPES IN HIGH SCHOOL BASEBALL PITCHERS

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BACKGROUND: Baseball pitchers utilize their lower extremities as force generators to supply energy up the kinetic chain to maximally deliver the ball. A pitcher's ability to absorb and produce force up the kinetic chain are influenced by neuromuscular and mechanical properties. In order to achieve certain performance outcomes such as throwing different pitch types, a pitcher's stride leg stiffness may be altered due to anticipatory factors as well as their ability to transform energy upon landing. The purpose of this study was to examine stride leg stiffness between different pitch types. METHODS: Fifteen baseball pitchers (age: 15.7 ± 1.2 y; height: 178.2 ± 5.2 cm; weight: 72.5 ± 8.6 kg) completed fastball (FB), curveball (CV), and change up (CH) pitches for a strike at regulation distance (18.4 m) off a mound. Kinematic data were collected at 240 Hz using an electromagnetic tracking system. A force plate with a sampling rate at 1200 Hz was used to collect ground reaction force (GRF). Vertical GRF (VGRF) was measured during the arm-cocking phase: stride foot contact to maximal shoulder external rotation. Stride limb length was measured as resting limb length between the greater trochanter and the lateral malleolus. Limb length displacement of the pitcher was determined as the difference between resting stride limb length and the instantaneous leg length in the Y-direction. Leg stiffness was calculated using the ratio of VGRF and leg displacement normalized to body weight. The max leg stiffness during the arm-cocking phase for each pitch type was used for analysis. A within-subjects repeated measures analysis of variance (ANOVA) with leg stiffness as the dependent variable was used to assess whether leg stiffness differs by pitch type. RESULTS: The ANOVA determined that mean leg stiffness did not significantly differ between pitch types, (F 2, 28 = 2.677, p = .086). Mean leg stiffness values for each pitch type include: FB: 19.6 ± 3.6 Nm/kg; CV: 17.4 ± 3.9 Nm/kg; and CH: 18.7 ± 4.6 Nm/kg. Additionally, the effect size was small, partial η^2 = .161. CONCLUSIONS: Results indicate that in the current population stride leg stiffness did not differ between pitch types. The current findings on leg stiffness in high school pitchers warrants further investigation with larger and diverse samples to examine how leg stiffness relates to performance and injury risk in baseball pitchers.

P117: COMPARING KINETICS OF PITCH TYPE BETWEEN YOUTH BASEBALL PITCHERS WITH AND WITHOUT UPPER EXTREMITY PAIN

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BACKGROUND: Throwing curveballs (CV) has not been recommended for youth pitchers. Though, it has been shown in healthy pitchers that the CV produces less shoulder and elbow forces than fastballs (FB). It is unknown if these lower force patterns are exhibited among pitchers reporting pain. The purpose of this study was to examine shoulder and elbow forces between the CV and FB in youth pitchers with (W) and without (WO) upper extremity (UE) pain. METHODS: Eighteen youth baseball pitchers (12.9±1.4 y, 164.7±12.6 cm, 54.8±13.9 kg) performed three maximal effort CV and FB pitches for a strike at regulation distance (18.4 m). The fastest pitch was analyzed from stride foot contact to ball release. Participants were placed in the pain group if UE pain was reported on a health history questionnaire (n=9, 13.0±1.5 y, 165.1±11.5 cm, 55.1±13.8 kg), and were matched with pitchers who did not report pain (n=9, 12.8 ± 1.2 y, 164.4±13.6 cm, 54.6±14.1 kg). An electromagnetic tracking system was used to obtain kinematic and kinetic data. A 2x2 (pitch type) mixed design MANOVA was used to determine if there was a difference in CV and FB UE kinetics between pitchers W and WO UE pain. The between-subjects factor was pain (pain/no pain) and the within-subjects factor was pitch type (FB/CV). RESULTS: The mixed design MANOVA was not significant for pain (Wilks' Λ=.934; p=.804) and the interaction between pain and pitch type (Wilks' Λ=.893; p=.649). However, it was significant for pitch type (Wilks' Λ=.543; p=.032). Univariate ANOVAs for pitch type were significant for elbow valgus [F(1, 16)=10.557; p=.005] and shoulder net force [F(1, 16)=6.824; p=.019]. It was not significant for elbow net force [F(1, 16)=4.141; p=.059]. Simple effects analyses showed elbow valgus moment was significantly greater in the FB (M=42.3 N·m, SD=5.4) compared to CV (M=32.3 N·m, SD=4.4). Shoulder net force was significantly higher in the CV (M=682 N, SD=69.2) compared to the FB (M=617 N, SD=71.2). CONCLUSION: There was no difference in FB and CV upper extremity kinetics between youth pitchers W and WO pain. Youth pitchers have traditionally been cautioned against throwing the CV. The current study revealed higher shoulder net forces during the CV. However, the elbow valgus moment was significantly less for the CV than the FB.

Further research is needed to understand the relationship between breaking pitches and risk of injury.

P118: PELVIS AND TRUNK KINEMATIC DIFFERENCES EXIST BETWEEN BASEBALL TEE AND FRONT TOSS HITTING

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BACKGROUND: Kinematic differences exist between baseball live pitching and machine hitting; however, the differences between common hitting practices are unknown. The purpose of this study was to compare kinematics between tee and front toss hitting. **METHODS:** 21 baseball players (13.9±3.1yrs; 167.1±17.4cm; 64.7±20.1kg) performed three maximal effort swings using front toss and a stationary tee. The tee was adjusted to the middle of the strike zone, and front toss was pitched underhand (9.14m away). Kinematic data (pelvis and trunk rotation, trunk flexion, and lateral flexion) were averaged across three trials and collected using an electromagnetic tracking system. Front and back-side were defined as the participant's left and right sides, respectively. Hitting variables were analyzed at foot contact (FC), ball-contact (BC), and follow-through (FT). A 2(condition)x3(event) within-subjects RM·MANOVA was used to determine kinematic differences between tee and front toss. **RESULTS:** The RM·MANOVA was significant for condition (Wilks' Λ=.248; p<.001), event (Wilks' Λ=.003; p<.001), and interaction between condition and event (Wilks' Λ=.215; p<.001). Univariate ANOVAs showed a significant condition effect for pelvis [F(1, 20)=12.3; p=.002] and trunk rotation [F(1, 20)=52.0; p<.001]. Event effect was significant for pelvis rotation [F(1.6, 32.2)=841.5; p<.001], trunk rotation [F(2.0, 39.3)=1439.7; p<.001], trunk lateral flexion [F(1.9, 38.7)=19.9; p<.001], and trunk flexion [F(1.4, 29.0)=12.8; p<.001]. There was a significant interaction for pelvis rotation [F(1.6, 31.3)=11.9; p<.001], trunk rotation [F(1.6, 31.4)=24.2; p <.001], trunk lateral flexion [F(1.3, 25.5)=14.1; p<.001], and trunk flexion [F(1.7, 33.9)=7.2; p=004]. Simple effects showed significant differences between conditions for pelvis rotation at FC (p<.001), trunk rotation at all events (all p-values <0.014), and trunk lateral flexion at FC (p=.026) and BC (p=.008). Specifically, there was greater pelvis rotation toward the front-side at FC, greater trunk rotation toward the front-side at all events, and greater trunk lateral flexion toward the back-side at BC during front toss, and greater trunk lateral flexion toward the back-side at FC during tee hitting. **CONCLUSIONS**: Kinematic differences exist between baseball tee and front toss hitting. Hitters display a more closed pelvis and trunk position when hitting off a tee compared to front toss.

P119: STANDING BALANCE MEASURES IN COLLEGIATE CHEERLEADERS BETWEEN NEW AND OLD CHEER SPECIFIC FOOTWEAR

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BACKGROUND: Cheerleading requires athletes to perform movements with a focus on balance maintenance. Footwear affects human balance, and literature suggests that older footwear may cause further balance decrements. However, balance has not been examined in cheerleader-specific footwear. Thus, the purpose of this study was to examine balance in collegiate cheerleaders while wearing "old" and "new" cheer shoes. **METHODS:** Twenty-five healthy male (n = 5) and female (n = 20) collegiate cheerleaders with no history of neuro-musculoskeletal disorders completed this study. Participants completed balance testing on separate testing days while wearing either a "new" or "old" pair of cheerleading shoes. Participants self-reported the number of training hours that the shoes have been worn in order to calculate shoe age. Balance testing consisted of three 20-second trials for each condition. Balance conditions were randomized for each participant and included bilateral stance on the force plate and foam pad. Unilateral stance on the dominant, and non-dominant limb on the force plate, and foam pad. The average sway velocity (VEL) and root-mean-square (RSMS) of the center of pressure was used to quantify balance in the anterior-posterior (AP) and medial-lateral (ML) directions. Paired samples t-tests were used to analyze the results, with an alpha level of 0.05, and Cohen's d was reported as a measure of effect size. **RESULTS:** Analyses revealed no statistically significant differences for balance measures between footwear (all p > 0.05). However, results did suggest moderate effect sizes in the non-dominant foam pad condition for APRMS (d = 0.58) and MLRMS (d = 0.48) suggesting balance decrements in the new shoes. **CONCLUSIONS:** While not statistically significant, findings of this study may suggest balance decrements in the new cheer shoes. These findings may be due to the novel aspect of the new shoes compared to the older shoes the participants may be more familiar with. Further, because of the novelty of the new shoes participants may have attempted to rely more on proprioceptive input during balance compared to the old shoes. If participants relied more on proprioceptive information on the unstable foam pad surface that may partially explain the increased postural sway. Future research should examine varying ages of shoes to potentially identify when cheer footwear begins to break down and cause balance decrements.

P120: BALANCE MEASURES BETWEEN OLD AND NEW CHEERLEADING FOOTWEAR IN FLYER SPECIFIC CHEER POSITIONS

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BACKGROUND: Cheerleading, specifically flyers require athletes to perform sport-specific movements such as the heel stretch and arabesque that stresses balance performance. Footwear affects human balance, and literature suggests that older footwear may cause further balance decrements. However, balance has not been examined in cheerleader-specific footwear. Thus, the purpose of this study was to examine balance in collegiate flyers while wearing "old" and "new" cheer shoes. **METHODS:** Nine healthy female collegiate cheerleaders with no history of neuro-musculoskeletal disorders that had completed a cheerleading season as a flyer within the last year completed this study. Participants completed balance testing on separate testing days while wearing either a "new" or "old" pair of cheerleading shoes. Participants self-reported the number of training hours that the shoes have been worn in order to calculate shoe age. Balance testing consisted of three 20-second trials for each condition. Balance conditions were randomized for each participant and included heel stretch on the force plate, and foam pad, and arabesque on the force plate, and foam pad. The average sway velocity (VEL) and root-mean-square (RSMS) of the center of pressure were used to quantify balance in the anterior-posterior (AP) and medial-lateral (ML) directions. Paired samples t-tests were used to analyze the results, with an alpha level of 0.05, and Cohen's d was reported as a measure of effect size. **RESULTS:** Analyses revealed no statistically significant differences for balance measures between footwear (all p > 0.05). However, results did suggest moderate effect sizes for APRMS on the force plate during the heel stretch (d = 0.54) and MLRMS on the force plate during the arabesque (d = 0.53) suggesting balance decrements in the old shoes. **CONCLUSIONS:** While not statistically significant, findings of this study may suggest balance decrements in the old cheer shoes. Previous research has suggested that old ballet footwear causes balance decrements during ballet-specific positions due to the breakdown of the footwear characteristics. It is possible that the older cheer footwear in the current study caused balance decrements during these flyer-specific positions due to the breakdown of footwear characteristics such as the sole and midsole.

P121: PREVENTION AND TREATMENT METHODS ON THE OCCURRENCE OF MEDIAL TIBIAL STRESS SYNDROME IN HIGH SCHOOL CROSS COUNTRY ATHLETES

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BACKGROUND: Medial Tibial Stress Syndrome (MTSS; i.e., shin splints) is among one of the most frequently reported running-related musculoskeletal injuries. Minimal research has investigated the prevention of MTSS with limited evidence supporting few preventative measures; therefore, the purpose of this study was to determine preventative measures that most strongly correlated with decreased prevalence of MTSS. METHODS: Participants were recruited via communication with high school cross country coaches and included male and female high school cross-country runners (14-18 years). Data was collected through an electronic Qualtrics Survey which included 12 questions with an estimated 3-minute response time. The questions addressed potential risk factors for MTSS, any warm-up protocols currently being engaged in before running, and any measures taken to prevent and treat MTSS. Data was analyzed using Chi-square Goodness of Fit tests and Tests of Independence to determine frequencies of occurrences for MTSS and examine the

association between categorical variables, respectively. RESULTS: Chi Square Tests of Independence revealed significant associations between MTSS and prevention methods, including: 1) MTSS and strengthening exercises ($\chi2(2) = 7.571$, $p = 0.023$, $\varphi = 0.735$); and 2) MTSS and wearing proper running shoes ($\chi2(2) = 9.800$, $p = 0.007$, $\varphi = 0.837$). For treatment methods, MTSS was significantly associated with icing ($\chi2(2) = 7.778$, $p = 0.020$, $\varphi = 0.745$), using pain relief cream ($\chi2(2) = 7.778$, $p = 0.020$, $\varphi = 0.745$), using a roller ($\chi2(2) = 7.778$, $p = 0.020$, $\varphi = 0.745$), wearing proper running shoes ($\chi2(2) = 7.143$, $p = 0.028$, $\varphi = 0.714$), stretching ($\chi2(2) = 11.096$, $p = 0.004$, $\varphi = 0.890$), and strengthening exercises ($\chi2(2) = 11.278$, $p = 0.004$, $\varphi = 0.898$). Additionally, MTSS was also associated with Body Mass Index (BMI) ($\chi2(4) = 11.100$, $p = 0.025$, $\varphi = 0.630$). CONCLUSION: This information regarding prevention and treatment techniques can be used to better educate coaches on which athletes are more prone to developing MTSS and how a factor (e.g., wearing proper running shoes) can affect all their athletes. Additionally, coaches and parents may benefit from understanding the optimal body weight needs for their athlete as too low of a body weight was seen to be associated with increased occurrence of MTSS in the current study.

P122: INFLUENCE OF DEMOGRAPHIC FACTORS ON CONCUSSION-RELATED DECISION-MAKING BY CERTIFIED ATHLETIC TRAINERS

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PURPOSE: This study aimed to identify demographic variables relating to factors influencing concussion-related decision-making (CRDM) by certified athletic trainers (ATC). Understanding these factors will better inform interventions on improving the CRDM abilities of ATCs. **METHODS:** A cross-sectional study of ATCs (n=1,029; age = 26.0 ± 3.7) completed a validated questionnaire on demographic variables and theory-based (Integrated Behavior Model) factors about CRDM. Multivariable linear regression models (*a priori* alpha level = 0.05) estimated the effect of each independent variable (scales: knowledge - 25 to 100; attitudes - 14 to 98; perceived behavioral control - 3 to 21; self-efficacy - 2 to 14; intentions - -45 to 45). The predictive factors were: gender (male vs. female), race (non-Caucasian vs. Caucasian), years of experience as an ATC, employment setting (high school vs. college), and sport coverage responsibilities (non-collision vs. collision). Knowledge, attitudes, perceived behavioral control, and self-efficacy were also included as predictors in the model for intentions. **RESULTS:** Most participants were female (n=724, 70.2%), Caucasian (n=874, 84.7%), and recent graduates (mean = 3.1 ± 1.8 years of experience) and half were employed in high schools (n=519, 50.3%) and responsible for collision sport coverage (n=533, 51.6%). Demographic factors were not significantly related to factors associated with CRDM. However, safer attitudes were associated with better intentions to remove concussed individuals ($\beta = 0.17$; $p<0.001$). **CONCLUSION:** Intentions to make appropriate concussion-related decisions are a vital step in removing concussed individuals from play. ATCs may have diverse backgrounds and carry diverse professional responsibilities immersed in their own team cultures and experiences; however, these variables, as measured in this study, do not appear to impact their decision-making capabilities regardless of personal and professional background. There does not appear to be a need to develop specific initiatives for different types of ATCs. As such, it is important that educational initiatives focus on creating safer concussion-related attitudes and the need for appropriate decision-making of all ATCs. Supported in part by a NATA Research and Education Foundation Doctoral Grant.

P123: TRUNK ANGLE EFFECTS ON QUADRICEPS:HAMSTRING RATIO DURING BODYWEIGHT SQUATS

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BACKGROUND: Anterior cruciate ligament (ACL) ruptures occur in up to 250,000 people per year. Neuromuscular activation imbalance between the quadriceps and hamstrings may be a significant contributor to ACL injury. It has been demonstrated that a quadriceps/hamstring ratio (QHR) closer to one reduces the risk of ACL injury. The purpose of this study was to determine the trunk angle or angles that produced a hamstring dominant QHR during a bilateral body-weight squat. METHODS: A cross-sectional design with repeated measures was used in which a sample of 10 subjects performed three repetitions of squats with trunk flexion of 15, 30, 45, and 60 degrees relative to the horizontal plane. A bilateral squat was performed until the subject's thighs were parallel with the ground. During each squat repetition Delsys Trigno® wireless surface electrodes (Delsys Inc., Natick MA) were placed bilaterally over the biceps femoris, semitendinosus, vastus lateralis, and vastus medialis muscles. Mean EMG activity was estimated for each muscle on each leg during each repetition. The ratio of the mean activity of the vastus medialis to semitendinosus was estimated for the right and left legs (RQHRM and LQHRM, respectively). The ratio of the mean activity of the vastus lateralis to the biceps femoris was estimated for the right and left legs (RQHRL and LQHRL, respectively). The Friedman Rank Sum Test was used to evaluate the interaction of trunk angle on QHR. RESULTS: Friedman Rank Sum Test demonstrated trunk angle had a significant effect on RQHRL ($X^2=11.76$, $p=0.008$), RQHRM ($X^2=14.04$, $p=0.003$), and LQHRM ($X^2=13.8$, $p=0.003$). Pairwise comparisons showed significant differences between the 15° and 60° conditions for RQHRL ($p=.009$), RQHRM ($p=.001$), and LQHRM ($p=.001$), and between the 30° and 60° conditions for RQHRL ($p=.035$). CONCLUSIONS: No trunk lean angle resulted in a hamstring dominant QHR but 60-degree trunk lean reduced the dominance of the quadriceps during squatting. The results suggest clinicians can manipulate neuromuscular activation of quadriceps and hamstrings by cueing the amount of trunk lean during squatting. This has application with the rehabilitation of individuals following ACL injury.

P124: THE EFFECT OF ONE NIGHT OF SLEEP RESTRICTION ON SUBSEQUENT AEROBIC PERFORMANCE

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Adequate sleep is a vital component of health and wellness. Poor sleep has been shown to significantly impact athletic performance; however most research has focused on several days or more of sleep deprivation. The impact of a single night of sleep restriction on subsequent performance is less well understood. This paradigm would more closely mimic anxiety and nervousness prior to an important event. **PURPOSE:** To examine the effect of one night of sleep restriction (SR) on cycle time trial (TT) performance compared to a night of normal sleep (NS). **METHODS:** Eight recreational cyclists [age = 20.6 ± 1.4 yr; body mass index (BMI) = 23.0 ± 1.9; VO_{2max} = 42.7 ± 6.6 mL/kg/min/] completed 3 performance trials (1 familiarization and 2 experimental) on a cycle ergometer. Performance trials consisted of a 3-kilometer TT. Experimental trials were performed after NS (6-8 hours) or SR (3 hours). Order of experimental trials was randomized. Experimental trials were performed at the same time of day (6:00 - 8:00 am). Diet was replicated prior to each trial and physical activity was monitored for 48 hours prior to each trial with accelerometer. Sleep was monitored via accelerometry the night of the experimental trials to confirm sleep duration. **RESULTS:** There was no difference in average power (151 ± 32 vs. 146 ± 41 Watts for SR and NS, respectively; P = 0.3), peak power (230 ± 66 vs. 239 ± 89 Watts; P = 0.6) or average heart rate (187 ± 11 vs. 189 ± 15; P = 0.5) between the experimental trials. Additionally, there was no significant difference in TT finish time (6.0 ± 0.5 vs. 6.2 ± 0.8 sec for SR and NS, respectively; P = 0.5) despite a 10.5 second faster time with SR. 5 of 8 subjects has a faster finishing time with the SR trial. **CONCLUSION:** Results showed no difference in TT finishing time between the SR and NS conditions, yet a majority of subjects performed better during the SR condition. Additional research with a greater sample is needed to further assess this question. A potential mechanism for the faster time with SR may be sleep inertia, which is the transitional state between sleep and wake, characterized by impaired performance. Sleep inertia can last for several hours. In the current study, subjects completed the TT in the NS condition within the time frame where sleep inertia could affect performance.

P125: RELIABILITY OF TMS MEASURES OF LOWER LIMB CORTICOSPINAL EXCITABILITY

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BACKGROUND: Transcranial magnetic stimulation (TMS) is a non-invasive technique that is commonly used to study corticospinal plasticity. However, TMS measurements vary within and between

individuals, and there are a variety of unique methodological challenges associated with studying the lower limbs. Perhaps the most prominent of these challenges is that, unlike the upper limbs, the motor representation of the lower limbs is deep and oriented near the midline, rendering it difficult to isolate the behavior of specific muscles. The purpose of this study was to determine the test-retest reliability of corticospinal excitability (CE) of three distinct muscles. **METHODS:** Twenty-nine participants (mean ± SD age= 23 ± 4 years; 15 males and 14 females) reported to the laboratory for 2 visits that were separated by ≥ 48 hours but ≤ 1 week. Isometric strength testing of the right knee extensors was performed with an isokinetic dynamometer (knee joint angle = 110°) while bipolar surface electromyographic (EMG) signals from the rectus femoris, vastus lateralis, and tibialis anterior were recorded. A double-cone coil was used to deliver single TMS pulses over the portion of the motor cortex which demonstrated the greatest rectus femoris EMG peak-to-peak amplitude (i.e., hotspot) while participants performed an isometric knee extension corresponding to 10% of their maximal voluntary contraction torque. Twenty pulses were delivered at a stimulator output corresponding to 120% of active motor threshold (AMT). Motor evoked potential peak-to-peak amplitude was used to quantify CE. Statistical analyses included paired samples *t*-tests, Cohen's *d* effect sizes, intraclass correlation coefficients (SEM), and the standard error of measurement (SEM). **RESULTS:** Excellent test-retest reliability was observed for AMT (p = .699, d = .075, ICC = .919, SEM = 5.2%) and vastus lateralis CE (p = .365, d = .185, ICC = .973, SEM = 16.2%). In contrast, CE reliability was lower for the rectus femoris (p = .093, d = .336, ICC = .841, SEM = 41.6%) and tibialis anterior (p = .059, d = .381, ICC = .896, SEM = 48.0%). The high ICCs may be attributed to substantial variance between participants. **CONCLUSION:** Reliability of lower limb TMS measures may be muscle specific. Rectus femoris AMT and vastus lateralis CE may be useful for assessing neuromuscular adaptations to exercise and rehabilitation interventions.

P126: THE VALIDITY OF RHRV IN BATCH PROCESSING RAW EKG SIGNALS FOR THE DETERMINATION OF HEART RATE VARIABILITY

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BACKGROUND: Heart rate variability (HRV) metrics are commonly utilized in various exercise settings and health sciences. In determining HRV, raw electrocardiograph (EKG) signals are typically individually and manually analyzed, greatly increasing the time burden and the risk of inter- and intra-rater discrepancies. Analyzing raw EKG signals via replicable computer code to determine HRV would address these issues and allow for comparability across studies. **METHODS:** Forty-four raw EKG signals collected as part of a larger study were used to test the validity of a custom R script for analyzing raw EKG signals. The script utilized the *RHRV* package and compared it to criterion HRV values obtained from Kubios Premium (v3.1.0). Calculated HRV metrics (standard deviation of the normal-normal intervals [SDNN], root mean square of successive differences [RMSSD], and high-frequency power [HF]) were compared to Kubios values. Comparisons were made under three conditions to iteratively and progressively test for analytical differences between Kubios and the custom R code results: first, by using the unfiltered RR time series obtained from Kubios; secondly, by using Kubios automatic artifact-corrected values; and finally, by using the custom and adjustable R code R-wave detection algorithm and artifact corrections. Raw EKG signals were collected at either 1000 or 2000 Hz, and epoch (range: 90 to 300 seconds) for analysis was selected in Kubios. Custom R-wave detection in R was completed via a version of the Pan-Tomkins algorithm, with varying and optimized parameters for the Butterworth bandpass filter. Custom R code artifact correction was completed via an adaptative threshold algorithm. The validity of calculated HRV metrics was assessed via validity coefficients. **RESULTS:** Uncorrected signals demonstrated high validity between methods for SDNN (r = 0.9999), RMSSD (r = 0.9999), and HF (r = 0.9219). The progressive addition of artifact corrections (SDNN: [r = 0.9869]; RMSSD [r = 0.8900]; HF [r = 0.7349]) and R-wave detection (SDNN: [r = 0.7691]; RMSSD [r = 0.5401]; HF [r = 0.6120]), reduced the agreement between methods. **CONCLUSIONS:** These results suggest that HRV can be reliably and validly calculated using *RHRV*, but methodologic differences in artifact correction and R-wave detection commonly completed for all HRV analysis can substantially affect the calculated HRV metrics.

P127: ASSESSING BEVERAGE BIOAVAILABILIY USING DEUTERIUM OXIDE APPEARANCE IN BLOOD: DO METHODS MATTER?

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Deuterium oxide (D_2O) appearance in blood is utilized as a biomarker of fluid bioavailability (reflecting both gastric emptying and intestinal absorption). New technology, cavity ring down spectroscopy (CRDS), has emerged and how it compares to traditional methodologies is unclear. **Purpose:** To compare biomarkers of D_2O appearance obtained via isotope ratio mass spectroscopy (IRMS) to CRDS. **Methods:** After overnight fast, eight men ingested non-carbohydrate electrolyte fluid (6 ml/kg body mass) containing 0.15 g/kg D_2O. Serial venous blood was obtained before and over 45 min post-ingestion. D_2O was analyzed by independent labs: IRMS on water (purified by diffusion from plasma) (IRMS-WAT); IRMS on plasma (IRMS-PLA); and CRDS on plasma (CRDS-PLA). Two methods were used to determine absorption speed based on D_2O half-time to peak[MM1] ($t_{1/2max}$), a modified one-compartment model and asymmetric triangle model. **Results:** Background [D_2O] were different (P = 0.000) among IRMS-WAT, IRMS-PLA and CRDS (152.2 ± 0.8, 147.2 ± 1.5 ,137.7 ± 2.2 ppm). Differences in peak [D_2O] were observed (P=0.001) but after correcting for the dilutions in IRMS methods, there were no differences (P=0.24) in peak enrichment. D_2O appearance curves were consistent across methods, plateauing after 15 min with no difference from 20-45 min. Bland-Altman analysis indicated better agreement (lower mean error ±SD) between D_2O (delta ppm) obtained via the two IRMS methods (-4.17 ± 9.9) than between values obtained with CRDS and either IRMS-WAT or IRMS-PLA (-7.62 ± 25.3, -11.8 ± 25.4, respectively). Mean calculated $t_{1/2max}$ (11 min) did not differ by the three spectroscopic or the two analytical $t_{1/2max}$ methods; however, the difference between analytical $t_{1/2max}$ methods was significantly less (P=0.039) when $t_{1/2max}$ was below the mean (<11 min) compared to those with slower absorption (> 11 min). **Conclusion:** Although absolute D_2O background and peak values may differ among methods (IRMS vs. CRDS) and infusate (purified water vs. plasma), D_2O appearance curves of fluid uptake are independent of analytic methods. However, the appropriate analytical model to determine hydration speed depends upon the individual's absorption profile.

P128: THE EFFECT OF FARMERS WALK EXERCISE ON PERFORMANCE MEASURES UP TO THREE DAYS POST EXERCISE

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BACKGROUND: Introduction of functional training movements, such as the farmers walk carry (FWC), into athletic training programs has become popularized in recent years. However, more research is needed to determine how these types of exercises may impact performance in the days following exercise. METHODS: Fourteen participants (23.43 ± 1.87 yrs., 170.73 ± 9.37 cm, and 82.69 ± 22.84 kg) were asked to perform 10 repetitions of a 20m normal walk condition
(NWC) or FWC, which was randomized and counterbalanced among participants. The FWC protocol was performed utilizing a high-handled hex-bar with a weight equal to 75% of the participants deadlift 1RM (96.69 ± 29.20 kg), while the NWC protocol was performed without additional weight. Participants were then asked to return 24, 48, and 72 hours post exercise and perform 3 weighted shoulder shrugs at 75% of shrug 1RM, as well as 3 vertical jump attempts, to record power and velocity measures. Repeated Measures Analysis of Variance (RMANOVA) were used to examine the measures of power, velocity, and averages between the two conditions across time. RESULTS: A main effect for time was found for average shrug velocity ($F_{3,27}$ = 4.03, &It), with a decrease in the average shrug velocity in the FWC exercise session R24 and R48, and in the NWC to R48 and R72. There was a significant interaction effect for VJ best ($F_{3,33}$ = 3.51, &It) and a main effect for time ($F_{3,33}$ = 3.34, &It) CONCLUSIONS: The results from this study suggest that performing the FWC at 75% of deadlift 1RM was not detrimental to performance measures up to three days post exercise, when compared to a NWC.

P129: SEASON LONG IN-GAME PERFORMANCE VARIATIONS IN PROFESSIONAL SOCCER PLAYERS

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BACKGROUND: In-game performance elicits maximal effort from players in order to maximize performance and increase the likelihood of success. As the season progresses, and weekly training loads accumulate, players may not fully recover, which could impact player performance during matches. PURPOSE: To determine the variation between in-game performance metrics during a competitive season in professional soccer players. METHODS: Data from 26 third division professional male soccer players were monitored with an individual GPS bioharness during 19 games were included for analyses. Bioharness metrics of total distance (TD), maximum speed (MS), sprint distance (SD), number of sprints (#S), and explosive distance (ED) were used for analyses. Matches were combined into three groups for all analyses. Each group consists of matches during two-month periods (April-May [6 matches], June-July [7], August-September [6]). Due to violations of normality, a Kruskal-Wallis analysis of variance (ANOVA) was used to analyze main effect differences. A Fisher's least significant difference post hoc pairwise analysis determined intervariable differences. Alpha was set at 0.05 for all significant main effect findings. RESULTS: Significant main effect differences were noted for TD ($\chi;^2(2) = 9.502$, $p < 0.01$), SD ($\chi;^2(2) = 7.004$, $p = 0.03$), #S ($\chi;^2(2) = 8.893$, $p = 0.01$), and ED ($\chi;^2(2) = 11.694$, $p < 0.01$). Post-hoc analyses revealed that players had increased TD ($p = 0.02$; $p = 0.03$), SD ($p = 0.05$; $p = 0.05$), #S ($p = 0.03$; $p = 0.03$), and ED ($p < 0.01$; $p = 0.03$) in games played in April-May compared to June-July and August-September, respectively. No differences were noted between June-July and August-September matches in any variables of interest. MS was not impacted as the season progressed ($p = 0.38$). CONCLUSIONS: In-game performance variables decreased ~9-15% as the season progressed. While game and tactical decisions may somewhat influence in-game performance variables, it appears that player performance is negatively impacted as the season progresses. It is possible that players are not adequately recovered during the week prior to the next competition.

P130: PILOT STUDY: IMPACT OF 2.4-KG PROXIMAL EXTERNAL LOADING ON 10-KM RUN PERFORMANCE IN RECREATIONALLY COMPETITIVE RUNNERS

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BACKGROUND: Recreationally competitive runners typically have higher variability in body fat percentage than elite distance runners. For runners with higher body fat percentages, modest decreases in non-lean mass is achievable and could potentially improve performance. This pilot study examined the performance and metabolic effects of artificially increasing trunk mass with a 2.4 kg, gel-based weighted compression garment. **METHODS:** Trained runners of various skill level (M = 10, F =6, age = 40 ± 9 years) completed two outdoor 10-km runs on a familiar and challenging course without (CON, first run) and with the weighted compression garment (LOAD, second run). Runners were instructed to finish the CON with a session RPE of ~7 on a 10-point scale. LOAD took place 7-14 days later with a goal to match CON pace (announced every 2.5-km). In a third laboratory session, running economy (RE) was assessed under both conditions at CON pace (1% grade). **RESULTS:** Runners were able to maintain pace under LOAD (CON = 52.37 ± 6.14, LOAD = 52.86 ± 7.44 min), but experienced an increase in cardiovascular strain for the last half of the run (heart rate ~8 beats/min higher during 5.0-7.5 and 7.5-10-km splits ($p < 0.05$) and perceptual (session RPE = 71 ± 10 vs 84 ± 10 cm) disadvantages. Similar trends in heart rate and RPE were found during RE trials, but unlike performance, RE was impaired ($p = 0.03$) by LOAD (13.8 ± 2.9 vs 13.0 ± 2.6 kcal/min). **CONCLUSIONS:** The high variance from the mixed-sex sample and non-true time trial design may have clouded running performance statistical outcomes, but this data suggests that even modest changes in body mass may influence recreationally trained runners' competition abilities.

P131: EVALUATION OF ATHLETE LOAD AND RELATIONSHIP BETWEEN EQUATION VARIABLES IN DIVISION I WOMEN'S LACROSSE

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BACKGROUND: Athlete monitoring systems have developed proprietary algorithms to create a generalized "load" score for athletes. This score, measured in arbitrary units (AU) typically includes external load variables, but there are inconsistencies of definitions found in the field surrounding this term and the proprietary nature of the calculation by device manufacturers. The primary purpose of this study was to evaluate the proprietary metric from VX Sport, Athlete Load (AL), for collegiate women's lacrosse across different positions, and compare training to games. A secondary purpose was to evaluate the relationship between AL and the equation variables [duration total, total distance, high-intensity distance (HID), and total sprints] and session rating of perceived exertion. METHODS: Global positioning system units and heart rate monitors were worn by athletes (n = 22) during 104 training sessions and nine games. Data were uploaded to VX Sport Software where it was trimmed to remove any downtime during the recorded session as accurately as possible. RESULTS: Analyses indicated no differences ($p = 0.186$) between training AL (48.0 ± 5.8 AU) and game AL (57.7 ± 32.8 AU), along with no positional differences ($p = 0.913$) between the attackers (training: 49.5 ± 5.6 AU; game: 55.7 ± 37.0 AU), midfielders (training: 49.4 ± 7.4 AU; game: 58.9 ± 33.2 AU), and defenders (training: 45.6 ± 5.8 AU; game: 58.9 ± 32.4 AU). Correlation analyses between equation variables indicated strong correlations during training for HID ($r = 0.75$), and sprints ($r = 0.83$) all $p < 0.001$; with games showing strong correlation with distance ($r = 0.84$) and HID ($r = 0.80$), all $p < 0.001$. CONCLUSIONS: The data suggests there is no difference between training and games. This is likely a result of differences in playing time with athletes that experience less time on the field bringing the mean score down. Furthermore, the data shows that HID and sprints contribute more to AL during training whereas distance and HID contribute more during games. A likely explanation for this is due to more distance being covered in games than practice by each athlete and the nature of practices, with the drills performed requiring a high number of sprints. Additionally, there is more time spent in HID during games however, it is over a longer period of time essentially making the ratio of time spent in HID during training even to that of games.

P132: DIFFERENCES IN PSYCHOLOGICAL HARDINESS AMONG CLASSIFICATION AND POSITION IN DIVISION I WOMEN'S LACROSSE

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BACKGROUND: Psychological hardiness encompasses three components: commitment, control, and challenge. Those low in hardiness have poor coping mechanisms and increased stress; conversely, those with high hardiness are more adaptable, more coachable, have higher concentration rates, experience less stress, and report lower levels of burnout. Research has shown athletes possess more hardiness than their non-athlete counterparts. Prior studies have shown various lacrosse positions take on different physical workloads, which may also affect hardiness. The purpose of this study was to determine the differences in psychological hardiness in female collegiate lacrosse players among year classification and position. **METHODS:** The Dispositional Resilience Scale-15 (DRS-15) was used to measure psychological hardiness at the beginning of a training year in 25 female Division I lacrosse athletes. Kruskal-Wallis tests were used to evaluate differences in hardiness and the three subscales by position (attacker, midfielder, and defender) and year classification (freshman, sophomore, junior, senior). **RESULTS:** By position, there was no difference in the hardiness subscales for commitment ($p = .062$), control ($p = .182$), or challenge ($p = .674$). There was a positional difference for total hardiness ($p = .037$), with midfielders (23.3 ± 2.4) exhibiting lower rates than attackers (28.6 ± 3.2, $p = .039$), but not defenders (26.6 ± 7.5, $p = .162$). For classification, there was not a difference found in commitment ($p = .182$), control ($p = .485$), or challenge ($p = .795$). Total hardiness among classifications was found to not be different either (range of 25.3-30.0, $p = .332$). **CONCLUSIONS:** The analyses show that players do not demonstrate a difference in hardiness subscales, by either position or classification, but midfielders showed lower hardiness than attackers. This information assists coaches to evaluate tolerance

to training load, formulate more effective practices, maximize performance, and demonstrates how different positions respond to stressors. Based on this analysis, midfielders are more adaptable, resilient, and better stress-coping mechanisms for student-athletes, than attackers or defenders. **GRANT:** This research was funded in part by the National Association for Kinesiology in Higher Education.

P133: CHANGES IN SLEEP QUALITY IN DIVISION I WOMEN'S LACROSSE ATHLETES

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BACKGROUND: Evaluating sleep quality among athletes is critical due to the adverse effects of sleep deprivation, including declined cognitive function, increased irritability, reduced communication skills, reduced athletic performance, and reduced capacity to think and react quickly. Analyzing qualitative sleep scores enable the athletes and coaches a format for communication to achieve optimum training, performance, and recovery. The purpose of this study was to assess changes in sleep quality in Division I female lacrosse athletes throughout the academic/training year. METHODS: The athletes (n = 34) completed an online questionnaire to rate sleep quality on each day of training and games. Sleep quality was rated in arbitrary units (AU) using the anchors of 0, 25, 50, 75, and 100, with higher scores representing better quality sleep. Friedman's tests were used to analyze differences in weekly sleep quality from the fall semester and spring semester. RESULTS: Sleep quality scores in the fall semester ranged from 78.9-87.3 AU and the spring semester ranged from 80.7-88.6 AU. There was a difference in sleep among the fall semester, p = .005, with two weeks in mid-September (78.9-80.9 AU), and one week in mid-October (81.4 AU) having lower sleep quality scores (p = .001-.010). There were also weekly differences in the spring semester, p = .007, with lower scores during one week in mid-January and three weeks in early to mid-April (78.0-79.3 AU) and higher sleep quality scores were noted during mid- to late-February (83.8-86.5 AU), p = .009-.046. CONCLUSIONS: The university was on a COVID-19-related pause for in-person academics and extracurriculars during mid-October, just after a week of poor sleep quality. Additionally, many mid-term exams took place, and mid-term grades were finalized. Upon return to the normal activities, sleep quality also returned to normal levels. The reduction in sleep quality in April aligned with preparation for the start of final exams. These factors likely contributed to the decline in sleep scores. Overall, the results indicate that poor sleep quality among the studied athletes was related more to academics and personal life than training load and athletics.

P134: DESCRIPTIVE STUDY OF COMPETITIVE BATON TWIRLERS

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BACKGROUND: Competitive baton twirling is a sport that combines elements of gymnastics, dance and ballet while necessitating cardiovascular endurance, muscular endurance and power, hand-eye coordination, spatial awareness, kinesthetic awareness, timing, and choreography. Approximately one million baton twirlers participating in the sport in the United States. Despite considerable participation in competitive baton twirling, little is known about the characteristics of the athletes. METHODS: This work documents demographic and behavioral characteristics of competitive baton twirlers. Questionnaires were completed by 169 female twirlers from across the Unites States and Canada. Questionnaires were sent out via social media and the only excluding factor was that participants had to have participated in competitive baton twirling. RESULTS: Respondents reported a mean ± SD age of 18.07 ± 6.08 y, height of 162.28 ± 6.24 cm, weight of 60.58 ± 32.49 kg, BMI of 22.92 ± 2.34 kg/m2, GPA 3.73 ± 0.3, and years of competing 8.02 ± 1.81 y. All (100%) qualified respondents reported experiencing injury due to competing in or training for baton. The extent of the injuries reported varied greatly. The top five injuries reported consists of bumps and bruises (95.5%), sprained or strained fingers (53.9%), sprained or strained wrist (25.3%), sprained or strained neck (14.6%), sprained or strained back (35.4%). A diversity of training, recovery, hydration, and nutrition habits were also reported. Of the 169 respondents 72% of the twirlers practice four or more days out of the week; 95% employ stretching and mobility for each session and 90% have structured and targeted practices. Over half of the twirlers consider nutrition when training and competing (66%), while 92% consider hydration when training and competing. CONCLUSION: These findings indicate that the competitive baton twirlers that participated in this research are adolescent females, diverse in physical profile, of normal BMI, high academic achievers, dedicated athletes, consistently overcome injuries and train by diverse means.

P135: CHARACTERIZATION OF THE RELATIONSHIP BETWEEN MENARCHE AND BODY COMPOSITION IN ELITE COLLEGIATE GYMNASTS

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BACKGROUND: Physical activity consisting of high mechanical stress has shown a positive relationship with bone mineral density (BMD) in female athletic populations. Menarche after the age of 12 can lead to lower fat mass and BMD into adulthood; the effect of delayed menarche on lean mass (LM) is unknown. The purpose of this study was to characterize and evaluate the relationship between age of menarche, BMD, and fat free mass index (FFMI), in Division I collegiate female gymnasts. **METHODS:** Twenty-two competitive Division I female gymnasts (Mean±Standard Deviation [SD]: Age: 19.1±1.2 yrs; Height: 161.5±6.3 cm; Weight: 61. 7±8.4kg; FFMI: 18.3±1.2 kg/m^2) participated in a survey (North American Menopause Society Validated Questionnaire) to assess age of menarche and a whole body DXA scan (GE Lunar iDXA) to measure BMD and LM. BMD percentile was evaluated using National Health and Nutrition Examination Survey (NHANES). FFMI was calculated from DXA-derived LM and bone mineral content (BMC), FFMI (kg/m^2) = LM (kg) + BMC (kg) / Height^2 (m^2). Bivariate correlations were used to analyze the trength of the relationship between menarche, BMD, FFMI, and BMD percentile. **RESULTS:** Age of menarche (15.4±1.5 yrs; range - 13 to 19 yrs) was negatively associated with BMD (r=-0.045; p=0.851) and BMD percentile (r=-0.435; p=0.055), although neither were significant. There was no significant relationship between FFMI and age of menarche (r=0.194 p=0.412). **CONCLUSIONS:** Despite a lack of statistical significance, possibly due to a small sample, negative relationships observed between age of menarche, BMD, and BMD percentile, indicate a need for further investigation. While female gymnasts may rank in higher percentiles for BMD when compared to general population norms (NHANES), the potential negative impact of late onset menarche on bone health requires further development of athlete specific BMD norms.

P136: 24-H HYDRATION BEHAVIORS DURING ONCE VERSUS TWICE PER DAY COLLEGIATE SOCCER PRACTICES IN HOT-HUMID CONDITIONS

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BACKGROUND: This field study evaluated 24-h hydration parameters among collegiate, male soccer players (n = 17) in a high heat stress environment. The observation types included a pre-season training camp twice per day (morning and afternoon) practice scenario (X2) and a regular season once per day morning practice and afternoon team meeting scenario (X1). **METHODS:** Observations began prior to morning practice and ended at the start of the next morning practice. Urine specific gravity (USG) and body mass were assessed before morning practices, before afternoon practice (X2)/pre- team meeting (X1), and before next morning practice. All beverage fluid intake, practice sweat volume, and urinary losses were assessed during each 24-h window. **RESULTS:** Sweat losses differed ($p < 0.05$) among all 3 practices, but players' ad libitum fluid intake offset large fluid deficits during practices. X2 sweat loss and fluid intake were 2.181 ± 0.693/1.823 ± 0.757 L and 1.710 ± 0.474/0.922 ± 0.569 for morning and afternoon practices, respectively. X1 morning practice sweat loss and practice fluid intake were 3.361± 0.956 and 2.190 ± 0.524 L. Mean fluid shifts were more negative for X1 from the start of morning practice day 1to the start of afternoon practice (X2) or team meeting (X1) (X 1 = -0.304 ± 0.675; X2 = 0.446 ± 0.916 L, p = 0.004) but not from the start of morning practice day 1 to start of morning practice day 2 (X1 = 0.664 ± 1.051; X2 = 0.479 ± 0.856, p = 0.52). USG and body mass remained stable an did not exhibit significant main effects for data collection time point. **CONCLUSIONS:** Ad libitum practice and recovery fluid intake was sufficient to maintain euhydration for the majority of players during both practice scenarios.

X2 conditions prompted greater fluid consumption before the second practice of the day.

P137: EXAMINING THE RELATIONSHIP BETWEEN LATERAL ROTATIONAL BROAD JUMPS AND BAT SPEED FOR COLLEGE BASEBALL PLAYERS

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Strength professionals commonly incorporate field-based exercises designed to translate to a particular sport movement. Swinging a bat involves a complex, sequential movement pattern through multiple planes of movement. PURPOSE: The purpose of this study was to examine the relationship between lateral rotational jumps on bat velocity and peak hand speed in collegiate baseball players. METHODS: Thirteen college baseball players (age: 20.15 ± 1.77, height: 180.25 ± 6.74 cm, weight: 86.66 ± 10.77 kg) completed a baseline testing session of lateral rotational broad jumps. Athletes completed a dynamic warm-up followed by 2 attempts of lateral rotational broad jumps for lead and trail leg based on their respective batting stance. On a separate day, athletes took 5 swings with their game bat (33in/30 oz, 34in/31oz) off a tee with 20 seconds in between each swing to mimic the time between pitches. Each participant was instructed to step up into the batter's box as they would in a practice/game situation while the investigator placed the tee in the middle of each of their respective strike zone based on batting stance. Each participant was instructed to hit a line drive over the shortstop or second baseman's head depending on which side the athlete hit from. A blast motion sensor was used to collect swing metrics of each swing trial. The average of the 3 best swing attempts were taken based on bat velocity. Researchers collected and analyzed possible relationships between lateral rotational jumps of the lead and trail leg on swing outcomes of interest. A series of Pearson's correlation coefficients were used at an alpha level of p&It.05 to determine if a significant relationship was found. RESULTS: A negative association was found in lateral rotational jumps of the trail leg on bat velocity of -.538 with a p&It.05. No other significant relationships were observed in lateral rotational jumps on the remaining swing outcomes. CONCLUSION: Strength professionals can use this data to incorporate multi-planar exercises in their programs to help aid in bat velocity.

P138: AN EVALUATION OF DRILL INTENSITIES IN DIVISION I WOMEN'S LACROSSE

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BACKGROUND: Managing athlete training volume is becoming increasing important, but there is little information regarding drill intensities and how drills affect each position. The purpose of this study was to identify drill intensities to determine the training volume for each position. METHODS: Global positioning system units were worn by 27 Division I female lacrosse athletes to gather training metrics, including: distance rate, maximum speed, distance, high-intensity distance (HID), sprint efforts, accelerations, decelerations, and sprint distance. All data was collected and uploaded into VX Sport software where it was trimmed and split for each drill completed in practice. Drills were categorized according to the five classifications: stickwork, small-sided games, conditioning, individual skill work (ISW), and team drills. All training metrics, except distance rate and maximum speed, were analyzed per minute spent in the drill to control for time. RESULTS: The drill database consisted of 99 days of training, which included three drills for stickwork, four drills for ISW, five drills for small-sided games, six drills for conditioning, and five drills for team drills. Analyses revealed a difference in the interaction of type of drill and player position for drill intensity metrics, $p < .001$. The conditioning drills required higher intensity work than all other drills for each metric analyzed, $p < .001$. ISW drills were less intense for distance rate, total distance, and accelerations than all other drill types, $p = .000$-$.006$. Stickwork was less intense than all other drill types for maximum speed and decelerations, $p < .001$. By position, attackers exhibited higher distance rate, speed, total distance, sprints, accelerations, and sprint distance than the other two positions, $p = .000$-$.004$. Midfielders exhibited greater sprint repetitions ($p < .001$) and sprint distance ($p = .003$) than defenders. CONCLUSIONS: Attackers showed higher intensities during training than the other two positions. Coaches can use this information to provide more specific training for each position and to manage the training volume of their athletes. Drill intensities can also be compared to game intensities to provide more specific training for games.

P139: COLLEGIATE ATHLETES REPORT HIGHER RPE'S ON WEEKEND GAME-DAYS COMPARED TO WEEKDAY GAME-DAYS.

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BACKGROUND: Seasonal variations in ratings of perceived exertion (RPE) have been previously reported in athletes, with an increase during the peak of their season. No research to date has investigated potential differences in collegiate athlete's RPE on weekend and weekday competitive matches, nor has the impact of the match result (win or loss) on RPE been studied. The student-athlete population have combined academic and athletic pressures which could cause increased stress and tiredness depending on the time of week. Therefore, the purpose of this analysis was to examine the differences in RPE between the time of week (weekend or weekday) and results of the game (win or loss). **METHODS:** Twenty NCAA division I collegiate male soccer players (mean±SD; age, 20±1y; mass, 77.0±6.3kg; height, 170.1±7.2cm) reported their RPE using a Borg CR-10 scale immediately following each match throughout the entire 2017 competitive season. Results of each match (win or loss) were recorded, and models covaried for the relative ranking of the opposing team. The interaction of time of week (weekend or weekend day) and match result was tested via ANCOVA with the alpha level set at $p < 0.05$ for all analyses. **RESULTS:** There was a significant difference in match RPE based on time of the week and result of the match (weekday win, 5.5 ± 1.1; weekday loss, 6.8 ± 0.5; weekend win, 7.2 ± 0.6; weekend loss, 6.7 ± 0.7) ($p = .016$). RPE was also higher during weekend matches (6.9 ± 0.6) compared to weekday matches (6.5 ± 0.8) ($p = .038$) without taking result of the game into account. Finally, the relationship between RPE and result of the game (win or loss) alone was insignificant. **CONCLUSIONS:** RPE was higher following weekend day matches that resulted in a win. Additional research needs to be done to explore why this relationship has been found. Potential research could consider match day stress leading up to a weekend day match, or exploring the association of academic deadlines on a weekend and how these impact RPE in training or matches on those days.

P140: COMPARISON OF GOOD AND POOR JUMPERS AS DETERMINED BY REACTIVE STRENGTH INDEX MODIFIED

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BACKGROUND: The countermovement vertical jump (CMJ) is an exercise commonly used to monitor an individual's neuromuscular abilities. Jump height is the most commonly used variable when discussing jumping ability. This provides a gross performance metric of one's ability, yet fails in explaining the explosiveness of an athlete as a given jump height can be achieved using differing neuromuscular strategies. This has led to the more thorough analysis of the CMJ to better understand an athlete's explosive muscular qualities. One such variable is the reactive strength index modified (RSImod) which accounts for the kinetic outputs of the tasks (jump height) and temporal constraints that are seen in sport. Thus, the purpose of this investigation was to compare groups of high and low RSImod performers to determine what variables may contribute to the explosive qualities in collegiate female athletes. METHODS: 42 female Division 1 collegiate athletes completed two maximal effort countermovement jumps as part of their athlete monitoring program. Prior to completing testing, each participant completed a standardized dynamic warm up. Each trial was separated by thirty seconds. All trials were performed on the same portable force platform, sampling at 1000 Hz. The mean of the two trials was calculated for each variable. Groups were determined as being above or below the median RSImod (0.38) for the entire sample. Group comparisons were made using independent t-test for each of the variables of interest. RESULTS: Significant differences were seen in RSImod (0.42 ± 0.05 vs 0.32 ± 0.4) and the high RSImod group having shorter eccentric duration (548.7 ± 77.62 vs 509.72 ± 53.07 ms). Though not significantly different, a moderate to large effect sizes was seen when comparing time to take off ($d = 0.55$) and jump heights ($d = 1.22$) between groups with the high RSImod group having greater jump heights and a shorter duration of time to takeoff. CONCLUSIONS: As RSImod is calculated as the ratio of jump height over time to take off (movement initiation to point of takeoff from the

ground), the difference between individuals with high RSIm values appears to be a combination of achieving greater jump height and doing so in less time as neither showed statistically significant differences between groups.

P141: ASSOCIATIONS BETWEEN COUNTERMOVEMENT JUMP PERFORMANCE AND BODY COMPOSITION IN FEMALE ATHLETES

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BACKGROUND: Both vertical jump performance and body composition have been shown to distinguish between levels of competition in volleyball athletes. With previous investigations displaying relationships between body composition and vertical jump height using a range of instrumentation and prediction equations, limited data has been presented using gold standard measurements for both body composition and vertical jump performance. The purpose of this investigation was to examine the relationship between absolute and relative measures of body composition and vertical jump performance using gold standard measurements in a female athlete population. METHODS:14 female Division I collegiate volleyball athletes participated in this investigation (age 19.86 ± 0.86 years, height 180.61 ± 3.99 cm, body 69.93 ± 9.73 kg). Participants completed a standardized warm up prior to completing 3 countermovement jumps. Each jump was performed with a PVC dowel (<1.0 kg) placed across the upper back in a high bar squat position. All trials were separated by 30 seconds of rest. All jump trials were performed using a force platform, sampling at 1000 Hz. Body composition was analyzed through total body DXA scan. Absolute and relative measure of body composition were then calculated for the total body and lower extremity. All testing was performed within a one-week period at the conclusion of the competitive season. Pearson Product Moment Correlations were used to determine the relationship between jump performance and body composition measures. RESULTS: Significant large to very large (r = 0.5 - 0.9) positive relationships were seen between total body lean and fat mass, lower extremity lean and fat mass, and CMJ force and power. Significant large (r = 0.5 - 0.7) negative relationships were present between total body fat percentage, total fat mass and CMJ jump height. CONCLUSIONS: These findings support much of the previous literature that increases in mass, regardless of composition, creates increases in force and power production during the vertical jumping task. Additionally, it should be noted that the relationship strength stayed consistent when looking between total and lower extremity absolute values of lean and fat mass to force and power production.

P142: THE EFFECT OF PITCHING WITH UNDERWEIGHT AND OVERWEIGHT BALLS ON PITCH VELOCITY IN COLLEGIATE BASEBALL PITCHERS

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BACKGROUND: In recent years there has been increased interest in the implementation of weighted baseball training as a strategy for increasing pitch velocity. Therefore, the purpose of this retrospective study was to examine the efficacy of overload (20% greater than regulation weight) and underload (20% less than regulation weight) throwing on the pitch velocity of collegiate pitchers over the course of an off-season. METHODS: Pitch velocity of varsity collegiate baseball pitchers (N=56) from 2012-2015 was examined following the completion of two separate off-season throwing programs. The weighted implement (WI) group (n=35) used overload (6oz) and underload (4oz) baseballs in addition to normal throwing activities with a regulation baseball (5oz) during the 2012 and 2014 off-seasons. The normal throwing (NT) group (n=21) participated in normal throwing activities only during the 2013 and 2015 off-seasons. Pre- and Post-training pitch velocities were collected using the Stalker Pro Sport 2 Radar Gun during off-season testing sessions and scrimmages. A 2x2 repeated measures ANOVA was used to determine if differences existed between the two throwing programs and pitch velocity between the two time points. RESULTS: No significant interaction was found between the two groups (WI and NT) and the two time points (pre- and post-offseason). No significant main effect found for time (p=0.07) and no significant main effect for group (p=0.27). The pre- to post-velocity for the WI group was 87.25±2.32 mph and 87.54±2.73 mph, respectively. The pre- to post-velocity for the NT group was 86.800±1.319 mph and 86.99±1.27 mph, respectively. CONCLUSION: The present study found no significant differences in pitch velocity between pre and post off-season testing for the weighted baseball throwing program as compared to a traditional throwing program. This indicates that the implementation of 20% overload and 20% underload throwing did not significantly change pitch velocity amongst collegiate pitchers. With the growing popularity of weighted implementation for throwing sports, further investigation is needed on alternate over/underloads and programming strategies to determine the efficacy for increasing pitch velocity.

P143: ASSOCIATIONS BETWEEN GPS-DERIVED TRAINING METRICS AND SUBJECTIVE READINESS RATINGS IN NCAA FEMALE SOCCER PLAYERS

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BACKGROUND: Global positioning system (GPS) is commonly used to measure workloads during soccer training sessions. This is often accompanied by subjective "readiness ratings" (e.g., ratings of stress, fatigue, sleep quality, etc.) to provide information about the physical and psychological status of each athlete across a training period or season. There is currently little research on the associations between readiness ratings and training metrics in NCAA female soccer athletes. The purpose of this study was to evaluate within-individual associations between same-day pairings of subjective readiness ratings (soreness, stress, mood, sleep quality and duration) and GPS-derived training metrics (total distance covered, distance covered while sprinting, number of sprints, top and mean sprint speed) collected during training sessions across a six-month period. METHODS: GPS training data and subjective readiness ratings that were collected by a NCAA Division III female soccer team was analyzed retrospectively for this study. An athlete's data was included in the analysis if they had multiple instances where subjective readiness ratings and GPS training metrics were collected on the same day. Repeated measures correlation coefficients (r_{rm}) were calculated to quantify within-individual associations between same-day readiness ratings and training metrics over time. RESULTS: Data from 11 athletes were included in the analysis, with each athlete providing an average of 8.7 ± 3.6 pairings of same-day readiness ratings and GPS training data. Ratings of stress had statistically significant negative correlations with total distance covered (r_{rm} = -0.29, p = 0.006), distance covered while sprinting (r_{rm} = -0.31, p = 0.004), number of sprints performed (r_{rm} = -0.25, p = 0.021), top speed reached while sprinting (r_{rm} = -0.35, p < 0.001) and mean speed during sprints (r_{rm} = -0.27, p = 0.011). Ratings of soreness had statistically significant negative correlations with distance covered while sprinting (r_{rm} = -0.24, p = 0.027), but not with any other GPS metric. There were no statistically significant correlations between ratings of sleep duration, sleep quality, or mood with any GPS metric (p > 0.05 for all). CONCLUSION: The results of this analysis suggest that higher ratings of stress and soreness are associated with lower running performance during training sessions in NCAA Division III female soccer players.

P144: PREDICTING VO_{2MAX} USING BODY FAT PERCENTAGE IN PROFESSIONAL AND COLLEGIATE MALE SOCCER PLAYERS

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BACKGROUND: The maximum amount of oxygen a body can use during exercise (VO_{2max}) is an important indicator of cardiorespiratory fitness and overall athletic performance. Metabolic carts are a luxury that all levels of sport and athletics may not have the means to use. Body fat percentage (BF%) is something that is easily measurable by a professional and does not require tremendous amounts of time. Using BF%, it may be possible to predict VO_{2max} levels in male soccer players of varying levels. PURPOSE: The purpose of this study was to determine the relationship between BF% and VO_{2max} values using two levels of male soccer players. METHODS: Thirty-six male (Professional: n=13; Collegiate: n=23) soccer players participated in this study. Each participant had three skinfold measurements (Chest, Abdomen, and Thigh) taken during preseason by trained exercise professionals. Each participant also ran a Yo-Yo Intermittent Recovery Test Level 2 that was conducted by strength and conditioning professionals. VO_{2max} for each participant was calculated from the Yo-Yo results. Pearson correlations were run on all variables to determine their relationship. Additionally, a stepwise linear regression was calculated to potentially predict VO_{2max} based on the BF% variables. Significance of relationships was calculated at $p \leq 0.05$. RESULTS: A significant, negative, strong correlation was found between BF% (11.4 ± 6.1%)

and VO_{2max} (56.6 ± 3.3 ml/kg/min, r = 0.70; p < 0.01) among collegiate soccer players. A significant regression equation was found (F (1,21) = 19.48, p < 0.01) with an adjusted R2 of 0.46. The prediction equation was VO_{2max} = 60.813 - 0.372(BF%). 95% Cis were [55.137, 57.984] and [-0.548, -0.197] respectively. BF% was not a significant predictor (p = 0.28) of VO_{2max} in professional players. CONCLUSIONS: Based on the findings, BF% is a significant predictor of VO_{2max} and may be useful in determining VO_{2max} in collegiate soccer players. BF% could predict ~48% of the variance in VO_{2max} in this group. However, the ability of BF% to predict VO_{2max} does not appear to be evident in professional players. It is possible that age, the higher level of competition, or a variety of other factors may influence VO_{2max} in professional soccer players.

P145: SEASONAL VARIATION IN ANTHROPOMETRIC AND PERFORMANCE VARIABLES IN AMERICAN PROFESSIONAL SOCCER PLAYERS

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BACKGROUND: Preseason is an essential component of sport; it prepares players physiologically for the beginning of competitive season by allowing for improvements in performance and fitness variables. As the season progresses, the need to maintain ideal performance state may be difficult due to accumulating training load. PURPOSE: The purpose was to determine the seasonal variation of power, agility, and body fat percentage (BF%) via a series of tests throughout the competitive season of American professional soccer players. METHODS: 23 male United Soccer League (USL) One players underwent a performance battery (akimbo vertical jump (VJ), reactive strength index (RSI), L-Drill and Pro-Agility Shuttle) and 3-site skinfold BF% analysis at three separate times during the course of a 10-month competitive season. All data was recorded by the same trained exercise professionals for the duration of the season. Repeated measures ANOVA analyses (α = 0.05) was used to determine the seasonal variation at the three-separate timepoints (Preseason (P), Start of regular season (S) and mid-season (M)). Post-hoc analyses on significant omnibus findings were analyzed with Bonferroni correction factor. Players who were exempt from testing due to injury are not included in the ANOVA analyses. RESULTS: For players who completed all three trials (n=15), there was no statistically significant difference for BF% (p = 0.14) and RSI (p = 0.19). A significant main effect was found in VJ (p < 0.01). Post-hoc analyses revealed that P VJ (20.9 ± 2.2in) was less than S (23.5 ± 2.5in; p < 0.01) and M (24.1 ± 2.1 in; p < 0.01). A significant main effect was found in L-Drill (p < 0.01). Post-hoc analyses revealed that P L-Drill (7.73 ± 0.36s) was worse than S (7.27 ± 0.35s; p < 0.01) and M (7.26 ± 0.28s; p < 0.01). A significant main effect was found in Pro Agility (p < 0.01). Post-hoc analyses revealed that P Pro Agility (4.72 ± 0.27s) was worse than S (4.44 ± 0.30s; p < 0.01) and M (4.33±0.12s; p < 0.01). CONCLUSION: It appears that player performance is worse following the offseason compared to other points during the competitive season. Preseason conditioning allows for improvements in power and agility in USL players. Throughout season the maintenance phase of performance variables is essential to ensure optimal performance.

P146: RELATIONSHIP BETWEEN COMMON HEALTH, SKILL, AND PERFORMANCE SPORT SCIENCE MEASURES IN PROFESSIONAL MALE SOCCER ATHLETES

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BACKGROUND: Several components of health-related fitness, skill-related fitness, and sport performance are often measured as part of a comprehensive sport science plan. Soccer is a sport that requires intermittent jogging, sprinting, walking, and explosive movements. The purpose of this study was to investigate the relationship between common sport science measures tracked by professional soccer team. METHODS: Thirteen male professional soccer athletes (age 24 ± 1 y; ht 179.7 ± 7.8 cm; wt 77.8 ± 6.1 kg), completed all measurements related to this investigation. Each participant completed a Yo-Yo endurance test, a 7-site skinfold body composition assessment, a vertical jump protocol on a mat (akimbo style i.e., hands on hips), and had their maximal sprint speed calculated by on-field, GPS data. Pearson product moment correlations were used to investigate the relationships between these variables. RESULTS: Body fat (10.9 ± 3.8 %) had a negative, moderate relationship (r = -0.55) with GPS derived max-sprint speed (31.3 ± 2.2 $km \cdot h^{-1}$) and negative, weak relationships with VO_{2max} calculated from the Yo-Yo intermittent test (57.4 ± 3.6 $mL \cdot kg^{-1} \cdot min^{-1}$; r = -0.33), and vertical jump (57.7 ± 2.5 cm; r = -0.26). However, vertical jump and speed had a strong, positive relationship (r = 0.74). Of note, VO_{2max} had slight stronger relationships with body fat and fat mass (8.5 ± 2.8 kg; r = -0.33) than fat-free mass (69.2 ± 6.8 kg; r = 0.18). CONCLUSIONS: These findings reflect those similar in the literature with respect to the relationship between vertical jump and sprint speed. Uniquely, these data use a live-action, GPS-derived speed measure as opposed to measures of speed commonly recorded in an assessment-focused session.

P147: INTERNAL WORKLOAD, TRAINING DISTRESS, AND STARTING STATUS IN COLLEGIATE VOLLEYBALL PLAYERS DURING A COVID-19 SEASON.

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BACKGROUND: Pressure is high among athletes throughout a season to earn starting positions and thus playing time. Starters (S) typically accrue greater internal workloads (IW) than nonstarters (NS) due to more playing time in matches. Heightened IW puts an athlete at increased injury risk or overtraining. While higher IW may negatively affect physical and psychological training distress in S, NS may also exhibit high training distress due to psychological pressure from earning match time. Our purpose was to assess relationships between IW and subjective training distress and to evaluate differences in these metrics between S and NS over a competitive volleyball (VB) season. **METHODS:** Female collegiate VB athletes (N=15; [S: n=6; NS: n=8]) completed an 11-week modified spring season due to the COVID-19 pandemic. Athletes wore heart rate monitors (Polar Team Pro System) during all team activities to quantify IW via Edwards training impulse (TRIMP). Subjective training distress was monitored weekly via the Multicomponent Training Distress Scale (MTDS). Differences in TRIMP and MTDS scores (total score, depressed moods [DM], vigor [V], physical signs/symptoms [PSS], sleep disturbances [SD], perceived stress [PS], and general fatigue [GF]) between S and NS were assessed via linear mixed effects models. Pearson's correlations (r) were used to assess relationships between TRIMP and MTDS scores. All significance for analyses were set at P<0.05. **RESULTS:** There were no main effects of S/NS or group by time interactions for TRIMP, total MTDS, DM, V, PSS, or PS (P>0.05). There were significant group by time effects for SD (P=0.04) and GF (P=0.05). TRIMP was weakly, inversely correlated with total MTDS (r=-0.25, P=0.01), DM (r=-0.22, P=0.02), PSS (r=-0.20, P=0.03), and SD (r=-0.29, P=0.02). However, there were no significant relationships between TRIMP and V, PS, or GF (P>0.05). **CONCLUSIONS:** While there were no differences in TRIMP or total MTDS, SD and GF changed differently over the season based on starter status. Lack of differences in TRIMP may be attributed to in-game substitutions strategies contributing to workloads. Additionally, the inverse relationship between TRIMP and MTDS was unexpected but may relate to relative fitness of the athlete. Further investigations are warranted to better understand the interactions between starter status, workload, and SD and GF in athletes.

P148: EFFECTS OF CLEAR AND TINTED FOOTBALL VISORS ON AGILITY AND FUNCTIONAL REACTIVE ABILITY IN NCAA FOOTBALL PLAYERS

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BACKGROUND: Football helmet visors have been added as safety accessories to helmet facemasks in efforts to mitigate ocular injury. Recent rule changes have banned tinted visors while clear visors are generally accepted as legal. We have previously shown that dark tinted helmet visors impair peripheral visuomotor ability in collegiate players. However, athletes were stationary when completing reaction time tests which may not translate to actual gameplay. **PURPOSE:** The purpose of this study was to identify how clear and tinted visors influence agility and functional reactive ability in NCAA football players. **METHODS:** Division 1 NCAA football players with normal/corrected to normal vision participated. In a randomized manner, participants completed reactive tests for the following conditions: Baseline/no

helmet (BL), Helmet + Clear visor (HCV), Helmet + Smoke tinted visor (HSV), Helmet + Mirrored visor (HMV). For each condition, participants completed two reactive tests using a FITLIGHT trainer system: reactive reach test (RRT) and reactive step test (RST). For the RRT, 5 poles equipped with a total of 10 LED sensors were placed in a semi-circle 1 meter around a center point. Participants were asked to step and reach to hit 10 lights with their hands as fast as possible. For the RST, 5 LED sensors were place on the ground in a semi-circle pattern 1 meter around a center point. Participants were asked to step and hit each sensor with their foot to hit 5 lights as fast as possible. Each reactive test was repeated for a total of 3 attempts. Average reaction time and time to test completion (TTC) were analyzed and compared between visor conditions. **RESULTS:** HCV ($p < 0.001$), HSV ($p < 0.001$), and HMV ($p<0.001$) conditions resulted in slower reaction time during RRT compared to BL. TTC was significantly increased during the HCV ($p < 0.001$), HSV ($p < 0.001$), and HMV ($p<0.001$) conditions versus BL. However, no differences existed between visor conditions ($p > 0.05$). For the RST, reaction time was slower during HCV ($p = 0.028$), HSV ($p = 0.038$), and HMV ($p = 0.017$) conditions versus BL. TTC was significantly higher during the HCV ($p = 0.010$), HSV ($p = 0.009$), and HMV ($p=0.007$) versus BL. No differences existed between facemask conditions ($p > 0.05$). **CONCLUSIONS:** Regardless of visor condition, wearing a football helmet impaired functional reactive ability and agility performance. However, visor tint did not exacerbate functional reactive ability. These findings highlight the need for new helmet designs which may not obstruct lines of sight to maintain player safety and performance in collegiate football players.

P149: PHYSIOLOGICAL CHARACTERISTICS OF COLLEGIATE TENNIS PLAYERS PRIOR TO PRESEASON

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BACKGROUND: Muscular power and endurance are both important for tennis players due to the power-endurance nature of the sport. Physiological testing can aid coaches in making training decisions on athlete readiness and adaptations. The purpose of this study was to evaluate baseline physiological and performance characteristics of tennis players and identify relationships between parameters. METHODS: Collegiate tennis players (male [M]: n=7, age = 20.7 ± 1.3 y, height = 186 ± 4 cm, mass = 82.2 ± 4.5 kg; female [F]: n=10, age=19.6 ± 1.3 y, height = 166 ± 5 cm, mass = 65.3 ± 9.2 kg) participated in preseason testing to assess body composition, reaction time (RT), muscular power, and aerobic capacity. First, body composition (body fat percentage [BF%], fat-free mass [FFM]) was measured by air displacement plethysmography (BOD POD), followed by cognitive (Dynavision D2) and whole-body dynamic (Trazer System) RT. Muscular power was assessed by maximal countermovement jump with hands-on-hips (CMJ) method and aerobic capacity was determined via maximal oxygen consumption (VO_2max) testing. Data are presented as mean ± standard deviation and relationships between metrics were assessed using Pearson's correlations (r) with an alpha-level of 0.05. RESULTS Average BF% and FFM were 10.8 ± 4.0 % and 73.3 ± 3.6 kg for M and 21.6 ± 6.2% and 51.7 ± 6.7 kg for F. Cognitive RT was 0.7 ± 0.1 s for both M and F and dynamic RT was 0.5± 0.0 s and 0.5±0.1 s for M and F, respectively. Average CMJ was 56.4 ± 6.2 cm for M and 41.9 ± 4.4 cm for F and average VO_2max was 57.1 ± 5.1 ml/kg/min for M and 47.3 ± 5.8 ml/kg/min for F. BF% was inversely related to both CMJ ($r=-0.72$; $P<0.01$) and VO_2max ($r=-0.77$; $P<0.01$). CONCLUSIONS: Overall, this sample of athletes was lean, although M were relatively leaner than F based on normative data. While RT was similar between sexes, future research should investigate how these parameters relate to on-court tennis performance. CMJ and VO_2max should be monitored consistently to assess athlete-readiness and response to training programs. Correlational findings suggest increased BF% may hinder both anaerobic and aerobic performance, as athletes with higher BF% had lower CMJ heights and cardiovascular fitness. Decreasing BF% and increasing FFM may improve overall athlete fitness and therefore positively impact tennis-specific performance.

P150: PERFORMANCE AND BODY COMPOSITION MEASURES IN MALE TENNIS PLAYERS DURING A COVID-19 MODIFIED COLLEGIATE YEAR

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Background: The novel coronavirus (COVID-19) pandemic resulted in nationwide lockdowns and quarantine periods, creating a barrier for athletes to maintain their usual fitness routines. Athletes and coaches needed to adjust training to accommodate for shutdowns and reduced access to typical training modalities. **Purpose:** *The purpose of this study was to determine changes in performance and body composition variables throughout a yearlong COVID-19 modified tennis season in male collegiate athletes.* **Materials and Methods:** Performance and body composition metrics of collegiate male tennis players (N=8) were assessed at the beginning and end of the fall 2020 academic semester [(Pre2020) & (Post2020)] as well as the beginning and end of the spring 2021 semester [(Pre2021) & (Post2021)] during a COVID-19 modified yearlong tennis season. Athletes arrived at the laboratory >2 hours fasted, having abstained from caffeine and vigorous exercise >24 hours prior. Body composition was assessed via air displacement plethysmography to determine percent body fat (%BF) and fat-free mass (FFM). Following a standardized dynamic warmup, athletes completed maximal countermovement vertical jump tests, with both hands on hips (CMJ_{HOH}) and arm swing method (CMJ_{AS}), using a digital contact mat. This was followed by a whole-body dynamic reaction time (RT) test (Trazer system). A VO_{2max} test was used to determine maximal aerobic capacity and ventilatory threshold (VT). The best of two trials were reported for RT and vertical jump height. Linear mixed-effects models were used to analyze changes over time with significance set at $P<0.05$. **Results:** FFM was the lowest Pre2020 compared to all other time points ($P<0.001$). CMJ_{HOH} increased from Pre2020 to Pre2021 (ΔCMJ_{HOH} = 2.4 ± 1.2 cm; $P=0.045$) before returning to baseline values at Post2021. There were no statistically significant changes in %BF, CMJ_{AS}, RT, VO_{2max}, or VT ($P>0.05$). **Conclusions:** Improvements in lower body power and FFM occurred as the academic year progressed. This may be a result of increased workload demands as athletes returned to structured training following the off-season. These significant improvements may be due to lower baseline values post COVID-19 lockdowns. In addition, the return-to-baseline CMJ_{HOH} values at the end of the season may provide an indication of athlete readiness resulting from the cumulative demands of the yearlong tennis season.

P151: ACCURACY OF SUBJECTIVE LOAD PARAMETERS COMPARED TO ANALYTICAL LOAD MEASUREMENTS IN NCAA DI WOMEN'S VOLLEYBALL

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BACKGROUND: Monitoring the workload of athletes in both an individual and team setting has become common practice. This practice can look different depending on the physical demands of the sport. In volleyball, an inertial measurement unit known as Vert can be utilized to track the number of jumps and other jump-related variables performed by players. Other ways in which jump frequency can be estimated are needed for teams and players without Vert. This study aimed to determine if volleyball athletes can accurately predict the number of jumps they perform after training and match play when given a perceptual scale. A secondary aim of this study was to determine if player position, session rating of perceived exertion (sRPE), and perceived sets played affected the player's accuracy when predicting jump count. METHODS: Thirteen female NCAA DI volleyball players competing on a team in the Southeastern Conference participated in this study. A survey was given following each practice and match and asked for sRPE, perceived sets played, jump count, and any self-counting of jumps. Around fifteen minutes before the end of each practice and match, the participants received the questionnaire as an automated message on their phones through the MyTeams app. Analytical workload data was collected via Vert worn during practices and matches in a waistband. Accuracy of the players' jump range selection was done by block coding. Generalized estimating equations (GEE) were used to determine if each player's jump count accuracy differed based on player position, sRPE, or perceived sets played. RESULTS: It was found that 23.2% of the team's jump count range estimations were accurate within 25 jumps of the actual number performed. 58% of the player's responses were accurate within 50 jumps of the actual number performed. Position was the only variable to associate ($p<0.001$, $r=0.263$) with player jump count accuracy with setters being the least accurate (10.8%) and liberos being the most accurate (32.8%). CONCLUSIONS: Based on these results, a subjective perceptual scale may be worth further exploration, however, adjustments may be needed on the perceived jump count scale to improve accuracy among positions.

P152: VISUAL TRACKING SPEED AND SOCCER PERFORMANCE METRICS

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BACKGROUND: Visual training has previously been shown to correlate to sport specific level of training and sport specific performance measures in controlled conditions. However, it remains unclear if these relationships exist between visual tracking thresholds and in competition decision making metrics over the duration of a soccer season. The purpose of this study was to investigate the relationship between visual tracking speed (VTS) baseline scores and soccer-specific performance measures. **METHODS:** 19 NCAA Division I soccer players were tested before the 2021 spring soccer season, after exclusionary criteria (played in 7 of 9 matches and >10 minutes per game) only 13 were utilized for analysis. VTS was measured from 1-core session (20 trials) on a 3-demensional multiple object tracking (3D-MOT) software Neurotracker (NT; CogniSens Athletic, Inc., Montreal, Quebec, Canada). The soccer performance metrics were obtained from WyScout (Wyscout, Chiavari, Italy). Spearman's rank order correlation coefficient was utilized to examine potential correlations between criterion variables. **RESULTS:** There was weak nonsignificant correlation between VTS score and passing accuracy (r = -0.380, p = 0.20). However, there was a strong correlation found between consistency score and passing accuracy (r=0.650, p = 0.016). When examining players based on their role of attackers compared to defenders, there were strong correlations for attacking players consisting of a nonsignificant strong correlation with consistency and passing accuracy (r = 0.730, p = 0.063) was observed. For defenders, consistency and defensive win rate had a strong correlation (r = 0.731, p = 0.099). **CONCLUSIONS:** This is the first study to examine NeuroTracker (NT) VTS and soccer performance metrics related to in-game decision-making. While consistency was found to correlate with some of the decision-making metrics, VTS did not correlate with any team performance metrics. Future research should seek to include multiple teams for improved sample size while also exploring a potential transfer effect through training.

P153: CHARACTERISTICS OF MENSTRUAL CYCLE AND HORMONAL CONTRACEPTIVE USE IN COLLEGIATE FEMALE ATHLETE IN THE UNITED STATES

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BACKGROUND: Monitoring female athlete menstrual cycles is recognized as an important metric to assess and monitor optimal health. Additionally, phases of the menstrual cycles are thought to correlate with differences in performance outcomes. Historically, collegiate-level athletes have relied on hormonal contraceptive (HC) use to promote menstrual cycle regularity and/or as a method to reduce menstrual cycle dysfunction. Recent global trends indicate a decrease in HC use in female athletes but has not been quantified across a diverse range of collegiate NCAA level athletes. Therefore, the purpose of this study is to quantify HC use vs. non-use, and to characterize menstrual cycle patterns of non-HC users, in a diverse population of collegiate level female athletes. **METHODS:** Female collegiate athletes (N=410) from four different universities, participating in one of 13 sports assessed, completed a questionnaire through the WHOOP (WHOOP, Inc) application platform. The responses were categorized by groups using oral contraceptives (OC) (n=175), other forms of HC (n=60), and by non-users of HC (n=175). The group using other forms of HC were subcategorized into either IUD, implant, ring, or other, groups. The number of typical bleeding days per cycle, and periods in the past year, were examined for the non-users of HC group. Prevalence and type of HC use and non-use was calculated as percentage of total sample and HC population, respectively. Days of menstruation is reported as percentage of the non-HC user population, trichotomized by range of days. **RESULTS:** HC use was 57% (n=235, age = 21±2 yrs., weight = 67.0±10 kg, height = 170±9 cm) of total population, of which 74% (n =175) used OC, 7% (n=31) used IUDs, 3% (n=16) used a hormonal implant, and 2% (n=11) reported other HC use. Current non-users of HC were 42% (n=175, age = 21±2 yrs., weight = 66.6 ±10 kg, height = 170±8 cm). Sixty percent (n=105) of non-HC users reported a normal bleed pattern of 3 to 6 days, while 1% (n=2) reported 1 to 2 days, and 3% (n=5) reported 7 to 8 days. Of the non-HC users, 2% (n=5) reported 5 or less periods in the last year, while 60% (n=139) reported 9 or more in the last year. **CONCLUSIONS:** This is the first study to investigate HC vs. non-HC use, as well as menstrual cycle patterns in female collegiate athletes from a wide range of sports at the NCAA level. Understanding the prevalence of HC use, and the normal bleeding patterns of naturally cycling sportswomen is important for developing appropriate monitoring and management practices for collegiate level female athletes. Future outcomes of this dataset include investigating menstrual cycle irregularities across a competitive season, variations by sport, and any changes induced by stress of training modalities and lifestyle behaviors.

P154: IDENTIFYING MECHANISMS OF FIREFIGHTER INJURIES: A HEALTHCARE PRACTITIONER PERSPECTIVE

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BACKGROUND: Firefighting involves the performance of rigorous occupational tasks in unpredictable, dynamic, a8nd hot environments which increases firefighters' risk of injury. Specifically, the National Fire Protection Association reported that musculoskeletal (MSK) injuries account for 56% of non-fireground and 41% of fireground injuries. Furthermore, physical training (PT) is the most common cause of injury, accounting for one-third of all injuries and resulting in 41% of post-injury absences from work. There is limited research identifying occupational injury risk factors among firefighters. However, health care professionals (HCPs) working with fire departments may be able to provide critical insight into the potential mechanisms of these common injuries. Therefore, the purpose of this study is to query HCPs working directly with firefighters to identify potential mechanisms and risk factors associated with MSK injuries during PT and other tasks based on their specific clinical experiences. METHODS: A phenomenological design will be implemented to understand the experiences of HCPs when treating MSK injuries in firefighters. Semi-structured interviews will be conducted virtually with twelve HCPs. Inclusion criteria include licensed HCPs (e.g., Athletic Trainer, Physical Therapist), who have at least three years of experience in treating and rehabilitating firefighter injuries. Two interviews will be pilot tested with HCPs to ensure reliability and validity. Ten interviews will be used in data analyses. Interviews will be transcribed and uploaded to Dedoose (SocioCultural Research Consultants, LLC), a qualitative analysis software program. To ensure reliability and validity of codes and categories, two researchers will code to a level of agreement of at least 90%. Member checking will be used to ensure the accuracy of findings with HCPs responses. IBM SPSS (Version 28, Armonk, NY) will be used for descriptive statistics. ANTICIPATED RESULTS: It is hypothesized that HCPs will indicate that MSK injuries occur primarily during PT, while performing intense yet infrequent occupational operations, and as a result of compromised movement patterns. These findings will provide key focus areas for future longitudinal studies to identify risk factors. Funding: Currently under review by the Federal Emergency Management Agency's Fire Prevention and Safety grant mechanism.

P155: EFFECTS OF AN 8-WEEK ACCOMMODATING RESISTANCE TRAINING PROGRAM ON MARKERS OF PERFORMANCE IN STRENGTH-TRAINED FEMALES

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BACKGROUND: It is accepted that improved performance can be attributed to gains in strength, power, and velocity. Although various strategies are implemented to enhance performance by athletes and coaches alike, a less studied method is the incorporation of bands in structural exercises, more frequently termed 'accommodating resistance' (AR). AR has grown in popularity within the last two decades and is assumed to better match the human strength curve in comparison to traditional resistance exercises. In effect, AR may stimulate greater neurological adaptations when combined with traditional resistance training. While numerous studies have evaluated the acute effects (i.e. single session) of AR training on markers of performance, fewer studies have examined the chronic effects of AR training (≥5 weeks). To date, no AR studies have been conducted on a trained female cohort, exclusively. Therefore, the purpose of this study is to quantify the effects of strength, power, and speed in trained

females, following a periodized program incorporating AR. **METHODS**: The present study will follow a counter-balanced, parallel design with one group serving as the control group (i.e. traditional resistance training) and one group serving as the treatment group (i.e. AR). A total of 20 experienced (≥6 months resistance trained, squat 1x bodyweight) trained females will be recruited for the current study. Pre- and post- trial tests will include a 1-repetition-maximum (1RM) test in the back squat and bench press to assess changes to muscular strength, as well as bench press reps to failure (60% of 1RM) to test muscular endurance, and a 15-s modified Wingate to determine peak power, mean power, and rate of fatigue in 15-s. Participants will be stratified into two respective groups based on relative strength (sum total taken from participants 1-repetition-maximum in the squat and bench press divided by body weight). Each participant will follow a 4-day strength training program for 8-weeks. Two days will be completed in the lab, following either the AR protocol in squat and bench press, or volume-load equated traditional squat and bench press protocol. The additional 2 days will be the same program across groups, completed on their own and providing verbal feedback of completion. Statistical analysis will include a 2x2 repeated measures analysis of variance (RMANOVA) for each dependent variable at their respective timepoint. Additionally, effect sizes (Cohen's *d*) will be calculated and reported to provide interpretation of meaningful differences. **ANTICIPATED RESULTS**: It is hypothesized that the AR group will significantly increase their relative strength in the squat and bench press and power in the modified Wingate compared to the traditional resistance trained group, as a result of improved muscular capacity to produce extended, greater force.

P156: FATIGUE NEURAL SIGNATURE IS DISTINCT FROM CONCUSSION

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BACKGROUND: Traumatic brain injuries are a major health concern in the US, accounting for approximately 224,000 hospitalizations and 61,000 deaths in 2017. Fatiguing activities create a mismatch between central nervous system control and the mechanical output, because muscles have lower neural excitation and are less responsive to balance perturbations. Evaluation of regional EEG patterns between fatigued concussed participants could shed light on this as we should see upregulated activity in the areas with higher sensory weighting and could tell us if concussion impairs shifts in multimodal sensorimotor integration. METHODS: Thirty-two (N = 32) participants, seventeen (n = 17) concussed, completed the research protocols. Non-concussed participants had their balance perturbed by a whole-body fatigue protocol, a 30-minute walk on an inclined treadmill (1.9 m/s) while wearing a weighted backpack (27 kg). Participants were assessed under a variety of conditions: eyes-closed (EC), eyes-open (EO), single leg (SL), mental distraction (SS), unstable surface (US), virtual reality-induced optical flow (VR), and virtual reality baseline (VB). EEG was measured pre- and post-fatigue. For participants with mTBI, EEG was only measured once. A four-way ANOVA was conducted to compare the groups across all conditions. The dependent variable was spectral power. RESULTS: After visual inspection, data processing, and removal of outliers, there were 2802 (92.3%) valid and 236 (7.7%) missing data points. Spectral power was normalized by taking the natural logarithm of the data points. Natural log spectral power (LnP; M = 2.60, SD = 1.57) was positively skewed ($Skew/SE_{Skew}$ = 10.69, p < .001, two-tailed) and mesokurtotic ($Kurt/SE_{Kurt}$ = 1.14, p = .127, two-tailed). The test of between-subjects effects revealed a significant main effect of Condition, $F(6, 2606) = 8.08$, $p < .001$, η_p^2 = .018, and significant interactions between Region x Bandwidth, $F(6, 2606) = 4.64$, $p < .001$, $\eta_p^2 = .011$, Region x Group, $F(6, 2606) = 17.34$, $p < .001$, $\eta_p^2 = .038$, and Bandwidth x Group, $F(1, 2606) = 22.79$, $p < .001$, $\eta_p^2 = .009$. Spectral power was generally lower in the concussed group. CONCLUSIONS: Fatigue appears to have a distinct neural spectral power signature when compared to acute concussion. More specifically, fatigue spectral power was greater in the fatigued group than in the concussed group.

P157: INCREASED ALPHA DESYNCHRONIZATION DURING DYNAMIC VISUAL ASSESSMENTS WITHIN ONE YEAR OF CONCUSSION

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BACKGROUND: Mild Traumatic Brain Injuries (mTBI) can lead to visual processing deficits, including decreased visual acuity, visual field impairment, eye movement dysfunction- including vergence, saccadic, smooth pursuit movements and an increase in mental workload during visual tasks. Previous studies have shown a general relationship between visual tracking performance and brain function, whereas brain-specific studies, as measured via electroencephalogram (EEG), indicated head-injury correlational differences between mTBI patients and healthy controls. Specifically, mTBI patients demonstrated decreased alpha activity with a corresponding, subsequent, increase in theta activity and an overall increase in cognitive effort during visual-tracking and motor tasks. The purpose of this project was to examine the relationship between brain activity and visual-motor deficit in participants with a recent mTBI compared to healthy controls. We hypothesized that participants with recent mTBIs (within the previous 13 months) would exhibit alpha desynchronization and perform worse on dynamic vision tests compared to healthy controls. METHODS: To test these hypotheses, data from 10 concussed participants (age: 20.2 ± 1.87 yrs, post-injury: 8.0 ± 3.96 months) and 17 healthy participants (age: 20.7 ± 1.68 yrs) wore a 32-channel dry EEG cap while completing a series of RightEye dynamic vision tests. Participants' eye movements were tracked using an SMI Red-RE eye tracker, while MATLAB was used to analyze alpha and theta power within spectral analysis. RESULTS: The mTBI group demonstrated a significant ($p < .05$) increase in alpha desynchronization during discriminant reaction time and smooth pursuit tasks. CONCLUSIONS: These findings indicate that mTBIs results in increased cognitive workload in brain regions that negatively impact visual motor control and neurological functions during visual discrimination tasks within 1-year post-injury. Furthermore, the results demonstrate the need to assess the long term impact of concussions on the visual-motor system.

P158: COMBINING PHYSICAL AND MENTAL PRACTICES OF A DART-THROWING TASK ENHANCES MOTOR LEARNING

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BACKGROUND: Determining practical ways to improve motor skill learning and approaches to perform under-pressure are crucial to enhance adaptive behavior. Utilizing visualization technique while practicing a skill may yield benefits to skill acquisition. To address this question, the present study aimed to investigate whether the combination of physical and mental practice (visualization) of a dart-throwing task would enhance motor learning. **METHODS:** Thirty participants were divided in 2 groups (15 visualization/dart group; and 15 only dart group) and required to perform **3 dart-throwing phases** (**pretest**: 10 trials; **Practice**: 6 blocks x 10 trials; **3 immediate Posttests [20 minutes after practice] in random order**: **Retention**: 10 trials - **Transfer:** 10 trials - **High-pressure**: 10 trials). Importantly, visualization group "visualized" the skill during the 1-min breaks between practice blocks, while the Dart only group read a nutrition paper during breaks to prevent visualization. Participants threw darts to a target positioned 1.73 m off the ground; and 2.37 m from the throwing line for **pretest; practice, retention and high-pressure posttests**; while a **transfer test** was performed from a 3.37 m line. Before practice phase, participants received instructions about dart-throwing skills. Between the practice and posttests phases, participants filled out questionnaires related to Psychological Skills (such as, motivation, competence, anxiety). **RESULTS:** To assess motor learning, a 2 (Group) by 3 (Posttest) mixed-factor ANCOVAs (with repeated measures on the second factor) were conducted for radial error (accuracy) and bivariate variable error (precision), with pretest radial error and bivariate variable error serving as the respective covariate. On these preliminary results (30 participants data collected out of 56 expected) there was a main effect of group p = 0.041; a main effect of posttest p = 0.023; but no group by posttest interaction p = 0.251. Mean posttests scores showed superior performance for the visualization group [depicted in bold] (lower scores representing better learning): retention test (10.82 cm ± 3.44 cm vs **8.43** cm ± 2.39 cm); transfer test (18.32 cm ± 5.41 vs **14.35** cm ± 4.12 cm); high-pressure test (11.49 cm ± 4.2 cm vs **7.85** cm ± 2.5 cm). **CONCLUSION:** The combination of visualization and dart practice enhanced motor learning by showing less errors - superior accuracy results in all posttests).

P159: A COMPARISON OF EFFICACY OF NEED SUPPORTIVE AND THWARTING INSTRUCTION ON ENJOYMENT AND STATE ANXIETY

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BACKGROUND: Grounded in the positive psychology and Self-Determination Theory framework, need-supportive instruction (NSI) has shown to positively impact participants' enjoyment while learning new motors skills by supporting the three basic psychological needs of competence, autonomy, and relatedness. Need-thwarting instruction (NTI), on the other hand, has been found to be associated with maladaptive outcomes, e.g. state anxiety. However, there is very little experimental evidence examining the effects of NSI and NTI. Thus, the purpose of this study was to compare the effects of NSI and NTI on participants' enjoyment and state anxiety during a novel motor skill course. METHODS: A sample of 105 undergraduate students (M_{age} 20.56±5.41; 69 females, 40 males) with no previous experience in juggling were recruited. Participants were allocated to two different arms: NSI and NTI taught by an experienced instructor. The intervention consisted of five 45 min juggling motor skill lessons, which were identical in the dose, frequency, and content. Baseline and posttest data were collected. The Physical Activity Enjoyment Scale and State-Trait Anxiety Inventory were used to measure the enjoyment and state and trait anxiety. RESULTS: Analysis of covariance test results showed a significant intervention effect on enjoyment (F[2,107] = 14.22, p<.001, ηp^2=.48) and state anxiety (F[2,107] = 3.18, p = .020, ηp^2= .05) when the level of trait anxiety was controlled. The pairwise comparisons with the estimated means showed that NSI group participants' enjoyment increased (t[54]=-4.53, p<.001, d=.61) (M_{pre}=4.73± 1.08; M_{post}=5.29± .99) while there were no change in NTI group participants' enjoyment (t[56]=.53, p=.598) (M_{pre}= 4.98±1.16; M_{post}=4.93±1.26). NSI group's state anxiety decreased (t[54]=3.12, p<.003, d=.3) (M_{pre}=3.14± .82; M_{post}=2.80± .94) while NTI group's state anxiety increased (t[56]=2.10, p=.041, d=.063) (M_{pre}=2.78±.86; M_{post}=2.49±1.05). Finally, participants with higher levels of trait anxiety experienced more posttest anxiety compared to the participants with lower trait anxiety (F[2,107]=6.95, p<.001, ηp^2=.23). CONCLUSIONS: NSI elicited positive affective outcomes while NTI increased participants' state anxiety. NSI is recommended over NTI when learning new motors skills. Keywords: self-determination theory, motivation, intrinsic, motor skill, motor competence

P160: EFFECT OF CLINICALLY ENGAGED ANATOMY CURRICULUM ON DOCTORATE OF PHYSICAL THERAPY STUDENT PERFORMANCE

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BACKGROUND: COVID-19 forced the pedagogical delivery model of anatomy. This study compared test scores in a clinically engaged anatomy curriculum, which integrated the application of anatomic concepts, biomechanics, surface palpation, and dynamic anatomy on physical therapy students. METHODS: The DPT anatomy cohort of 2019 served as the control group for this study and received a traditional model of the anatomy curriculum for half of the fall 2019 semester. The cohort of 2019 finished the fall 2019 semester under a clinically engaged delivery model. The anatomy cohort of 2020 served as the experimental group for this study and received 2.5 hours of virtual, synchronous lecture, 2 hours of cadaver dissection every other week, 4 hours of virtual dissection every other week, and 2 hours of functional/integrated lab time every other week. Each cohort was examined with two written midterm examinations, one midterm lab examination, and cumulative written and lab final examinations. Data analysis of midterm exam scores was performed using R Studio (Version 1.4.1717© 2009-2021 RStudio, PBC). The midterm 1 score for the 2019 cohort was 69.12% and the cohort of 2020 midterm score was 80.1%. The second written midterm scores displayed no significant differences between the 2019 and 2020 cohorts with a mean score of 80.1% and 79.14%, respectively. RESULTS: ANOVA of the 4 midterm scores revealed a significant difference between the midterm 1 score of the 2020 cohort versus the midterm exam scores of the 2019 cohort and the midterm examination two scores of the cohort of 2020 ($F(3,156) = 11.31$, $p < 0.001$). The midterm 2 scores of both cohorts demonstrated no significant differences in mean scores and scores in the lower quartiles. A post hoc Tukey test showed that the 2020 cohort's midterm 1 scores were significantly different from the other groups. CONCLUSIONS: The results of this study further validate previous literature by demonstrating that the number of hours spent in didactic lectures does not explain student performance. Anatomy instructors in physical therapy programs should strive to seek opportunities to apply their curriculum to clinical scenarios and concepts to reinforce learning.

P161: THE EFFECT OF FATIGUE ON NEUROMUSCULAR COUPLING IN PRINT AND CURSIVE HANDWRITING

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BACKGROUND: Handwriting is a skill that is taught from elementary school and is refined throughout the lifespan. Although the use of electronic devices has grown in recent years, handwriting is considered essential for day-to-day life. Handwriting is a crucial communication skill involving fine motor control which can be subject to fatigue over long durations. A decrease in muscular activity or increase in cortical brain activity is known to infer neuromuscular fatigue. Throughout the literature, fatigue has been measured through such as brain activity, muscle activity, pain, and rate of perceived exertion. While research has shown the differences in print and cursive handwriting, most focus on populations with disabilities. Moreover, few studies have examined neuromuscular coupling, or lack thereof, as a quantifiable measure of fatigue. Thus, the purpose of this study is to investigate the neuromuscular coupling observed in cursive vs print handwriting in a fatigued vs non-fatigued state. METHODS: Twelve male college-aged (18-22) participants were recruited for this study. Participants were fitted with an electroencephalography (EEG) cap and electromyography (EMG). Following this, participants wrote a randomly generated 100-word paragraph in either cursive or print. Next, the participant's writing hand was fatigued (fatigue was defined as greater than 30% decrease in grip strength) and the participant immediately wrote a second 100-word paragraph. Neuromuscular coupling was defined as the area of cohesion between EEG and EMG. Additionally, overall speed, letter size, and legibility were measured pre- and post-fatigue. RESULTS: No significant difference in neuromuscular coupling was observed pre-fatigue in print or cursive writing. Additionally, a significant decrease in coupling ($p<0.005$) was observed post-fatigue in both conditions. However, a significantly greater decrease ($p<0.05$) in coupling (less coherence) was seen in print than cursive writing. Interestingly, post-fatigue writing was significantly smaller and time to completion was faster in both conditions. CONCLUSION: The current study suggests a negative effect of fatigue on neuromuscular coupling during a writing task, with print writing performance suffering the most. These results suggest that, while writing for long periods of time that induce fatigue, it may be more beneficial less detrimental to employ cursive writing techniques.

P162: EFFECTS OF PROXIMAL LIMB BLOOD FLOW RESTRICTION TRAINING ON DISTAL LIMB FATIGUE AND RECOVERY

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BACKGROUND: Blood flow restriction (BFR) training has been shown to increase hypertrophy at low resistance loads, to a similar extent as observed in high resistance loads, likely as a result of metabolic stress. However, the effects of BFR use have focused largely on muscular performance around the site of occlusion, with little information on the tissue distal to the occlusion site. The effect of direct tissue compression may play a significant role in the effects of BFR. Therefore, the purpose of this study was to analyze the effects of BFR training on indices of muscular performance in non-compressed muscle tissue distal to the site of occlusion. **METHODS**: Participants (N = 20; M±SD: 23.0 ± 3.8 years; 174.1 ± 9.0 cm; 77.9 ± 13.0 kg; 23.8 ± 8.6%body fat) completed a baseline visit and two experimental conditions consisting of exercise only (control; CON) and exercise with BFR. CON and BFR were performed in a counter-balanced order. Personal tourniquet pressure (PTP) was determined in each leg using the Delfi PTS II system for the BFR session only. The following assessments occurred pre and post each visit: anatomical cross-sectional area (CSA) of the gastrocnemius, toe tap test, average stride length test, and counter-movement jump. The exercise protocol consisted of 3 sets of 15 repetitions of ankle plantarflexion (PF) and dorsiflexion (at 60 and 500 degrees per second, respectively) on the dominant limb, using an isokinetic dynamometer, which also measured average force and total work per set. BFR application during the exercise protocol consisted of unilateral occlusion at 80% of PTP,

applied 30 s before initiating exercise on each leg, at the proximal thigh. Two-way repeated measures analysis of variance (ANOVA) was performed to determine if changes in CSA, and measures of muscular strength and performance differed by BFR application (condition × time). Significance was set as $p<0.05$. **RESULTS**: CSA was increased post- versus pre-exercise following BFR compared to CON. Toe taps and stride length performance were decreased post- versus pre-exercise following BFR compared to CON. Jump height decreased post- compared to pre-exercise with no difference between conditions. Average force and total work were both significantly lower in the BFR trial. **CONCLUSIONS**: The addition of BFR to the quadricep during exercise elicited higher levels of muscular fatigue and decreased recovery rate in the calf musculature.

P163: CARDIORESPIRATORY AND MUSCLE RECRUITMENT RESPONSE TO INCREMENTAL EXERCISE IN FLYWHEEL-BASED INERTIAL TRAINING (FIT) SQUATS

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BACKGROUND: Spaceflight induces rapid loss of muscle mass and aerobic capacity. Flywheel-based inertial training (FIT) - a gravity-independent form of exercise - provides external resistance through the moment of inertia ($I = ½ mr^2$) of a rotating disk in a velocity-dependent manner. FIT preserves muscle mass during prolonged unloading and increases aerobic capacity in ambulatory subjects. Optimizing FIT exercise protocols for muscle recruitment and cardiorespiratory responses may improve exercise efficiency and reduce exercise hardware needs. PURPOSE: To determine cardiorespiratory and muscle recruitment responses to FIT with varying workloads. METHODS: We will recruit 40 healthy participants (20M, 20F) between the ages of 18 and 50 y who regularly engage in aerobic and resistance training. Each participant will visit the lab four times. The first session will consist of screening and body composition testing (Bioelectrical Impedance Analysis, BIA). The second session will consist of a maximal intensity graded exercise test using a bicycle ergometer and familiarization with the FIT exercise device (Exxentric Kbox 4Pro). At least 3 d after the familiarization visit subjects will complete session 3 and will then complete session 4 at least 7 d later. During testing each participant will complete unloaded quarter-squats at 30 and 50 repetitions per minute. Squat depth (60^0 knee flexion) will be monitored by wireless electrogoniometer of the knee in real-time. This procedure will be repeated with increasing moments of inertia increments of 0.005 $kg{\cdot}m^2$. Cardiorespiratory (heart rate, gas exchange) and muscle recruitment (electromyography of the gluteus maximus, vastus lateralis, biceps femoris, and soleus) data will be collected during FIT exercise. Reliability of cardiorespiratory and electromyography (EMG) data will be compared by Cronbach's alpha. Responses to speed and inertial load will be compared by 2x2 repeated measures ANOVA with $\alpha = 0.05$. ANTICIPATED RESULTS : We hypothesize that O_2 consumption and EMG activity will increase with increasing repetition speed and inertial load. We further hypothesize that there will be a speed x load interaction on O_2 consumption and EMG activity. Future work will aim to identify a FIT workload which concurrently elicits sufficient cardiorespiratory and EMG stimulus to prevent systemic deconditioning during prolonged unloading.

P164: KNOWLEDGE OF THE FEMALE ATHLETE TRIAD AMONG PHYSICALLY ACTIVE PREMENOPAUSAL WOMEN

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BACKGROUND: The Female Athlete Triad (low energy availability, low bone density, and menstrual disturbance) is a well-established phenomenon that can lead to severe health consequences not only among elite female athletes, but also among recreationally active females. Despite decades of research in this area, very few studies have assessed knowledge related to the Triad among physically active premenopausal females regardless of their athletic/competitive status. METHODS: 804 premenopausal females (26±7.8 yrs) completed an electronic survey to assess their knowledge of the Triad. Participants self-selected as collegiate/professional athletes (CP) (n=33), competitive amateur athletes (CA) (n=122), or recreationally active athletes (RA) (n=649). The inclusion criteria were based on performing a minimum of either 75 min of vigorous aerobic activity, 150 min of moderate aerobic activity, or two days of resistance training per week. RESULTS: Overall, 79% were not familiar with the Triad term, with RA (83%) and CP (73%) being the least familiar, followed by CA (60%). Only 11% could list all three Triad components and 5% answered two components correctly. CA demonstrated the most knowledge of the three components (23%) compared to CP (9%) and RA (9%). Amenorrhea was the most commonly recalled component (17%), followed by low energy availability (15%), then bone mineral density (14%). Less than 40% of participants recognized that cessation of menstruation with heavy training was abnormal, with the majority being unsure (34%) or unaware of this being a problem (27%). CA displayed the most knowledge about this issue (53%) with CP (39%) and RA (36%) displaying similar knowledge. After being presented with the three components of the Triad, 10% felt they were at risk for the Triad and 15% thought they might be at risk. The perception of being at risk was the highest among CP (36%) compared to RA (25%) and CA (18%). CONCLUSIONS: Although CA demonstrated higher knowledge about the Triad over collegiate/professional and recreationally active athletes, all three groups displayed low awareness and knowledge about the Triad. Our findings indicate that there is an urgent need for more targeted education to ensure physically active females understand the signs, symptoms, and risks of the Triad in order to prevent and/or minimize serious health risks in this population.

P165: DIETARY PRACTICES AND SOURCES OF DIETARY INFORMATION AMONG CROSSFIT® PARTICIPANTS: PRELIMINARY FINDINGS

Taylor Morneault[1], Matthew Brisebois[1], Samuel Kramer[2], James Kamla[1], Kelvin Wu[1], Jerold Corpuz[1], Katherine Fowler[1], Keston Lindsay[3]. *[1]The University of South Carolina Upstate, Spartanburg, SC. [2]International Vitamin Corporation, Greenville, SC. [3]University of Colorado Springs, Colorado Springs, CO.*

BACKGROUND: CrossFit® is a popular high-intensity functional training program. CrossFit® participants may follow popular diets to support their health or physical pursuits, but the specific diets followed by CrossFit® participants remains unknown. The purpose of this study was to survey CrossFit® participants on the diets that they practice. METHODS: The survey was adapted from previous research and pilot tested. The final survey was distributed to CrossFit® gyms via local flyers, email correspondence, phone calls, and advertisement in a CrossFit®-related news outlet. The data were collected and are currently undergoing analysis. RESULTS: Of the 3,260 recorded responses, 681 complete responses were cleaned and analyzed (female 56%, age 38.9 ± 10.5 y, body mass index 25.9 ± 4.0 kg/m^2). Respondents had been performing CrossFit® 4.1 ± 1.1 d/wk for 5.6 ± 3.0 y. Two hundred eight (30.5%) respondents were CrossFit® coaches and 58.3% reported actively participating in fitness competitions. Four hundred thirty-four (63.7%) respondents reported following a specific diet over the past 6 months. The top ten reported diets were Macro Counting (20.4%), Paleo (6.9%), Renaissance Periodization (6.6%), Intermittent Fasting (6.5%), Gluten-Free (3.2%), Ketogenic (2.2%), Vegan (1.6%), The Zone (1.5%), Whole 9 (1.5%), and Mediterranean (1.3%). The top five reasons for following a specific diet were to improve overall health (47.9%), improve CrossFit® performance (30.2%), decrease body fat (29.4%), increase energy levels (25.8%), and improve recovery (19.8%). The top five sources of dietary information were the internet (51.1%), coach/trainer (30.5%), nutritionist/dietitian (27.2%), social media (20.4%), and academic journals/peer-reviewed research (20.1%). CONCLUSION: A large proportion of CrossFit® participants may follow specific diets with the intention of improving health and performance. Particularly, Macro Counting may be popular among CrossFit® participants. These findings may support future research on the effects of dietary practices on CrossFit® performance and help form empirically driven recommendations to support the health and athletic performance of CrossFit® participants.

P166: DIETARY AND SPORT SUPPLEMENT USE AND SOURCES OF INFORMATION AMONG CROSSFIT® PARTICIPANTS: PRELIMINARY FINDINGS

Samuel Kramer[1], Matthew Brisebois[2], James Kamla[2], Kelvin Wu[2], Taylor Morneault[2], Jerold Corpuz[2], Katherine Fowler[2], Keston Lindsay[3]. *[1]International Vitamin Corporation, Greenville, SC. [2]The University of South Carolina Upstate, Spartanburg, SC. [3]University of Colorado Springs, Colorado Springs, CO.*

BACKGROUND: CrossFit® is a popular high-intensity functional training program. CrossFit® participants may consume dietary and sports supplements to support their health and physical pursuits, but current intakes remain unknown. The purpose of this study was to survey CrossFit® participants on the dietary and sport supplements

they consume. METHODS: The survey was adapted from previous research and pilot tested. The final survey was distributed to CrossFit® gyms via local flyers, email correspondence, phone calls, and advertisement in a CrossFit®-related news outlet. The data were collected and are currently undergoing analysis. RESULTS: Of the 3,260 recorded responses, 681 complete responses have been cleaned and analyzed (female 56%, age 38.9 ± 10.5 y, body mass index 25.9 ± 4.0 kg/m^2). Respondents had been performing CrossFit® 4.1 ± 1.1 d/wk for 5.6 ± 3.0 y. Two hundred eight (30.5%) respondents were CrossFit® coaches and 58.3% reported actively participating in fitness competitions. Five hundred eighty (85.2%) of the respondents reported using supplements at least two days per week over the past 6 months, with an average of 2.88 ± 2.61 supplements. Supplements were organized into 36 broad categories from a list of 2,015 unique reported supplements. The ten most reported categories of supplements were protein (53.7%), creatine (26%), pre-workout (23.5%), omega fatty acids (18.5%), multivitamin (17.5%), vitamin D (14.2%), amino acids (13.8%), fuel (i.e., electrolytes and carbohydrates; 11.2%), collagen (10.4%), and magnesium (8.2%). The top five reasons for using supplements were to improve recovery (58.1%), improve overall health (55.2%), increase muscle mass/strength (44.9%), improve CrossFit® performance (44.2%), and increase energy levels (34.9%). The top five sources of information on supplements were the internet (57.3%), coach/trainer (29.4%), academic journals/peer-reviewed research (23.2%), nutritionist/dietitian (21.3%), and social media (17.3%). CONCLUSION: A large proportion of CrossFit participants report using dietary supplements to improve their health and physical performance. Reported usage is larger than many previous studies involving gym goers and athletes. These findings may support future research on the effects of supplements on CrossFit® performance and help form empirically driven recommendations to support the health and performance of CrossFit® participants.

P167: THE PLACEBO EFFECT OF CAFFEINATED GUM ON ANAEROBIC PERFORMANCE IN COLLEGE AGED FEMALES

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BACKGROUND: Caffeine is one of the most examined ergogenic aids over the past 30 years, yet little research has evaluated the placebo effect of caffeine during this time. Furthermore, there is a scarcity of research conducted within the female population. Therefore, the primary aim of this study was to examine the effects of caffeine and the placebo effect in women on markers of anaerobic performance. **METHODS**: Sixteen females completed five sessions consisting of two familiarization trials and three experimental trials. Prior to the start of the experimental trials, participants were given either a 300 mg form of caffeinated gum or a placebo gum. For the last trial, participants were given a placebo and told they were receiving caffeinated gum. During the experimental trials, participants completed a repeated Wingate protocol consisting of four, 15-s Wingates followed by a 2.5 min recovery. Additionally, heart rate and rating of perceived exertion (RPE) were collected following completion of each Wingate. **RESULTS**: Wingate variables, RPE, and heart rate were analyzed via a 3x4 repeated measures analysis of variance (RMANOVA). If significant main effects or interaction effects were observed, post hoc testing was performed with Bonferroni's correction. Additionally, a 1-way RMANOVA was conducted to examine possible changes across *resting* heart rate in each group. Regarding max power, average power and fatigue index, there were no significant differences found (P>0.05). Regarding RPE, there was not a significant interaction or main effect found (P>0.05), however a significant time effect was found (P<0.001). Specifically, RPE increased across each stage, regardless of supplement. As it relates to heart rate, a significant interaction was not found (P>0.05), however a significant main effect (P=0.02) and a significant time effect (P=0.006) were found. Caffeine increased heart rate compared to either placebo or deception, although no differences between placebo or deception were found for heart rate. Additionally, heart rate increased across each Wingate, regardless of supplement consumed. Moreover, a significant main effect was found for resting heart rate (P=0.02). Caffeine increased resting heart rate compared to the placebo group (P=0.01), but not deception group (P=0.25). Further, deception increased resting heart rate significantly more than the placebo (P=0.03). **CONCLUSIONS**: Although the deception trial produced no statistical changes regarding performance markers, there was an increase in resting heart rate (~6 bpm) during the deception trial suggesting a psychological component to participants receiving a 'known' supplement. Further research is needed however, to determine the exact magnitude of this effect as our study was likely underpowered to observed statistical changes beyond resting heart rate.

P168: CAFFEINE NEGATIVELY AFFECTS SHORT PUTTS MADE BUT REDUCES SHOULDER FATIGUE DURING 18-HOLE SIMULATION

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BACKGROUND: This study examined if caffeine alters putting accuracy in golfers during 18 holes of simulated golf. **METHODS:** Male golfers (n = 10) (handicap 0-10) completed two, simulated 18-hole rounds of golf with placebo (PLA) or caffeine (CAF) (6 mg·kg^{-1}) in a double-blinded, counter-balanced design. Short (1.52 - 2.14m) and long (4.57 - 5.2m) putts were completed for each hole following a tee shot and a standardized (350 m) treadmill walk. Putts made, distance missed, HR, and acute RPE were measured for each hole. Session RPE was collected after completion as were subjective feelings for feelings of fatigue, nervousness, tremors, stomach distress, mood, and restlessness. **RESULTS:** Putts made (short distance) were statistically higher during PLA (6.3 ± 1.2) than CAF (5.1 ± 1.5) with no significant different for long distance (PLA = 3.9 ± 1.0, CAF = 3.8 ± 0.9). Accuracy, at the short putts (CAF = 27.3 ± 9.1cm, PLA = 26.8 ± 5.2cm) and long putts (CAF =34.5 ± 4.9cm, PLA = 32.1 ± 9.3cm), were not significantly different. RPE for shoulders was mitigated during the CAF session and approached significance (p = 0.06) with a divergence observed after hole nine. Compared with PLA, CAF resulted in significantly higher subjective feeling of tremors (p = 0.04), nervousness (p = 0.02), and stomach distress (p = 0.008) with no significant differences for fatigue, mood or restlessness. **CONCLUSIONS:** Caffeine before a round of golf negatively impacted putting (short distance only) but mitigated feelings of shoulder exertion later in the round for skilled golfers. Variation of results among participants indicates individuals should be aware of their personal responses to caffeine.

P169: THE INFLUENCE OF MENSTRUAL CYCLE PHASE ON FLUID INTAKE AND URINARY HYDRATION MARKERS

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BACKGROUND: Variations in female sex hormones across the menstrual cycle (MC) influence the osmotic threshold for the release of the fluid regulatory hormone arginine vasopressin, which has been shown to alter fluid retention and thirst perception. However, fluid intake behaviors across the MC have yet to be explored. Thus, the purpose of this study was to determine differences in fluid intake behaviors and hydration status across the menstrual cycle in naturally cycling females. METHODS: Seventeen naturally cycling females (mean±SD; age, 24±5 y; height, 163±7 cm; mass, 71.3±24.4 kg; body fat, 22.7±9.3%) provided 24h urine samples over three consecutive days during three timepoints throughout their MC; early follicular (MC_{EF}, days 3-5), late follicular (MC_{LF}, days 11-13), and mid-luteal (MC_{ML} days 18-20) phases, where day 0 was defined as the start of menstruation. Participants also completed daily fluid and dietary intake logs to assess fluid intake behavior. Urinary hydration biomarkers assessed included urine volume (U_{VOL}), urine osmolality (U_{OSM}), urine specific gravity (U_{SG}), and urine color (U_{COL}). MC phase was used in separate linear mixed effects models as a fixed effect predictor of total fluid intake (TFI, all fluids from beverages and foods) and urinary hydration biomarkers, with a random effect of participant. RESULTS: There was no significant effect of MC phase on TFI (MC_{EF}, 3472±1505 mL; MC_{LF}, 3416±1410 mL; MC_{ML}, 3331±1703 mL; β [95% CI], -171.59 [-348.7, 6.8], p=0.172). U_{VOL} was significantly greater during MC_{EF} (2.36±1.33 L) compared to MC_{LF} (2.09±1.41 L) and MC_{ML} (2.20±1.40 L), β=-0.145 [-0.268, -0.022], p=0.022. U_{OSM} was significantly greater during MC_{ML} (465±217 mOsm·kg^{-1}) than MC_{EF} (393±193 mOsm·kg^{-1}) or MC_{LF} (426±203 mOsm·kg^{-1}),(β=44.90 [19.0, 70.8], p=0.001. However, there was no impact of MC phase on U_{COL} (β=0.064 [-0.12, 024], p=0.489) or U_{SG} (β=0.0003 [-0.001, 0.002], p=0.751). CONCLUSIONS: Our results indicate fluid intake behaviors do not change throughout the menstrual cycle in naturally cycling females despite differences in 24h urine volume and urine osmolality. Since mean total fluid intake exceeded daily adequate intake recommendations with corresponding 24h urinary hydration markers

indicating euhydration, the potential clinical implications of menstrual phase on hydration status may be minimal, however this remains to be fully elucidated.

P170: CHARACTERIZING STRENGTH, PROTEIN INTAKE, AND PHYSICAL ACTIVITY IN PRE- AND POST-MENOPAUSAL WOMEN

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BACKGROUND: Women spend up to 40% of their lives in menopause. Menopausal changes coupled with age-related reductions in muscle strength can impact functionality and quality of life. Protein (PRO) intake and physical activity (PA) may also influence changes in muscle strength. The purpose of this study was to investigate the menopause status-related differences in maximal and rapid strength of the leg extensors in pre- (PRE) and post-menopausal (POST) women. A secondary aim was to understand the impact of dietary PRO and PA levels on strength. **METHODS:** Forty-six healthy females were stratified by menopause status: Pre-menopausal (n=23; Age=39.7±3.3 yrs; Wt=68.7±14.9 kg), and post-menopausal (n=23; Age=54.9±3.5 yrs; Wt=68.7±13.7 kg; amenorrheic for ≥12 consecutive months). Leg extensor strength of the dominant leg was evaluated by a calibrated portable isometric dynamometer. The greatest peak force (PF), and corresponding rapid forces, of 3 maximal efforts were utilized. The International Physical Activity Questionnaire was used to assess overall PA level. The Diet History Questionnaire III was used to assess PRO intake for the previous 30 days. Relative PRO intake (r_PRO) was evaluated by dividing the PRO intake by body mass (PRO[g]/body mass[kg]). Independent sample t-tests were used to examine differences between PRE and POST for PA, r_PRO, PF, and rapid force at 50, 100, 150, and 200 milliseconds (ms). Bivariate correlations were used to examine the relationships between the strength variables vs. r_PRO intake and PA. **RESULTS:** There were no significant differences between PRE and POST for PA [Mean Difference (PRE-POST)±Standard Error: -1146.9±678.1 MET min/wk; p=0.098), r_PRO (0.2±0.1 g/kg; p=0.212), PF (36.2±30.5 N; p=0.242), 50 ms (0.3±3.1 N; p=0.935), 100 ms (2.5±10.0 N; p=0.805), 150 ms (8.3±19.1 N; p=0.666), or 200 ms (12.6±26.5 N; p= 0.636). No significant correlations were observed between strength measures and r_PRO intake (p=0.153-0.949) or PA (p=0.052-0.702). **CONCLUSIONS:** The lack of significant differences in maximal and rapid strength measures between menopause groups may be due to the similar PRO intake and PA levels, which may signify the efficacy of these practical approaches to maintaining strength as women age. This study was supported by the UNC Center for Women's Health Research.

P171: DAILY FLUID INTAKE BEHAVIORS AND ASSOCIATED HEALTH EFFECTS AMONG AUSTRALIAN AND UNITED STATES POPULATIONS

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Background: Minimal data exist exploring the influence of age, physical activity (PA), and prevalence of associated chronic health conditions (CHC) on fluid intake (FI) behaviors and potential intercontinental differences. Therefore, the purpose of this study was to characterize how FI beliefs and behaviors may influence FI practices (beverage consumption, fluid volume, timing) between individuals residing in the United States (US) and Australia (AUS). **Methods:** 490 individuals (74.5% female; age, 25±6y; CHC, 16.3%; USA, 79.4%) completed a 23-item survey between November 2020 - June 2021. Participants were asked to detail their frequency of PA and FI (volume, frequency, and beverage type). FI beliefs were evaluated to determine their contribution to FI behaviors across the day and the presence of CHC. Multinomial and multiple linear regression analyses explored the association of daily FI beliefs and behaviors across multiple domains. An independent-samples t-test was conducted to compare FI, beliefs, PA, and CHC between the US and AUS. **Results:** FI behaviors were significantly different between countries, with the US more likely to consume fluids to meet a total target volume (β=1.150, p=0.036) and consume fluid at the same time as structured daily activities (β=0.773, p=0.046) compared to FI alongside food intake. However, there were no differences in beverage consumption (water, juice, sugar-sweetened beverages, and beer), total fluid volume, PA, or FI beliefs between countries (p>0.05). Beverage consumption was higher among US than AUS residents for coffee, tea, and wine (all p<0.05). Total fluid consumption (mL) was greater among males (3189±2407mL) than females (2215±1132mL; β=3.61, p<0.001), individuals who regularly consumed fluid during the day to meet a targeted volume (β=1728.5, p<0.001), and those who regularly consumed fluid as a habitual behavior (β=3.97, p<0.001) compared to those individuals who only consumed fluid alongside mealtimes (β=1041.7, p<0.001). Individuals with a CHC were less likely to be aware of their frequency of FI (β=1880.9, p=0.001). **Conclusions:** FI behaviors differed between the US and AUS. However, FI behaviors did not influence total volume consumed, choice of beverage consumed, and FI beliefs. Therefore, FI practices and behavior appear to be individualized, and location does not significantly affect drinking behaviors among this population.

P172: BODY COMPOSITION CHANGES DURING SUMMER TRAINING AMONG COLLEGIATE MEN'S BASKETBALL PLAYERS

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Title: Body Composition Changes during Summer Training among Collegiate Men's Basketball Players **Authors:** Shaun Kuo, Aston Dommel, and R. Drew Sayer **Institutions:** Department of Nutrition Sciences, University of Alabama at Birmingham **Background:** Body composition is an important determinant of athletic performance that is directly influenced by training and detraining. Collegiate athletes experience substantial variability in training intensity during the course of a season, but little research has been conducted to track changes in body composition across periods of intense training and breaks from structured sport-related activities. **Methods:** Body weight and composition were measured in members of a collegiate men's basketball team over the course of an 11-week summer training period. DXA scans were completed at the beginning of summer training (Pre), at the end of the 7-week intense training period (Post), and after a 4-week break from structured on-campus training (Break). Paired *t*-tests were used for comparisons of body weight, fat mass, fat free mass, and percent body fat at Pre vs. Post, Pre vs. Break, and Post vs. Break. Data are presented as mean ± SD. **Results:** Body weight was not significantly different throughout the summer training period. Total fat free mass increased 1.8 ± 2.2 kg from Pre to Post training (p = 0.007), but these fat free mass gains were partially lost during the 4-week break (-0.89 ± 1.1 kg, p = 0.006). Non-significant reductions in total fat mass were observed from Pre to Post training that were maintained throughout the 4-week break. The combined increase in fat free mass and trend towards reduced fat mass resulted in lower % body fat at Post (-0.9 ± 1.2%, p = 0.01) and Break (-0.8 ± 1.3%, p = 0.03) compared to Pre. **Conclusion:** These data demonstrate cyclic changes in body composition during a summer training period that could impact athletic performance. Future research should further evaluate potential mediators and moderators of changes in body composition and include performance measures. Research in this capacity may allow strength and conditioning experts to identify strategies to maintain training-induced body composition and performance gains during periods of less structured and intense training.

P173: ESTIMATION OF TOTAL BODY WATER USING SINGLE FREQUENCY BIOIMPEDANCE ANALYSIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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BACKGROUND: Single frequency bioimpedance analysis (SFBIA) is a simple alternative to isotope dilution techniques for assessing total body water (TBW). How characteristics related to the sample (e.g., age, health status) and SFBIA methodology (e.g., criterion technique, device, frequency, index) influence SFBIA accuracy has yet to be comprehensively examined. The aims of this systematic review and meta-analysis were to 1) quantify the accuracy of SFBIA for predicting TBW and 2) determine the potential impact of study-level effect modifiers. METHODS: Five electronic databases were searched for studies that compared isotope dilution TBW values to SFBIA. Standardized mean difference (SMD) effect sizes were calculated using the Gibbons method for each comparison and an overall estimate was generated using a three-level random-effects model. Within- and between-study level variance was evaluated using one-sided log-likelihood-ratio tests. When appropriate, subgroup analyses were

performed to identify potential study-level moderators. RESULTS: Aggregate-level data from 51 studies (255 individual effects) were included in the final analysis. Study samples included predominantly healthy participants with large ranges in mean age (0 to 82 y) and body mass index (14.1 to 50.2 kg/m^2). The overall SMD indicated a negligible difference between SFBIA and criterion dilution methods (SMD=-0.04, p=0.67), but lacked homogeneity at both the within-(σ^2=0.45) and between-study (σ^2=0.26) levels (all p<0.001). Moderator analysis revealed that the interaction between frequency and index (p<0.01) influenced the observed error between SFBIA and criterion methods. Resistance index (Ht^2/R) produced less error than impedance index (Ht^2/Z) across all frequencies (all p>0.10), with Ht^2/R at 50 kHz producing the most accurate estimate of TBW (β=0.06, p>0.05). Additionally, there was a small yet significant effect for sample sex (% women, β=-0.003, p<0.05), suggesting that SFBIA may underestimate TBW in samples that are predominantly women. No main effects were observed for other study-level factors (e.g., sample characteristics or BIA methodology). CONCLUSION: Overall, Ht^2/R produced less error in TBW estimation than Ht^2/Z, with Ht^2/R at 50 kHz providing the smallest mean difference in TBW when compared to isotope dilution. These results suggest that SFBIA may provide acceptable estimates of TBW across a range of diverse samples.

P174: RELATIONSHIP BETWEEN BODY COMPOSITION AND SELF-ESTEEM IN COLLEGE FEMALES

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BACKGROUND: Body composition is related to both physical and mental health. Self-esteem plays a significant role in an individual's psychological well-being. Therefore, the purpose of this study was to analyze the relationship between body composition and self-esteem in female college students. METHODS: Female college students (N=17, 20.1±1.7 years) completed a survey and body composition assessment. Participants completed the Rosenburg Self-Esteem survey, a 10-item questionnaire scored using a 1-4 Likert scale (ranging from "strongly agree" to "strongly disagree"). Upon completion of the survey, subject height was measured using a wall-mounted stadiometer. Weight and body fat percentage (BF%) were measured using the Bod Pod. Body Mass Index (BMI) was also calculated. Variables were normally distributed. Pearson correlation was used to analyze the relationship between BF% and BMI, BMI and self-esteem, and BF% and self-esteem. One-way ANOVA was used to assess if there were between group differences in self-esteem score based on BMI classification. RESULTS: There was a positive correlation between BF% and BMI (r=.785, p<.001) and between BF% and self-esteem (r=.495, p=.043). However, the correlation between BMI and self-esteem was not significant (p=.174). There was not a significant difference in self-esteem scores between groups categorized by BMI (p=.330). CONCLUSIONS: Previous research has concluded a negative correlation between body composition and self-esteem; however, a positive correlation between BF% and self-esteem resulted from the current study. This may be due to the small sample size and that 16 of the 17 participants were college athletes at the university, both of which are limitations to this study. Future research should focus on increasing sample size and comparing athletes vs. nonathletes.

P175: COMPARISON OF MAXIMAL FAT OXIDATION RATES BETWEEN EXERCISE MODALITIES IN COLLEGE-AGED WOMEN

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The purpose of this study was to determine if differences exist between exercise modalities and the measured maximal fat oxidation rates in college-aged females. Seven healthy moderately trained females (24.8 ± 6.22 y) were assessed during a graded treadmill and a graded cycle ergometer test to exhaustion to determine maximal oxygen consumption (VO2max) (33.26 ±5.7; 24.56 ±3.0 ml.kg.min, p=0.002) and the maximal fat oxidation rate (FatMax). During two subsequent exercise testing sessions, subjects performed an exercise protocol equating to incremental increases in speed and grade every 3 minutes until a respiratory exchange ratio (RER) of 1.0 was reached. Testing was administered within a two-week period, allowing a minimum of 48 hours between assessments, with similar conditions existing between tests. Standard gas measurements were collected and analyzed during all tests. The absolute FatMax was found to be 0.43 ± 0.102 g.min and occurred at 56.5% VO2max on the treadmill and 0.26 ± 0.053 g.min (55.2% VO2max) on the cycle. Paired-samples t-tests found a significant difference in FatMax between modalities (p=0.004), however FatMax occurred at roughly the same relative exercise intensity (p >0.05). Considering that VO2max was significantly different between modalities, the difference could be related to the amount of active skeletal muscle recruited with each exercise modality.

P176: NHLH2 EXPRESSION IN MUSCLE MAY CONTRIBUTE TO ENERGY EXPENDITURE PATHWAYS

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BACKGROUND: Obesity is a worldwide epidemic affecting billions of people every year, with one-third of the United States population considered either overweight or obese. The transcription factor nescient-helix-loop-helix-2 (*NHLH2*) has been implicated in neuronal pathways that regulate energy metabolism, including exercise motivation and energy uptake - both of which are associated with obesity. An RNA sequence analysis and porcine study have recently found *NHLH2* expression in muscle cells. This study sought to determine if, and when, Nhlh2 was expressed in a C2C12 myoblast cell line, which can be differentiated into myotubes. METHODS: C2C12 mouse myoblast cells were cultured in vitro to determine Nhlh2 expression as the cells differentiated from myoblasts to myotubes. A real-time qPCR analysis was performed to compare RNA from undifferentiated cells to that of the differentiated cells collected 2 hours post-treatment +/- leptin stimulation (as neuronal cell expression of *NHLH2* responds to leptin stimulation. *NHLH2* and melanocortin-4-receptor (*Mc4R*) target genes were both measured, as *Mc4R* is a neuronal target of *NHL2*. A two-way ANOVA test was used to determine significance (p<0.10). RESULTS: The data confirmed that *NHLH2* RNA was expressed in C2C12 mouse muscle cells, but that *Mc4R* expression was very low. *NHLH2* expression was almost doubled in differentiated cells as compared to proliferating cells (P=0.09), with again low overall expression of *Mc4R*. Differences in expression between +/- leptin treatment groups were not statistically significant. CONCLUSIONS: *NHLH2*, previously thought to be expressed only in neuronal cells, was found to be more highly expressed in differentiated C2C12 myotubes than proliferating myoblasts, confirming its expression in muscle. As *NHLH2* is a basic helix-loop-helix transcription factor similar to other muscle differentiation factors, such as MyoD, these data reveal that *NHLH2*-regulated pathways may be implicated in muscle differentiation and metabolism. Muscle is one of the largest energy consumers of the body, and errors in metabolism can lead to the development of muscle wasting and obesity. Further research will determine when *NHLH2* expression increases during the myoblast differentiation process to determine this transcription factor's involvement, if any, in muscle differentiation. This work was supported by the NIH R-25 grant (#R5DK2735) as part of the TOUR Scholars program, directed by TOUR Program Directors Dr. Deborah Good and Dr. Samantha Harden.

P177: IMPACT OF TRADITIONAL BLOOD FLOW RESTRICTION VERSUS BAND TISSUE FLOSSING ON METABOLISM AND PERFORMANCE

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Blood flow restriction during resistance exercise (BFR+RE) increases metabolic stress and muscle fiber recruitment, elevating fatigue and hypertrophy even at low resistance loads. Band tissue flossing (BTF) is a method for BFR involving the wrapping of a long elastic band around the limb. PURPOSE: The purpose of this study was to compare the effects of BTF to BFR during RE on changes in glucose, lactate, and total work performed. METHODS: Fifteen apparently healthy subjects (25±1.2yrs) visited the lab for three different sessions separated by at least 72 hours. Each session involved 3 sets of 20 max-effort seated leg extensions and flexions on an isokinetic dynamometer with one of three randomized conditions: control (CON), BFR, or BTF. During BFR and BTF sessions, occlusion was applied immediately before exercise and removed immediately after collecting post-exercise blood. Glucose and lactate measurements were collected pre- and immediately post-exercise. Total work performed was recorded for extension during each set and analyzed for between-condition differences. RESULTS: Only the CON and BTF conditions resulted in significantly lower glucose immediately post-exercise compared to pre-exercise (mean change: CON = -11.0±13.5 and BTF = -10.31±10.9mg/dL). However, no significant differences in mean change in glucose were found between any of the conditions. In all conditions, blood lactate post-exercise was significantly greater than pre-exercise (mean change: CON = 3.5±0.6,

BFR = 3.4±0.5, BTF = 3.4±0.6mmol/L), again with no between-condition differences in mean change. Total work performed during set 1 was not significantly different between conditions. During set 2, significantly less work was performed in BFR (p=0.046; 1024.9±96.9ft-lbs) and BTF (p=0.004; 865.1±118.2ft-lbs) when compared to CON (1182.0±115.6ft-lbs). During set 3, significantly less work was again performed in the BTF condition (p<0.001; 663.1±333.7ft-lbs) when compared to CON (1050.7±325.8ft-lbs). CONCLUSIONS: Application of an occluding device, whether BFR or BTF, results in significantly less work done than without occlusion. Despite the decrease in work, though, BFR or BTF+RE results in similar increases in lactate and uptake of glucose as seen when performing more work without occlusion. This suggests that both BTF and BFR are effective for achieving significant metabolite production during RE via lesser amounts of work.

P178: EFFECT OF CARBOHYDRATE TO PROTEIN RATIO ON METABOLIC FLEXIBILITY IN WOMEN ACROSS THE MENOPAUSE TRANSITION

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BACKGROUND: Evidence suggests a lower carbohydrate to protein (CHO:PRO) ratio may positively influence metabolism in women. The purpose of this study was to evaluate the effect of CHO:PRO on metabolic flexibility across the stages of menopause. **METHODS**: 72 healthy females (Age=48.3±7.2 yrs; Wt=69.2±14.2 kg) were separated into 3 subgroups pre-menopause (PRE; n=24), peri-menopause (PERI; n=24), and post-menopause (POST; n=24). Respiratory exchange ratio (RER) was measured via indirect calorimetry to determine the rate of fat oxidation (FATox), carbohydrate oxidation (CHOox), and metabolic flexibility (MF) during exercise. MF was measured during submaximal exercise on a cycle ergometer with watts (W) increasing by 25 W every 2-minutes until the participants reached 75% of their heart rate reserve (HRR). The ranges of intensity excluding the warm-up phase included: ≤30% HRR (low intensity [LOW]), 31-≤50% HRR (moderate intensity [MOD]), and 51-75% HRR (high intensity [HIGH]). Overall MF was determined by the change in RER by subtracting RER_{REST} from mean RER for each intensity (ΔRER_{LOW}, ΔRER_{MOD}, and ΔRER_{HIGH}). CHO:PRO was determined from Diet History Questionnaire (DHQIII) and stratified in tertiles as >3.3g, 2.5-3.3g, <2.5g. Repeated measures ANCOVAs, covarying for estrogen and total calorie intake, were used to evaluate the group-by-CHO:PRO ratio interaction effects. **RESULTS**: There was no significant group by CHO:PRO interaction for ΔRER_{LOW} (p=0.509), ΔRER_{MOD} (p=0.890), or ΔRER_{HIGH} (p=0.197), and no main effects for CHO:PRO ratio for MF (p=0.263-0.895). For ΔRER_{MOD}, there appeared to be a greater decrease in MF from PRE to PERI (Mean difference (MD) ± Standard Error (SE)= 0.009± 0.031 a.u.) with little difference from PERI to POST (MD ± SE: -0.003± 0.031 a.u.). There was also no significant effect of CHO:PRO on FATox (p=0.739) or CHOox (p=0.722). **CONCLUSIONS**: Alterations in CHO and PRO, after controlling for calorie intake and estrogen, do not appear to influence MF as women transition to menopause. Metabolic flexibility may be blunted in both peri- and post-menopause during moderate intensity exercise. Future research is needed to understand and identify potential strategies related to diet and exercise that may help maintain metabolic flexibility for women during this transitional time.

P179: THE AGREEMENT OF BODY FAT PERCENTAGE ESTIMATES FROM ULTRASOUND, SKINFOLD, AND AN UNDERWATER WEIGHING CRITERION

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BACKGROUND: Accurate measures of body composition are clinically important, as higher adiposity is associated with various unfavorable health outcomes. Ultrasound has been proposed as a viable alternative to skinfold (SKF) thickness for the estimation of body fat (%Fat) as it may overcome reliability concerns often associated with SKF measurement. However, ultrasound has not been extensively examined in generally healthy, young adults. Therefore, the purpose of this study was to examine the agreement between %Fat from ultrasound ($\%Fat_{US}$), skinfold thickness ($\%Fat_{SKF}$), and an underwater weighing ($\%Fat_{UWW}$) criterion. METHODS: A convenience sample of 46 young adults were included in our analysis (28.3% female, 82.6% Caucasian, 22.8±4.1 yrs., 24.3±3.5 kg/m^2). Ultrasound and SKF measurements were taken on the same seven standardized sites on the right side of the body by the same evaluator. For each participant, two SKF and ultrasound measures were taken at each site. For each measurement site, the two SKF and ultrasound measures were averaged. The averaged SKF site measures were then summed. The averaged ultrasound site measures were converted to millimeters, doubled, and then summed. The sum of SKF and ultrasound measures were used separately to calculate body density via the gender specific Jackson and Pollock equations. Body density via underwater weighing (UWW) served as the criterion measure. Subsequently, $\%Fat_{US}$, $\%Fat_{SKF}$, and $\%Fat_{UWW}$ were calculated using the Siri equation (%Fat = [495/body density] - 450). A repeated measures ANOVA examined potential differences between $\%Fat_{US}$, $\%Fat_{SKF}$, and $\%Fat_{UWW}$. Data are presented as mean ± standard deviation, with p<0.05 used to determine statistical significance. RESULTS: A small, non-significant mean difference was observed between $\%Fat_{US}$ (19.3±9.1 %Fat) and $\%Fat_{UWW}$ (18.1±6.8 %Fat) (ES=0.18, p = 0.11). A small, but statistically significant, mean difference was observed between $\%Fat_{SKF}$ (19.3±7.1 %Fat) and $\%Fat_{UWW}$ (18.1±6.8 %Fat) (ES=0.18, p = 0.05). Both, $\%Fat_{US}$ (r =.818, SEE=3.9 %Fat, p<.001) and $\%Fat_{SKF}$ (r =.808, SEE=4.0 %Fat, p<.001) yielded similar agreement with $\%Fat_{UWW}$. CONCLUSIONS: Ultrasound and SKF were comparable to UWW when measured using Jackson and Pollock's 7-site body density equations. However, the time burden to participants and added financial cost may not justify the utility of ultrasound within generally healthy, young adults.

P180: TRACKING BODY COMPOSITION CHANGES IN COLLEGIATE BASKETBALL PLAYERS: COMPARISON OF METHODS

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BACKGROUND: Evaluating the sensitivity of various technologies to detect body composition changes over time is helpful when assessing a strength training program's efficacy. The purpose of this study was to compare estimates of tracking lean mass (LM) and fat mass (FM) using dual-energy x-ray absorptiometry (DXA), three-dimensional body scan (3D), and multi-frequency bioelectrical impedance analysis (MF-BIA) in Division I collegiate male basketball athletes. METHODS: Body composition was measured in male basketball players (n=14; Mean ± standard deviation [SD], Age: 19.9±1.2 years, Height: 193.9±7.7 cm, Weight: 91.9±9.7 kg) before (May 2021) and after (July 2021) an 8-week training block. FM and LM were measured in the morning, following a minimum of a 2hr fast, via DXA (criterion method), 3D, and MF-BIA. Total error (TE) and standard error of estimate (SEE) were used to compare the accuracy of 3D and MF-BIA to DXA. Results were classified using Heyward and Wagner standards for evaluating prediction errors. Paired samples t-tests were used to evaluate the change in FM and LM between devices. RESULTS: 3D in comparison to DXA resulted in poor TE and fairly good SEE for LM (TE: 5.1 kg; SEE: 3.7 kg) and poor TE and very good SEE for FM (TE: 6.4 kg; SEE: 2.8). MF-BIA in comparison to DXA resulted in poor TE and ideal SEE for LM (TE: 9.1 kg; SEE: 2.2 kg) and fairly good TE and ideal SEE for FM (TE: 4.2 kg; SEE: 1.8 kg). LM changes between 3D and DXA were significantly different (Mean Difference ± Standard Error, 1.0±2.6 kg, p=0.02). No significant differences were seen in LM changes between MF-BIA and DXA (-2.8±3.0kg, p= 0.21) or between FM changes in 3D and DXA (-0.2±1.0 kg, p=0.42). FM changes between MF-BIA and DXA were significantly different (1.1±1.5 kg, p=0.01). CONCLUSIONS: The use of 3D to detect and track LM and FM changes may not be appropriate for this population due to poor TE. Depending on frequency of measurement, accessibility and time constraints, MF-BIA may be more practical for tracking changes in LM. If feasible, DXA may be the most appropriate device for tracking LM and FM changes in this population due to better TE and SEE.

P181: RESTING METABOLIC RATE IN RESISTANCE-TRAINED MALES AND FEMALES AGED 18-49: A PILOTED PREDICTION EQUATION

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BACKGROUND: Estimating resting metabolic rate (RMR) is useful when determining an individual's energy needs. Indirect calorimetry is the gold standard for estimating RMR, however, this procedure is not available to the general population. As such, prediction equations are a useful alternative. It has been recognized that the accuracy of

prediction equations may be population-specific. Individuals who resistance train are expected to have a higher RMR due to an increase in metabolically active tissue. Due to this, previously developed prediction equations often underestimate RMR in resistance-trained individuals. Therefore, a prediction equation specific to this population may be required. **METHODS**: Forty-two apparently healthy non-obese, individuals (74% female, 24.6 ± 7.3 years, 167.3 ± 9.2cm, 67.2kg ± 11.6kg 21.5 ± 7.4% BF) who engaged in muscle strength training for a minimum of twice per week for the previous 6 months were included. Reference RMR was estimated utilizing indirect calorimetry. Height, weight, and body composition (body fat percentage [BF%], fat mass [FM], fat-free mass [FFM], total body water [TBW], and dry FFM [dFFM: FFM-TBW]) were measured using A-mode ultrasound, skinfold calipers, and bioelectrical impedance. The results of these three methods were averaged and then used for analyses. Multiple stepwise linear regression analyses were performed to develop FFM and weight-based RMR prediction equations. Accuracy of the equations was examined using values for, R, R squared, standard error of the estimate, total error, and 95% limits of agreement. **RESULTS**: The resultant equations are as follows: FFM-based equation [RMR= 460 + (27 * FFM (kg)) - (10 *age) - (184*sex (1=M, 0=F))], weight-based equation [RMR= -850 + (15*weight (kg)) - (10*age) + (9.9*height (cm))]. A significant correlation was observed between the FFM and weight-based prediction equations when compared to the reference RMR (r =.91, p <.001 & r=.88, p<.001 respectively). **CONCLUSION:** Estimated RMR values from both equations were strongly related to measured RMR within resistance-trained individuals. If a person is unaware of their body composition, the weight-based equation may be a reasonable option. These results require replication using a fully powered and more diverse sample. Future research should provide validation of this newly developed equation to refine the ability to predict RMR in resistance-trained individuals.

P182: BODY COMPOSITION OF DIVISION I BASKETBALL PLAYERS PRE AND POST 8-WEEK STRENGTH AND CONDITIONING PROGRAM

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BACKGROUND: Total and regional body composition measures are directly related to performance and injury prevention. Multifrequency bioelectrical impedance analysis (MF-BIA) is a feasible method to track season long body composition changes. The purpose of this study was to examine the effect of an 8-week summer strength and conditioning program on body composition in National Collegiate Athletic Association (NCAA) Division I basketball players. METHODS: Body composition of 14 NCAA Division I basketball players (Age=20.4±1.3 yrs, Height=193.3±7.1cm, Weight=90.5±9.6 kg, Percent Body Fat =10.0±3.6%) was measured using MF-BIA at the start of summer training (May 2021) and again after concluding an 8-week strength and conditioning program (July 2021). Total body fat mass (FM), fat free mass (FFM) and regional (trunk, arms, legs) FM and FFM outcomes were evaluated. Paired sample t-tests were used to evaluate the pre- and post-training FM and FFM outcomes. RESULTS: Total body FM decreased significantly from pre- to post-training [Mean Difference (Pre-Post)±Standard Error: 0.89±0.26 kg, p=0.005). Trunk FM (-0.49±0.17 kg, p=0.014), left leg FM (-0.20±0.04 kg, p<0.001), and right leg FM (-0.17±0.03 kg, p<0.001) decreased significantly from pre- to post-training. Total FFM (2.46±0.50 kg, p<0.001) increased significantly from pre- to post- training. Trunk FFM (1.37±0.21 kg, p<0.001), left arm FFM (0.25±0.04 kg, p<0.001), and right arm FFM (0.27±0.05 kg, p<0.001) increased significantly, with no significant change in leg FFM from pre- to post-training. CONCLUSION: The overall increase in total body FFM and decrease in total body FM demonstrates the importance of off-season strength and fitness development. Future evaluations of the effect of number of sessions attended, the volume and intensity of exercise, and years of experience on the efficacy of an off-season training program may be warranted.

P183: SUBOPTIMAL SLEEP AND ADIPOSITY IN COLLEGE STUDENTS

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BACKGROUND: In adolescents and adults, suboptimal sleep characteristics have been associated with increased adiposity. Several sleep disturbances such as short sleep, and variability in sleep duration, quality, and timing are prevalent among college students due to social and academic pressures that impact sleep hygiene. However, it is unknown whether these sleep characteristics are related to adiposity during a time where excess weight gain is prevalent and which, if any, are most influential. Moreover, the interplay between sleep and lifestyle behaviors such as physical activity (PA) and nutrition are well documented, but it is unclear whether these factors mediate the relationship between sleep characteristics and adiposity. Therefore, our aims are twofold, - first to assess cross-sectional and prospective associations among sleep characteristics and adiposity and second, to perform an exploratory analysis to identify if behavioral variables (e.g., PA and nutrition) might mediate this relationship. **METHODS:** The sample will include college students aged 18-22 years (n=100, 50% Female) with no history of eating or sleep disorders, no orthopedic injuries preventing physical activity and no use of medications know to alter sleep. Participants will be assessed prospectively over two academic semesters to allow for changes in sleep characteristics relative to changing academic schedules. Anthropometric measurements including height, weight, waist and hip circumference will be collected. Sleep characteristics, diet, and PA will be assessed subjectively using various validated online questionnaires. Sleep, PA, and sedentary behavior will also be assessed objectively using a wrist-worn tri-axial accelerometer for 7 days following each testing visit. Lastly, adiposity will be assessed using Bioelectric Impedance Spectroscopy where fat mass (% and kg) as well as fat free mass (kg) will be collected. The data will be analyzed using linear mixed models including sleep variables and known behavioral covariates. **ANTICIPATED REDULTS:** We anticipate that sleep characteristics including short sleep duration, night-to-night variability in sleep duration, and sleep timing will be associated with increases in adiposity. Further, we also anticipate that changes in diet such as late-night snacking, decreased PA, or increases in sedentary behavior will mediate the relationship between the sleep variables and adiposity. **FUNDING:** Funding for this project was provided by Undergraduate Research Program at Elon University.

P184: FAT-FREE MASS IS A PREDICTOR OF ENERGY INTAKE IN YOUNG ADULTS

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Background: Recent evidence suggests that fat-free mass, but not fat mass or body weight, is a strong predictor of total energy intake in adults. Fat-free mass is the largest and most metabolically costly component of body composition, suggesting it is a major driver of energy intake. Additional research is needed to assess this association exclusively in young adults. **Objective:** The primary goal of this cross-sectional analysis was to assess the association between fat-free mass, fat mass, and body weight with daily energy intake in young adults (M age = 18 years). **Design:** Data collected as part of the RIGHT Track study, a longitudinal study on growth and development, included assessment of body weight (digital scale), body composition (BodPod), and daily energy intake (three 24-hour dietary recalls) at 18 years of age (n=192; 103 females). **Results:** A multivariable linear regression analysis revealed that fat-free mass ($\beta = 0.697$; $p = 0.02$), but not fat mass ($\beta = 0.179$, $p = 0.65$) or body weight ($\beta = -0.569$, $p = 0.29$), was a significant predictor of energy intake ($R^2 = 0.417$; $p < 0.001$). **Conclusions:** These results are consistent with previous findings, showing that fat-free mass is the strongest predictor of energy intake when exclusively assessed in young adults. Fat-free mass measures, rather than body weight and fat mass, could therefore be used to estimate energy intake more accurately. This research was funded by the NIH (R01 HD078346-01A1).

P185: ASSESSMENT OF EXERCISE-INDUCED DEHYDRATION AND REHYDRATION: EFFECTIVENESS OF USING PREDICTION EQUATIONS FOR PLASMA OSMOLALITY

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ASSESSMENT OF EXERCISE-INDUCED DEHYDRATION AND REHYDRATION: EFFECTIVENESS OF USING PREDICTION EQUATIONS FOR PLASMA OSMOLALITY
BACKGROUND: Plasma osmolality (POsm) is a gold standard for assessing hydration status; however, osmometers are primarily found in research labs and therefore POsm is not typically measured in clinical or athletic settings. PURPOSE: To compare the accuracy in assessment of dehydration versus rehydration states following the

ingestion of oral rehydration solution (ORS) between published equations estimating POsm from Na^+, K^+, glucose, and blood urea nitrogen (BUN) versus direct measured POsm. METHODS: Seventeen healthy men cycled 90 min in the heat losing ~2.5% body mass and then ingested Pedialyte ORS ([Na^+] = 42.6 mmol/L; [K^+] = 30.9 mmol/L) replacing 100% of sweat loss over 30 min (~2 liters). Blood samples were collected at dehydration, then 30, 60, and 90 min post rehydration. POsm was directly measured with 50 µl samples (Micro Osmette osmometer, Precision System Inc). These values were compared to three highly cited equations estimating POsm (mmol/L): 1) 2 x (Na^+ + K^+) + BUN+ Glucose (Gerich, Diabetes, 1971); 2) 1.86 x (Na^+ + K^+) + (1.15 x Glucose) + BUN + 14 (Hooper, British Medical Journal Open, 2015); and 3) 2 x Na^+ + Glucose + BUN (Worthley, Anaesthesia and Intensive Care, 1987). RESULTS: All estimation equations were significantly correlated with measured POsm ($p < 0.0001$, R^2 ranging from 0.64-0.72). At dehydration and 90 min post-rehydration, measured POsm was 294.6 ± 3.4 and 285.0 ± 3.1 mosmol/L, respectively. At dehydration, Worthley was lower ($p < 0.05$) than the other equations and measured POsm (mean osmole gap = -3.4 mosmol/L). Conversely, at 90 min post rehydration, Gerich and Hooper equations were higher than Worthley and measured POsm (mean osmol gaps = -4.9 and -3.7 mosmol/L). CONCLUSION: Dehydration due to sweat losses in the heat results in underestimation of POsm when using equations excluding plasma K^+ (e.g. Worthley). However, rehydration is not accurately assessed with equations including K^+ (e.g. Hooper and Gerich) when ORS is ingested to fully restore fluid balance. Therefore, selection of an appropriate published equation to estimate POsm depends on the nature of dehydration and/or fluid replenishment. Supported by a grant from Einsof Biohealth, Miami, FL.

P186: THE EFFECT OF FLUID AVAILABILITY ON CONSUMED FLUID VOLUME AND PERCEPTUAL THIRST MEASURES DURING AEROBIC EXERCISE

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BACKGROUND: Ad libitum fluid intake is a common hydration practice during exercise. Fluid availability is a factor thought to influence fluid intake. However, it is currently unknown if readily available fluid will impact fluid intake behavior and gastrointestinal (GI) issues that are often associated with increased fluid intake. PURPOSE: The purpose of this study was to determine if ad libitum verses periodic fluid intake influences water consumption and GI distress during exercise. METHODS: Male and female NCAA Cross Country athletes (n = 11; age = 20 ± 1 y) participated in this counterbalanced cross-over study. Each participant completed a moderate intensity 10-km run on two separate occasions. In one trial, participants had unlimited availability to fluid to consume ad libitum (AL). In the other trial, participants consumed fluid periodically at stations placed every 3.2 km (PER). Assurance of euhydration prior to each trial was confirmed via urine specific gravity (USG) and urine color. Subjective perceptions of thirst and gastric fullness were assessed pre- and post-exercise via Likert questioning and a visual analog scale, respectively. RESULTS: Participants started each trial euhydrated (AL = 1.009 USG ± 0.009; PER = 1.009 USG ± 0.009; urine color AL = 3 ± 1; urine color PER = 2 ± 1). Fluid volume consumption was significantly higher during the AL condition compared to PER ($p = 0.05$). Thirst significantly increased from pre to post run regardless of treatment ($p<0.001$), however, there were no differences between the groups ($p = 0.492$). Feelings of fullness did not change pre-post trial ($p = 0.304$) or between trials ($p = 0.958$). CONCLUSIONS: Increased fluid availability allows for increased fluid consumption without the negative experience of GI discomfort. Individuals should consider having regularly available fluid during exercise to increase the volume of fluid consumed and mitigate dehydration.

P187: THE IMPACT OF SEXUAL ORIENTATION ON FOOD INSECURITY AMONG DIVISION 1 STUDENT ATHLETES

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BACKGROUND**:** Food insecurity is a growing health concern among U.S. college students with reported incidence as high as 59%. Among this population are LGBTQ+ students and student athletes. It is well established that individuals identifying as LGBTQ+ are disproportionately affected by FI. However, data on student athletes, and particularly LGBTQ+ student athletes is lacking. Inadequate access to consistent, nutritious food can present barriers detrimental to success in the classroom as well as competitive athleticism. Therefore, the objective of this study was to measure the prevalence and severity of food insecurity among heterosexual (HS) and LGBTQ+ Division 1 student athletes and to identify possible reasons for observed differences in FI between these two groups. METHODS: Eligible Division 1 NCAA student athletes 18 years of age or older were included in this multi-site cross-sectional survey study. Data was collected using an anonymous online questionnaire (Qualtrics®), with food security status measured via the validated 10-item USDA survey. Additional information including demographic data, food and nutrition-related knowledge, and questions on sexual orientation were collected. RESULTS: A total of 404 participants completed the survey, with 380 identifying as HS and 24 identifying as LGBTQ+. A total of 59 (15.5%) HS student athletes experienced low food security and 67 (17.6%) experienced very low food security in the past 12 months. Conversely, 2 (8.3%) LGBTQ+ student athletes experienced low food security with 1 having experienced very low food security (4.2%) in the past 12 months. CONCLUSIONS: These results illustrate the high prevalence of food insecurity among Division 1 student athletes at two southeastern universities. When very low, low, and marginal FI are combined, approximately 50% of student athletes identified as food insecure. Though contrary to similar comparative studies on the LGBTQ+ population, our results show LGBTQ+ student athletes experiencing less food insecurity than the HS student athletes. Overall, these results demonstrate a need for strategies and interventions that increase access to consistent food resources in this population.

P188: FOOD INSECURITY AMONG COLLEGE STUDENT ATHLETES IN THE SOUTHEASTERN REGION: A MULTI-SITE STUDY

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BACKGROUND: The prevalence of food insecurity among college students is a growing public health concern with incidences reported as high as 59%. Among this population are college student athletes. Preliminary evidence suggests college student athletes may be especially vulnerable to food insecurity because of their additional athletic obligations that are secondary to other coexisting factors associated with food insecurity as a college student. The primary objective of this study was to measure the prevalence and magnitude of food insecurity among college student athletes at two southeastern universities. METHODS: Eligible Division 1 NCAA student athletes 18 years of age or older were included in this multi-site cross-sectional survey study. Data was collected using an anonymous online questionnaire (Qualtrics®), with food security status measured via the validated 10-item USDA survey. Additional information including demographic data, food and nutrition-related knowledge was also collected. RESULTS: When combining participants identifying with very low food security, low food security and marginal food security, approximately 50% of participants identified as food insecure. Incidence of very low food security was two-fold greater at UAB (urban environment) versus ASU (rural environment). CONCLUSION: Preliminary results of the present study suggest that food insecurity is a profound and present issue at these two southeastern universities. This highlights the need for nutritional/educational resources to support student athletes' performance both in the classroom and in their respective sport. The significance of these preliminary findings magnifies the importance for continued research on food insecurity among college student athletes at other institutions. This information could one day be used to lobby governing bodies both at the university and NCAA level to provide more adequate support and resources for the college student athletes that represent their institution.

P189: THE EFFECT OF CAFFEINE SUPPLEMENTATION ON RATE OF TORQUE DEVELOPMENT IN FEMALES

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BACKGROUND: Previous research investigating the effects of caffeine on rapid force characteristics have mainly been performed in males,

with little to no research in females, especially those on oral contraceptives (OC). Therefore, the purpose of this study was to assess rate of torque development (RTD) of the quadriceps following acute caffeine supplementation in college-aged females on OCs. **METHODS:** Twenty recreationally active females (Mean ± SD; 20 ± 1 y) volunteered to participate in a randomized, double-blind crossover, placebo-controlled study. Participants completed a familiarization visit and a 1-week caffeine (CAF) washout, followed by two experimental visits in which RTD of the right quadriceps was assessed in 20-minute intervals prior to and following the consumption of either CAF (6 mg/kg/bw) or placebo (PLA). RTD was assessed via maximum voluntary isometric contraction (MVIC), in which subjects were asked to "kick as hard and fast as possible." Peak RTD (pRTD), as well as RTD during 0-100 ms (RTD_{0-100}) and 100-200 ms ($RTD_{100-200}$) were calculated from each MVIC offline. **RESULTS:** Repeated measures ANOVAs indicated that pRTD was greater in CAF when compared to PLA (750.6 ± 328.7 $Nm \cdot s^{-1}$ vs. 649.5 ± 318.9 $Nm \cdot s^{-1}$; p=0.010) and collapsed across time. A significant interaction effect and post-hoc analyses indicated that RTD_{0-100} was significantly greater at CAF_{20} (552 ± 356.6 $Nm \cdot s^{-1}$) when compared to CAF_{100} (400.6 ± 305.7 $Nm \cdot s^{-1}$; p=0.025) and at PLA_{PRE} (338.0 ± 240.9 $Nm \cdot s^{-1}$) when compared to PLA_{20} (231.4 ± 173.3 $Nm \cdot s^{-1}$; p=0.022). RTD_{0-100} was also significantly greater in CAF at PRE (555.0 ± 385.7 vs. 338.0 ± 240.9 $Nm \cdot s^{-1}$; p<0.001), $POST_{20}$ (552.0 ± 356.6 vs. 231.4 ± 173.3 $Nm \cdot s^{-1}$; p=0.001), $POST_{60}$ (523.9 ± 293.5 vs. 261.6 ± 244.5 $Nm \cdot s^{-1}$; p=0.002), and $POST_{100}$ (400.6 ± 305.7 vs. 324.8 ± 175.4 $Nm \cdot s^{-1}$; p<0.001), when compared to PLA. There were no changes in $RTD_{100-200}$. **CONCLUSIONS:** The primary finding of the present study was significantly greater early-phase and pRTD in CAF, when compared to PLA. Specifically, RTD_{0-100} significantly declined from PRE to $POST_{20}$ in PLA, but not CAF. While there was a significant decrease in RTD_{0-100} in CAF from $POST_{20}$ to $POST_{100}$, RTD_{0-100} was significantly greater during CAF at $POST_{20}$, $POST_{60}$, and $POST_{100}$. Thus, these data suggest that CAF resulted in a net increase in early-phase RTD when compared to PLA, despite the lack change from PRE in the CAF condition.

P190: SEX DIFFERENCES IN BODY COMPOSITION CHANGE IN COLLEGE ATHLETES DURING AN EXTENDED HOLIDAY BREAK

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Background: The COVID-19 pandemic caused substantial disruptions to collegiate sports including mandatory lockdown orders and rescheduling or cancelling of competitive seasons. These disruptions in training regimens and access to on-campus training facilities caused concern among athletic staff regarding potential adverse changes to athletic performance and body composition in the athletes. The purpose of this study was to determine how weight, muscle mass, fat mass, and vertical jump changed in collegiate athletes while they were on an extended winter break due to COVID-19. **Methods:** Body weight, fat mass, and muscle mass were measured using bioelectrical impedance analysis in 107 collegiate athletes (n=50 male, n=57 female). Vertical jump was measured using the Just Jump System in 43 athletes (n=8 males, n=35 females). All measures were obtained 2 weeks before winter break (11/9/20-11/20/20) and within 2 weeks of returning to campus (1/4/21-1/15/21). Pre- and post-winter break body composition data were analyzed in SAS 9.4 using paired t-test and analysis of variance (ANOVA). Results are presented as Means ± SE. **Results:** Among all athletes, a t-test analysis showed a significant gain in body weight from pre to post winter break (1.10 ± 0.37 lbs. $p < 0.05$). When considered by sex, males experienced significant weight gain (2.48 ± 0.51 lbs. $p < 0.05$), but weight change was not significant in female athletes Results from ANOVA confirmed that changes in body weight different between males and females (p<0.05). A similar pattern was observed for changes in fat mass. T-test analyses showed a significant gain in fat mass in the entire sample (1.25 ± .25 lbs. $p < 0.05$) and in males (2.35 ± 0.33 lbs. $p < 0.05$) but not females ($p > 0.05$). A significant difference in changes in fat mass between male and female athletes was confirmed by ANOVA (p<0.05). Muscle mass and max vertical jump were unchanged during the extended winter break. **Conclusion:** These data demonstrate potential sex differences in body weight and fat mass change among college athletes during an extended winter break. Future research should determine whether female and male athlete engaged in different dietary and physical activity behaviors during the extended winter break and whether the same trend is seen over a usual winter break. Research such as this may help practitioners develop sex-specific strategies to maintain optimal body composition and athletic performance during extended breaks.

P191: THE EFFECT OF DIETARY NITRATE SUPPLEMENTATION ON SKELETAL MUSCLE CONTRACTILE PROPERTIES IN FEMALES AND MALES

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Nitric Oxide (NO) plays a pivotal role in muscle contractile function. Inorganic nitrate (NO_3-) supplementation has been demonstrated to increase NO bioavailability and potentially improve exercise performance. Currently the effects of dietary nitrate (NO_3^-) on muscle function in young healthy females compared to males is understudied and unclear. **Purpose**: To determine sex-differences of dietary NO_3^- supplementation on skeletal muscle function during knee extension and muscular endurance during a time to failure (TF) task. **Methods**: Seven healthy females (age 24.0±3.6y, BMI 24.0±3.9) and ten healthy males (age 23.4±3.7y, BMI 25.1±2.6) were randomized in a double-blind, placebo-controlled crossover study. Female subjects were tested during the Early Follicular phase of the menstrual cycle to control for estrogen levels. Subjects ingested 70ml twice/day for 5 days, either NO_3^--rich Beet root juice (BRJ ~13mmol NO_3^-) or NO_3^--depleted placebo (PL). The last dose (140ml) was ingested 2h prior to laboratory arrival. Knee extension contractile function was assessed using a Biodex 4 isokinetic dynamometer at three different speeds (180°, 270°, and 360°/sec) during 10 consecutive maximal efforts. Subjects were given a thirty second rest between each speed. After a 5min rest, subjects completed a TF task which consisted of cycles of 3 sec contraction at 60% maximal isometric voluntary contraction and 2 sec rest for as long as possible. An inability to maintain the 60% threshold on three different occasions despite verbal encouragement throughout the test was considered as the end of the test. **Results**: Repeated Measures Two-Way ANOVA revealed that there were no significant differences in peak torque (nM/Kg), average power (watts/kg) and peak power (Watts/Kg) at all speeds for males or females between BR and PL conditions ($p > 0.05$ for all). Similarly, TF was not statistically different in females (PL; 269.14±161.17 vs BRJ; 277.14±157.50 sec; $p > 0.05$) or males (PL; 228.20±171.13 vs BRJ;194.13±99.65 sec; $p > 0.05$). **Conclusion:** Dietary nitrate supplementation did not increase muscle contractile function or endurance in healthy young males or females.

P192: A PILOT STUDY EXAMINING EXERCISE AND GASTROINTESTINAL HABITS AMONGST COLLEGE STUDENTS

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BACKGROUND: College represents a time of changing habits for many individuals. Exercise is well established to impact gastrointestinal health, but little research has been conducted to assess this in college students. Thus, the objective of this pilot study was to assess the current exercise and gastrointestinal habits in college students. A secondary objective of this study was to identify potential relationships between exercise and gastrointestinal habits in this population. **METHODS**: This cross-sectional survey was conducted at a small public Southeastern University in Spring 2021. 183 students completed the survey with the average age being 22.2 years old. Survey questions assessed demographics, exercise history and current exercise level, gastrointestinal habits (Bowel Health Questionnaire), and sleep. Data was collected using Qualtrics and analyzed using SPSS and GraphPad Prism. T-tests, and one-way ANOVAs were run to analyze potential relationships between exercise and gastrointestinal habit variables. Statistical significance was set at p<0.05. **RESULTS**: On average, students reported participating in 2.47 days of vigorous exercise, 3.21 days of moderate exercise, and 3.58 days of light exercise over the past 7 days. Individuals who met the ACSM guidelines for vigorous exercise for least 3 days per week had significantly more episodes of gas in the past month compared to those who did not meet the guidelines for vigorous exercise (p=0.004). No statistically significant relationships were observed between other gastrointestinal habit parameters and exercise frequency (mild/light, moderate, or vigorous). One major finding was that 11.4% of individuals reported gastrointestinal symptoms preventing them from starting or completing a physical activity or exercise session at some point in the past 30 days. **CONCLUSIONS**: Overall, this study establishes a baseline understanding of exercise and gastrointestinal habits in college students at a small, public, Southeastern university. Relationships between certain gastrointestinal

symptoms and exercise were observed. Additional research should be conducted using more specific measures of exercise and gastrointestinal habits. Future studies should also assess interventions to minimize gastrointestinal symptoms to allow greater participation in physical activity.

P193: EFFECT OF QUARANTINE AND ISOLATION ON NUTRITION AND FOOD INSECURITY IN STUDENT-ATHLETES

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BACKGROUND: Nutrition and food insecurity for many student-athletes became a source of stress and a logistical hurdle if under quarantine or isolation on or off campus during the spring of 2021. The purpose of this study was to investigate the level of impact quarantine or isolation protocols had on nutritional intake, and food insecurity in student-athletes. METHODS: A survey was developed specific to nutritional intake, and food insecurity outcomes. The anonymous survey (Microsoft Forms) was distributed via email to student-athletes toward the end of the Spring 2021 semester. RESULTS: 124 participants consented to the study (55 males, 68 females, 66% white). 64% of subjects reported having to isolate or quarantine at least once, with 50% doing so on campus. 65% of athletes reported their eating habits changed drastically or moderately during isolation or quarantine. Athletes reported decreases in intake of vegetable (68.3%), grain (59.5%), fruit (64.6%), lean protein (58.3%), and red meat (65.8%). Student-athletes also reported feeling insecure about food (51%), and reported quarantine/isolation (30.8%), or access to the cafeteria (35.9%) as the top two sources of insecurity, with financial insecurity still reported as the number one source by 28% of respondents. 29% of student-athletes reported having to eat less than they felt they should because of not enough food or money, with 52% reporting still feeling hungry after eating a meal in the cafeteria. 63% of student-athletes reported not being able to work as they previously did due to COVID. Finally, 90% of student-athlete reported that their coaches understand their basic nutritional needs, yet 42% report practice often conflicts with dining hall hours. CONCLUSIONS: The primary sources of nutritional stress were related to quarantine protocols, cafeteria hours and access, and other financial insecurities. Nutritional access and food insecurity should be a priority in future studies and considered paramount in developing support plans for student-athletes.

P194: ACUTE CAFFEINE SUPPLEMENTATION ENHANCES BASEBALL PITCHING PERFOMANCE

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BACKGROUND: Caffeine is an ergogenic aid that has been shown to enhance exercise performance, as well as a variety of sport-specific tasks. However, the effect of caffeine on baseball pitching performance has limited scientific study. The purpose of this study was to examine the effects of acute caffeine supplementation on pitching performance in competitive baseball players. METHODS: Fifteen collegiate baseball players were recruited for this study. Using a double-blinded, counterbalanced, crossover design, subjects supplemented with either 5 mg/kg of caffeine (CAFF) or a placebo (PL; gluten-free cornstarch) 60 minutes before testing. During each trial, subjects completed 10 maximal effort throws from a pitching mound in the stretch position with 20 seconds of rest between throws. Subjects were instructed to throw as hard as possible, while focusing on hitting a strike zone target placed 18.4 m away. Throwing speed (mph) was measured using a radar gun placed behind the strike zone. Throwing accuracy was recorded as the number of throws that hit inside the strike zone. A paired samples t-test and Cohen's d effect size calculations were used to compare throwing speed and accuracy between conditions. RESULTS: CAFF significantly increased peak throwing speed ($p=0.014$, $d=0.73$) and mean throwing speed ($p=0.006$, $d=0.83$) compared to PL. Additionally, throwing accuracy was significantly higher following CAFF ($p=0.045$, $d=0.57$). CONCLUSION: Acute caffeine ingestion enhances baseball pitching speed and accuracy in competitive baseball players.

P195: EFFECTS OF ACUTE YOHIMBINE HCL INGESTION ON ANAEROBIC SPRINT PERFORMANCE

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BACKGROUND: Yohimbine hydrocholoride (YHM) possess sympathomimetic properties which are mediated through antagonism of adrenergic receptors resulting in greater norepinephrine release. While a multitude of stimulants have been studied in the context of exercise performance, there is a paucity of research inquiring as to whether YHM can provide ergogenic benefits. **PURPOSE:** The purpose of this study was to examine the effects of acute YHM ingestion on anaerobic capacity, anaerobic power, total work, and fatigue index during repeated Wingate Anaerobic Tests (WAnT) **METHODS:** In a double-blinded crossover design, physically active females (18-25 years) participated in two separate repeated cycle sprint trials each with a different treatment: Placebo (PL; gluten free corn starch) or Yohimbine Hydrocholoride (YHM; 2.5 mg). For each trial, participants consumed their respective treatment 20 minutes prior to exercise. Following a warm-up, participants completed 3 × 15 second Wingate anaerobic tests (WAnT) separated by 2 minutes of active recovery. Anaerobic capacity, anaerobic power, total work, and fatigue index were analyzed between treatments. **RESULTS:** YHM ingestion did not result in improvements in anaerobic capacity ($p= 0.161$), anaerobic power ($p= 0.154$), or total work ($p= 0.107$) compared to PL. However, YHM ingestion resulted in a lower fatigue index ($p= 0.027$). **CONCLUSIONS:** YHM supplementation does not appear to improve power output and total work during repeated sprints. However, it resulted in a lower fatigue index indicating that YHM ingestion may attenuate fatigue and preserve power output. Thus, individuals seeking to combat fatigue during repeated sprints may use YHM as an effective dietary enrichment strategy.

P196: THE EFFECTS OF ACUTE RAUWOLSCINE SUPPLEMENTATION ON ANAEROBIC EXERCISE PERFORMANCE

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BACKGROUND: Rauwolscine is an alpha-2-adrenergic antagonist that is marketed as a performance enhancing supplement. Currently, there is a paucity of research on rauwolscine supplementation and exercise performance. The purpose of this study was to investigate the effects of acute rauwolscine supplementation on anaerobic exercise performance. METHODS: Eight resistance-trained males were recruited for this study. Using a double-blinded, counterbalanced, crossover design, subjects supplemented with either 2 mg of rauwolscine or a placebo (PL; gluten-free cornstarch) 30 minutes before anaerobic testing. During each trial, subjects completed 3 × 15 s Wingate Anaerobic Tests (WAnT) with a 2 min active recovery period between tests. Mean power, peak power, fatigue index, total work, and rating of perceived exertion (RPE) were recorded and analyzed. Additionally, blood lactate was measured prior to and immediately following the exercise tests. RESULTS: There was no difference in peak power ($p=0.821$), mean power ($p=0.453$), fatigue index ($p=0.980$), total work ($p=0.429$), and RPE ($p=1.000$). Blood lactate was higher during the rauwolscine trial compared to PL ($p=0.050$). CONCLUSION: Acute rauwolscine supplementation had no effect on anaerobic exercise performance and perceived exertion in resistance-trained males.

P197: PRE-SLEEP FEEDING IN NCAA DIVISION I FEMALE ATHLETES

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BACKGROUND: Due to the high metabolic demand of sport, it is essential that athletes meet their caloric need to support training, recovery, and muscle growth. Consuming protein (30-40g) before sleep may have positive effects on muscle protein synthesis, overnight recovery, and performance. Currently no data exists to assess pre-

sleep nutrition habits in elite female athletes. PURPOSE: To examine the frequency and content of pre-sleep nutrition in elite female athletes. METHODS: 483 Division I female athletes (mean ± SD: age: 21.4 ± 2.5 yrs, weight 67.1 ± 10.2 kg, height 171.2 ± 8.9 cm) from four universities wore a WHOOP, Inc. band 24h a day for the entire 2020-2021 competitive season to measure activity, sleep, and recovery. Surveys were administered through the WHOOP app every 3 days over the season to collect data on pre-sleep feeding habits. Descriptive results were completed using R studio. RESULTS: 3741 pre-sleep feeding survey responses were recorded. Of that, 23.9% (n = 895) of the data was unusable as caloric content could not be determined due to insufficient data reported. The remaining 76.1% (n = 2846) of the survey responses were made up of 276 athletes, of which, 21% (n = 58) ate before bed more than once. The average pre-sleep food intake for n=58 consisted of total kcals (mean ± SD: 283.4 ± 68.8 kcals), protein (8.3 ± 3.2g; 11.5% of total kcals), carbohydrate (35.8 ± 13.0 g; 50.4% of total kcals), and fat (12.1 ± 3.8 g; 38.1% of total kcals). Percentage of each sport that ate before sleep was 24.1% soccer, 13.8% swimming, 12.2% cross country, 8.6% volleyball, 6.9% softball, 5.3% beach volleyball, 3.4% golf, lacrosse, and tennis, 1.7% basketball, and 17.2% the sport was not specified. CONCLUSIONS: This is the first study to investigate the self-reported frequency of pre-sleep feeding in a wide range of female sports at the NCAA Division I level. Of 483 female athletes in the study, only 58 users recorded that they ate before bed on more than one occurrence. Meals prior to bed primarily consisted of carbohydrate (50.4%) and fat (38.1%), with only 11.5% of pre-sleep kcals coming from protein. The impact of pre-sleep feeding on next-day performance and recovery is warranted.
This study was supported by WHOOP, Inc.

P198: THE EFFECTS OF THREE WEEKS OF TIME-RESTRICTED EATING WITH RESISTANCE EXERCISE ON MUSCULAR STRENGTH IN COLLEGE AGED ADULTS.

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Introduction: Time-restricted eating (TRE) has shown to have a multitude of benefits one's overall health such as reducing the risk for cardiovascular disease and promoting weight loss. However, there is limited data on effects of TRE on muscular strength. Purpose: The current study examined the effects of TRE with resistance training (RT) on muscular strength in college-aged adults. Methods: Eleven healthy college-aged adults between the ages of 18-21 years, volunteered to complete a 3-week RT. The subjects were randomly assigned into either control group (CG) or experimental group (EG). The CG performed the RT workout 3 days a week with normal diet for three weeks. The EG performed the RT workout 3 days a week with TRE diet that allowed subjects to consume food between 11am and 8pm for three weeks. Body weight measurement and one repetition maximum test for bench press and back squat were administered at baseline and post-intervention. All data were analyzed by a 2 (group) x 2 (time) ANOVA with repeated measure ($p < 0.05$). The Bonferroni pairwise comparisons were conducted as post hoc to locate the significant mean differences. Results: Either CG or EG did not significantly change muscular strength and body weight. Conclusion: Three weeks of TRE with resistant training did not enhance muscular strength. This research can be used for a guide for those interested in their muscular fitness goals. The long-term effects of the TRE diet on muscular strength should be further explored in future studies.

P199: PRIORITIZING HEALTHBEHAVIORS FORFIRSTYEAR STUDENTS TOMANAGESTRESS AND DEPRESSION

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BACKGROUND: First year college students often experience emotional turmoil due to the transition (Wyatt, et al., 2017), and mental health challenges have amplified during the COVID pandemic. Fruehwirth, et al., (2021) reported an increase in depression prevalence for first year college students from 21.5% before to 31.7% four months into the pandemic. Social isolation and distanced learning increased the prevalence of depression and anxiety. Risk factors for stress, anxiety, and depression include history of mental illness, heavy workload, poor grades, and lifestyle factors. Additionally, Black Americans and women are at increased risk for depression. We previously reported the relationships that physical activity participation and weight status have with stress and depression. Nutrition habits, stress, depression, weight, and physical activity(PA) can mutually affect each other. Therefore, the purpose of this presentation is to discuss the relationship of nutrition habits with stress, depression, and physical activity. Methods: Participants (N=110) were students at an HBCU who completed a Polar TriFit assessment at the university's wellness center. PA, nutrition habits, stress, and depression symptoms were self-reported. Results: Only 2% of participants had nutrition habits classified as excellent, and those participants also scored low for stress and depression. The difference in the distribution of nutrition habits for stress and depression were significant ($p<.05$). More low stress participants reported good or excellent nutrition habits compared to those who reported mild or moderate stress levels (34.7% vs. 11.3%). More than half (51.5%) of those who scored low for depression symptoms reported good or excellent nutrition habits compared to 10% of those who scored mild or moderate depression symptoms. More physically active participants reported excellent or good nutrition habits compared to physically inactive participants (31.7% vs. 12.8%; $p=.001$). Conclusions: There is an association between good nutrition habits and lower stress and depression symptoms. Universities should offer nutrition education to all students and affordable healthy food options on and around campus. The more we continue to learn about the positive effects of nutrition on stress and depression, the more programs should be implemented to provide students with good nutrition and ultimately contribute to healthy lifestyle changes.

P200: POSITIVE RELATIONSHIPS BETWEEN UNLIMITED ONLINE QUIZZES AND IN-CLASS EXAM PERFORMANCE IN AN UNDERGRADUATE NUTRITION COURSE

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BACKGROUND: Although tests are typically used to assess knowledge, testing itself has been shown to be a way of improving retention (Tulving, 1967). As such, multiple-choice quizzes have been shown to improve retention in classroom final exams (Bjork, Little & Storm, 2014). This increased retention reveals itself more so in the long term vs. short term (Roediger & Karpicke, 2006). METHODS: Students enrolled in undergraduate Human Nutrition classes (five cohorts) were provided eight online quizzes utilizing the Blackboard Learning Management System. Students were allowed unlimited submissions, but were required to wait two hours or more between attempts on a single quiz. Quizzes contained 10 questions selected by Blackboard software at random each time from large pools with the order of answers also randomized. Students also took four in-class exams on content presented in the quizzes and a cumulative final exam at the end of the course. Two quizzes covered material in Exam 1, three quizzes for Exam 2, one quiz for Exam 3 and two quizzes for Exam 4. At the end of the semester, students took a cumulative final exam which covered material from all quizzes. Quizzes were scored on a 20 point scale with the best grade attained, exams scored on a 50 point scale including the cumulative final. Multiple Regression was used to compare quiz grades to subsequent exam grades. Pearson correlation statistics were used to compare the number of quiz attempts to quiz grades. Repeated Measures ANOVA were used to compare differences in Quiz grades and attempts. RESULTS: The sample size consisted of 55 female and 68 male students. The mean number of attempts on each quiz ranged from 2.837 to 4.107 and the mean grades ranged from 16.667 to 18.313 (83.335% to 91.565%). Mean exam grades ranged from 33.372 to 36.533 (66.744% to 73.066%). The mean number of attempts on each quiz significantly ($p < 0.001$) differed and number of attempts were significantly correlated to the grades on the quizzes ($r = 0.258$ to 0.420, $p < 0.005$ or lower). The mean grade on quizzes significantly ($p < 0.001$) differed and higher grades on quizzes were significantly related to higher grades on subsequent exams for Exams 2-4 ($p < 0.001$) and the cumulative final ($p = 0.006$) but not on Exam 1 ($p = 0.112$). CONCLUSIONS: The number of attempts on online low-stakes quizzes allowing multiple attempts were positively related to quiz grades which, subsequently were positively related to exam performance. As a result, online quizzes may be an effective tool for learning in an undergraduate Human Nutrition course.

P201: THE METABOLIC AND PHYSIOLOGICAL DEMANDS OF A FIRE GROUNDS TASK VS. A LIVE-BURN IN PROFESSIONAL FIREFIGHTERS

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BACKGROUND: Firefighting is demanding, creating a unique situation that presents the firefighter with a dual-stress challenge (i.e. simultaneous physical and mental stress). Dual-stress challenges, such as a live-burn, victim search and rescue (S&R), are known to exacerbate markers of cardiovascular disease more so, than a single physical or mental stress alone. To date, no study has attempted to determine if the fire grounds test (FGT) mimics the metabolic and physiological demands of firefighting. **METHODS**: Twenty-eight firefighters were recruited for this study. In a counterbalanced design, fourteen firefighters were randomized to complete either a FGT or a S&R. The FGT consisted of a victim removal, hose deployment, ladder carry, room search, stair climb, a forced entry and ceiling breach, and a roof walk. The S&R consisted of firefighters searching for three ‘victims (i.e. 100 kg dummies) inside a burning building while also attempting to extinguish the fire. Markers of stress (cortisol, uric acid, interleukin-1 beta) were collected pre, immediately post, and 30 min post each task to examine the metabolic demands. Additionally, heart rate and air depletion (PSI) were measured immediately post each task to examine the physiological demands. Stress markers were analyzed with a 2-way mixed model repeated measures analysis of variance. Physiological markers were measured with an independent t test. **RESULTS**: For stress markers, there was a significant interaction found for interleukin-1 beta (P=0.008). Post hoc analysis found that the S&R elevated circulating interleukin-1 beta concentrations, 30 min post task compared to the FGT. For cortisol, there were no significant interactions or main effects found (P>0.05). However, a time effect was found (P=0.007). Overall, cortisol was higher in both groups immediately post-task, compared to baseline. There were no further differences for uric acid or immediate post heart rate and PSI between either group (P>0.05). **CONCLUSIONS**: Physiological markers were not different between the FGT and S&R groups. Interleukin-1 beta demonstrated a greater increase to the S&R task when compared to the FGT. Our data show that the FGT may not mimic the metabolic demands of actual firefighting. Therefore, fire departments may want to consider adding an additional mental stressor and/or environmental stress to their entry test which closer mimics the demands of firefighting.

P202: GENETICALLY-ESTIMATED TELOMERE LENGTH WEAKLY ASSOCIATES WITH BODY COMPOSITION AND METABOLIC PROFILES BUT NOT CARDIORESPIRATORY FITNESS

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Background: Leukocyte telomere length is associated with many age-related diseases. However, its association with fitness-related traits and exercise responses are less understood. The purpose of this study was to investigate the association of genetically estimated telomere length (gTL) with cardiorespiratory fitness and metabolic traits before and after endurance exercise training in the HERITAGE Family Study. Methods: gTL was calculated in Black and White adults from the HERITAGE Family Study (n=708) using 9 established telomere length GWAS SNPs. Race-stratified associations between gTL and baseline measures and changes in cardiorespiratory fitness traits, body composition, and the components of metabolic syndrome were determined using partial correlations controlling for age. Results: Mean (±SE) gTL significantly (p<0.001) differed between Black (754.5±8.2 bp) and White subjects (603.1±5.98 bp). There were no associations between gTL and cardiorespiratory fitness traits at baseline or in response to training in Black or White subjects. Furthermore, there were no associations between gTL and body composition traits at baseline or in response to training in Black subjects. In White subjects, gTL was negatively, weakly correlated with baseline body composition measures including: BMI (r=-0.14), waist circumference (r=-0.12), visceral fat (r=-0.11), fat mass (r=-0.13), percent body fat (r=-0.11); all p<0.05. Only change in waist circumference was correlated with gTL in Whites subjects (r=-0.12, p=0.02). At baseline, Black (n=55) and White (n=97) subjects with metabolic syndrome had significantly shorter mean gTL compared to those without (p<0.05). Furthermore, gTL was negatively correlated with number of baseline metabolic syndrome components in Whites (r=-0.12, p=0.02), but not Blacks. In response to training, gTL was negatively correlated with change in number of metabolic syndrome components in Whites (r=-0.10, p=0.044), but positively correlated in Blacks (r=0.15, p=0.047). Conclusion: Baseline cardiorespiratory fitness traits and their response to training were not associated with gTL. Increased central adiposity and metabolic syndrome components are associated with shorter gTL in Whites. The gTL estimate used may not be optimized in Blacks and perhaps not sensitive enough to fully capture hypothesized associations with fitness traits or metabolic health.

P203: EFFECTS OF CAFFEINE ABSTINENCE ON THE ACUTE RESPONSE TO LOW-LOAD BLOOD FLOW RESTRICTION EXERCISE

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BACKGROUND: Caffeine (CAFF) ingestion is known to enhance muscular responses to exercise. Blood flow restriction (BFR) studies typically require CAFF abstinence (ABS) prior to BFR exercise (BFR-ex). Yet, this hasn’t been tested in habituated CAFF users. The aim of this study was to compare the acute muscular responses to BFR-ex following habitual CAFF intake and acute ABS. METHODS: 10 participants completed a 3 visit within-subjects (2-14d apart) study. Visit 1 involved familiarization, CAFF intake form, and one-repetition maximum (1RM). Visits 2-3 consisted of dominant arm BFR-ex (3 sets of biceps curls to failure at 30% 1RM, 40% AOP, 30s inter-set rest). In a counterbalanced order, one visit was with CAFF and the other ABS (both 1hr after typical intake). Maximal voluntary contractions (MVC, N) were taken pre- and post-BFR-ex. Electromyography amplitude (EMGa) of the biceps brachii was measured during MVCs and BFR-ex and normalized as a percentage of peak activation during pre-MVC (%Pre). Normalized EMGa during BFR-ex was averaged over the first 3 and last 3 repetitions for each set. Repetitions (REP) completed were recorded for each set. Bayesian RMANOVAs were conducted for all variables to find the most probable alternative model vs. the null (BF_{10}). EMGa for MVC was compared with a Bayes paired t-test. Data are mean±SD. RESULTS: A main effect of time (BF_{10}=6.740e+^{6}) suggests MVC decreased from pre- (234.8±56.0) to post (143.8±54.2). Anecdotal evidence suggests there may be no difference (BF_{10}=.374) in MVC EMGa between CAFF (93.1±54.3%) and ABS (82.1±40.2%). A main effect of time (BF_{10}=1.923e+22) for REPs indicated higher REPs completed in set 1 (33.7±9.7) vs. 2 (11.2±3.2, BF_{10}=1.143e+^{8}) and 3 (8.9±3.0, BF_{10}=1.159e+^{9}); and set 2 vs. 3 (BF_{10}=217.4). A main effect of time (BF_{10}=38.213) indicated that exercise EMGa increased from the beginning (112.7±45.4) to the end of set 1 (209.1±114.9, BF_{10}=486.856), and from the beginning (168.1±73.2) to the end of set 2 (198.2±103.5, BF_{10}=3.221). However, weak evidence suggests no difference from the beginning (175.4±79.6) to end of set 3 (186.2±99.1, BF_{10}=0.576). CONCLUSION: Muscular responses to BFR-ex appear to not differ between ABS vs. CAFF. Future studies may not require participants to ABS from CAFF prior to BFR-ex.

P204: MALE COLLEGIATE SOCCER PLAYERS UNDERESTIMATE SWEAT LOSSES REGARDLESS OF SWEAT LOSS VOLUME

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BACKGROUND: Prescribing fluid intake during and between training or competition bouts requires an accurate estimation of individual sweat losses. This study evaluated sweat loss estimation accuracy among collegiate male soccer players (n = 17) following three practice sessions in the heat. METHODS: Data were collected during a pre-season training camp morning (AM1; 90 minutes; 31.2 ± 0.5°C) and afternoon (PM1; 90 minutes; 26.9 ± 0.9°C) practice and during a regular season morning practice (AM2; 90 minutes; 31.5 ± 0.3°C). Change in nude body mass, with adjustment for fluid intake and urine output, from pre- to post-practice was assessed to determine sweat loss volume. After each practice participants estimated their sweat loss volume by filling cups with a volume of water equivalent to the volume of sweat they believed they lost during the practice session. RESULTS: Sweat losses differed (p < 0.05) among all 3 practices (AM1 2.181 ± .693 L; PM1 1.706 ± .474 L; AM2 3.360 ± .956 L). Estimated sweat

loss volume was less ($p < 0.001$) than actual sweat losses for AM1 (0.804 ± 0.329 L; 40.2 ± 21.5%), PM1 (0.672 ± 0.324 L; 40.1 ± 19.9%) and AM2 (1.076 ± 0.489 L; 31.8 ± 11.6%) but there were no differences in percentage accuracy. PM1 sweat loss estimation was less than the two morning practices ($p < 0.01$). CONCLUSIONS: Male soccer players greatly and consistently underestimate sweat losses regardless of sweat loss volume. Displaying to players their actual versus estimated sweat losses may increase awareness of fluid needs and improve hydration behaviors, particularly among those who chronically hypohydrate.

P205: EFFECT OF CAFFEINE ON PHYSICAL PREFORMANCE IN FEMALE COLLEGE SOCCER PLAYERS

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Background: Soccer requires a large range of physical demands for high level performance and requires a unique set of physical demands due to a blend of aerobic and anaerobic energy system contributions. Studies on the effects of caffeine supplementation on soccer performance have largely focused on males completing soccer-specific drills. Females' responses to caffeine may differ from males and drills may not mimic game play. Therefore, this study proposes to examine caffeine's effects on physical performance and perceptual responses in simulated women's NCAA D1 soccer competition. **METHODS:** Participants will be 27 NCAA D1 athletes (age 18 to 23). Participants will avoid caffeine for ≥ 24 hours before trials. The design will be a double blind, placebo controlled cross-over study. A total of four full length scrimmages will take place. The first two scrimmages will be two days apart, followed by the third and the fourth a week later also two days apart. Participants will be randomly assigned into two teams. Half the players on each team will consume caffeine (6 mg/kg body weight) for the first two games and the other half for the last two games, with a matched placebo administered in alternate trials. Capsules (caffeine and placebo) will be administered 1-hour prior to trials. Players will wear a TITAN GPS system tracking; distance traveled, speeds at ≥18.1 km, speeds at ≥21.6, total sprints, load, accelerations, decelerations, top speed, and sprint distance (mean and total). Heart rate will be monitored using a Polar Heart Rate Monitor. The Omni RPE scale will be used to estimate acute and session RPE, with the Perceived Recovery Scale used for subjective assessments of pre-exercise feelings of recovery. Repeated measures ANOVA will be used to assess differences between trials. **ANTICIPATED RESULTS:** Caffeine will have a positive effect on performance measures and mitigate acute and session RPE. PRS will be sensitive to total work in previous trials.

P206: EFFECT OF THERAPEUTIC EXERCISE ON RELAPSE RATE IN HOSPITALIZED EATING DISORDER PATIENTS VERSUS STANDARD TREATMENT

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BACKGROUND: 30 million people are diagnosed with eating disorders in the United States alone. Within this population, 35-41% of patients relapse within 18 months of the start of treatment. Eating disorder patients are often restricted from exercise since many compulsively over exercise at a high intensity. However, the effect of occasional low-intensity exercise during eating disorder treatment has not been studied in association with relapse rate. Therefore, this proposed study intends to investigate the impact of low-intensity, trainer-led walking on relapse rate in hospitalized eating disorder patients. METHODS: In the Spring of 2022

P207: THE IMPACT OF A HIGH FIBER DIET ON PULSE WAVE VELOCITY IN YOUNG ADULTS AT RISK FOR CARDIOVASCULAR DIESEASE

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BACKGROUND: Cardiovascular disease (CVD) is the leading cause of death globally. CVD risk is increased through poor diet, particularly when the diet is low in fiber. High fiber diets have been recommended to reduce CVD risk and all-cause mortality. However, it is unclear whether increasing fiber intake can improve subclinical cardiovascular outcomes in asymptomatic individuals, i.e., decreased CVD risk. The purpose of this study is to evaluate whether a high fiber diet reduces aortic arterial stiffness (AS), measured using carotid-femoral pulse wave velocity (PWV), in young adults (20-35 years) at risk for CVD. METHODS: Our proposed 8-week randomized control trial will include young (20-35 years) male and female adults (n=60), at high risk for CVD. American College of Sports Medicine risk stratification scoring including age, family history, smoking status, sedentary lifestyle, obesity, dyslipidemia, prediabetes, and dietary patterns (meal number, food group consumption, snacking habits) will be utilized to classify CVD risk. Eligible moderate to high-risk participants will be randomized into three groups including one control and two experimental groups. The control group (n=20) will be instructed to continue their normal dietary pattern. One experimental group will increase fiber intake (45 g) in addition to their normal diet (n=20). The second experimental group will substitute fiber (45 g) for isocaloric foods from their normal diet (n=20). At baseline, 4-week, and 8-week timepoints, PWV will be measured. A linear mixed model will be used to assess the group and time differences in PWV across the duration of the study. ANTICIPATED RESULTS: We hypothesize that the implementation of a high fiber diet, whether this be as an addition to one's normal diet or as a substitution will reduce PWV after 8-weeks. A 1 m/s decrease in PWV will be considered a clinically significant CVD risk reduction. Our proposed study will potentially lead to improvements in dietary recommendations to improve AS in young adults at risk for CVD.

P208: IMPACT OF DIETARY HABITS ON THE EXTENT OF FRAILTY IN ADULT SURVIVORS OF CHILDHOOD CANCER

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BACKGROUND: Frailty, physical weakness, is one measurable indicator of poor health that is associated with premature aging and is a predictor of chronic disease. Typically, frailty is prevalent in older adults who are experiencing the effects of aging. However, recent research recognizes that the premature aging effects of cancer treatment make frailty a concern in cancer survivors as well. This study population will consist of women survivors of childhood acute lymphoblastic leukemia (ALL) because adolescent cancer survivors and women are especially at-risk groups. Frailty is defined as experiencing three or more of the following: low muscle mass, exhaustion, low energy expenditure, slow walking speed, or muscle weakness. This study will analyze the extent of frailty in women survivors of childhood cancer in comparison to an age-matched group. Additionally, dietary and exercise habits will be examined to see if lifestyle habits and the extent of frailty are correlated. METHODS: Whole body and regional muscle mass will be measured using a DXA scanner. To determine walking speed, the participants will be instructed to walk at their normal pace for 15 feet. Slow walking speed will be determined based on time in relation to height. Muscle weakness will be measured using a hand grip dynamometer and will be calculated based on BMI and age-specific cut off points. The Medical Outcomes Survey Short Form-36 will be used to measure exhaustion. Participants that score 1.3 SD below the population mean will be categorized as experiencing exhaustion. Energy expenditure will be measured using a physical activity questionnaire from the National Health and Nutrition Examination Study. Participants who expend less than 270 kilocalories per week will be classified as having low energy expenditure. Physical activity will be tracked using an accelerometer wristband and dietary habits will be recorded using the MyFitnessPal application over a 7-day period. ANTICIPATED RESULTS: It is expected that cancer survivors, compared to age-matched women, will experience higher levels of frailty as demonstrated by low muscle mass, slower walking speed, more severe muscle weakness, lower energy expenditure, and higher levels of exhaustion. Additionally, decreased frailty will be associated with positive dietary and exercise habits in both cancer survivors and age-matched controls.

P209: THE IMPACT OF A WORKPLACE PHYSICAL ACTIVITY AND NUTRITION EDUCATION PROGRAM ON BEHAVIORAL CHANGE

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BACKGROUND: The risk for diabetes and cardiovascular disease increases in individuals with metabolic syndrome (MetS), which is defined as the clustering of various risk factors of metabolic origin including obesity, dyslipidemia, hypertension, and hyperglycemia. Behaviors widely practiced in the United States do not support effective control of these risk factors, and different variables such as lack of knowledge and resources inhibit the necessary behavioral change. Previous studies have shown that various educational programs designed to address and support the dietary and lifestyle changes required to control metabolic risk factors are efficacious. The

purpose of this study is to determine the efficacy of a 16-week nutrition and physical activity education program in changing behaviors that have a negative impact on health outcomes. METHODS: A total of 26 participants were recruited from a local university to participate in a 16-week education program: 8-weeks synchronous in-person program with weekly group and individual sessions; 8-weeks asynchronous program with weekly newsletters and by-weekly individual sessions; 4-weeks with no programming. Group education sessions consist of modules that cover healthy eating, meal planning, physical activity, and stress management, whereas, individual sessions focus on personal goal setting, goal attainment, and quality of life assessment. Assessments were completed before the program and will be repeated at weeks 4, 8, 16, and after 4 weeks of no programming. The Automated Self Administered 24-Hour Dietary Assessment (ASA24®), International Physical Activity Questionnaire (IPAQ), Self-Regulation of Eating Behavior Questionnaire (SREB), Short Form Self Regulation Questionnaire (SSR), and Adult Eating Behavior Questionnaire (AEB) will be used to assess dietary and physical activity behavioral change. Results will be analyzed using repeated measures ANOVA to determine the significance of differences between various time points. ANTICIPATED RESULTS: It is hypothesized that participation in the interactive intervention education program will enable participants to develop long-term behavior changes that will reduce the risk of developing metabolic syndrome.

P210: FAMILY DIETARY CHARACTERISTICS AND CHANGES IN EATING HABITS ACROSS THE TRANSITION TO COLLEGE

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BACKGROUND: Literature suggests that an average young adult will gain around 7.5 pounds during their first year of college. Importantly, accelerated weight gain during this time is associated with increased lifetime risk of obesity and heart disease. Characteristics of the family environment, such as how often the family eats per day, whether those meals are home cooked, and family food choices play a significant role in the development of eating habits. However, there is little information on how such characteristics impact dietary choices as young adults begin to make independent food decisions in the college setting. Thus, the purpose of the study is to, first, establish cross-sectional associations among characteristics of the family environment and eating habits during youth, and second, determine whether those same characteristics are associated with changes in eating behaviors following the college transition. **METHODS:** This prospective study will follow high school seniors (n=75, 50% females), aged 17-18 years at study entry with no history of eating disorders. Participants will be assessed twice with baseline assessments occurring during the spring semester of senior year and follow-up assessments occurring during the first semester of college. Characteristics of the family environment, including how often the family eats together and the source of meal (e.g., home-cooked or take-out) will be assessed using questions taken from the Family Eating and Activity Habits Questionnaire. Eating habits, including total caloric intake, fruits and vegetable consumption, and added sugars, will be assessed using the National Cancer Institute's automated self-administered 24-hour (ASA24) dietary assessment tool. Associations among characteristics of the family environment and both cross-sectional and prospective eating habits will be assessed using linear regression. **ANTICIPATED RESULTS:** We anticipate that family units that eat together more frequently and tend to eat more home-cooked meals will be associated with positive eating habits during high school. We also anticipate that these same characteristics will be associated with more stable (less detrimental changes) eating habits as participants transition to college. **FUNDING:** Funding for this project will be provided by the National Heart, Lung, And Blood Institute of the National Institutes of Health under Award Number R15HL159650 and Undergraduate Research Program at Elon University.

P211: EFFECTS OF CHEMOTHERAPY REGIMENS ON SKELETAL MUSCLE MITOCHONDRIAL FUNCTION IN BREAST CANCER PATIENTS MEASURED BY NEAR INFRARED SPECTROSCOPY

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Background: Cancer patients undergoing chemotherapy are known to develop skeletal muscle mitochondrial dysfunction and subsequent cachexia due to massive treatment related oxidative stress, increasing the risk of chemotherapy-related morbidity and mortality. The timeline is unknown as to when this dysfunction starts to occur and is traditionally measured via invasive muscle biopsy. This adds additional burden to the patient and makes tracking of cachexia throughout treatment difficult. **Purpose:** To assess the effects of differing chemotherapy regimens on skeletal muscle mitochondrial function throughout treatment in breast cancer (BC) patients using near infrared spectroscopy (NIRS). **Methods:** Non-metastatic BC patients will be recruited prior to the initiation of chemotherapy treatment involving taxanes and/or anthracyclines. Mitochondrial function of the vastus lateralis muscle will be measured during activation, noninvasively, by assessing changes in oxygenated and deoxygenated hemoglobin using a NIRS PortaMon device. Within 5 days prior to every infusion, participants will perform moderately intense exercise on a stationary ergonometric bike while wearing the PortaMon device. Data collected in real-time by the NIRS will be analyzed using a one-way ANOVA to detect differences in mitochondrial oxidative capacity between different chemotherapy regimens as well as between treatment time points within each individual regimen. Between treatment differences will be considered statistically significant at $\alpha < 0.05$. **Results:** Throughout chemotherapy treatment, it is anticipated that the time constant (Tc) it takes the vastus lateralis muscle to reoxygenate will increase indicating skeletal muscle mitochondrial dysfunction. It is also anticipated that there will be between treatment differences in mitochondrial oxidative capacity. **Discussion:** The results of this project will further provide insight into how different chemotherapy regimens impact mitochondria at a cellular level, potentially further informing oncology practice regarding the costs and benefits of a chemotherapy regimen. This is a novel way to noninvasively assess mitochondrial function during treatment in a cancer population, which has not yet been previously studied.

P212: SURFACE EMG COMPARISON OF ISOMETRIC POSTERIOR CHAIN EXERCISE IN TORQUE MATCHED CONDITIONS

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BACKGROUND: Low Back Pain (LBP) is the second most common cause of disability in the U. S., with approximately 80% of adults experiencing low back pain at some point in their lives. In order to best treat LBP, exercises should selectively target the impaired muscle groups. The Reverse Hyperextension (RH) exercise allows an individual to strengthen the posterior chain while simultaneously providing extrinsic stabilization of the abdomen and spinal column. Alternatively, the traditional Back Extension (BE) allows strengthening with the lower extremities stationary on a supported surface, and the torso hinging in an open chain position through flexion and extension. This study assessed the activation of spinal erectors utilizing the RH and BE when the two exercises are matched for hip torque and hip angle. METHODS: Maximal trunk extension effort was collected performing Biering-Soransen test on standard high plinth with counter stabilization placed mid gastrocnemius. Downward force was applied to the trunk at the level of spine of scapula for duration of 5 second for a series of 3 trials. Isometric RH and BE were performed at hip angles of 120, 140, 160, and 180 degrees of extension with hip angles measured manually using an inclinometer. Torques about the hip for the RH and the BE at each desired posture were matched using anthropometric tables and equations for static equilibrium. Data analysis compared surface EMG amplitude of the iliocostalis, longissimus, and multifidus at the 4 hip angles. A two-way within-subjects ANOVA was performed to compare exercise and angles. RESULTS: The RH elicited a significant increase in muscle activation for the longissimus thoracis at all angles, when compared to the BE ($F_{(1,19)} = 117.24$); $p<0.05$). A main effect was present for exercise for the left and right illiocostalis ($F_{(1, 19)} = 35.74$, $p<0.05$; $F_{(1,19)} = 19.61$, $p<0.05$, respectively) and for angle at 120 ($F_{(1,19)} = 49.96$, $p<0.05$) and 180 ($F_{(1,19)} = 41.52$, $p<0.05$) degrees. There was not a significant difference in multifidus activation between the two exercises. The most significant difference in muscle activation occurred at 180 degrees for all muscle groups. CONCLUSIONS: This research indicates the RH can serve as an effective exercise to target the paraspinal musculature. An increase in muscle activation correlates to an increase in force production and strength and, typically, a decrease in pain.

P213: INCIDENCE OF PAIN IN YOUTH SOFTBALL PITCHERS AND POSITIONAL PLAYERS

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BACKGROUND: The rise in fastpitch softball participation across the United States is associated with increased injury rates. Pitchers are 2.6 times more likely to sustain an injury than positional players; therefore, the purpose of this study was to compare the incidence of pain between youth softball pitchers and positional players. **METHODS:** 33 youth (<18yrs) fastpitch softball pitchers (age: 13.7 ± 2.0yrs, height: 163.8 ± 8.2cm, weight: 63.7 ± 16.0kg) and 56 positional players (age: 14.9 ± 2.5yrs, height: 159.8 ± 17.6cm, weight: 63.1 ± 14.8kg) completed an online Qualtrics® survey during the 2021 season. The presence of pain was determined by answering "yes" to the question, "Do you currently experience any pain/discomfort?". Those who answered "no" were considered "pain free". A Chi-Square Test of Independence was used to analyze the association between position (pitcher or positional) and incidence of pain. Statistical significance was set a priori to $p<0.05$. Descriptive analyses were performed to examine pain location, intensity [0(least)-10(most pain) scale], and the frequency of those who continue to play with the onset of pain. **RESULTS**: 30% (n = 10) and 38% (n = 21) of pitchers and positional players reported experiencing pain, respectively. However, the Chi-Square Test of Independence revealed no statistically significant association between position and pain incidence ($\chi_{(1)} = .474$, p=.491). The most frequently reported pain locations were the shoulder (40%) and elbow (30%) for pitchers and the shoulder (62%) and knee (33%) for positional players. The average pain intensity was 5.2 and 5.0 for pitchers and positional players, respectively. The percentage of pitchers and positional players who played through their experienced pain during practice or competition was 70% and 82%, respectively. **CONCLUSIONS:** Pitchers did not exhibit a higher incidence of pain than positional players; however, it is important to note the high incidence of pain in both pitchers (30%) and positional players (38%). Future research should identify upper extremity pain and injury risk factors in pitchers and positional players since the shoulder and elbow were two of the most frequently reported pain locations. Athlete monitoring and injury prevention strategies should be enhanced to reduce the rates of athletes playing with pain during practice and competition.

P214: COMPARING TRAINING VOLUMES BETWEEN SOFTBALL PITCHERS WITH AND WITHOUT UPPER EXTREMITY PAIN

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BACKGROUND: Youth baseball pitchers with upper extremity (UE) pain have higher training volumes and play more months per year than pitchers without pain. Similar research has not been done in softball despite comparable UE injury rates. The purpose of this study was to investigate the differences between training volumes and months per year playing between softball pitchers with and without UE pain. **METHODS:** 36 youth and high school softball pitchers (14.0 ± 2.0yrs, 58.8 ± 28.5cm, 62.0 ± 19.9kg) active on a team roster within the past 6 months completed an online survey via Qualtrics. Participants were asked *Do you currently experience any pain/discomfort in the upper extremity?*. Based on response, they were placed in UE pain (n=11;15.2 ± 1.9yrs; 164.9 ± 6.7cm; 72.0 ± 22.4kg) or no UE pain (n=25; 13.5 ± 1.8yrs; 156.2 ± 33.8cm; 57.6 ± 17.4kg) groups. Participants were asked to indicate the number of in and off-season hours per week spent practicing softball, practicing other sports, and strength and conditioning training. Lastly, participants were asked about their months per year spent training for softball. A Mann-Whitney *U* test was performed to examine the differences between training volumes between pitchers with and without UE pain. Median and interquartile data were reported for each variable. **RESULTS:** The Mann-Whitney *U* test indicated there were no significant differences between hours per week of in [pain:14(10,20); no pain: 12(8,15)] and off-season [pain: 8(5,12); no pain: 6(4,12)] practicing softball, in [pain: 2(0,7); no pain: 0(0,6)] and off-season [pain: 3(0,8); no pain: 0(0,3)] practicing other sports, and in [pain: 5(2,8); no pain: 4(2,8)] and off-season [pain: 7(2,14); no pain: 5(3,7)] strength and conditioning training. There were also no differences between months per year [pain: 12(11,12);no pain: 12(11,12)] of playing softball between softball pitchers with and without UE pain (all p-values > 0.132). **CONCLUSION:** The findings show other modifiable risk factors should be examined to identify the susceptibility of UE pain in youth and high school softball pitchers. However, results should be interpreted with caution considering the relatively small sample size (n=36). Future studies should compare other modifiable risk factors such as throwing volumes, years spent playing competitive softball, and degree of sport specialization between softball pitchers with and without UE pain.

P215: CHARACTERIZATION OF CARDIAC AND HEMODYNAMIC RESPONSES TO BLOOD FLOW RESTRICTION IN MEN

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BACKGROUND: Blood Flow Restriction (BFR) during resistance exercise mimics the hypoxic environment that is seen while exercising at high intensities, but during low-intensities. There have been few studies investigating the cardiac and hemodynamic responses to BFR with conflicting results, but there is limited information about blood flow redistribution with BFR at rest. The purpose of this study was to determine the physiological changes that occur during the two most common clinical BFR pressures (50% and 80% of limb occlusion pressure (LOP)), when providing occlusion to the lower limbs. Heart rate (HR), blood pressure (BP_{sys} and BP_{dia}), mean arterial pressure (MAP), tibial and brachial artery blood flow (T_{BF} and B_{BF}), mean velocity (T_{TAMV} and B_{TAMV}), blood vessel area (T_{area} and B_{area}) and diameter (T_{dis} and B_{dis}) were analyzed. METHODS: Seven healthy men (age: 25.1±4.6 years; height: 182.2±6.7 cm; body mass: 87.2± 10.9kg, and body fat: 14.8±6.2%) participated in this study. Participants sat on a gurney chair with Delfi PTS cuffs on both thighs. Baseline (T1) measurements of HR, BP, MAP, BF in the brachial and posterior tibial arteries were evaluated after resting for at least 5 minutes. Both cuffs were inflated for 8 minutes, to either 50% or 80% of LOP. HR, BP and MAP was monitored throughout the entire 8 minutes of inflation and 8 minutes of post-occlusion rest using the Finapres NOVA. Brachial and tibial artery measurements were taken at T2 and T3, at least 30 seconds after inflation. After deflation, participants remained seated for 8 minutes with no BFR, all the measurements were re-collected at 0-4 (T4) and 4-8 (T5) minutes post-occlusion. Repeated measures ANOVA with Bonferroni correction was used to determine significant changes. An alpha level of < 0.05 was used to determine significance. RESULTS: There were no significant differences for any measurements in the 50% BFR pressure. During the 80% BFR pressure session, Hr was significantly higher at T2 vs T5 and T3 vs T4, BP_{dia} and MAP were both significantly higher at T3 than T1 or T2. B_{dis} and B_{area} were both significantly higher at T1 than T4. No other measurements were significant for the 80% BFR pressure. CONCLUSIONS: Preliminary results demonstrate that 80% of limb occlusion pressure showed significant differences in both cardiac and hemodynamic responses to BFR potentially due to the pressor reflex that would cause brachial vasodilation along with an increase in HR. While 50% pressure may not cause these same significant responses.

P216: ENJOYMENT AND PERCEIVED DURATION BETWEEN STANDARD AND INTERACTIVE EXERCISE BIKES

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BACKGROUND: While virtual, interactive exercise is a unique exercise modality suggested to positively impact attitude toward exercise, little is known about the effect on enjoyment and perceived duration. Therefore, this study examined effects of interactive cycling on perceived duration and exercise enjoyment. METHODS: Thirteen participants (age 20.3±1.03 years) completed a VO_2 peak test, two 20 minute cycling trials, and two 40 minute cycling trials. For each duration, one trial was completed on the interactive Expresso bike (EXP) and the other on a Velotron (VEL). Intensity was matched within time trials from wattage and VO_2 values of the EXP session. RPE overall (O), legs (L), and breathing (B) were estimated every 5 minutes and session RPE (SRPE) was estimated 15 minutes post exercise using the OMNI pictorial scale. Following each trial, participants estimated exercise duration (minutes) and completed a Physical Activity Enjoyment Scale (PACES) questionnaire to assess exercise enjoyment. SRPE, perceived duration, and the PACES questionnaire were compared between sessions (EXP vs. VEL) using paired t-tests within 20 and 40 minute duration trials. Separate 2 (trial) X 4 (time point) ANOVA's for the 20 minute duration and 2 (trial) X 8 (time point) ANOVA's for the 40 minute duration were used for between trial comparisons of RPE-O, RPE-L, and RPE-B. Results

were considered significant at $p \leq 0.05$. RESULTS: No significant difference was found for SRPE or perceived duration within either time period. Acute perceptual responses were significantly lower (~ 0.77 unit) for EXP for RPE-O (25, 35, 40 minutes) and RPE-L (~1 unit) (25 minutes) in the 40 minute session. The following PACES questionnaire responses were significantly higher for EXP (vs. VEL) within the 20 and 40 minute trials: enjoyed, liked, interested, pleasurable, fun, happy, pleasant, felt good, not frustrated, gratifying, stimulated, accomplished, nothing I would rather do, with energized being significantly higher for EXP (vs. VEL) in the 20 minute session. CONCLUSION: Although exercising on an interactive bike (EXP) does not significantly alter perceived duration, it mitigated acute RPE-O in longer exercise durations. Additionally, with the positive impact on participant exercise experience from an interactive exercise bike, it could be an alternative option for sedentary individuals to increase exercise participation and adherence.

P217: COMPARING METABOLIC AND CARDIOVASCULAR DEMANDS BETWEEN DIFFERENT BOUTS OF HIFT

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BACKGROUND: High Intensity Functional Training (HIFT) is a successful mode of exercise that uses constantly varied functional movements that are executed at a high intensity. However, there is limited research examining HIFT, including the physiological responses to the modality. Therefore, the purpose of this study was to assess the physiological responses elicited from two differing HIFT workouts. METHODS: Five (n = 5) males with a HIFT training history of a minimum of three times per week for the previous six months completed this study. After the familiarization trial, each participant completed a crossover study where all participants completed a seven-minute workout of maximal burpees (W1), and an eight-minute workout of box jumps and deadlifts (W2) during two separate experimental trials. The following variables were collected during each trial: continuous oxygen consumption, continuous heart rate, rating of perceived exertion, five-minute post blood lactate, and caloric expenditure. Mean differences were statistically compared between the two workouts via a paired samples t-test with a level of significance set to $\alpha = 0.05$. RESULTS: Average (W1: 38.5 ± 5.1, W2: 34.6 ± 6.7 mL/kg/min; $p = 0.02$) and maximum (W1: 49.6 ± 7.5, W2: 46.8 ± 8.3 mL/kg/min; $p = 0.01$) oxygen consumption were significantly greater in W1 compared to W2. There were no significant differences in average heart rate (W1: 175 ± 7, W2: 175 ± 8 BPM; $p = 0.17$), max heart rate (W1: 191 ± 4, W2: 187 ± 5 BPM; $p = 0.28$), rating of perceived exertion (W1: 16 ± 1, W2: 16 ± 1; $p = 0.39$), five-minute post blood lactate (W1: 13.2 ± 2.5, W2: 13 ± 2.6 mmol/L; $p = 0.47$), or caloric expenditure (W1: 208 ± 16, W2: 211 ± 20 Kcals; $p = 0.23$). CONCLUSIONS: This study indicated that W1 elicited a statistically significantly higher average and maximal oxygen consumption compared to W2. However, there were no significant differences for any other variable. The results of this study add to the current understanding of the physiological responses to varying HIFT modalities and can be valuable to those working with HIFT participants to optimally prescribe the modality to aid in both health and performance related improvements.

P218: VISCERAL FAT AND ARTERIAL STIFFNESS IN YOUTH WITH HEALTHY WEIGHT, OBESITY, AND TYPE 2 DIABETES

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BACKGROUND: Visceral fat is associated with increased cardiovascular risk in adults but studies in youth are limited. We assessed associations between visceral fat and arterial stiffness in youth with healthy weight, obesity, and type 2 diabetes, and determined whether relationships were independent of clinical estimates of body fatness (i.e., body mass index; BMI, and waist circumference). **METHODS:** This cross-sectional sample included youth ages 10 to 23 years (67% female, 56% non-black) with healthy weight (BMI=5th to 85th percentile, n=236), obesity (BMI$\geq$95th percentile, n=224), and type 2 diabetes (BMI$\geq$95th percentile, n=145). Visceral fat was assessed via dual-energy X-ray absorptiometry. Carotid-femoral pulse wave velocity (PWV) was assessed via applanation tonometry. Final analyses combined the obese and type 2 diabetes groups as there were no differences between these groups in associations between primary outcomes. All regression analyses accounted for age, sex, ancestry, and mean arterial pressure. **RESULTS:** Visceral fat and PWV were greater in youth with obesity vs. healthy weight ($p<0.001$). In youth with obesity, visceral fat was positively associated with PWV (B=0.14, SE=0.02, $p<0.001$), and was predictive of PWV beyond BMI and waist circumference. Adiposity measures were not associated with PWV in youth with healthy weight (all $p>0.05$). **CONCLUSIONS:** Visceral fat likely contributes to subclinical cardiovascular complications in youth. Since cardiovascular health tracks from adolescence to adulthood, longitudinal studies in youth with obesity are required to define the role of visceral fat in lifelong cardiovascular disease risk. **FUNDING:** Funding for this work was received from the Endocrine Fellows Foundation and University of Georgia Obesity Initiative. The original study was funded by the National Institutes of Health (R01-HL076269).

P219: COMPARISON OF THE POWER OUTPUTS AT PERCEPTUAL AND PHYSIOLOGICAL THRESHOLDS

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BACKGROUND: Fatigue thresholds provide information about unique physiological or perceptual responses to exercise that are used to develop individualized cardiorespiratory endurance prescriptions. The ventilatory threshold (VT) and respiratory compensation point (RCP) estimate the demarcation of the moderate and heavy, and the heavy and severe exercise intensity domains, respectively. The physical working capacity at the rating of perceived exertion thresholds (PWC_{RPE}) estimates the maximal power output that can be sustained for an extended period of time without an increase in RPE. The critical heart rate (CHR) is the highest heart rate (HR) that can be sustained for an extended period of time. This study compared the PWC_{RPE}, power output (P) at the CHR (P_{CHR}), P at respiratory compensation point (P_{RCP}), and P at ventilatory threshold (P_{VT}). **METHODS**: Eleven subjects (Mean ± SD: Age 25 ± 4 yrs) completed a graded exercise cycle ergometer test (GXT) to determine P_{VT}, $P_{RCP,}$ and the P at V O_2 peak (PP). The PWC_{RPE} and P_{CHR} were determined from 4 constant P trials (85 - 100% PP), and time to exhaustion (T_{Lim}), HR, and RPE were recorded. The PWC_{RPE} was determined from the slope coefficients for the RPE versus time relationship for 4 constant P rides that were plotted as a function of P. The CHR was determined from the total heart beats (HB_{lim}) versus T_{Lim}, and P_{CHR} was estimated from linear regression of the P versus HR. **RESULTS**: The PWC_{RPE} (195 ± 51W; 74 ± 4% PP), P_{RCP} (204 ± 55W; 78 ± 5% PP), and P_{CHR} (207 ± 65W; 78 ± 10% PP) were not different from each other, but each threshold was greater ($p = 0.019 - 0.025$) than the P_{VT} (160 ± 34W; 62 ± 8% PP). The $PWC_{RPE,}$ $P_{RCP,}$ $P_{CHR,}$ and P_{VT} were all moderately to highly correlated ($r = 0.735 - 0.959$). **CONCLUSIONS**: Based on their proximity to the $P_{RCP,}$ it is likely that the PWC_{RPE} and P_{CHR} are at the higher end of the heavy intensity domain. PWC_{RPE} is likely influenced by afferent responses from the working respiratory and skeletal muscles. The P_{CHR} provides an initial P associated with the CHR in the heavy domain, however, it is possible that the reductions in P required to maintain the CHR would result in a transition from the heavy to moderate intensity domain. The moderate to strong relationships among each threshold suggested that ventilatory, cardiovascular, and perceptual thresholds are sensitive to distinguish cardiorespiratory fitness level.

P220: NEUROMUSCULAR RESPONSES DIFFER DURING CYCLE ERGOMETRY TO EXHAUSTION AT TWO SEVERE INTENSITY DOMAIN POWER OUTPUTS

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BACKGROUND: During fatiguing exercise, increases in electromyographic (EMG) amplitude (AMP) reflect fatigue-induced recruitment of additional motor units and/or increases in firing rate (muscle excitation), while decreases in EMG mean power frequency (MPF) reflect a reduction in the muscle fiber action potential conduction velocity. To further elucidate the patterns of response in EMG AMP and MPF during fatiguing exercise, the present study examined the time course of changes in the EMG AMP and MPF responses during 2 cycle ergometry trials to exhaustion (TTE). METHODS: 11 subjects (age 24.9±3.6yrs) completed a graded exercise test to determine peak power (PP) and peak EMG AMP and

MPF, followed by TTE at 85% and 100%PP. EMG signals were collected from the vastus lateralis of the right limb, normalized to their respective peak EMG signal, and examined using 10 time points that reflected 10% of the time to exhaustion (T_{Lim}) (0-10%···90-100%). Separate, 2 (TTE:85%vs100%PP) x 10 (time:%T_{Lim}) repeated measures (RM) ANOVAs with follow-up 1-way RM ANOVAs and Student Newman-Keuls (SNK) tests were used to examine the time course of changes in EMG AMP and MPF. Differences in EMG signals between intensities were examined with post-hoc Tukey tests. RESULTS: The T_{Lim} was 8.5±2.0 min at 85%PP and 4.0±0.9 min at 100%PP. There were significant 2-way interactions for EMG AMP (p=0.002) and EMG MPF (p=0.010). Follow-up analyses for EMG AMP at 85%PP indicated significant increases relative to the initial value (10%T_{Lim}) from 70% to 100%T_{Lim}, while at 100%PP, EMG AMP increased relative to the initial value from 40% to 100%T_{Lim}. EMG AMP was also significantly greater at 100%PP relative to 85%PP, from 50% to 100%T_{Lim}. For EMG MPF, there were significant follow-up 1-way RM ANOVAs, but the SNK did not reveal significant differences across time within each intensity. Across intensities, the EMG MPF at 85%PP was significantly greater than 100%PP at 40%T_{Lim} and again from 60% to 100%T_{Lim}. CONCLUSIONS: There were unique neuromuscular fatigue responses at 85%PP compared to 100%PP reflecting an earlier onset of fatigue-induced increases in muscle excitation and a greater normalized EMG AMP for the trial at 100%PP compared with 85%PP. Despite no changes in EMG MPF across time, EMG MPF was lower for the last 50%T_{Lim} at 100%PP compared to 85%PP, which may reflect a greater influence of metabolic byproduct accumulation for the trial at 100%PP.

P221: UTILIZING ACTIVPAL ACCELEROMETERS TO MONITOR WEIGHTED VEST WEAR COMPLIANCE IN THE INVEST RCT: ALGORITHM DEVELOPMENT

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Background: Despite adverse consequences of obesity, dietary weight loss recommendation remains controversial for older adults due to concomitant reduction in bone mineral density and increased risk of osteoporotic fracture. The INVEST in bone health study (NCT04076618) was designed to determine if external weight replacement via weighted vest use can counter weight loss associated bone loss in older adults. As success of the weighted vest intervention depends on sufficient daily wear time, we sought to develop an accelerometer-based algorithm to objectively monitor vest wear time. **Methods:** A single user (KHA) wore a HyperVest Pro ® (Hyperwear, Austin TX) weighted vest for three consecutive days, describing periods of vest wear time and recording total minutes of wear. An ActivPAL (PAL Technologies, Glasgow, Scotland) 4 triaxial accelerometer was embedded in a front chest pocket of the weighted vest to capture triaxial acceleration at 20Hz over the same period. Data were downloaded and summed for each axis (X,Y,Z) over 15-second epochs, before being converted to a vector magnitude (VM). Four algorithms were implemented for classifying wear-time using PHP version 7.0. The first three (A1) were modeled on common scoring techniques in physical activity monitoring such that epochs falling below a predetermined threshold (100, 500, or 1000 VM units) were classified as non-wear. The second algorithm (A2) was modeled on wear time scoring in GGIR, which classifies a 15-minute epoch as non-wear if the range and standard deviation of acceleration on two of three axes fell below predefined thresholds. These are computed on a 60-minute window centered on the target 15 minutes. **Results:** Average daily wear minutes reported from the log were mean±SD (range): 443±68 (364-482) minutes. Average daily wear time minutes from each algorithm were: A1-100 VM: 444±69 (364-486) minutes, A1-500 VM: 376±76 (292-439) minutes, A1-1000 VM: 241±83 (179-335) minutes; A2: 443±60 (375-481) minutes. **Conclusion:** Preliminary results suggest that A1-100 VM and A2 capture vest wear time to within <1% error relative to detailed self-report. Next, we plan to add more wear time days to provide more data to help validate the algorithm. Finally, we plan to apply both algorithms to the INVEST dataset to compare objective, algorithm-based wear time to traditional, self-reported logs.

P222: COMPARISON OF RESPONSE TO EXERCISE AT CONSTANT HEART RATE VERSUS CONSTANT POWER OUTPUT

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BACKGROUND: The current recommendations for improving cardiorespiratory endurance (CE) are based on percentages of VO_2 or heart rate (HR) maximum or reserve. However, these intensities are often based on estimation equations that are extrapolated to power outputs (P) or velocities. The recent application of the critical power model to a physiological parameter in HR provides an individualized threshold which has demonstrated a dissociation of typical responses that have previously been described during constant P exercise. Therefore, the purpose of this study was to examine the patterns in physiological (VO_2, HR, P, respiration rate [RR], muscle oxygen saturation [%SmO_2]), neuromuscular (electromyographic and mechanomyographic amplitude [EMG AMP,MMG AMP] and mean power frequency [EMG MPF,MMG MPF]), and perceptual (rating of perceived exertion [RPE]) responses during exercise anchored at critical heart rate (CHR) versus the P associated with CHR (PCHR). **METHODS:** On separate days, nine participants (Age 26±3y) performed a graded exercise test (GXT), 4 constant P trials at 85%-100% of peak power output (PP) to derive CHR and PCHR from the total heartbeats vs time to exhaustion (T_{lim}) and P vs HR relationships, respectively. The physiological, neuromuscular, and perceptual responses were recorded during trials at CHR (173±9b·min^{-1},T_{Lim}=45.5±20.2min) and PCHR (198±58W,T_{Lim}=21.0±17.8min) and normalized in 10% intervals to their respective values at PP. RESULTS: There were significant mode (CHRvsPCHR) x normalized time (10%-100%T_{Lim}) interactions for all variables (p=0.00-0.036) except MMG AMP (p>0.05). Follow-up one-way ANOVAs and Student Newman-Keuls tests indicated differences among the time points for CHR VO_2 (mean±SD %change=-19±12%), PCHR VO_2 (25±10%), PCHR HR (23±6%), CHR RR (24±23%), PCHR RR (105±53%), CHR P (-33±11%), CHR RPE (22±14%), PCHR RPE (65±26%), CHR %SmO_2 (41±33%), PCHR %SmO_2 (-7±30%), CHR EMG AMP (-13±15%), PCHR EMG AMP (18±21%), CHR EMG MPF (9±8%), CHR MMG MPF (7±11%), and PCHR MMG MPF (1±11%). CONCLUSIONS: Exercise at CHR was more sustainable than exercise at PCHR due to decreases in P required to maintain HR. As a result, participants demonstrated a dissociation of the predictable responses seen in constant P exercise. These differences at CHR may indicate that exercise anchored by a physiological parameter provides a more sustainable exercise modality that can be used to improve CE.

P223: EFFECTS OF HIGH INTENSITY INTERVAL STAIR CLIMBING ON ARMY COMBAT FITNESS SCORES

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BACKGROUND: High-intensity interval training (HIIT) stair running serves as a feasible opportunity to increase the overall health and fitness levels of soldiers and aligns with the Army's priority to improve readiness. Research suggests that stair running has many health and fitness benefits, but Army Combat Fitness Test (ACFT) research is scarce. The purpose of this study was to determine the effects of adding HIIT stair running on ACFT scores for cadets. METHODS: Participants were randomly assigned to an intervention (INT) or control (CON) group. The INT group completed 4 weeks of additional exercise training 3 days/week consisting of HIIT stair running. Data were analyzed using a 2 x 2 ANOVA. RESULTS: After analysis, the results showed no significant interaction effects $F(1,11) = 3.468$, $p=.089$; however, there was a significant main effect for time $F(1,11) = 9.397$, $p=.011$, but no main effect for group $F(1,11) = 1.555$, $p=.238$. CONCLUSIONS: HIIT stair running had no significant interaction effect on ACFT scores as well as no main effect for group; however, a beneficial improvement was observed over time. This can be expected as these individuals were all participating in an exercise program and over time we would expect improvements in the dependent variables.

P224: THE INFLUENCE OF SONOGRAPHER EXPERIENCE ON MEASUREMENTS OF SKELETAL MUSCLE CROSS-SECTIONAL AREA

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BACKGROUND: The affordability and convenience of B-mode ultrasound devices has made their use widespread in university research settings, clinics, and hospitals. As such, establishing a reliable image acquisition protocol is essential for reporting consistent

measurements. Since ultrasound image acquisition requires training and skill, relying on the same sonographer to conduct all imaging can be challenging, especially if turnover of research support is frequent. The purpose of this study was to investigate whether sonographer experience influences ultrasound-derived measures of muscle cross-sectional area (mCSA). By assessing three muscles, we sought to determine whether the influence of experience is muscle specific. **METHODS:** An experienced (7 years) and novice sonographer independently acquired images of the biceps brachii, vastus lateralis, and medial gastrocnemius of 17 participants (10 females, 7 males; mean ± SD age = 22 ± 3 years). Images were captured in the transverse plane with use of a panoramic function while participants rested in the supine (biceps brachii, vastus lateralis) or prone (medial gastrocnemius) position. Before data collection, the novice sonographer engaged in a 2-hr training session with the experienced sonographer, which included acquiring images together on 2 pilot participants not included in the sample. The sonographers were not together in the laboratory during image acquisition and the order in which images were acquired between sonographers and muscles was randomized. Images were analyzed in ImageJ by a blinded, experienced investigator not present during data collection. Statistical analyses included paired samples *t*-tests, Cohen's *d* effect sizes, intraclass correlation coefficients (ICC), and the standard error of measurement (SEM). **RESULTS:** Similar mCSA values were observed for the biceps brachii (p = .280, d = .271, ICC = .975, SEM = 6.5%) and vastus lateralis (p = .417, d = .202, ICC = .986, SEM = 6.6%). There were significant differences between sonographers for the medial gastrocnemius (p = .035; d = .559; ICC = .939, SEM = 8.2%). **CONCLUSION:** The influence of sonographer experience on mCSA measurements is muscle specific. Specifically, medial gastrocnemius mCSA values differ between an experienced versus a novice sonographer. Our findings have important implications for laboratories that use ultrasound and possess research team members of varying experience levels.

P225: VO_{2MAX} AND BODY FAT PERCENTAGE VARIATIONS BASED ON SPORT INVOLVEMENT

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BACKGROUND: This study investigated the differences in the physiological components that are desired or trained in athletes based on the sport that they play. The purpose of the study was to determine whether an athlete's sport of choice influenced their maximum oxygen consumption (VO_{2max}), body fat percentage (BF%), and capabilities to perform. METHODS: 10 collegiate soccer players and 10 collegiate softball players were recruited. All participants had at least 3 training sessions per week. The subject's height and weight were taken before the testing procedures. Participants' VO_{2max} was predicted via the 1-mile run test. Skinfold measurements were taken from 3 sites: triceps, super iliac and thigh to calculate BF%. The mean values for height, weight, mile time, VO_{2max}, and BF% were calculated for each group. RESULTS: An unpaired T-Test comparing average weight, VO_{2max} and BF% between the groups was conducted. Soccer player average weight (67.14 kg ± 13.48), mile time (9.12 minutes ± 0.93), and BF% (9.10% ± 4.73) were significantly lower ($p<0.05$) when compared with the softball players average weight (92.99 kg ± 24.43), mile time (12.16 minutes ± 2.54), and BF% (24.87% ± 10.98). Concerning VO_{2max} the soccer group had significantly higher values (30.52 ± 3.62) compared to the softball group (22.83 ± 7.60). CONCLUSION: Soccer athletes have a higher VO_{2max} and a lower BF% than the softball athletes. The study demonstrates the difference in body composition and cardiorespiratory fitness between female collegiate soccer and softball players. This is likely due to their unique training and the specificity in meeting the demands of their sport.

P226: CAN YOGA INCREASE PHYSICAL AND MENTAL HEALTH?

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BACKGROUND: The purpose of this study was to determine whether the addition of a ten-minute yoga session twice per week had a positive impact on stress levels and heart rate. Lower stress levels and cardiovascular changes were expected after each session. METHODS: Materials used in this study included a heart rate monitor, informed consent form, a one question mental health survey, yoga mat, and a 10 minute moderate intensity yoga video via youtube. Before beginning the yoga session participants signed the consent form, answered the mental health survey and had their heart rate taken. At the end of the session, heart rate will once again be taken and the participant would fill out the survey. RESULTS: Outcomes from the study showed a significant relationship between yoga and the reduction of stress levels. Over the course of 5 weeks stress levels dropped greatly after yoga with a mean average of 6.28 prior to yoga and a mean average of 1.72 after the yoga session. When your heart rate is elevated from exercise it causes more oxygen and blood to be pumped into your muscles which will aid lowering risks of high cholesterol and heart disease. Yoga benefited each participant's physical health due to the participants heart rate mean average being 63.12 prior to the yoga session and 141.68 post yoga session. CONCLUSION: The purpose of this study was to determine whether incorporating yoga sessions a couple of days per week had a positive impact on health. The study indicated that a ten minute yoga session will reduce stress and increase heart rate.

P227: COMPARING ACTIVE ADULT WOMEN AND COLLEGE FEMALE ATHLETES HEART RATE, BLOOD PRESSURE, AND OXYGEN LEVEL

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COMPARING ACTIVE ADULT WOMEN AND COLLEGE FEMALE ATHLETES HEART RATE, BLOOD PRESSURE, AND OXYGEN LEVEL

Hope Ramsey
Montreat College

BACKGROUND: Previous research has shown, heart rate and blood pressure levels increase incrementally with exercise. This study aims to determine if heart rate, blood pressure, and oxygen levels differ in age groups of active females. METHODS: For this study, there were 3 active adult women (39.7 ± 7.5 years) and 3 college female athletes (20.3 ± 1.5 years). The subjects were asked to run with maximal effort. When completed, their blood pressure, heart rate, and oxygen level were taken. RESULTS: Active adult women had slightly higher resting blood pressure (115/73) and heart rate (69 bpm) than compared to college female athletes resting blood pressure (114/68) and heart rate (67 bpm). The active adult women had slightly lower blood pressure (124/79) and heart rates (149 bpm) after the workout than the college female athletes post-exercise blood pressure (129/75) and heart rate (153 bpm). Their oxygen percentages stayed the same for both resting and post-exercise (98%). CONCLUSION: Both blood pressure and heart rate increase post-exercise in active adult women and collegiate female athletes, though the increases appear to be slightly higher in the athletes. This suggests that continued engagement in activity post-college may mitigate any detrimental increases in blood pressure or heart rate due to aging. Future studies should recruit more volunteers, ensure equitable intensity levels are maintained during the activity and account for body composition changes when determining whether the increases in heart rate and blood pressure are equitable in these populations.

P228: CAN AGE AND BONE MINERAL DENSITY PREDICT VERTICAL JUMP PERFORMANCE IN FIREFIGHTERS?

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BACKGROUND: Explosiveness is a performance variable that often declines with age, stemming from loss of muscle mass and increases in body fat percentage. Research suggests that bone mineral density (BMD) preservation may assist in the maintenance of muscular power as an individual ages, thereby protecting against fractures, falls, and other injuries. Tactical populations, particularly firefighters, are at an increased risk for injury due to the additional load carriage in their profession, and they often perform explosive maneuvers that could lead to injury if muscular power is not maintained. It is unknown whether a firefighter's age or BMD can predict their level of explosiveness. Thus, the purpose of this study was to determine if firefighters' age or BMD could predict their explosiveness during a maximal-effort vertical jump with a countermovement (CMJ). METHODS: Fifty-five firefighters (179.24$\pm$6.23 cm, 95.44$\pm$16.82 kg, 33.89$\pm$8.82 years) participated in various health and fitness tests used to analyze metrics recommended by the National Fire Protection Agency prior to beginning an individualized wellness program. This study utilized Dual-Energy X-Ray Absorptiometry and a CMJ to assess each firefighter's BMD and explosiveness, respectively. RESULTS: A linear regression model was used to understand the effect of age and BMD on CMJ performance. All assumptions were met; homoscedasticity was present as assessed by visual inspection of a plot of standardized residuals versus standardized predicted values. Residuals were normally distributed as assessed by visual inspection of a normal probability plot. A statistically significant regression equation

was found ($F(2,52)=4.703$, $p=.013$), with an R^2 of 0.153. Firefighter's predicted CMJ performance was equal to 46.457-.459(Age)+10.402(BMD), where CMJ performance was measured in centimeters, age was measured in years, and BMD was measured in g/cm^3. Firefighter's CMJ performance decreased .459 cm for each year of age and increased 10.402 cm for every 1 g/cm^3 of BMD. Age was found to be a statistically significant predictor of CMJ performance ($p=.004$) while BMD was not ($p>0.05$). CONCLUSION: The results suggest that age can be used as a predictor of explosive ability in firefighters, although BMD failed to predict the same outcome. Future research should continue looking at risk factors for firefighter injury, particularly in muscular power declination.

P229: THE VALIDATION OF A WEIGHTED AEROBIC RUN FOR IMPROVING TACTICAL READINESS (V-WARFITR)

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BACKGROUND: Despite a variety of fitness tests across all branches of service, there remains a common requirement to test cardiorespiratory fitness (CRF) to predict combat readiness and performance. However, no military CRF test resembles combat performance by including load carriage, acceleration/deceleration, change of direction, or an externally stimulated pace. This study aimed to assess the relationship between a weighted vest run (WVR) that resembles combat performance and CRF in a sample of active duty US Marines to determine if a WVR was a valid predictor of CRF. **METHODS:** Ten exercise-trained Marines (100% male, 23-34 yrs), from the Naval Reserve Officer Training Corps unit at The Citadel completed three testing visits separated by 7 days each. At the baseline visit, participants performed a 20m pacer test without a weighted vest, and had maximal handgrip strength, maximal vertical jump, and body composition (BODPOD) assessed. Participants then completed two separate exercise visits separated by 7 days in random order: a graded exercise test (GXT) to measure CRF and the WVR, which was a 20m pacer test with weighted vest. Pearson's correlations were used to assess the relationship between measured CRF from the GXT and predicted CRF from the WVR. **RESULTS:** There was a moderate statistically significant correlation ($r=0.673$, $p=0.033$) between predicted VO_2max from the WVR and measured VO_2max via GXT. Though not significant, there were trending moderate correlations between baseline pacer test predicted VO_2max and measured VO_2max ($r=0.608$, $p=0.082$), as well as between predicted VO_2max from the WVR and baseline pacer test predicted VO_2max ($r=0.551$, $p=0.124$). In multiple regression analysis, there was no significant association between BMI, grip strength, and vertical jump height with predicted VO_2max from the WVR. **CONCLUSIONS:** These suggest that performing a WVR is a valid predictor of CRF while resembling combat performance by including load carriage, change of direction, acceleration/deceleration, and an externally stimulated pace. Therefore, these data provide initial evidence of the potential for a WVR to replace traditional CRF field tests in tactical athletes. Future work should examine the relationship between CRF and WVR in a larger sample of US Marines and members of the other branches of the US Armed Forces.

P230: POST-EXERCISE HYPOTENSIVE RESPONSES TO ACUTE ISOVOLUMETRIC STRENGTH AND ENDURANCE EXERCISE

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BACKGROUND: Post-exercise hypotension (PEH) has been documented following acute resistance training sessions that range from approximately 40 - 80% of the 1-repetition maximum (1 RM). Most authors report statistically significant reductions in systolic blood pressure (SBP), with more varied results related to diastolic blood pressure (DBP). The purpose of this study was to determine the effect of acute isovolumetric resistance training sessions at 40% and 80% 1RM on post-exercise blood pressure in a group of healthy participants from a local community fitness facility. METHODS: Twelve individuals (Age = 23 ± 5 years; BMI = 27.9 $\pm$ 6.8 kg/m^2; SBP = 121 $\pm$ 8 mmHg; DBP = 69 $\pm$ 7 mmHg) completed 1 RM testing following ACSM's guidelines prior to completing 3 experimental sessions: non-exercise control, exercise at 40% 1RM, and exercise at 80% 1RM. Exercise conditions were matched for volume and included 7 exercises that were completed using resistance machines (Matrix, Cottage Grove, WI). Blood pressure and heart rate (HR) were measured pre-exercise and every 15 minutes post-exercise for 1-hour (Greater Goods, Balance, USA). Dependent variables were analyzed using 3x4 factorial ANOVAs with repeated measures. Tukey post-hoc testing was used to determine differences between individual group means. Alpha was set at 0.05. RESULTS: DBP ($p = 0.01$) and MAP ($p < 0.01$) were lower and HR ($p = 0.01$) higher following both exercise conditions when compared to non-exercise control. In addition, there were statistically significant main effects for time for SBP ($p = 0.03$), DBP ($p < 0.01$), MAP ($p < 0.01$), and HR ($p < 0.01$). SBP was lower at 30 when compared to 60 minutes, while DBP was lower at 15 when compared to 45 and 60 minutes. MAP was reduced at 15 and 30 compared to 60 minutes, and HR was higher at 15 when compared to 30, 45, and 60 minutes, and at 30 when compared to 45 and 60 minutes. CONCLUSIONS: Contrary to other studies, we report no main effect for SBP following acute resistance exercise. Blood pressure was lower at 15 and/or 30 when compared to 60 minutes following exercise. Acute resistance exercise at both 40 and 80% of 1 RM is effective at lowering DBP and MAP in the hour following exercise despite maintained elevations in heart rate.

P231: THE EFFECT OF SIX-WEEK NEUROMUSCULAR TRAINING INTERVENTION ON MUSCLE ACTIVATION OF THE LOWER LIMB

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BACKGROUND: Anterior cruciate ligament injury is one of the most common knee injuries, making up around 20% of all sports-related injuries. The implementation of neuromuscular training (NMT) has been shown to reduce biomechanical risk factors and increase neuromuscular control. Previous studies investigating NMT have focused on the effects of this training on dynamics, rather than coordination of the muscles contributing to a specific task. The purpose of this study was to quantify the effect of a 6-week neuromuscular training intervention on muscle synergies during a drop landing. **METHODS:** Eight participants (men=3, women=5) were recruited for this study. For each visit, EMG surface electrodes were placed on the right rectus femoris (RF), vastus medialis (VM), vastus lateralis (VL), biceps femoris (BF), semitendinosus (ST), and medial gastrocnemius (GA). Participants were familiarized with the procedures, then completed five drop landings from a height relative to their maximal jump height. This procedure was repeated after the completion of six weeks of the intervention. The linear-progression training intervention consisted of one day of plyometric and two days of resistance training per week. All electromyography (EMG) signals were normalized to the maximum activation across all landing trials. Concatenated nonnegative matrix factorization was performed to determine muscle synergies and weightings. Preliminary analyses found two muscle synergies could explain 96% of the variance. Muscle weightings for each synergy were compared pre and post intervention. In addition, integrated EMG during landing of the BFLH, ST, and GA (%MVIC*sec) was compared using paired samples t-tests ($p<0.05$). **RESULTS:** In general, all muscles evenly contributed to each muscle synergy (range: 13%-20% each). Relative contributions to muscle synergies were not different between pre/post. ST (11.7±2.6%s vs. 11.3±2.3%s), BFLH (11.8±2.9%s vs. 11.5±2.6%s), and GA (11.8±2.7%s vs. 11.4±2.4%s) integrated EMG were not significantly different between pre and post ($p=0.17$, $p=0.81$, $p=0.70$, respectively). **CONCLUSION:** The NMT did not have a significant effect on integrated EMG levels in the BFLH, ST or GA. Our findings suggest changes in neuromuscular activation and synergy would not be the mechanism behind a reduction in ACL injury risk following similar training interventions.

P232: EFFICACY OF A MOTIVATIONAL VIDEO ON HEART RATE, RPE, AND WORK PERFORMED DURING STATIONARY CYCLING

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BACKGROUND: Lack of enjoyment and motivation are two common factors that deter people from engaging in physical activity and exercise on a regular basis. It has been found that visual stimulation during exercise may help motivate some people to achieve a greater level of exertion, however it may serve as a distraction for others. The purpose of this study was to compare the effects of watching a motivational video (Tour de France cycling montage (MOT)) versus a calming video (Bob Ross watercolor painting (CALM)) while cycling. METHODS: Ten recreationally active subjects (60% female, 21.5 ± 0.7 yrs) completed two twenty-minute sessions on a stationary bike at a

moderate intensity (12-14 on Borg Rating of Perceived Exertion (RPE) scale). The order of the MOT and CALM treatments were randomized. Subjects wore noise-cancelling headphones to block out external auditory stimuli. The surrounding environment was consistent in both sessions and subjects were encouraged to visually focus only on the tablet playing the video. Subjects were able to adjust their pedaling cadence and resistance on the bike in order to maintain the prescribed intensity but were blinded to the bike's informational display. RPE and heart rate (HR) were assessed pre-exercise, at 5, 10, 15, 20 minutes, and 1 minute post-exercise. Total distance biked (miles) was noted immediately post-exercise. Paired sample t-tests were used to compare differences between MOT and CALM for mileage, mean HR, and mean RPE. A 2x6 factorial ANOVA was conducted for HR and RPE from MOT and CALM compared across time. RESULTS: MOT improved mileage completed (8.01 ± 0.89 m vs 6.95 ± 1.05 m, p = 0.004), but had no effect on mean HR (MOT 137.8 ± 15.7 bpm, CALM 126.8 ± 18.1 bpm, p = 0.11) or mean RPE (MOT 12.9 ± 0.7, CALM 12.3 ± 1.3, p = 0.20). Significant simple main effects were found for HR and RPE across time (F (5,45) = 31.392, p < 0.001, F (5,45) = 35.187, p < 0.001). CONCLUSIONS: Subjects were able to increase performance while watching a motivational cycling video during exercise but did not perceive an increase in effort or intensity while doing so. Upbeat, motivational visual stimulation may be considered as a tool to encourage people to participate in greater amounts and/or higher intensities of exercise.

P233: RELATIONSHIP BETWEEN CHANGE IN VO_2VT_2 AND CHANGE IN 2-MILE RUN TIME

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Body:BACKGROUND: Resistance training (RT) is widely understood to influence oxygen consumption kinetics during aerobic exercise. While measurement of cardiovascular (CV) fitness has focused heavily on maximal oxygen consumption (VO_2max), the utility of assessing the second ventilatory threshold (VO_2VT_2) has gained increasing attention as a relevant metric. The purpose of this study was to identify associations between changes in VO_2max and VO_2VT_2 with changes in 2-mile run times following a 6-week RT intervention. **METHODS:** 17 collegiate Reserve Officer Training Corps (ROTC) cadets (n=9 female; n=8 male) completed a 6-week RT intervention consisting of 4 sessions per week. VO_2max, VO_2VT_2, and 2-mile run times were assessed pre- and post-intervention. Heart rate (HR) was measured via chest strap during all testing (Polar Electro Inc., Woodbury, NY, USA). Paired sample *t*-tests were used to evaluate changes in VO_2max, VO_2VT_2, and 2-mile run time. To determine relative intensity of the 2-mile run, paired *t*-tests were used to compare average HR during the 2-mile run and $HRVT_2$. Pearson-product moment correlations were used to assess relationships between individual changes in VO_2max and VO_2VT_2 with changes in 2-mile run times. An alpha level of 0.05 was used to determine statistical significance. **RESULTS:** On average, no significant changes were observed from pre- to post-testing for VO_2max, VO_2VT_2, or 2-mile run time (P > 0.05). HR during the 2-mile run was significantly higher than $HRVT_2$ at both pre- (94.4% vs. 85.2%$HR_{max,}$ P < 0.01) and post-testing (94.3% vs. 85.6%$HR_{max,}$ P < 0.01). No correlation was observed between changes in VO_2max and 2-mile run times (r = 0.05, P = 0.8), but changes in VO_2VT_2 were inversely correlated with changes in 2-mile run times (r = -0.55, P = 0.02).**CONCLUSIONS:** These findings suggest greater utility of changes in VO_2VT_2, compared to VO_2max, in predicting changes in 2-mile run times. Average HR during the 2-mile run was significantly higher than $HRVT_2$, indicating the run was performed at a high intensity. Training strategies aimed at improving VT_2 may translate to improved high-intensity aerobic performance during efforts requiring large anaerobic contributions regardless of influence on VO_2max. Furthermore, VT_2 may be a more malleable physiological parameter than VO_2max and has potential to facilitate greater aerobic performance improvements.

P234: RELATIONSHIPS BETWEEN RELATIVE STRENGTH AND ADIPOSITY IN CAREER STRUCTURAL FIREFIGHTERS

Sarah Lanham, Savannah McLain, Mario Keko, Bridget Melton. *Georgia Southern University, Statesboro, GA.*

BACKGROUND: Two common field measures for estimating strength are isometric mid-thigh pull (IMTP) and hand grip strength (HGS). However, exclusive reliance on absolute values may neglect the importance of force production ability in reference to an individual's body weight. Relative strength (RS) may offer an additional perspective on strength performance for individuals and groups. The purpose of this study was to examine the relationships between total body mass and absolute strength measures, as well as identify the correlation between total body mass and adiposity in career structural firefighters. METHODS: For this study, 53 male career structural firefighters (aged 34.1 ± 8.8 years) from rural Southeast Georgia volunteered to perform a body composition test (i.e., DXA) and two performance tests (i.e. HGS and IMTP). Dual energy X-ray absorptiometry (DXA) was used to determine body fat percentage (BF%) and total body mass (TBM). A handgrip dynamometer was used to determine HGS and a lower body dynamometer was used to determine isometric mid-thigh pull (IMTP). HGS RS, and IMTP RS were calculated by dividing the respective values by the participant's TBM. Spearman's Rho and Pearson's correlations were calculated to determine associations between BF and both IMTP and HGS. Relationships between BF% to HGS RS and IMTP RS were based on r-values. RESULTS: The results indicate a moderate strong, positive correlation between BF% and TBM (r = 0.61; r_s = 0.66; p < 0.001). IMTP RS and BF% yielded a moderate strong, negative correlation (r = -0.64; r_s = -0.64; p < 0.001), while a moderate, negative correlation was observed between HGS RS and BF% (r = -0.56; r_s = -0.52; p < 0.001). CONCLUSIONS: Based on these findings, adiposity appears to be positively associated with total body mass and negatively associated with both relative strength measures in this population. These findings warrant further research as to provide estimation models for RS to account for individual differences in physiological and anthropometric factors.

P235: THE EFFECT OF SPRING-LOADED KNEE BRACES ON VERTICAL JUMP, SPRINT PERFORMANCE, AND USER PERCEPTION

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BACKGROUND: Prophylactic and functional knee braces have been studied extensively on the effect they have on exercise performance. New spring-loaded knee braces have been suggested to improve athletic performance; however, these claims have yet to be studied. The purpose of this study is to determine the effects of spring-loaded assistive knee braces on anaerobic exercises and user perception. METHODS: Physically active, college-aged males (22.3±0.6 yrs, 186.0±23.5 lbs, 72.3±0.6 in) were recruited into the study. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory two times and completed a series of exercise tests while either wearing the spring-loaded knee braces or no knee braces in a randomized, cross-over design. Each visit, vertical jump height (m) and a 10-yard sprint time (s) were measured and at the completion of each test, participants rated their level of comfort, stability, and perception of performance on a 100mm visual analogue scale (VAS). RESULTS: The exercise performance variables of vertical jump height (p=0.14) and 10-yard sprint time (p=0.36) were not significantly different between braced and unbraced conditions. Additionally, there was no significant differences between subjective measurements of vertical jump stability (p=0.20), vertical jump performance (p=0.14), and 10-yard sprint performance (p=0.08) during braced and unbraced conditions. However, VAS scores were significantly higher on vertical jump comfort (p=0.04), 10-yard sprint comfort (p=0.03), and 10-yard sprint stability (p=0.03) in the unbraced condition. CONCLUSION: Results suggest wearing a spring-loaded knee brace does not improve exercise performance but can negatively affect the user's perception of comfort and stability.

P236: IT'S ELECTRIC! QUANTIFYING ENERGY EXPENDITURE DIFFERENCES BETWEEN REGULAR PEDAL BICYCLES AND ELECTRIC-ASSIST BIKE-SHARE BICYCLES.

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BACKGROUND: With over half of American adults not meeting national physical activity guidelines, one way to promote regular activity is through bike share systems. A growing trend among bike-share systems is offering electric-assist pedal bikes (e-bikes). This study 1) quantified the differences in energy expenditure between regular bikes and e-bikes, and 2) examined differences in perceptions of difficulty and enjoyment between regular and e-bikes. METHODS: Fifteen participants from Charleston, SC completed the study, all of whom

were 18-40 years old, had no underlying health conditions, and met physical activity guidelines. First, participants completed a bicycle maximal fitness test and body composition in the laboratory. Then, on separate days, participants completed two, hour-long steady-state bicycle rides at a local park, one on a regular bike and one on an e-bike, the order of which was randomly selected. During each bicycle ride, continuous heart rate and speed (kilometers per hour) were measured with a Polar H7 Bluetooth heart rate monitor. Using the Borg scale, participants reported perceived exertion at four intervals of each ride. Similarly, on a 5-point Likert scale (1=strongly agree to 5=strongly disagree), participants reported perceived enjoyment, difficulty, and tiredness at the end of each ride. Paired t-tests were used to assess differences between the e-bike and regular bike rides. RESULTS: Participants (n=15) were mostly female (66.7%), with an average age of 27.1 and an average body mass index of 22.9. Participants exerted more energy at a greater percentage of maximum heart rate on the regular bike (mean=66.4%) compared to the e-bike (mean=58.3%, p=0.006). Participants also rode at significantly greater speed on the e-bike (mean=20.9km/h) compared to the regular bike ride (mean=14.7; p=0.000). Enjoyment was higher on the e-bike (mean=1.4) than the regular bike (mean=2.2; p=0.009). Perceived exertion, difficulty, and tiredness were lower on the e-bike (mean= 9.6, 4.0, 3.6, respectively) compared to the regular bike ride (mean= 12.0, 2.9, 2.3, respectively). CONCLUSIONS: E-bike rides resulted in lower energy expenditure than regular bikes, though both modes could still have health benefits since they fell within the moderate-intensity physical activity category. E-bikes may be attractive for integrating activity in daily routines since participants reported less difficulty and more enjoyment.
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P237: INFLUENCE OF FARTLEK TRAINING ON COLLEGIATE VOLLEYBALL PLAYERS
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BACKGROUND: This study encompasses observing the effects of Fartlek training on collegiate volleyball players' performance when paired with their existing exercise regimens. Fartlek training is a common technique used to increase power. This training involves a constant run-in which periods of faster runs are mixed with periods of easy cardio work. My partner and I suspected that the training would increase the athletes' block and approach height, increase their endurance and speed. We believed this due to these athletes adding training in their program that works more on increasing their power, which will help the athletes get to balls quicker and jump higher. METHODS: Four collegiate Volleyball players (19 ± 1.41 years) will be selected from the volleyball team to participate in this training for four weeks in addition to post season training. Post season training includes resistance training three times a week and agility training twice a week. Players will engage in the Fartlek program along with existing workouts twice a week for four to five weeks. A typical Fartlek interval training session consists of approximately six sprinting intervals, with walking in between each sprint, fulfilling a fifteen-minute period twice a week. Initial testing will include a twenty-five second sprint drill, a sweet sixteen sprint drill, block jump height, as well as approach jump height. Following these tests, the athletes will engage in their daily training program along with the interval training program. Post training testing will occur at the end of the Fartlek program. ANTICIPATED RESULTS: We suspect that each athlete will increase sprint drill times, be quicker on the court and be able to play for longer period of times verses the other collegiate volleyball players who did not participate in the training. Improvements in the sprint drill, sweet sixteen drill, and jump heights are also anticipated.

P238: CREATING AN OPTIMAL PERFORMER: A BODY COMPOSITION AND PERFORMANCE ANALYSIS
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BACKGROUND: The interaction between physical demand and the visual aesthetic of dance has grown more complex as society moves toward combining physical and mental fitness to encourage body positivity. Dancers have historically monitored their weight and body shape to optimize performance; however, this study aims to investigate correlations between a dancer's training, body composition, and overall performance. The results will encourage a separation between physicality and aesthetics that will foster a more positive body image and efficient movement patterns. METHODS: This project requires a mixed methods approach. Quantitative data will be collected from professionally trained female dancers ages 18 to 30 years old via body composition (fat mass, fat-free mass, body water, etc.) and strength, flexibility, control, and power tasks. A dynamometer will be used to measure the force created in key muscles, including the quadriceps and biceps. Dancers will be tested for control with a star excursion balance test, flexibility with a sit and reach, and power with a vertical jump test. Additionally, a qualitative performance study will assess deliberately selected movements to highlight the transferability of skill onto a simple movement phrase. ANTICIPATED RESULTS: Preliminary data suggest that ballet dancers will have greater flexibility measures while modern and West African dancers may have higher strength measures. Broadway jazz will likely occupy the middle of the range for all of the criteria because it is composed of influences from the other styles being studied. Performatively, ballet technique will result in a much more lifted and effortless quality, while the other dance styles will demonstrate more forceful and weighted movement. The different performance qualities from each dance genre highlight the biomechanical variance from one dancer to another due to their learned movement patterns.

P239: THE EFFECTS OF AN EXTRINSIC MOTIVATOR ON VERTICAL JUMP HEIGHT
DuAnn E. Kremer, Lauren Stanford, Jill Lucas. *University of Lynchburg, Lynchburg, VA.*

BACKGROUND: An extrinsic motivator, such as a target, can encourage an individual to work harder during a task or activity. Extrinsic motivation is easier to manipulate than intrinsic motivation, so it is important to know how it affects performance. The purpose of this study was to examine if the addition of an extrinsic motivator had an effect on performance in a vertical jump test. METHODS: Seventeen subjects (52.9% female, 70.6% D-III varsity athlete, 20.82 ± 1.33 yrs of age, BMI 25.23 ± 2.67 kg/m^2) performed a minimum of three countermovement vertical jumps under each of the two testing conditions: switch mat and switch mat with Vertec. Jump height was calculated from flight time measured by the switch mat. The Vertec served as the extrinsic motivator, as it provided an overhead target to reach for. Prior to testing, all subjects participated in a standardized dynamic warm-up and a series of practice jumps. Each jumping trial was followed by a 30 second rest period. Subjects continued jumping until no further improvement was seen in performance, compared to previous trials under the same condition. A dependent t-test was used to compare max jump height between the two conditions. An additional nominal variable was created to indicate if subjects experienced improvement with the Vertec. Chi-square tests compared the relationship between sex and improvement with the Vertec as well as athlete status and improvement with the Vertec. Body mass index (BMI) and max jump height were analyzed with a Pearson product moment correlation. RESULTS: The extrinsic motivator improved jump performance by an average of 0.99 in (22.49 ± 5.03 in vs 21.50 ± 4.43 in, $t(16) = -2.77$, $p = 0.014$). Thirteen of the seventeen subjects achieved a higher jump height with the Vertec. Improvement with the Vertec did not vary by sex ($\chi 2$ (1, N = 17) = 1.64, $p = 0.31$) or by athlete status ($\chi 2$ (1, N = 17) = 0.05, $p = 0.05$). A non-significant weak positive correlation was found between max jump height on the switch mat and BMI ($r = 0.228$, $p = 0.379$). A similar relationship was found between max jump height with the Vertec present and BMI ($r = 0.253$, $p = 0.327$). CONCLUSIONS: It was concluded that adding an extrinsic motivator significantly improves vertical jump performance. The improvement in performance did not differ based on sex or whether the subject was a current D-III varsity athlete. Body mass index was weakly correlated with performance. Our results suggest that the use of extrinsic motivators may be beneficial in both testing and training environments.

P240: THE EFFECT OF AMMONIA INHALANTS ON ANEROBIC PERFORMANCE AND PSYCHOLOGICAL VARIABLES
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BACKGROUND: Recently ammonia inhalants have been used by weightlifters and athletes for their potential ability to improve exercise performance and their stimulative properties; however, research

reveals mixed results. Therefore, the purpose of this study is to examine the effects of ammonia inhalants on anaerobic exercise performance and psychological responses. METHODS: Physically active, college-age females (21.4±0.8 yrs, 132.9±24.1 lbs, 65.4±2.8 in) were recruited into the study. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory two times and completed three 15-second Wingate Anaerobic Cycling Tests (WAnT) at 7.5% of body weight on a Velotron cycle ergometer after sniffing a 0.33 cc ammonia capsule or placebo (water) in a randomized, cross-over design. After each WAnT participants were asked their rate of perceived exertion (RPE). There was a 2-minute recovery break between each WAnT. RESULTS: Mean watts (p=0.59), peak watts (p=0.23), anaerobic capacity (p=0.17), anaerobic power (p=0.08), fatigue index (p=0.06), heart rate (p=0.11), and RPE (p=0.33) were averaged over the three repeated WAnTs and were not significantly different between the ammonia salts and placebo conditions. CONCLUSION: These findings do not support the use of smelling ammonia inhalants to improve anaerobic performance and ammonia inhalants do not appear to change the psychological variable of perceived exertion.

P241: HEART RATE VARIABILITY IN RESPONSE TO BLOOD FLOW RESTRICTION TRAINING AND REDUCED SEDENTARY TIME: A PILOT STUDY

Tanya Miller, Clayton Nicks, Brian Tyo, Kate Early. *Columbus State University, Columbus, GA.*

BACKGROUND: Excessive sedentary time is associated with increased cardiovascular disease (CVD) risk. In sedentary middle-aged adults, resistance training has been found to improve comorbidities associated with CVD, such as heart rate variability (HRV). Few studies have examined the impact of blood flow restriction (BFR) training, a safe and effective alternative to traditional resistance training, on HRV. The purpose of this study was to examine the effects of 20 weeks of BFR training or reduction of SED in sedentary adults.
METHODS: Campus office workers (n = 14, 36% male, age 29-66 y) underwent resting HRV, handgrip strength, and muscular endurance testing. Subjects were randomized to the following: BFR 3days/week consisting of 20-minute (60 sessions total), supervised sessions using Theraband; reduced sedentary time (SED) consisting of accumulated three 10-minute periods of standing during the work-day; and CON maintained normal activity. Time and frequency domain metrics of HRV were derived pre-, mid- and post-intervention.
RESULTS: A repeated measures ANOVA revealed no changes in HRV within the control (n=6, p>0.05) or sedentary group (n=4, p>0.05). No significant changes were found in the BFR group (n=6, p>0.05), with the exception of heart rate, which changed pre- to mid-intervention (p=0.02). No significant changes were found in handgrip strength within the control (n=6, p>0.05) or sedentary group (n=4, p>0.05). Significant changes were found in the BFR group for right grip strength (n=6, p>0.05), which changed mid- to post-intervention (p=0.03). No significant changes were found in muscular endurance within the sedentary (n=4, p>0.05) or BFR group (n=6, p>0.05). No significant changes in muscular endurance were found within the control group (n=6, p>0.05), with the exception of knee flexor repetitions, which changed pre- to post-intervention (p=0.03).CONCLUSIONS: 20 weeks of BFR did not result in changes in HRV in sedentary adults. Changes were found in the BFR group for heart rate pre- to mid-intervention and right handgrip strength mid- to post-intervention, and in the control group for knee flexor repetitions, likely due to the familiarization effect. These results are expected given our sedentary but generally healthy population. Caution is warranted when interpreting practical applications of these preliminary results given our sample size.

P242: DO CHANGES IN NAVY FITNESS TESTING PROTOCOLS IMPACT SERVICE MEMBERS PERFORMANCE?

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BACKGROUND: Many branches of the armed forces have recently changed their physical fitness assessments. More specifically, the Navy changed the fitness testing protocol by replacing curl-ups with a plank (in addition to the push-up test and 1.5 mile run which remain unchanged). Because plank and push-ups are both maximal exertion tests largely involving the same muscle groups, the changes in the testing protocols may cause more potential sailors to fail. This study will investigate if the changes to the Navy's Physical Readiness Test (PRT) impact performance on the fitness test. METHODS: 24 males between the ages of 18 and 29 will participate (data collection is ongoing). Once all baseline data is collected, participants will perform the standardized Navy PRT warm-up immediately followed by the Navy PRT. The testing protocols consist of 1) maximum number of push-ups in two minutes or until exhaustion/cannot maintain form, 2) maximum number of curl-ups in two-minutes (old version) or a forearm plank hold held as long as possible (new version), and 3) 1.5-mile run. At the end of each exercise the participants' heart rate and rating of perceived exertion (RPE) will be recorded. Approximately 1 week later, participants will come in for session two and complete the opposite protocol. Additional qualitative data regarding the perceived differences in the two protocols will be collected at the end of session 2. Scoring for each session will be completed (i.e pass or fail for each exercise) and compared to determine whether the new protocol results in more individuals failing vs. the old protocol. RESULTS: To date, two participants have completed the study. Following the old PRT protocol participant #1 completed 46 push-ups (Satisfactory), 70 curl ups (Good), and ran 1.5-miles in 9:11min (Excellent). Following the new PRT protocol participant #1 completed 42 push-ups (Probationary), held a forearm plank for 1:49min (Good), and ran 1.5 miles in 8:33min (Outstanding). Following the old protocol participant #2 completed 28 push-ups (Probationary), 51 curl-ups (Satisfactory), and ran 1.5 miles in 11:35min (Good). Under the new protocol participant #2 completed 43 push-ups (Good), held a forearm plank for 1:49min (Good), and ran 1.5 miles in 11:28 (Excellent). CONCULSIONS: Researchers expect to see better performance on the old PRT protocol. This is because the old protocol (curl-up, push-ups, run) is less fatiguing on the shoulder and chest muscles of participants than the new protocol (push-ups, forearm plank, and run). Grant Information: Funding through the WKU Graduate School Research Grant

P243: VALIDITY OF WRIST-WORN STEP COUNTING MONITORS DURING ACTIVITIES LIMITING ARM SWING

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Background: Little is known about the effect on the validity of wrist-worn step counting devices during activities limiting arm swing (i.e. holding on to an object). The purpose of this study was to determine the difference in step counts as measured by various wrist-worn step counters (Apple Watch 3, Apple Watch 6, FitBit Inspire, AmazFit Bip, ActiGraph GT9X Link, and Garmin Vivofit 4) when worn during activities with typical arm swing versus with limited arm swing. Methods: N=12 male and female college-age participants completed a single lab visit with 15 trials (free walking at 2 and 3.5 mph, jogging at 6 mph, walking at 2 and 3.5 mph while carrying a coffee mug (right and left hand), a textbook (right and left hand), and pushing a shopping cart, walking at 3.5 mph while pushing a stroller, and jogging at 6 mph while pushing a stroller). The six devices were randomly assigned to a wrist placement with three devices on the right wrist and three on the left. Device step counts were then compared to hand-counted steps from GoPro camera footage; the camera was mounted to a chest harness and pointed towards the participants' feet during all trials. For each trial, absolute percent error (APE) was calculated as ([device measured steps - actual steps]/actual steps) × 100. One-sample t-tests were used to compare APE for each device to the gold standard of hand-counted steps, and one way ANOVA with Tukey correction for multiple comparisons was used to compare the six devices to one another. In all comparisons, alpha of 0.05 was utilized. Results: Most devices undercounted steps for the trials with limited arm swing. For the control trials with typical arm swing, devices undercounted by as much as 23.9% (ActiGraph at 2mph) and overcounted by as much as 7.6% (AppleWatch 3 at 3.5mph). When holding a coffee mug or textbook, devices had an APE ranging from -15.5% to 13.7% at 2mph and -19.9% to 0.7% at 3.5mph. When holding an object fixed to the floor (i.e. a stroller or shopping cart), device APE was significantly greater than for holding the book or mug ($p<0.05$ for all devices). APE for the shopping cart trial ranged from -23.8 to -93.7% while APE for the stroller ranged from -7.3 to -94.8% at 3.5mph and -12.3 to -96.6% at 6mph. For all stroller and cart trials, the ActiGraph Link had significantly greater APE than the other devices ($p<0.05$). Conclusions: Consumer-grade wrist-worn step counters may undercount steps during activities with limited arm swing (i.e. hand on an object); this is particularly true when the object is fixed to the floor, such as a shopping cart or stroller.

P244: THE INFLUENCE OF SEGMENTAL BIOELECTRICAL IMPEDANCE SPECTROSCOPY PROPERTIES ON STAIR CLIMB PERFORMANCE IN CAREER FIREFIGHTERS

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BACKGROUND: Previous research has speculated that segmental bioelectrical impedance spectroscopy (sBIS) measures of characteristic frequency (CF) and phase angle (PA) may reflect skeletal muscle size and quality, respectively. Further, quadriceps muscle size and quality have also been found to influence stair climb performance (SCP) in career firefighters. Therefore, the purpose of this study was to examine the relationship of sBIS measures of CF and PA with SCP in career firefighters. METHODS: Thirty-eight male career firefighters (age: 32.2±8.0 yrs, stature: 178.6±8.1 cm, body mass: 92.9±19.3 kg) volunteered for this study. Participants refrained from vigorous exercise for 48 hours and fasted at least eight hours prior to visiting the laboratory on one occasion. Following a 10-minute lying period, sBIS was used to assess CF and PA of the dominant thigh. Characteristic frequency was normalized to body mass to represent a proxy for relative muscle size. Emitting electrodes were placed 10 cm distal to the anterior superior iliac spine and 10 cm proximal to the tibial tuberosity. The sensing electrodes were placed five cm inside the emitting electrodes. Prior to the stair climb, participants consumed a standardized shake to break their fast. Participants performed a stair climb assessment wearing a 22.73kg weight vest to simulate the weight of their personal protective equipment and self-contained breathing apparatus. After a warm-up, participants climbed a flight of stairs four times (104 total steps) without stopping or holding onto the handrails. Pearson's product-moment correlation coefficients (r) were used to determine the associations between sBIS measures (i.e., CF and PA) and SCP (i.e., completion time). A stepwise regression analysis was used to determine the relative contributions of CF and PA on SCP. An alpha level of ≤0.05 was set to determine statistical significance. RESULTS: There was an association between both CF and SCP (r= -0.390, P=0.016) as well as PA and SCP (r= -0.516, P<0.01). The stepwise analysis suggested that PA alone significantly contributed to SCP (R^2=0.246, P<0.01). CONCLUSIONS: These results suggest that CF and PA, estimates of muscle size and quality, influence SCP, with PA being the most significant predictor of SCP in career firefighters.

P245: THE EFFECT OF LISTENING VOLUME OF PEFERRED MUSIC ON AEROBIC EXERCISE PERFORMANCE AND PSYCHOLOGICAL VARIABLES

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BACKGROUND: Previous research has demonstrated that listening to preferred music can improve exercise performance, increase motivation, and decrease perceived exertion during exercise. However, there is less evidence on if listening to preferred music at different volume levels can increase exercise performance. Therefore, the purpose of this study is to investigate the effect of the volume of preferred music on aerobic exercise performance. METHODS: Physically active, college-aged females (21±1.1 yrs, 148.4±10.7 lbs, 67±0.7 in) were recruited into the study. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory two times and completed a 2000-meter row for time on a Concept2 rowing ergometer while listening to music at a low decibel (dB) volume (60 decibels) or a high decibel volume (80 decibels) in a randomized, cross-over design. On the first visit, participants selected a song they preferred listening to during exercise that was over 120 beats per minute and that same song was played on repeat throughout the duration of the 2000-meter row in both volume conditions. Participants were instructed to complete the rowing exercise as quickly as possible, and rate of perceived exertion (RPE) and motivation were recorded. RESULTS: Heart rate (p=0.27), relative power (p=0.11), time to completion (p=0.75), RPE (p=0.07), and reported motivation (p=0.71) were not significantly different between low music volume and high music volume rowing conditions. CONCLUSION: These findings suggest that volume of preferred music during aerobic exercise does not improve performance or subjective measures.

P246: RELATIONSHIP BETWEEN VISUAL ANALOG SCALES AND COMMONLY USED SCALES OF PERCEIVED READINESS AND EXERTION

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BACKGROUND: Subjective measures of perceived readiness and exertion are widely used in research and practical settings. However, these data are ordinal in nature and present unique challenges during analysis and interpretation. The purpose of this study was to investigate the correlation of two visual analog scales (VAS) to their counterparts for readiness and exertion metrics. METHODS: A sample of 20 ROTC participants (female n = 1, aged 18-28 y) participated this study. Participants were asked to provide subject measures of readiness (before) and exertion (after) completing the Army Combat Fitness Test (ACFT) during two sessions. Upon arrival, participants were asked to report their perceived readiness on a commonly-used perceived readiness scale (PRS: 0-10) and on a modified visual analog scale of perceived readiness (100-mm line anchored with "Unable to Perform" and "Ready for Peak Performance"). Then, all participants completed the current Army Combat Fitness Test (ACFT) and reported post session ratings of perceived exertion on the Omni scale (Omni RPE: 0-10) and a modified visual analog scale of perceived exertion (100-mm line anchored with "Rest/No Exertion" and "Maximal Exertion"). VAS scoring required the participant to mark on the 100-mm line where they fell on the spectrum and their score was later measured to the nearest millimeter the line passed. The protocol was repeated 72 h later. Data from both sessions were pooled for analysis for each comparison. Spearman's Rho correlations were used to explore the relationships between the visual analog scales and their traditional, ordinal counterparts. RESULTS: The results of the Spearman's Rho correlations showed moderately-strong correlations between the measures of readiness ($r_s(37) = 0.65$, $p < 0.001$) and exertion ($r_s(35) = 0.77$, $p < 0.001$). Of note, one participant did not complete session two and participant errors on the data collection sheet for Omni RPE called for the removal of two exertion-related data points. CONCLUSION: These data show that both visual analog scales have moderately-strong relationships with traditionally-used subjective metrics for readiness and exertion - establishing a level of criterion validity. Therefore, visual analog scales show promise as tool with which researchers and practitioners can assess subjective responses and be confident the data are continuous, limiting bias related to recall with serial measures.

P247: VALIDATION OF AN AIR CONSUMPTION DRILL IN STRUCTURAL FIREFIGHTERS

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BACKGROUND: Completion of fireground tasks requires firefighters (FF) to work at high levels of exertion while consuming air from a self-contained breathing apparatus (SCBA). The SCBA's finite volume of air serves as a lifeline. Thus, efficient air consumption (AC) is critical to FF safety. To conduct research on AC efficiency, a valid, reliable, and, occupationally-relevant AC drill (ACD) is needed. The purpose of this study was to validate an ACD for use in subsequent investigations. METHODS: A sample of 193 FF (58% of incumbent population) from one department completed a job task analysis (JTA) to rank job tasks based on criticality, rate the level of physical exertion (RPE; 0-10 category-ratio scale), and provide dimensions of each task. These data were used to establish specific tasks and dimensions of the ACD. A subsample of FF (n=33; Age: 37.5±7.7 yr; Experience: 10.9±6.3 yr) completed the ACD at an occupationally-relevant pace while breathing through the SCBA. An additional subsample (n=11) completed two trials to establish test-retest reliability. Total ACD completion time and change in SCBA air pressure were recorded. Exertion was measured pre-, during, and post-ACD. RESULTS: From the JTA, 91.3-99% of FF identified the stair climb, hoseline advance, equipment carry, ladder raise, forcible entry, search, rescue, and breach and pull as 'critical' to 'very critical' job tasks. The RPE of ACD tasks was similar to the JTA reported RPE (Task RPE difference, Range: 0-3.5). The test-retest reliability of ACD time and AC were ICC: 0.82 (SEM: 18 s) and ICC: 0.68 (SEM: 249 PSI), respectively. The mean ACD completion time was 7.8±1.4 min (range: 6.4-13.1 min). The mean absolute and relative AC were 1734±477 PSI (range: 939-3063 PSI) and 43.9±11.9% (range: 24.7-76.2%). The mean absolute and relative heart rate were 165.6±12.7 bpm (range: 137.6-194.2 bpm) and

90.9±7.0% (range: 77.3-103.3%). CONCLUSIONS: Findings suggest that the ACD required occupationally-relevant, yet variable levels of exertion, as evidenced by heart rate, AC, and RPE values. Collectively, the ACD demonstrated to be valid, reliable, and appropriate for future investigations within this department. Funding: University of Kentucky's KHP Graduate Block Funding and UK - Research and Creative Activities have supported this project. This study is under review by the Federal Emergency Management Agency's Fire Prevention and Safety grant mechanism.

P248: EFFECTIVENESS OF A POSTACTIVATION PROTOCOL FOR IMPROVING PERFORMANCE IN THE ARMY COMBAT FITNESS TEST

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The Army Combat Fitness Test (ACFT) aims to accurately reflect Soldier combat performance capability and includes a 3-rep-max deadlift (MDL), standing power throw (SPT), hand-release pushup (HRP), sprint-drag-carry (SDC), leg tuck (LTK), and two-mile run (2MR). The benefits of the current warmup protocol, known as the "Preparation Drill", performed prior to the first event of the ACFT, is limited by subsequent idle periods in between events. This study was designed to evaluate the effectiveness of implementing task-specific, post activation performance enhancement (PAPE) strategies, performed immediately prior to the event for which PAPE exercises are designed. The PAPE strategies were as follows: MDL = 1 rep at 10% higher than target 3RM, SPT = 5 consecutive vertical jumps, HRP = 5 plyometric pushups, SDC = 5 consecutive broad jumps, LTK = 5 medicine ball slams, and 2MR = 4 x 20 m sprints. METHODS: A total of 19 ROTC members completed two ACFT tests, separated by 72 hours. Approximately half (n = 10) completed the traditional "Preparation Drill" as their warmup prior to the first session and added PAPE warmup strategies as part of their second session. The remainder of the group (n = 9) completed the treatments in the opposite order to facilitate a repeated-measures, crossover design. The participants' composite ACFT score (passing score = 360, max = 600 pts) was used to test for mean difference in a two-way (Time x Treatment), repeated measures ANOVA. RESULTS: The results of the two-way repeated measures ANOVA revealed that there was no interaction effect (Time x Treatment) ($F(1,8) = 0.075$, $p = 0.79$, $\eta p^2 = 0.009$) nor main effect of Treatment ($F(1,8) = 0.084$, $p = 0.78$, $\eta p^2 = 0.010$). However, there was a main effect of Time ($F(1,8) = 58.87$, $p < 0.001$, $\eta p^2 = 0.88$) (mean ACFT score ± SD: Session 1 = 527 ± 43, Session 2 = 537 ± 39). CONCLUSION: The results of this study did not support the use of additional PAPE strategies to improve ACFT performance. Of note, all passed by a large margin (range 428 - 600). Additionally, there was a practice effect when the test was completed twice, separated by 72 hours - with 17/19 participants matching or exceeding their first score. Therefore, further investigation is warranted with particular attention to minimizing the impact of familiarization and targeting soldiers whose scores are closer to the passing threshold for some - or all - events.

P249: GENDER DIFFERENCES IN FUNCTIONAL MOVEMENT SCREENING SCORES IN MEN'S AND WOMEN'S COLLEGIATE TENNIS

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BACKGROUND: Ideal functional movement is essential for optimal sports performance and has implications for injury prevention. Functional Movement Screening (FMS) ™ is utilized to assess an athlete's mobility, core strength, and joint range of motion. Higher FMS scores indicate greater ability to perform one of the seven movement patterns. The aim of this study was to identify differences in movement patterns of male and female NCAA Division I Tennis athletes. **METHODS:** Thirteen members (7 women) of a NCAA Division I Tennis team (mean ± SD: age=20±2.1 yrs.; height=174±9.2 cm; weight=71±9 kg) volunteered for FMS screening. Movement patterns assessed included deep squat (DS), hurdle step (HS), in-line lunge (IL), shoulder mobility (SM), active straight-leg raise (ASLR), trunk stability push-up (TSP), and rotary stability (RS). Individual scores were recorded for each screening item and a sum of all items were calculated to provide a total FMS score. Scoring valued between 0 and 3, with 3 indicating no compensatory movements and 0 indicating pain with movement. Lowest score of 2 attempts was recorded for each movement and used to calculate total FMS. **Results:** A one-way analysis of variance (ANOVA) was conducted to compare FMS scores of each of the seven movement patterns and the total scores between the genders of tennis athletes. No significant differences were seen in the total FMS scores between males and females (15.2±1.6 vs.15±1.7; p=0.86). There were statistically significant differences ($p \leq 0.05$) between males and females for IL (2.0±0.63 vs. 2.7±0.49; p=0.042), ASLR (2.2±0.41 vs. 2.9±0.39; p=.009), and TSP (2.3±0.52 vs. 1.7±0.49; p=.048). This data indicates females performed better than men in IL and ASLR and males performed the TSP better than females. However, regardless of gender, tennis players were only able to perform at 71% across all the movement patterns. **Conclusion:** The findings of this study, indicate that female tennis players have greater ability to control movement while performing a lunge and greater hamstring flexibility than males. Similarly, males had greater ability to perform total body push-ups due to increased upper body strength. The total FMS scores for both genders indicated a 29% deficit in movement patterns hence, providing corrective exercises would be indicated to improve functional movement, sports performance, and potentially decrease injury potential.

P250: EVALUATION OF THE EFFECTIVENESS OF ROTC ARMY CADET EXERCISE TRAINING FOR THE ARMY COMBAT FITNESS TEST

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Purpose: The Army Reserve Officers' Training Corps (ROTC) Program challenges student cadets mentally as well as physically to develop specific skills pertaining to critical thinking as well as leadership. The purpose of this study was to evaluate the effectiveness of a physical fitness training program to improve the fitness performance capabilities of cadets in the events that were tested by the Army Combat Fitness Test (ACFT).Methods: Twenty-six student cadets of the University of Alabama at Birmingham ROTC program participated in the study. Over an 8-month period, the ROTC cadets trained on campus three days per week for one hour per session. Training was performed in a circuit training format and each participant cycled through each of the four training stations (Strength, Conditioning, Core, and Endurance) for 15 minutes each session (for a total training time of 60 minutes). Each cadet had body mass and body composition assessed as well as each component of the ACFT [maximum dead lift (MDL), standing power throw (SPT), hand release push-up (HRP), sprint-drag-carry (SDC), leg tuck/plank (LTK/PLK), and 2-mile run (2MR)]. Each variable was evaluated at three time points (pre-, mid-, and post-training program).Results: There was a significant difference in the 2MR score between time points [$F(2,50) = 4.530$, $p = 0.016$, = 0.153]. Upon using a Bonferroni correction to determine differences between groups, there was a significant difference between time point 1 and 3 ($p = 0.02$). However, no significant differences existed between time point 1 and 2 ($p = 0.773$) and time point 2 and 3 ($p = 0.266$). No other variables displayed a significant change across the three time points: body mass ($p = 0.741$), body fat percentage ($p = 0.238$), MDL ($p = 0.061$), SPT ($p = 0.308$), HRP ($p = 0.126$), SDC ($p = 0.132$), LTK/PLK ($p = 0.583$). Conclusion: The findings of this study suggest overall ineffectiveness of the Army ROTC exercise training program to improve ACFT performance over the span of an academic year with the exception of a steady improvement in aerobic endurance with the 2MR. Though the training program consisted of exercises tailored specifically to the ACFT, results showed that it did not necessarily improve the overall score.

P251: THE EFFECT OF ACUTE AGMATINE SULFATE SUPPLEMENTATION ON REPEATED ANAEROBIC SPRINT PERFORMANCE

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BACKGROUND: Agmatine sulfate is a commonly used ingredient in many pre-workout supplement blends that aim to improve physical performance and energy levels while exercising. However, the effect of isolated agmatine sulfate supplementation on anaerobic exercise performance is unknown. Therefore, the purpose of this study is to investigate the effect of acute agmatine sulfate supplementation on repeated anaerobic sprint performance. METHODS: Physically active, college-age males (21.8±0.5 yrs, 169.5±27.1 lbs, 69.0±5.0 in) were

recruited into the study. The study was approved by the university Institutional Review Board. All participants completed a health history and informed consent. Participants visited our laboratory two times and completed three 15-second Wingate Anaerobic Cycling Tests (WAnT) at 7.5% of body weight after consuming either two 500 mg capsules of agmatine sulfate or two 500 mg placebo (corn starch) capsules 30 mins prior to exercise. There was a 2-minute recovery break between each WAnT. Blood lactate was measured before and after the 3x15 WAnT tests and rate of perceived exertion (RPE) was recorded. The agmatine sulfate and placebo trials were randomized and counterbalanced. Each visit was separated by a 72-hour washout period. RESULTS: Mean watts (p=0.44), peak watts (p=0.93), anaerobic capacity (p=0.42), anaerobic power (p=0.97), fatigue index (p=0.77), heart rate (p=0.31), blood lactate (p=0.40) and RPE (p=0.24) were averaged over the three repeated WAnTs and were not significantly different between the agmatine sulfate and placebo conditions. CONCLUSION: These findings do not support consuming one dose agmatine sulfate supplementation prior to exercise to improve anaerobic exercise performance or perceived exertion.

P252: INTER-LIMB ASYMMETRIES, PEAK POWER, AND INTERNAL TRAINING LOADS IN NCAA DIVISION I FEMALE SOCCER ATHLETES

Drake Dillman, Ryan Albino, Caroline Vincenty, Alex Miller, Alexa J. Chandler, Harry P. Cintineo, Bridget A. McFadden, Shawn M. Arent, FACSM. *University of South Carolina, Columbia, SC.*

INTER-LIMB ASYMMETRIES, PEAK POWER, AND INTERNAL TRAINING LOADS IN NCAA DIVISION I FEMALE SOCCER ATHLETES Dillman, D., Albino, R., Vincenty, C., Miller, A., Chandler, A.J., Cintineo, H.P., McFadden, B.A., Arent, S.M. BACKGROUND: Periodic testing and workload monitoring throughout a competitive season can help athletes and coaches periodize training to optimize performance. In particular, vertical jump testing to assess peak power and inter-limb asymmetries can be used to monitor athlete-readiness. The purpose of this study was to evaluate the relationship between internal training loads (TL), asymmetry rates, and peak power throughout a soccer season. METHODS: National Collegiate Athletic Association (NCAA) Division I female soccer players (N=21) were evaluated at all practices and games using a team-based heart rate monitoring system (Firstbeat Sports, Jyvaskyla, Finland) to assess TL via Banister's training impulse score (TRIMP). At the beginning of each week, athletes performed a dynamic warmup followed by maximal bilateral (CMJ) and single leg (SL) countermovement vertical jump tests using a hands-on-hips method assessed via a digital contact mat. The best of two trials were used for each jump test. An asymmetry index (ASY) was calculated by dividing dominant by non-dominant SL height. A linear mixed effects model was used to assess changes in CMJ, ASY, and TRIMP throughout the season. Repeated measure correlations were used to determine relationships between weekly changes in TRIMP, CMJ and ASY using an absolute ASY score. Significance was set at $p<0.05$ RESULTS: Time main effects were observed for weekly changes in TRIMP ($p<0.001$) and CMJ ($p=0.01$) over the season. No changes in ASY were observed ($p=0.09$). There was a significant weak correlation between CMJ and ASY ($r=0.17$; $p=0.04$), but no other relationships between TRIMP, CMJ, and ASY ($p>0.05$). CONCLUSION: Changes in internal workloads and peak power were apparent throughout the season and may influence athlete readiness. Although no changes in ASY were seen, a significant inverse correlation between ASY and peak power was observed, which may impact on-field performance. Declines in peak power along with higher asymmetry rates have been associated with injury risk. Systematic monitoring and periodized testing may aid in athlete-management strategies to mitigate these risks.

P253: DIFFERENCES IN BASELINE FITNESS LEVELS OF NROTC MIDSHIPMEN BETWEEN FALL 2020 AND FALL 2021

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Background: College students in Reserve Officer Training Corps (ROTC) programs must meet physical fitness standards in order to commission as a military officer. While physical fitness training is required during the semester, cadets are expected to continue training during the summer break. However, nationwide closures due to COVID-19 during the spring and summer of 2020 may have impeded training abilities and thereby fitness status of incoming cadets in Fall 2020. The purpose of this analysis was to compare fitness levels of Naval ROTC (NROTC) midshipmen upon return to campus in Fall 2020 (FA20) compared to Fall 2021 (FA21). It was hypothesized the battalion would arrive at a higher fitness level in FA21 due to the accessibility of public exercise facilities over the summer months which were largely unavailable during the 2020 summer months. Methods: NROTC midshipmen completed a battery of fitness tests within one month of arrival to campus in FA20 (N=70; Age = 21 ± 2; 89% male) and repeated testing in FA21 (N=85; Age = 20 ± 2; 80% male). Body mass index (BMI; kg/m^2) was calculated from height and weight metrics. Performance tests consisted of a countermovement vertical jump (CMJ) and the 20-meter shuttle run test to estimate VO_{2max}. Linear mixed effects models were used to determine overall battalion differences in BMI, CMJ height, and VO_{2max} FA20 compared to FA21 with an alpha level of 0.05 to determine statistical significance. Results: While there were no differences in BMI (P=0.25), 47.2% of midshipmen were classified as 'overweight' in FA20 compared to 43.6 % in FA21. CMJ height was significantly higher at FA21 than FA20 (±1.4 cm; P=0.02) but there were no differences in estimated VO_{2max} (FA20 = 48.8 ±5.2 ml/kg/min; FA21 = 49.2 ± 5.4 ml/kg/min; P=0.45). Conclusions: While there were no differences in aerobic fitness, anaerobic fitness appeared to be higher in FA21. While it is not possible to determine the direct impacts of COVID-19 on fitness levels, it is plausible that pandemic-associated closures prevented strength and power training due to lack of fitness facilities and associated equipment, leading to decreased peak power measured as CMJ height. ROTC programs across the country may need to adjust their training programs upon return to in-person activities to ensure all cadets meet the required fitness standards, especially those related to strength and power.

P254: ASSESSMENT OF PHYSICAL FITNESS AND BODY COMPOSITION IN FIRST-YEAR COLLEGIATE DANCERS

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Introduction: It has been postulated that dance places the emphasis on quality and execution of movement, which requires a more athletic approach to training. However, some work has reported that physical fitness in dancers is similar to sedentary populations (Wyon, 2010). The current study served to investigate this. The purpose of the present study was to evaluate physical fitness and body composition in first-year collegiate dancers. Methods: Five first-year female dance students (N = 5; age: 18 + 0 years) from the same institution volunteered to participate in this study, during the first semester of the dance program. Body Composition was measured via Bioelectrical Impedance Analysis (BIA) (InBody 230). Muscular strength was assessed through the implementation of a submaximal ten-repetition maximum (10RM) bench press and back squat. Anaerobic power was determined utilizing the Wingate Cycle Ergometer Test. Results: Dependent samples t-tests were run to assess changes in various body composition measures prior to starting a strength and conditioning program after 8-weeks of training. No statistical significance was found in terms of body fat mass, lean body mass, and percent body fat ($p > .05$). Skeletal muscle mass significantly increased from baseline to week 12 ($p < .05$). No significant differences were found from baseline to post testing for peak relative power ($p = .052$) or fatigue index ($p = .143$). A significant difference was found from baseline to post testing for mean absolute power ($p = .012$) and mean relative power ($p = .028$). A significant difference was found from baseline to post testing for predicted back squat 1RM ($p = .006$) and for predicted bench press 1RM ($p = 0.13$). Conclusions: An improvement was seen in terms of the dancers' anaerobic capacity and strength after completing the 12-week resistance training program. Decreasing fatigue index, represents the ability to maintain power output for a longer duration of exercise. Through periodized resistance training programs dancers can improve their anaerobic power and decrease the rate at which they are fatiguing the anaerobic energy systems.

P255: AGREEMENT BETWEEN IPAQ AND SBQ ESTIMATES OF SEDENTARY BEHAVIOR IN UNIVERSITY STUDENTS

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BACKGROUND: Numerous questionnaires are available for measuring sedentary behaviors (SED) in different populations. The Sedentary Behavior Questionnaire (SBQ) and International Physical Activity Questionnaire (IPAQ) are two commonly used instruments; however, it is unclear whether the nine-item SBQ and the two-item IPAQ provide similar estimates in university students. Hence, the purpose of this

study was to compare the absolute and relative agreement between SBQ and IPAQ estimates in university students. **METHODS:** College students (n=555, 20.4±1.6yrs, 80% female) completed an online health behavior survey from January to March 2020 that included both the SBQ and IPAQ. Responses for all nine items from the SBQ were multiplied by the number of days per week (5 for weekdays, 2 for weekends), summed, and then divided by 7 to obtain the average number of minutes spent in SED each day. Responses from the IPAQ were multiplied by the number of days per week (5 for weekdays, 2 for weekends), summed, and then divided by 7 to obtain the average number of minutes spent in SED each day. A paired t-test was used to compare the absolute agreement between SED estimates. Spearman correlations were used to examine the relative agreement between total SED estimates and between the individual items of the SBQ and the total SED estimate from the IPAQ.**RESULTS:** The paired t-test revealed a significant difference in total SED estimates between the SBQ (483.1±196.9min/day) and IPAQ (390.3±1308.1min/day) (p<0.001). The correlation between SBQ and IPAQ estimates of total SED time was weak (R_s=0.24, p<0.001). Correlations between the SBQ component items and total SED from the IPAQ were also weak, but highest for paper/computer work R_s=0.17 (p<.01), gaming R_s=0.11 (p=.01), and reading R_s =0.10 (p=.02). **Conclusions:** These data indicate that there is poor absolute and relative agreement between SBQ and IPAQ estimates of SED in college students. However, it is unclear which of these two instruments provides the more accurate estimate of SED in this population. Future studies should compare SED estimates from a diverse array of questionnaires to estimates from objective criterion measures across a range of university settings.

P256: ALCOHOL CONSUMPTION AND PHYSICAL ACTIVITY, SEDENTARY, AND SLEEP BEHAVIORS IN UNIVERSITY STUDENTS

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BACKGROUND: Excessive alcohol intake has been associated with negative health outcomes, but it is unclear if alcohol consumption is related to the different behaviors (moderate to vigorous physical activity (MVPA), sedentary behavior (SED), and total sleep duration) that make up a 24-hour day in university students. The purpose of the study was to examine the associations between alcohol consumption and self-reported MVPA, SED, and sleep in university students. **METHODS:** University students (n=660, 20.3±1.6yr, 80% female) completed an online survey to assess demographics, total alcohol consumption per week, Greek Life membership, sleep duration (min/day) via the Pittsburgh Sleep Quality Index, SED (min/day) via the Sedentary Behavior Questionnaire, and MVPA (min/day) via the Leisure Time Physical Activity Questionnaire. Multiple linear regression was used to examine associations between different alcohol consumption categories (Moderate=*Females* 1-7 drinks per week, *Males* 1-14 drinks per week; Heavy= *Females* >7 drinks per week, *Males* >14 drinks per week) with MVPA, SED, and sleep behaviors adjusting for possible confounding factors (sex, race/ethnicity, BMI, and Greek Life membership). **RESULTS:** Moderate (β=6.9, p=0.10) and heavy alcohol drinkers (β=6.4, p=0.21) self-reported higher MVPA compared to university students that do not consume alcohol (trend p =0.02). Moderate (β=20.5, p=0.29) and heavy *(*β=41.5, p=0.27) alcohol drinkers self-reported higher SED compared non-drinkers, although these differences were not statistically significant (trend p=0.17). Moderate (β=0.5, p=0.94) and heavy (β=-5.8 p=0.61) alcohol drinkers had sleep times that were similar to those who reported not consuming alcohol (trend p=0.78). **CONCLUSIONS:** In this university student sample, alcohol drinkers reported participating in 6-7 additional minutes of MVPA per day than students that reportedly do not drink alcohol. However, only moderate drinkers had statistically significant higher values. While this analysis controlled for several potential confounders, other unmeasured differences between drinkers and non-drinkers may account for the higher MVPA observed among drinkers. Alternatively, alcohol drinking among university students may be a marker for greater engagement in social activities that incorporate MVPA.

P257: A PHYSICAL ACTIVITY INTERVENTION IN ADULTS WITH LYMPHOMA UNDERGOING TREATMENT: FEASIBILITY AND NEXT STEPS

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Background: Chronic treatment-related toxicities are prevalent among lymphoma survivors. Current research highlights the associations between anthracycline-based chemotherapy and cardiovascular complications. Physical activity has cardioprotective benefits that may reverse or prevent the decline of cardiovascular function among lymphoma patients during and after treatment. **Purpose:** The purpose of the Physical Activity and Lymphoma Study (PALS) is to determine the feasibility of conducting a tailored physical activity intervention for lymphoma patients receiving chemotherapy. **Methods:** Feasibility will be determined by accrual, adherence, and retention rates, as well as perceived barriers, adverse events, and program satisfaction. The PALS pilot study is in the process of recruiting 23 lymphoma patients, with 17 in the physical activity intervention group (PAI) and 6 in the healthy living intervention group (HLI). All participants will be recruited from the greater Piedmont Triad area in North Carolina. Participant accrual will be determined by examining the number of patients identified by referring physicians and who signed the informed consent. The PAI group's adherence will be determined by dividing the number of sessions prescribed by the number attended, with the goal of two sessions per week. The HLI group will be assessed by their attendance to biweekly interactive sessions on psychosocial well-being and healthy lifestyle recommendations. Retention will be estimated by participant drop-out rates and reasons for withdrawal will be captured by semi-structured qualitative interviews. Adverse events will be documented and evaluated for their association with the intervention. Program evaluations will be completed by participants to assess barriers to exercise and testing, as well as program satisfaction. **Anticipated results:** It is hypothesized that the intervention will be tolerated by participants as demonstrated by retention rates, adherence to tailored exercise sessions, minimal adverse events, and overall program satisfaction. The feasibility of the PALS pilot study will provide insight for a subsequent larger clinical trial aimed at improving exercise capacity, cardiac and cognitive dysfunction, as well as health-related quality of life among lymphoma patients receiving chemotherapy.

P258: IMPACT OF EMBEDDED FITNESS PROGRAMMING IN SOUTHEASTERN GEORGIA CAREER FIREFIGHTERS

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IMPACT OF EMBEDDED FITNESS PROGRAMMING IN SOUTHEASTERN GEORGIA CAREER FIREFIGHTERS Derick Anglin1, Greg A. Ryan2, Thomas Nagel1, Mario Keko1, Haresh Rochani1, Catherine Gallagher1, & Bridget Melton11Georgia Southern University, Statesboro, Georgia2Piedmont University, Demorest, Georgia
BACKGROUND: Cardiorespiratory fitness and muscular strength is crucial to firefighter preparedness. Although performance variables are important for occupational task, little is known on the impact of wellness programming on improving these variables. PURPOSE: The purpose of this study was to understand the impact that embedded fitness programming has on performance variables in rural southeastern firefighters. METHODS: Sixty-five career firefighters from two rural southeastern fire departments (FD) in Georgia participated in this this study. FD 1 had an established wellness program (n = 46, age: 36.1 ± 9.0 yr) and FD 2 acted as a control, with no established wellness program (n=19, age: 30.7 ±10.7 yr). FD 1 undergoes daily personal training and weekly team training programming with certified exercise professionals. Both FD performed a test battery consisting of 1RM bench press, isometric mid-thigh pull, isometric plank, pushups to fatigue, sit and reach, vertical jump, and VO2max test, conducted in a laboratory setting. Independent samples t-tests were run (α = 0.05) to compare FD results on all variables of interest. RESULTS: Significant differences were seen between the two FD in the following variables: Pushup test (FD 1: 30.4 ± 9.2 reps, FD 2: 21.0 ± 13.5; $p < 0.01$); Sit and Reach test (FD 1: 27.5 ± 8.5 in, FD 2: 11.9 ± 3.3; $p < 0.01$); VO2max test (FD 1: 43.8 ± 7.6 ml/kg/min, FD 2: 34.5 ± 7.6; $p < 0.01$). No differences existed between FD in the 1RM bench press ($p = 0.36$), isometric mid-thigh pull ($p = 0.20$), isometric plank ($p = 0.49$), or vertical jump ($p = 0.76$). CONCLUSIONS: While not universal, it appears that the embedded fitness program improves performance variables compared to a control fire department for rural firefighters. Most importantly, VO2max performance, which has been highlighted by firefighter organizations as crucial to occupational success, was improved in FD 1 compared to FD 2, indicating that an embedded

program may help cardiovascular performance in this population. The submitted work was conducted without funding.

P259: CHANGES IN NEAR-INFRARED SPECTROSCOPY ASSESSED MUSCLE OXIDATIVE CAPACITY IN COLLEGIATE CROSS-COUNTRY ATHLETES

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BACKGROUND: Muscle oxidative capacity (MOC) is the maximal rate at which the muscle can utilize oxygen to meet the energy demand of exercise. Measurements of MOC from muscle biopsies have shown that MOC is an important aspect of endurance performance and increases with endurance training, even in highly trained athletes. Recently, near-infrared spectroscopy (NIRS) measurement of muscle oxygen uptake (mVO_2) during brief arterial occlusions has shown to be a valid, reliable indicator of MOC. Endurance training throughout a collegiate cross-country season can lead to adaptations that increase MOC and performance. However, it is unclear if NIRS-derived MOC measurements are sensitive enough to detect changes in response to endurance training in highly fit athletes. This study will assess changes in MOC, via NIRS, in highly-fit collegiate runners across a cross-country season. METHODS: Collegiate cross-country runners will be tested pre- and post-season. Maximal oxygen uptake will be measured from an individualized treadmill test to characterize changes in fitness. MOC will be determined from a series of 20 short (5-10 sec) arterial occlusions interspersed with short recoveries. Rapid inflation cuffs placed on the distal portion of the thigh will be inflated to 300 mmHg during occlusions and released during recovery. Deoxyhemoglobin (HHb), collected at 10 Hz, will be measured at the gastrocnemius using NIRS. To calibrate the signal to individuals, a 5-min arterial occlusion will be performed to determine maximal deoxygenation (highest HHb) and the hyperemic response after cuff release will determine minimum HHB (maximal oxygenation). All data will be normalized to the minimum and maximum deoxygenation. HHb will be corrected for changes in blood volume using methods described by Ryan et al (2012). The slope of change in HHb during the first 3-5 seconds of each occlusion will be the mVO_2. Each mVO_2 will be plotted and a mono-exponential decay curve will be fitted to determine the time constant; time constant is indicative of MOC. A paired sample t-test will compare MOC from pre- to post-season. Alpha level will be set to 0.05 a priori. ANTICIPATED RESULTS: Changes in mitochondrial enzyme activity in response to endurance training have shown improvements in MOC in highly trained athletes. Therefore, it is expected that MOC, as measured by NIRS, will increase from pre- to post-season in cross-country runners.

P260: THE INFLUENCE OF A COLLAGEN-BASED MULTIPLE INGREDIENT SUPPLEMENT ON MUSCLE PERFORMANCE

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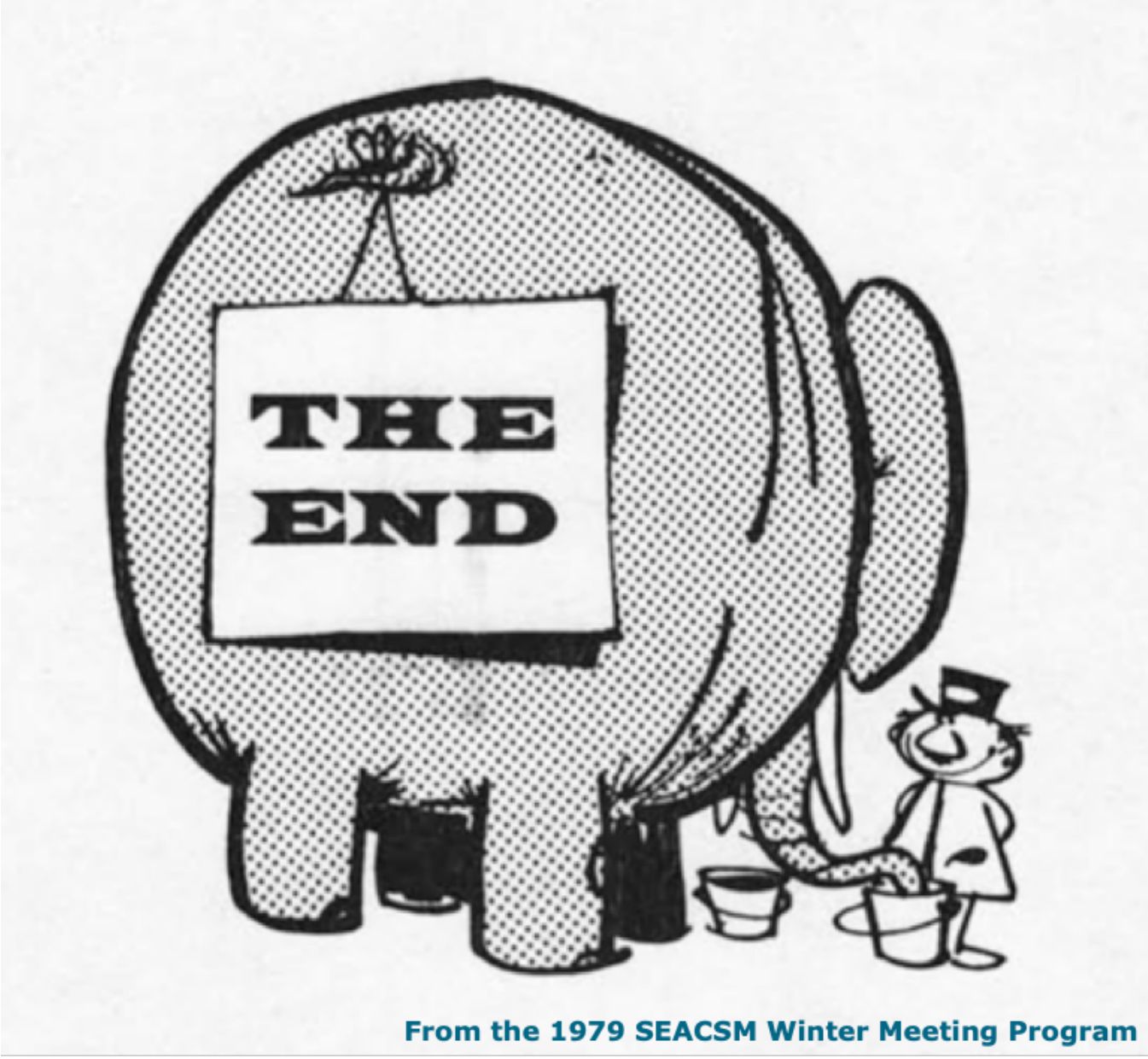
BACKGROUND: Nutritional supplementation is a common practice athletes engage in to enhance performance. Collagen supplementation is used to decrease recovery time, and improve muscular performance. The purpose of this study was to determine the effect of a novel enzyme-hydrolyzed collagen-based multiple ingredient supplement has on muscular performance. METHODS: Eight subjects who were already engaged in daily resistance training completed three data collection sessions at baseline, after 10 days, and after 21 days of taking a 30 ml/day dose of the supplement. Each testing session consisted of the following assessments: body composition, measured using whole-body plethysmography; upper body power, by medicine ball throw distance; lower body power, measured using a cycle ergometer; upper and lower body strength, measured by 1-RM bench press and standing broad jump distance; upper body endurance, measured by hand-release pushups; and midline endurance, measured by plank time. Subjects continued their own training program for the length of the study. The significance of differences was determined using ANOVA. RESULTS: Following 21 days of supplementation there were significance improvements in several variables compared to not using the supplement. These included lower body power (+157.37±119.37 W, p=0.007), upper body power (+26.12±23.1 kgm/sec, p=0.015), lower body strength (+5.31±3.58 in, p=0.004), and upper body endurance (+4±4.59 reps, p=0.043). There were no significant differences upper body strength (p=0.105), midline endurance (p=0.059), or body composition (p=0.105).CONCLUSIONS: The enzyme-hydrolyzed collagen-based multiple ingredient supplement used in this study appears to improve some measures of muscular performance compared to not using the supplement. This suggests that this new collagen-based supplement may enhance muscle strength, power, and endurance when combined with resistance training.



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