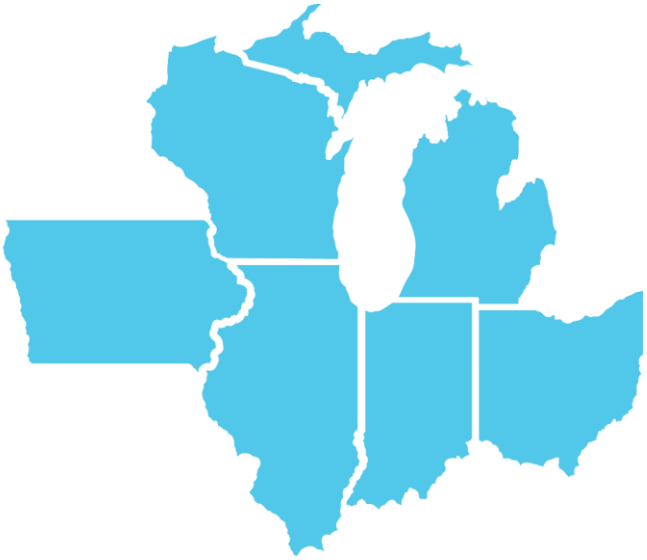
2023 Program of Events
50th Annual Meeting Midwest Chapter of the American College of Sports Medicine

AMERICAN COLLEGE of SPORTS MEDICINE®

Midwest Chapter



October 12-14, 2023
Hyatt Regency
Indianapolis, IN

Contents

Past-President's Welcome Letter

Colleagues, students, and friends,

Welcome back to Indianapolis as we celebrate the 50th Annual Meeting of the Midwest Chapter of the American College of Sports Medicine! I would also like to extend a special welcome to all our first-time student presenters and first-time attendees. I hope you will find your first MWACSM conference to be an enjoyable experience that fosters your continued learning and promotes your engagement in the field. As has become expected of our Chapter, we have an outstanding line-up this year that is sure to provide ample opportunities for you to gather with colleagues and peers. We are delighted that you can join us as we celebrate the legacy of ACSM's oldest regional chapter while sharing our latest research and scholarship.

Among the many highlights of this year's event are our two keynote speakers, both from our very own Midwest region. Dr. Stacy Fischer, from Nationwide Children's Hospital and Ohio State University, will present the keynote address on Friday, titled: *The Learning Connection: how physical activity, nutrition, free play and nurturing grow a healthy kid".* Dr. Lynn Darby of Bowling Green State University and Dr. J. Derek Kingsley of Kent State University, will present the Saturday morning historical lecture, titled: *Celebrating the Legacy of MWACSM.*

Additionally, we have a full agenda that features 18 faculty- and professional-led symposia, 23 oral presentations, and 98 poster presentations! Special events at the Annual Meeting include a Clinical Exercise Physiology panel discussion, ACSM Special Interest Group meet-and-greets, Exhibitor and Graduate School Fairs, a Student Lounge where students can drop in and mingle with professionals from a variety of disciplines, and the Annual Jeopardy-style Quiz Bowl Competition. We encourage you to take advantage of as many of these wonderful opportunities as possible!

I invite you to start your meeting by joining us at the Legacy Social, hosted by the History Committee, on Thursday, October 12th from 8:00 – 10:00 pm in the Studio Lounge. Stop by to enjoy beverages and light snacks while socializing with attendees from across the region. Reconnect, make new friends, network, and enjoy your time before exploring all that we have to offer at this year's Annual Meeting on Friday and Saturday!

As my time on the President's Council concludes, I would like to thank our Executive Director, Dr. Jodee Schaben, our President, Dr. Trent Cayot, and our President-Elect, Dr. Kevin Ballard, for their unwavering commitment to our Chapter. Their substantial efforts have been instrumental in both the planning and execution of our 50th Annual Meeting, as well as the ongoing success of the Midwest Chapter. Should you see them around the conference, be sure to let them know how much you appreciate their efforts. I consider myself incredibly fortunate to have served with them, among several others, over the past four years.

Welcome to the MWACSM 50th Annual Meeting – I hope you enjoy all we have planned!

Sincerely,

Katie Spillios, 2023 Past-President and Program Committee Chair, MWACSM

2023 Midwest ACSM Board of Directors

Dr. Katherine Spillios

Past-President

spillike@mountunion.edu

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President

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President-Elect

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selmer@mtu.edu

Dr. Andrew Jagim

Member-at-Large; Year 1

Jagim.Andrew@mayo.edu

Emily Post-Phillips

Member-at-Large; Year 1

Poste2@ohiodominican.edu

Chapter and Conference Information

In 1972, the Midwest Regional Chapter of the American College of Sports Medicine (MWACSM) was the first regional chapter to be granted permanent status. It was founded to follow, fulfill and promote, at the regional level, the objectives of the American College of Sports Medicine. The MWACSM is a chapter rich in tradition with a strong student focus. Through the years it has offered its members outstanding educational programs and opportunities for networking through the regional annual meeting.

Purpose and Objectives:

- To promote and advance scientific knowledge and application of this knowledge dealing with the effect of sports and other physical activities on the health and wellness of human beings at various stages of life.
- To collaborate with other organizations, educators, scientists, physicians, fitness practitioners, and students concerned with the same or related specialties.
- To arrange for mutual meetings of educators, scientists, physicians, fitness practitioners, and students concerned with the same or related specialties.
- To initiate, promote, and collaborate on research in these fields.
- To disseminate information pertaining to various aspects of sports, other physical activities, and medicine.

ACSM Continuing Education Credit (CEC)

The American College of Sports Medicine's Professional Education Committee certifies that the Midwest Regional Chapter meets the criteria for official ACSM Approved Provider status (Provider #650390). This conference meets the criteria for 12.0 credit hours of ACSM Continuing Education Credit (CEC). Each hour of professional education is awarded one CEC. Attendees should claim only the credits commensurate with the extent of their participation in the activity.

Name Badge

Badges must be worn at all times to gain admittance into educational sessions, poster sessions, and special events to include the opening reception. In addition, your name badge serves as your meal ticket during the meeting. If you lose your badge, please see the registration desk; there is a replacement fee of $5.00.

Annual Business Meeting and Saturday Keynote Session

The annual business meeting is scheduled for Saturday, October 14th from 11:00 am-12:00 pm in the Cosmopolitan Ballroom, brunch will be served prior to the business meeting. The annual business meeting is your opportunity to participate in the activities of the Midwest Chapter of ACSM. During this meeting, we will announce the award winners, newly elected officers, provide an update from the MWACSM Chapter Office and present other, new items. Please plan to attend.

Awards

Awards that will be presented include the Student and Clinical Presentation Awards, the Founder's Award, and the MWACSM ActiveU Competition Award. For more information on all our student and professional awards, to include eligibility requirements, criteria, application forms, and submission deadlines, please visit us here.

Continuing Education (CEC)

ACSM CEC Certificate

Participant Name

Midwest Chapter of the American College of Sports Medicine
Provider Organization

2023 MWACSM Annual Meeting, Indianapolis, IN
Course Title

#650390	12.0
Approved Provider Number	CECs

Lead Program Administrator Signature

Sponsors and Exhibitors

MWACSM thanks our 2023 Sponsors and Exhibitors for their support of our regional chapter and our Annual Meeting. We encourage all meeting attendees to take a few moments to visit with representatives from the following companies:

American College of Sports Medicine
Indianapolis, IN
Website: www.acsm.org

Sapphire Level
Cleveland University - Kansas City
Overland Park, KS
Website: https://www.cleveland.edu/

Silver Level
University of Indianapolis
Indianapolis, IN
Website: https://uindy.edu/health-sciences/
Additional Information: https://youtu.be/maQI1oNk1oY

St. Catherine University

St. Paul, MN
Website: www.stkate.edu
Additional Information: https://www.youtube.com/watch?v=hBzO1DzEEAA

Bertec
Columbus, OH
Website: www.bertec.com

Indiana Wesleyan University
Marion, IN
Website: www.indwes.edu

Cincinnati Children's Hospital - Cardiopulmonary Exercise Lab
Cincinnati, OH
Website: www.cincinnatichildrens.org

COSMED USA
Concord, CA

Website: www.cosmed.com

Hologic
Marlborough, MA
Website: www.hologic.com

Marquette University
Milwaukee, WI
Website: https://www.marquette.edu/grad/
Additional Information:
https://marquette.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=a1bedef2-6e24-4598-83b8-aeff015ea87c&start=0

Graduate Fair

On Friday from 10:00 am-12:00 pm and 2:00-4:30 pm, MWACSM will sponsor a Graduate and Internship Fair in the Atrium on the second floor. Information from the participating institutions will be available during this time, and attendees will have the opportunity to speak with representatives about their programs.

Baldwin Wallace University

Program(s): Master's Science in Exercise Physiology
Website(s): https://www.bw.edu/academics/master-exercise-physiology/
Contact: Dr. Jaimy Dyer, jmdyer@bw.edu

Ball State University

Program(s): Ball State University School of Kinesiology Graduate Programs
Website(s):https://www.bsu.edu/academics/collegesanddepartments/online/academic-programs/masters/maphysedcoach
https://www.bsu.edu/academics/collegesanddepartments/kinesiology/academic-programs/masters-degrees/biomechanics
https://www.bsu.edu/academics/collegesanddepartments/kinesiology/academic-programs/masters-degrees/clinical-exercise-physiology
https://www.bsu.edu/academics/collegesanddepartments/kinesiology/academic-programs/masters-degrees/athletic-training
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https://www.bsu.edu/academics/collegesanddepartments/kinesiology/academic-programs/masters-degrees/sport-administration
https://www.bsu.edu/academics/collegesanddepartments/kinesiology/academic-programs/masters-degrees/sport-exercise-psychology
Contact: Dr. Paul Nagelkirk, prnagelkirk@bsu.edu
Additional Information:
https://www.youtube.com/watch?v=djzy_LooEU0
https://www.youtube.com/watch?v=DwFL_A_-Y6E&t=2s
https://www.youtube.com/watch?v=9YIUUzqfkhc
https://www.youtube.com/watch?v=CfKjH6Z6Dlw
https://www.youtube.com/watch?v=UAb0kAV-2lc
https://www.youtube.com/watch?v=PA8oGAhvgG8
https://www.youtube.com/watch?v=_q6yl3IotuI

Bowling Green State University

Program(s): Athletic Training; Sport Administration; Kinesiology
Website(s): https://www.bgsu.edu/mat
Contact: Jessica Kiss, jekiss@bgsu.edu

Additional Information: https://www.bgsu.edu/education-and-human-development/human-movement-sport-leisure-studies/graduate-program.html

Calvin University

Program(s): MS Exercise Science - Online
Website(s): https://online.calvin.edu/programs/ms-masters-in-exercise-science/
Contact: Dr. Kerrie Berends, kerrie.berends@calvin.edu

Eastern Illinois University

Program(s): Exercise Physiology
Website(s): www.eiu.edu/ksrgrad/
Contact: Dr. Mark Kattenbraker, mskattenbraker@eiu.edu

John Carroll University

Program(s): Exercise Physiology
Website(s): https://www.jcu.edu/masters-in-exercise-physiology
Contact: Jacquelyn N. Zera, PhD, ACSM EP-C, EIM, FACSM, jzera@jcu.edu
Additional Information: https://www.jcu.edu/graduateschool

Kent State University

College of Education, Health, and Human Services
Program(s): M.S. and Ph.D. in Exercise Physiology
Website(s): https://www.kent.edu/exph
Contact: J. Derek Kingsley, Ph.D., FACSM, jkingsle@kent.edu

Lipscomb University

Program(s): Exercise & Human Performance
Website(s): https://www.lipscomb.edu/academics/programs/exercise-and-human-performance
Contact: Matthew Ruiz, matthew.ruiz@lipscomb.edu

Logan University

Program(s): Doctor of Chiropractic; MS Nutrition and Human Performance; MS Applied Nutrition and Dietetics; MS Sports Science and Rehabilitation; MS Strength and Conditioning; MS Health Informatics; EdD Health Professions Education
Website(s): www.logan.edu
Contact: Dr. Kristina Petrocco-Napuli, kristina.petrocco@logan.edu

Miami University

Program(s): MS Kinesiology, Nutrition, and Health, Master of Athletic Training, MS with Dietetic Internship
Website(s): https://miamioh.edu/ehs/departments/kinesiology-nutrition-health/academics/index.html
Contact: Kyle Timmerman, timmerkl@miamioh.edu
Additional Information: https://www.youtube.com/watch?v=KkmDd7tyhh0

Michigan Tech University

Program(s): Ph.D. Integrative Physiology; MS Kinesiology; Accelerated MS Kinesiology; Doctorate in Physical Therapy
Website(s): https://www.mtu.edu/kip/graduate/
Contact: Steven Elmer, sjelmer@mtu.edu

Northern Illinois University

Program(s): Kinesiology and Physical Education
Website(s): https://www.cedu.niu.edu/knpe/index.shtml
Contact: Peter Chomentowski, pchomentowski@niu.edu
Additional Information:
Body Composition Laboratory https://youtu.be/ahunfBtXy-I
Exercise Physiology Laboratory https://youtu.be/2rzgGF6Heew
M. Joan Popp Motor Behavior Laboratory https://youtu.be/wAWP0uKaidA
Anderson Hall Room 246 https://youtu.be/YnsNtNtth64
Sports Performance Lab https://youtu.be/NAQPnEf4boM

Northern Michigan University

Program(s): MS in Exercise Science; MS in Applied Sports Psychology; MS in Athletic Training; MS in Administration of Outdoor Recreation and Nature-Based Tourism
Website(s):
https://nmu.edu/graduatestudies/health-and-human-performance-programs
Contact: Megan Nelson, msuer@nmu.edu
Additional Information: https://nmu.edu/hhp/exercise-science-masters-degree

Ohio University

Program(s): Exercise Physiology; Clinical Exercise Physiology; Human Performance
Website(s): https://www.ohio.edu/chsp/ahsw/exercise-physiology/graduate
Contact: Angela Hillman, hillman@ohio.edu

Program(s): Master of Science in Athletic Training
Website(s): https://www.ohio.edu/chsp/ahsw/athletic-training/professional
Contact: Kristine Ensign, ensign@ohio.edu
Additional Information: https://youtu.be/CbqmijK6xO0

Purdue University

Department of Health and Kinesiology
Program(s): MS and PhD in Health and Kinesiology, MS in Athletic Training
Website(s): https://hhs.purdue.edu/hk/
Contact: Dr. Chad Carroll, carrol71@purdue.edu

Southern Illinois University Edwardsville

Program(s): M.S. Exercise Physiology; M.S. Dietetics
Website(s): https://www.siue.edu/education/applied-health/degrees-and-programs/index.shtml
Contact: Erik Kirk, PhD (Exercise Physiology), ekirk@siue.edu; Jennifer Zuercher, PhD (Dietetics), jzuerch@siue.edu

St. Ambrose University

Program(s): St. Ambrose University Master of Science in Exercise Physiology Program
Website(s): https://www.sau.edu/master-of-science-in-exercise-physiology
Contact: Rhiannon Seneli, PhD, senelirhiannonm@sau.edu
Additional Information: https://www.youtube.com/watch?v=w6S5awxLrOY

University of Cincinnati

Program(s): Doctorate in Physical Therapy; Occupational Therapy Doctorate; Masters in Athletic Training; Masters in Nutrition; PhD in Rehabilitation Sciences
Website(s): https://cahs.uc.edu/about/departments-schools/rehabilitation-exercise-and-nutrition-sciences.html
Contact: Linda Threm, thremla@ucmail.uc.edu

University of Illinois Chicago

Program(s): Clinical Exercise Physiology
Website(s): https://ahs.uic.edu/kinesiology-nutrition/admissions-and-programs/ms-in-kinesiology/clinical-exercise-physiology/
Contact: Brooks Hibner, PhD, bhibne2@uic.edu

University of Wisconsin La Crosse

Program(s): Clinical Exercise Physiology
Website(s): https://www.uwlax.edu/grad/clinical-exercise-physiology/

Contact: Salvador Jamie, sjaime@uwlax.edu

University of Wisconsin Madison

Program(s): MS Kinesiology; PhD Kinesiology; Occupational Therapy Doctorate; MS Athletic Training
Website(s): https://kinesiology.education.wisc.edu/academics/graduate-programs/
Contact: Karla Ausderau, PhD, kausderau@wisc.edu
Additional Information: https://kinesiology.education.wisc.edu/research/

University of Wisconsin River Falls

Program(s): Health and Wellness Management; Clinical Exercise Physiology; Strength and Conditioning
Website(s): https://www.uwrf.edu/MyDegree/HWM.cfm
https://www.uwrf.edu/programs/clinical-exercise-physiology
https://www.uwrf.edu/programs/strength-and-conditioning
Contact: Jodee Schaben, Jodee.Schaben@uwrf.edu; Greg Ruegsegger, Gregory.Ruegsegger@uwrf.edu; or Zach Rourk, Zachary.Rourk@uwrf.edu

Western Michigan University

Program(s): Exercise Science (MS); Education and Human Development, Exercise Science (PhD)
Website(s): https://wmich.edu/humanperformance/academics/ms-exercise-science
https://wmich.edu/grad/program-doctoral-ed-human-development
Contact: Timothy J. Michael, tim.michael@wmich.edu

Meeting At-A-Glance

Thursday, October 12th

Time	Vision	Atrium/Foyer	Studio Lounge
1:00pm	BOD Meeting		
2:00pm			
3:00pm			
4:00pm			
5:00pm			
6:00pm		Onsite Registration and Badge Pick-Up	
7:00pm			
8:00pm			Legacy Social Opening Reception, Hosted by the History Committee
9:00pm			

Friday, October 13th

Time	Cosmopolitan Ballroom	Atrium/Foyer	Discovery	Studio 1	Regency Ballroom E &F	Vision	Network (2nd Floor)
7:00am	Continental Breakfast 7:00-9:00am	Onsite Registration 7:30-11:00am			Poster Session #1 7:30-8:45am		OPEN FOR USE
7:30am							
8:00am		Badge Pick-Up 7:30-4:30pm	#1 Palmer 8:00-8:50am	Free Comm/ Slides #1 8:00-9:00am		#2 McDaniel, Elmer, and Heidorn 8:00-8:50am	
8:30am							
9:00am		Exhibitors 8:00-12:00pm	#3 Broeder 9:00-9:50am	Free Comm/ Slides #2 9:15-10:15am	Poster Session #2 9:00-10:15am	#4 Barkley 9:00-9:50am	
9:30am							
10:00am		Grad Fair 10:00-12:00pm	#5 Oppliger and Feltman 10:00-10:50am			#6 Kingsley 10:00-10:50am	
10:30am				Free Comm/ Slides #3 10:30-11:15am	Poster Session #3 10:30-11:45am		
11:00am			#7 Carl and Baker 11:00-11:50am			#8 Alessio, Ballard, Reidy, and Timmerman 11:00-11:50am	#9 Morelli, Ledman, Lagally, Carr, and Kern 11:00-11:50am
11:30am							
12:00pm	**Keynote and Luncheon – Cosmopolitan Ballroom 12:00-2:00pm** Dr. Stacy Fischer – *The Learning Connection: how physical activity, nutrition, free play and nurturing grow a healthy kid*						
1:00pm							

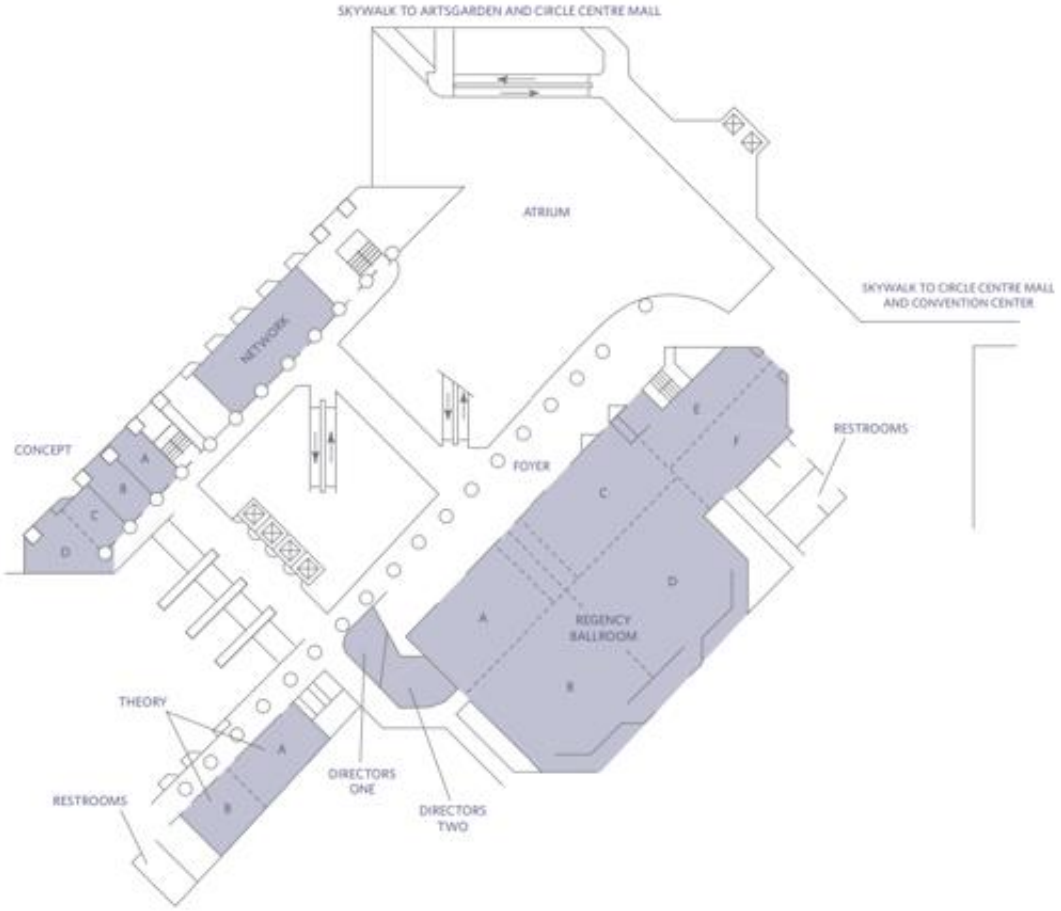
15-MINUTE BREAK; SESSIONS WILL RESUME AT 2:15PM

2:00pm					Poster Session #4 2:15-3:30pm		
2:30pm	Clinical Exercise Panel 5:00-6:00pm	Exhibitors 2:00-5:00pm Grad Fair 2:00-4:30pm	#10 Van Wasshenova, Rider, Montoye, and Coughlin 2:30-3:20pm	Free Comm/ Slides #4 2:30-3:15pm		#11 Freidenrich 2:30-3:20pm	Special Event – Student Lounge 2:30-5:00pm
3:00pm							
3:30pm			#12 Hubal and Deiwert 3:30-4:20pm	Free Comm/ Slides #5 3:45-4:45pm	Poster Session #5 3:45-4:45pm	#13 Chandran, Boltz, and Rao 3:30-4:20pm	
4:00pm							
4:30pm			#14 Gries 4:30-5:20pm			#15 Moriarty 4:30-5:20pm	
5:00pm				Special Event - ACSM SIGs 5:00-6:00pm			Special Event – ACSM SIGs 5:00-6:00pm
6:00pm	**Dinner on Your Own 6:00-8:00pm**						
7:00pm							
8:00pm	**Student Quiz Bowl – Cosmopolitan Ballroom 8:00-10:00pm**						
9:00pm							

Saturday, October 14th

<table>
<tr><th>Time</th><th>Discovery</th><th>Studio 1</th><th>Ballroom E&F</th><th>Vision</th></tr>
<tr><td>7:00am</td><td colspan="4">Morning Yoga Session – Network Room (2nd Floor)
7:00-7:30am</td></tr>
<tr><td>7:30am</td><td></td><td></td><td></td><td></td></tr>
<tr><td>8:00am</td><td rowspan="2">#16 Jagim and Zapp
8:00-8:50am</td><td></td><td></td><td rowspan="2">#17 Elmer
8:00-8:50am</td></tr>
<tr><td>8:30am</td><td rowspan="3">Free Comm/
Slides #6
8:30-9:45am</td><td rowspan="3">Poster Session #6
8:30-9:45am</td></tr>
<tr><td>9:00am</td><td rowspan="2">#18 Pinzone, Erb,
Humm, and Kingsley
9:00-9:50am</td><td></td></tr>
<tr><td>9:30am</td><td></td></tr>
<tr><td>10:00am</td><td colspan="4" rowspan="2">Keynote and Brunch – Cosmopolitan Ballroom
10:00-11:00am
Dr. Lynn Darby and Dr. J. Derek Kingsley – Celebrating the Legacy of MWACSM</td></tr>
<tr><td>10:30am</td></tr>
<tr><td>11:00am</td><td colspan="4" rowspan="2">MWACSM Business Meeting, Awards Presentation, and Closing Remarks
11:00am-12:00pm</td></tr>
<tr><td>11:30am</td></tr>
</table>

FLOOR PLAN
Second Level



FLOOR PLAN
Third Level

HYATT REGENCY INDIANAPOLIS
One South Capitol Avenue
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F: +317 616 6299
indianapolis.regency.hyatt.com

Keynote Speakers

The Learning Connection: how physical activity, nutrition, free play and nurturing grow a healthy kid

Friday, October 13th – 1:00 - 2:00 pm
Cosmopolitan Ballroom

Anastasia N. Fischer, MD, FAAFP, FACSM

Affiliation:
President, American College of Sports Medicine (2022-2023)
Clinical Professor of Pediatrics
Division of Sports Medicine
Nationwide Children's Hospital
The Ohio State University College of Medicine

Anastasia Fischer, MD, is a member of the Division of Sports Medicine in the Section of Ambulatory Pediatrics at Nationwide Children's Hospital and is a Clinical Associate Professor of Pediatrics at The Ohio State University College of Medicine. Dr. Fischer obtained a master's degree in Exercise Physiology at the University of Georgia before attending medical school at The Ohio State University College of Medicine. She then completed a family practice residency at University of Pittsburgh Medical Center in Pittsburgh, Pennsylvania, and a primary care sports medicine fellowship at Maine Medical Center in Portland, Maine. She is fellowship trained and board certified in sports medicine, and is a member of the American Medical Society for Sports Medicine and the American College of Sports Medicine, where she has served on the Board of Directors of the Midwest Regional Chapter, the national Board of Trustees, the Strategic Health Initiative for Women's Health, and currently serves as Past-President. She sits on the Board of Directors for Action for Healthy Kids, a non-profit organization that provides grants and instruction for schools to increase physical activity and sound nutrition practices. She has a special interest in research and advocacy regarding the adolescent female athlete, concussions, and spondylolysis. Dr. Fischer is a volunteer physician with the Tour de Grandview bicycle race and serves as team physician at Grandview Heights High School in the central Ohio area.

Celebrating the Legacy of MWACSM

Saturday, October 14th – 10:30 - 11:00 am
Cosmopolitan Ballroom

Lynn A. Darby, Ph.D., FACSM is currently a Professor in the Exercise Science Program at Bowling Green State University, Bowling Green, Ohio. She received all of her degrees from The Ohio State University. During her career she has taught courses in exercise physiology and completed research projects investigating exercise, mood and weight loss.

Dr. Darby joined the Midwest Regional Chapter of the American College of Sports Medicine (MWACSM) in the mid 1980's after an invitation from her BGSU colleagues. She has served in many roles for MWACSM over the years and became its historian in 2016. During the past year, along with assistance from the BGSU Center for Archival Collections, many of the MWACSM documents have been digitized and will be available to preserve the rich history of the first chartered regional chapter of ACSM.

Dr. Kingsley, FACSM is currently an Associate Professor and Program Coordinator at Kent State University. Prior to arriving at Kent State University he was an Assistant Professor at Indiana State University (2009-2013). Since Dr. Kingsley has been in the Midwest region, he has been actively involved in MWACSM. He began his service to MWACSM in 2010 as a member of the Membership Committee and the Exercise is Medicine Committee. In 2013 he began to assist the Awards and Scholarship Committee as a member and the judging of student presentations at the annual meeting. In 2013 he began to serve on the Board of Directors as a Member at Large. As a Member at Large he transitioned into the Chair of the Awards and Scholarship Committee in 2013 through 2016. Over the next few years, he was able to assist as a session moderator and judge before running for a position on the Executive Board. In 2018 he was lucky enough to serve as the President-Elect for this great organization. He then acted as President for two years due to COVID-19. In 2022, as Past-President, he hosted the meeting last year here in Indianapolis and completed his term on the Executive Board. Dr. Kingsley truly enjoys his involvement with MWACSM and actively recruits students to attend as the MWACSM meetings are always so great!

Evening Schedule - Thursday, October 12th

1:00 - 3:00 pm **MWACSM Board of Directors (Vision)**

6:00 - 8:00 pm **Onsite Registration and Badge Pick-Up**

no

8:00 - 10:00 pm **Legacy Social Opening Reception (Studio Lounge)**

Morning Schedule - Friday, October 13th: Symposia

<u>Symposium #1:</u> Discovery Room, 8:00-8:50 am

REGIONAL INTERDEPENDENCE ASSESSMENT AND TRAINING CONSIDERATIONS TO MAXIMIZE SPINAL STABILIZATION AND PERFORMANCE OUTCOMES

Session Moderator: Alex Montoye, Alma College

Presenters and Institutional Affiliations:

Thomas Palmer, Ph.D.
Mount Saint Joseph University, Cincinnati, OH

Biography: Dr. Palmer is a Certified Athletic Trainer, Certified Strength and Conditioning Specialist with distinctions, a Tactile Strength and Conditioning Facilitator and an Associate Professor at Mount St Joseph University in Delhi, Ohio. With over 29 years' experience as a tenured professor he holds several certificates in corrective exercises/manual therapies and has published over 25 peer-reviewed papers and two book chapters. His research focuses on evaluating the cause-and-effect relationships of training/rehabilitative interventions targeting performance outcomes. He earned a doctorate at the University of Kentucky in Rehabilitation-Science, a Master's degree from Old Dominion University, Virginia and undergraduate degree from SUNY at Cortland.

Session Overview: Proximal synergy or the ability to actively control the pelvis, spine and trunk has been reported to reduce the risk of injury and positively influence sport performance. The multi-complexity of this synergy warrants a regional interdependence approach for both assessment and training considerations. The distinct biomechanical contributions of these proximal segments have been well documented regarding injury and function, however ambiguity exists among best practice regarding assessment and training techniques used to determine the efficiency and impact the proximal segments have on performance. Over the past 15 years my lab has revealed best practice assessment and training guidelines that account for the functional biomechanics of the proximal segments resulting in greater spinal stability and functional performance. The assessment and training practices have proven performance and injury reduction outcomes with sport specific implications.

Learning Objectives:

1. Provide best practice psychometric data and recommendations from the literature and unpublished data.
2. Describe the biomechanical and force moments that influence assessment and training practices.
3. Provide data supported training techniques and outline periodization initiatives that identify and target potential deficits about the spinal, pelvis and trunk control.
4. Provide best practice ground to standing assessment and exercise guidelines with specific recommendations and literature supported methodology for appropriate assessment and training techniques.

<u>Symposium #2:</u> Vision Room, 8:00-8:50 am

SINGLE-LEG CYCLING FOR IMPROVING PERFORMANCE, RESTORING FUNCTION AND FACILITATING RESEARCH

Session Moderator: Emily Van Wasshenova, Oakland University

Presenters and Institutional Affiliations:

John McDaniel, Ph.D.
Kent State University, Kent, OH
Cleveland VA Medical Center, Cleveland, OH

Biography: Dr. John McDaniel is a Professor in the Exercise Science Program at Kent State University. He is also a research Health Science Specialist at the Cleveland VA Medical Center. His research is aimed at developing rehabilitation modalities to improve muscle function and vascular health in a variety of healthy and clinical populations. Dr. McDaniel is also highly involved with several projects that aim to promote the use of functional electrical stimulation cycling for those spinal cord injury related lower limb paralysis.

Steve Elmer, Ph.D.
Michigan Technological University, Houghton, MI

Biography: Dr. Steven Elmer is an Associate Professor and Graduate Program Director in the Department of Kinesiology and Integrative Physiology at Michigan Technological University. His goals are to find better ways to restore musculoskeletal function, maintain health, and improve performance in healthy and clinical populations. Specifically, his research is focused on: 1) skeletal muscle contraction, 2) coordination of locomotor tasks, and 3) exercise interventions to improve physical function. He also currently serves on several regional and national committees including the American Physiology Society - Science Policy Committee, American Kinesiology Association - Publications Committee, and Michigan Physiological Society - Executive Committee (past-President).

C. Eric Heidorn, M.S.
Kent State University, Kent, OH
Cleveland VA Medical Center, Cleveland, OH

Biography: Eric Heidorn is a Health Science Specialist at the Cleveland VA Medical Center in Cleveland, OH and a doctoral candidate in the Exercise Physiology program at Kent State University. His research interests include investigating ways to improve cardiovascular and muscular health through various exercise modalities in healthy and clinical populations. More specifically, some of these interests include investigating the use of ventilatory muscle training as well as working towards improving the efficacy of functional electrical stimulation exercise for individuals with paralysis.

Session Overview: In this symposium we will demonstrate how single-leg cycling can be utilized to improve performance, restore function, and facilitate research. First, we will compare the physiological and biomechanical characteristics of single-leg cycling to normal double-leg cycling, and. provide evidence supporting the use of chronic single-leg cycling training to stimulate improvements in metabolic and cardio-respiratory function in athletic (cyclists) and patient (COPD, pre-diabetes, ACL patients) populations. Along the way we will describe equipment modifications required to make single-leg cycling a workable exercise modality and touch briefly on a current topic of debate relating to the implementation of single-leg cycling. We will also demonstrate how single-leg cycling can be a valuable research model for comparing smaller and larger muscle mass activities and understanding relative contributions of central and peripheral factors to phenomenon such as neuromuscular fatigue. Finally, we will identify questions that remain to be answered and potential future directions.

Learning Objectives:
1. Describe physiological differences between small and large muscle mass exercise.
2. Recognize physiological and biomechanical differences and similarities between single-leg and double-leg cycling.
3. List positive outcomes associated with chronic single-leg cycling training.
4. Identify potential applications of single-leg cycling.

<u>Symposium #3:</u> Discovery Room, 9:00-9:50 am

HOW EXERCISE, NUTRITION, AND WELLNESS STRATEGIES IMPROVE CANCER SURVIVAL - A RESEARCHER'S PERSONAL PERSPECTIVE

Session Moderator: Derek Kingsley, Kent State University

Presenters and Institutional Affiliations:

Craig Broeder, Ph.D., FACSM
Exercising Nutritionally, LLC, Lisle, IL

Biography: Dr. Broeder has been a preventive health researcher for over 45 years. He is past-president of ACSM's Midwest chapter. Was one of the authors for the 8th edition of ACSM's Guidelines For Exercise Testing. Dr. Broeder's research on androgenic hormone supplements was selected from 450 research nominees world-wide as one of the top 25 nutrient supplement researchers in 2000. Dr. Broeder was the first person in 2009 to solo cycle the US perimeter in less than 100 days celebrating his wife's 20 anniversary surviving clear-cell ovarian cancer and started the Kay and Craig Broeder Preventive Cancer Health Fund within ACSM.

Session Overview: Cancer is the second leading cause of death in America. According to the latest data, 1,603,844 new cancers were reported in 2020 and 602,347 died of cancer. This talk highlights the importance of understanding cancer screening choices. It also will highlight, in context to

screening results data, the challenges a clinical exercise physiologist may need to overcome and effectively encourage a patient in enhancing that client's successful treatment outcomes. Finally, this talk will provide an overview of our current clinical research knowledge in exercise, nutrition, and general wellness in the treatment of cancer will be highlighted along with general strategies for working with cancer patients.

Learning Objectives:

1. Understanding the current evidence-based screening options available for men with cancer.
2. Understanding the current clinical research literature in how exercise, nutrition, and wellness interventions can improve cancer treatment outcomes in combination with medical interventions, i.e., surgery, radiation, chemo and immune therapy.
3. And finally, this talk will provide links to various state-of-the art detecting and treatment options available.

<u>Symposium #4:</u> Vision Room, 9:00-9:50 am

CHANGES IN PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR ACROSS THE COVID-19 PANDEMIC

Session Moderator: Sandy Knecht, Cincinnati Children's Hospital Medical Center

Presenters and Institutional Affiliations:

Jacob Barkley, Ph.D.
Kent State University, Kent, OH

Biography: Dr. Barkley is a Professor of Exercise Science at Kent State University in Kent, OH where he has worked for the past 17 years. His primary research interests focus upon factors that may influence physical activity and sedentary behavior. In his career he has published over 90 manuscripts in peer-reviewed scientific journals which have been cited more than 6,400 times. Additionally, his research has received extensive national and international media attention (e.g., Chicago Tribune, NPR, TIME). Recently, Dr. Barkley has worked on a series of studies designed to better understand how the COVID-19 pandemic may have affected health behaviors and if those effects have persisted now that pandemic-related restrictions have largely been lifted. This symposium will summarize those findings.

Session Overview: During the initial months of the COVID-19 pandemic restrictions such as the closure of fitness facilities, parks, and gymnasiums may have restricted individuals' ability to participate in physical activity. If such restrictions lead to a reduction in physical activity and an increase in sedentary behavior this could ultimately decrease fitness and increase the risk of COVID-19 severity. Because of the importance of physical activity and minimizing sitting, researchers, including our group, examined how the pandemic restrictions impacted these behaviors. Researchers reported reduced physical activity and increased daily sitting across a wide range of populations. Our group observed a 14% reduction of physical activity and a 15% increase in sedentary behavior. This suggests that pandemic related restrictions led to a reduction in physical

activity and an increase in daily sitting. Presently, pandemic-related restrictions have been lifted and early evidence from our group and others indicate that physical activity and sedentary behavior may have returned to pre-pandemic levels. We have reported that physical activity behavior during the spring/summer of 2022 was 19% greater than physical activity during the first six months of the pandemic when restrictions were commonplace. This 2022 physical activity was not different than pre-pandemic levels. While more work is needed this early evidence of a normalization in physical activity and sedentary behavior is encouraging.

Learning Objectives:

1. Discuss the evidence of reduced physical activity and increased sedentary behavior during the initial months of the COVID-19 pandemic relative to pre-pandemic behavior.
2. Discuss the evidence examining physical activity and sedentary behavior after the lifting of pandemic-related restrictions (i.e., "post-pandemic").

<u>Symposium #5:</u> Discovery Room, 10:00-10:50 am

SHOULD EXERCISE IS MEDICINE EMBRACE BICYCLE FRIENDLY AMERICA?

Session Moderator: Cassandra Ledman, Purdue University

Presenters and Institutional Affiliations:

Robert Oppliger, Ph.D., FACSM, Emeritus
University of Iowa, Iowa City, IA

Biography: Bob Oppliger is a Emeritus Fellow in the ACSM and has provided 30 years of leadership service including as secretary to the MWACSM. In 2016 he received the MWACSM Founder's Award. His research has focused on health and performance issues among wrestlers, authored more than 50 articles and reviews and presented widely.Away from the office Dr. Bob is an avid bicyclist and advocate for bicycle education and safety, referees' youth soccer, and is a Master Gardener Emeritus with more than 25 years of service. He serves on several community transportation policy committees and completed a term on the League of American Bicyclists Board of Directors.

Katie Feltman
American College of Sports Medicine National Office, Indianapolis, IN

Biography: Katie Feltman, CAE, is the Chief Operating Officer for the American College of Sports Medicine with oversight of membership, certification, publishing, technology, science initiatives, grants, and programs including Exercise is Medicine. An avid cyclist, Katie served as a board member, vice president, and president for the Central Indiana Bicycling Association and board member for the CIBA Foundation. Currently, Katie is an active member of the founding/inaugural class of the Momentum Indy Divas riding and mentorship program developed to foster a welcoming environment for women cyclists of all ages, experience and abilities. When Katie is not working or road biking, she enjoys reading, spending time with her rescued Great Pyrenees and cat and trying to grow the perfect Indiana tomato.

Session Overview: The League of American Bicyclists' Bicycle Friendly America program promotes physical activity through active transportation. Over 220 universities, 500 communities and almost 1600 businesses have been recognized as bike friendly. EIM promotes daily physical activity with active transportation being one option.

What is the Bike Friendly America program? What does the Bike Friendly America program have in common with EIM? Do the goals of the two initiatives overlap? Are there opportunities to gain synergy by partnering? This session will compare the two programs and consider ways to partner.

Learning Objectives:
1. Describe the Bicycle Friendly America program.
2. Identify the goals of the Bicycle Friendly America program.
3. Contrast the goals of EIM with those of the Bicycle Friendly America program.
4. Offer strategies to gain synergy between EIM and the Bicycle Friendly America program.

<u>Symposium #6:</u> Vision Room, 10:00-10:50 am

APPLYING FOR ACSM FELLOWSHIP

Session Moderator: Whitney Morelli, Medical College of Wisconsin

Presenters and Institutional Affiliations:

J. Derek Kingsley, Ph.D., FACSM
Kent State University, Kent, OH

Biography: Dr. J. Derek Kingsley, FACSM is an Associate Professor and Program Coordinator in the Exercise Science and Exercise Physiology program at Kent State University. He completed his doctorate in Exercise Physiology at Florida State University. He is certified by the American College of Sports Medicine and the National Strength and Conditioning Association. The research conducted in his laboratory, the Cardiovascular Dynamics Laboratory, investigates the effects of resistance exercise and resistance exercise training on autonomic and vascular health.

Session Overview: Applying for ACSM Fellowship is an important step for many individuals as they progress in their careers. The application for Fellowship can be hard to navigate for many. Therefore, the goal of this symposium is to provide information to individuals that are interested in applying for Fellowship by discussing the application, and the review process. Understanding the application process, and how the Credentials Committee works to review applications, may benefit many individuals that are considering applying.

Learning Objectives:
1. Better understand the meaning of ACSM Fellowship and what purpose it can serve.
2. Understand the revised application for Fellowship.
3. Understand the need for a Fellow mentor.
4. Comprehension of the Fellowship process.

<u>Symposium #7:</u> Discovery Room, 11:00-11:50 am

THE LONGITUDINAL VALUE OF HUMAN MOVEMENT AND EXERCISE: WHY EXERCISE AND MOVEMENT SHOULD NOT BE VIEWED AS "FOUR-LETTER WORDS

Session Moderator: Katie Spillios, University of Mount Union

Presenters and Institutional Affiliations:

Dan Carl, Ph.D., FACSM
University of Cincinnati, Cincinnati, OH

Biography: Daniel L. Carl, Ph.D., FACSM is an Exercise Physiologist and Professor in the Department of Rehabilitation, Exercise and Nutrition Sciences at the University of Cincinnati. He is the current University of Cincinnati, Chair of Faculty and Faculty Senate, and serves as Program Director of Health Sciences. Dan is a Fellow of the American College of Sports Medicine (FACSM) where he continues to serve as Chair of the Certification-related Content

Advisory Committee and is an active mentor in the Leadership & Diversity Training Program. He conducts research with a specific interest in High-Intensity exercise and its role in Stroke Rehabilitation.

Kayla Baker, Ph.D.
University of Cincinnati, Cincinnati, OH

Biography: Kayla M. Baker, PhD, CSCS is an Assistant Professor in the Department of Rehabilitation, Exercise and Nutrition Sciences at the University of Cincinnati. She currently serves as the University of Cincinnati's College of Allied Health Sciences Faculty Senate Representative and Advisor for the Health Sciences Club. Kayla is also currently serving on the American College of Sports Medicine Exhibits Advisory Committee. She has a primary research interest in outdoor exercise and its positive effects on mental wellness.

Session Overview: This symposium will share a look at the positive effects of exercise and human movement across the lifespan with a specific look at its long-term effects on brain and vascular health. We will begin with a look at the current trends in exercise participation, including the reasons behind why some individuals do not enjoy or participate in exercise, the associated numbers with obesity and disease states, and the proposed benefits of exercise and movement. We will then highlight research demonstrating the long-term benefits of exercise and movement that are harbored as we age, followed by brain health benefits (e.g., information on cognition, dementia, Alzheimer's, and Parkinson's) and vascular health benefits (e.g., the role in diabetes, cerebrovascular, and cardiovascular diseases). In closing, we will make a push to encourage exercise and movement, with an emphasis on movement for individuals who view exercise as a "four-letter word".

Learning Objectives:
1. Recognize trends in American exercise participation, obesity rates, and proposed benefits of movement.
2. Identify some of the pathological consequences associated with reduced movement.
3. Identify some of the brain health and vascular health benefits associated with lifelong exercise.
4. Discuss opportunities for eliminating barriers to exercise and movement.

<u>Symposium #8:</u> Vision Room, 11:00-11:50 am

INFLUENCE OF ACTIVE AND ASSISTIVE TRANSPORTATION ON CARDIOMETABOLIC HEALTH AND PHYSICAL ACTIVITY BEHAVIOR

Session Moderator: Mindy Mayol, University of Indianapolis

Presenters and Institutional Affiliations:

Helaine Alessio, Ph.D., FACSM
Miami University, Oxford, OH

Biography: Helaine Alessio, PhD, FACSM is a Professor and Chair of the Department of Kinesiology, Nutrition, and Health at Miami University and is a past President of the MWACSM. She teaches Exercise Science-related courses and has received university commendations for her teaching. She has been funded by NIH, private foundations, and corporations to support research, teaching, and service projects. She has published 2 books, 13 book chapters, and 54 journal articles, as well as national and international peer reviewed blogs, infographics, and NPR broadcasts. She is listed in the top 2% of Exercise Scientists cited in the world by Stanford University researchers. A recent paper on e-bikes published in the Translational Journal of the American College of Sports Medicine received "Best paper award" in 2021.

Kevin Ballard, Ph.D., FACSM
Miami University, Oxford, OH

Biography: Dr. Ballard is an Associate Professor in the Department of Kinesiology, Nutrition, and Health at Miami University. Prior to joining the Miami faculty, he worked as a Senior Scientist in Preventive Cardiology at Hartford Hospital, completed a postdoctoral fellowship in Nutritional Sciences at the University of Connecticut, and earned his Ph.D. in Kinesiology from the University of Connecticut. He is a Fellow of the ACSM, certified by the National Strength and Conditioning Association, and current president-elect of Midwest ACSM. Dr. Ballard's research focuses on the impact of physical (in)activity on cardiometabolic health and in healthy and clinical populations.

Paul Reidy, Ph.D.
Miami University, Oxford, OH

Biography: Dr. Reidy uses clinical and pre-clinical research approaches to investigate the effects of physical inactivity and physical activity on muscle and metabolic health. He collaborates with others in his dept to examine the effects of assistive devices (e-bikes or electric scooters) on glucose control. He also is examining the effect of scooter use on circulating immune cells. Pre-clinically, he is examining the effect of early postnatal life physical activity levels on growth and muscle health. All his research is conducted with undergraduate and graduate research associates.

Kyle Timmerman, Ph.D., FACSM
Miami University, Oxford, OH

Biography: Kyle Timmerman, PhD, FACSM is an associate professor and graduate director in the Department of Kinesiology, Nutrition, and Health (KNH) at Miami University. His work has been funded by the NIH and corporate entities. His research has focused on 1) anti-inflammatory effects of exercise, 2) muscle protein metabolism, and more recently 3) active transport. He has published 49 journal articles. His work has been cited more than 7,000 times. A paper recently published with Dr. Alessio on the metabolic cost of e-biking was awarded the 2021 "Paper of the Year" for the Translational Journal of the American College of Sports Medicine.

Session Overview: Unintended public health consequences of modern technological advances include more prevalent sedentary behaviors and higher motor vehicle emissions, contributing to an increased risk of cardiometabolic disease and premature mortality. Assistive and active transportation modalities (e.g., bicycling, scooting) may decrease or increase sedentary behaviors, both reduce motor vehicle emissions, contributing to the improvement of individual and public health. This session will 1) compare various assistive and active transportation modalities, 2) discuss cardiometabolic health benefits associated with assistive and active transportation modalities, and 3) highlight strategies to motivate individuals to engage in assistive and active transportation as part of their daily commutes and leisure time. Recent studies in young and older adults describing cardiometabolic health effects associated with assistive and active transportation modalities, including cycling, electric bikes, and motorized scooters, will be summarized and compared with walking and those who do not engage in assistive and active transportation.

Learning Objectives:
1. Describe the association among assistive and active transportation modalities and physical activity behavior, including cardiometabolic health, air quality, and reduced traffic congestion.
2. Apply research and data analysis to assess the impact of assistive and active transportation on cardiometabolic and public health outcomes and inform decision-making and policy development.
3. Recognize the various benefits of assistive and active transportation, including improved physical fitness, reduced risk of chronic diseases, decreased air pollution, and healthier communities.
4. Identify strategies to motivate individuals to engage in assistive and active transportation.

<u>Symposium #9:</u> Network Room, 11:00-11:50 am

IMPLEMENTATION OF EXERCISE IS MEDICINE - GETTING STARTED ON CAMPUS AND IN THE CLINIC

Session Moderator: Garett Griffith, Northwestern University

Presenters and Institutional Affiliations:

Whitney Morelli, Ph.D., FACSM
Medical College of Wisconsin, Milwaukee, WI

Biography: Whitney Morelli is an Assistant Professor at the Medical College of Wisconsin in the Department of Physical Medicine and Rehabilitation. She is a Fellow of the American College of Sports Medicine, an ACSM-certified Exercise Physiologist and has served as the chair of the MWACSM EIM committee since 2021. Dr. Morelli's research agenda seeks to promote physical activity among cancer survivors, with an emphasis on preventing or managing chronic disease symptoms and side effects among cancer survivors. She currently holds active funding from the National Cancer Institute, the American Cancer Society, National Institute of Child Health and Human Development, National Institute of Diabetes and Digestive and Kidney Diseases, and the Pat Summitt Foundation.

Cassandra Ledman, M.S., ACSM-CEP, NBC-HWC
Purdue University, West Lafayette, IN

Biography: Cassandra Ledman is a Clinical Associate Professor at Purdue University teaching courses within Clinical Exercise Physiology and Health and Wellness coaching. Since 2020, Cassandra has served as a committee member on the MWACSM EIM committee and as the faculty chair for the Purdue EIM-OC committee, where she dedicates a lot of her efforts to bringing a culture of physical activity and health to Purdue's campus. Cassandra demonstrates a strong interest in physical activity across the lifespan, the primary and secondary prevention of cardiovascular and metabolic diseases, and the influence of lifestyle medicine and health coaching on patient/client health outcomes. She is a Registered Clinical Exercise Physiologist (RCEP) and National Board-Certified Health and Wellness Coach (NBC-HWC).

Kristen Lagally, Ph.D., FACSM, ACSM-CEP
Illinois State University, Normal, IL

Biography: Kristen Lagally is a full professor in the School of Kinesiology and Recreation at Illinois State University. She is a Fellow of the American College of Sports Medicine, an ACSM-certified Clinical Exercise Physiologist and holds the Exercise is Medicine credential. Kristen served on the ACSM EIM-OC committee from 2015-2018 and

initiated the EIM-OC program at Illinois State in 2015. She has published and presented EIM-OC related research throughout that time.

Lucas Carr, Ph.D.
University of Iowa, Iowa City, IA

Biography: Lucas Carr is an Associate Professor in the Department of Health and Human Physiology at the University of Iowa. Dr. Carr is the founding director of the Exercise is Medicine on Campus program at the University of Iowa, which has been recognized as a Gold Campus since 2019. He is also the director of the Behavioral Medicine Laboratory which focuses on designing and testing lifestyle behavior change programs targeted to clinical populations.

Kathryn Kern, M.S., Ph.D. ©
Marquette University, Milwaukee, WI

Biography: Kate is a clinical exercise physiologist and PhD candidate in the Exercise and Rehabilitation Sciences program at Marquette University in Milwaukee, WI. She is also an adjunct professor for Carroll University's Master's in Exercise Physiology program and a director of neuro-exercise at a non-profit gym serving people with Multiple Sclerosis. Her clinical and research interests include implementation science of rehabilitative exercise for cancer survivors and those with neurological conditions.

Session Overview: The purpose of this session is to provide examples of how to start an Exercise is Medicine program on your campus or in the clinic. Presenters will discuss the appropriate steps to begin developing an EIM program on your campus or within a clinic system by sharing experiences, barriers, facilitators, and insight gained. Cassandra Ledman, MS, a Clinical Associate Professor at Purdue University and other campus EIM-OC representatives (Kristin Lagally, PhD, FACSM, Illinois State University; Lucas Carr, PhD, University of Iowa) will share their expertise on how to initiate an exercise is medicine referral program, where to find support and resources, lessons learned, and tips for success. Panelists will create a discussion around how to implement a referral program on your campus. Finally, presenters will share experiences and discussions around implementation of EIM within a clinic setting. Kathryn Kern, MS, of Marquette University will share her experience implementing a community based EIM program working with African American men, prostate cancer survivors in the Men Moving Forward program. Finally, Whitney Morelli, PhD FACSM, from the Medical College of Wisconsin, will share the implementation of a EIM program into a free-standing rehabilitation hospital among patients recovering from stroke.

Learning Objectives:
1. Following this session, attendees will be able to identify the appropriate steps to start an Exercise is Medicine On Campus referral program.
2. Following this session, attendees will be able to identify the appropriate steps and barriers associated with Exercise is Medicine initiatives within a hospital system.

Morning Schedule - Friday, October 13th: Free Communication/Slides

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Free Communication/Slides #1: Studio 1, 8:00-9:00 am

Session Moderator: Katie Spillios, University of Mount Union

8:00-8:15 am

BRAIN RESPONSE TO EFFORT REGULATION IN CYCLING EXERCISE

Keeton Burnside, Zakaria Bodiford, Sofia Buckley, Taylor Emenaker, Robert Heins, Pierce Boyne, Daniel Carl FACSM

BACKGROUND: Recent research has shown that dorsomedial prefrontal cortex (dmPFC) may play a role in motivation. Our study aimed to use unknown and known short-duration cycling trials to determine whether dmPFC is specifically involved with effort regulation. This is based on the premise that effort regulation demands would be greater during unknown duration trials. **PURPOSE:** We hypothesized that unknown duration trials would elicit a greater oxygenated hemoglobin (HbO2) response in dmPFC than known trials. **METHODS:** Participants performed a single-visit stationary cycling experiment comprised of 12 randomized trials of known vs unknown 10, 20, and 30 second bursts of maximal cycling speed. HbO2 response was measured using functional near infrared spectroscopy (fNIRS) for dmPFC and five control regions. Subject number: 25 healthy adult participants. **RESULTS:** The 20s unknown trial demonstrated a significant difference in activity in dmPFC compared to the known 20s trial. dmPFC was the only brain region significantly upregulated compared to the control regions. A significant difference in power output (W) was recorded during known and unknown 10s trials. However, this was not observed within the 20s and 30s trials. **CONCLUSION:** It was observed that dmPFC was significantly upregulated in 20s unknown trials, indicating the possibility of correlation between dmPFC and effort regulation during exercise. However, this effect was not found in the 10s and 30s trials. However, the lack of hypothesized effect for the 10 and 30s trials could suggest that the experimental conditions were not entirely successful at altering effort regulation.

8:15-8:30 am

PRE-EXERCISE CAFFEINE SUPPLEMENTATION PREVENTS EXERCISE-TRAINING INDUCED DECREASES IN EXERCISING BLOOD PRESSURE

Kylee West, Anna C. Zucker, Nathaniel J. Helwig, Thomas J. Hart, Jacob S. Venenga, Preston M. Engstrom, Mark Flores, Laura E. Schwager, Nathaniel D.M. Jenkins

BACKGROUND: Caffeine is often supplemented prior to exercise to enhance performance, but also acutely increases exercising blood pressure (BP) and heart rate (HR). However, it is unknown whether chronic pre-exercise caffeine supplementation impedes exercise training-induced improvements in exercising BP or HR. **PURPOSE:** To determine the effect of habitual pre-exercise caffeine supplementation on exercising systolic (SBP) and diastolic blood pressure (DBP) and HR responses to six weeks of exercise training. **METHODS:** Thirty-six women (mean±SD, age=24±7 y; BMI=24±3.8 kg·m2) were randomized to either a caffeine (150 mg) supplement (CAF; n=18) or placebo (PLA; n=18) group in a double blind, randomized, controlled trial. Participants completed high intensity exercise training on three non-consecutive days for six weeks and supplemented with CAF or PLA 30 minutes before exercise or upon waking on non-exercise days. Before (PRE) and after (POST) the 6-week intervention, SBP, DBP, and HR were measured while participants rested and exercised at 50W and 75W on an electronically braked cycle ergometer. Statistical analyses included three-way mixed factorial ANOVAs with lower order ANOVAs and post-hoc comparisons as appropriate. **RESULTS:** A group×intensity×time interaction was observed for SBP ($p=0.006$). Post hoc analyses indicated that SBP increased with increasing exercise intensity from rest to 50W and from 50W to 75W at both PRE and POST in the CAF and PLA groups (all $ps \leq 0.003$). However, whereas exercising SBP decreased from PRE to POST at 50W (-10.9 ± 6.7 mmHg, $p=0.004$) and 75W (-16.6 ± 6.5 mmHg, $p<0.001$) in the PLA group, SBP did not change from PRE to POST at any intensity in the CAF group ($ps \geq 0.37$). Additionally, an

intensity×time interaction was observed for DBP (p=0.007) indicating that resting DBP did not change (p=0.98), but that DBP decreased from PRE to POST at 50W (−8.5±7 mmHg; p=0.008) and 75W (−11.8±6.8 mmHg; p<0.001) independent of group. There were also main effects of intensity (p<0.001) and time (p=0.036) for HR, which indicated that HR increased with increasing exercise intensity independent of time or group, and that HR decreased from PRE to POST independent of group or intensity. **CONCLUSION:** Caffeine supplementation did not influence resting BP, but blunted training-related reductions in exercising SBP. Therefore, individuals may wish to avoid habitual pre-exercise caffeine supplementation if seeking to maximize the BP-lowering benefits of exercise.

8:30-8:45 am

THE EFFECT OF COMPRESSION GARMENTS ON CARDIORESPIRATORY VARIABLES FOLLOWING ANAEROBIC EXERCISE IN HEALTHY ADULTS

Jaye E. Fuller, Adam M. Coughlin, FACSM, Faith C. Kurtz, Jesse M. Jansen, Benjamin S. Minier, Curtis A. Cornell, & James R. Sackett

BACKGROUND: Compression garments (CG) have been used by athletes to enhance performance and recovery. Specifically, wearing CG following exercise has been shown to reduce muscle soreness and impact acceleration. However, it is unknown if donning CG following exercise will positively affect cardiorespiratory variables. **PURPOSE:** The purpose of this study was to test the hypothesis that wearing CG will improve cardiorespiratory variables following anaerobic exercise. **METHODS:** Five participants (age: 20.4±1.7 y, BMI: 22.8±1.9kg/m2, 2 F) completed three randomized sessions: a control session (CT) where subjects did not wear CG, a recovery session where subjects only wore CG during recovery (RC), and a session where CG was worn at all times (CG). Each session began with 10 min of supine baseline (BL). Then, subjects completed a 30-second Wingate Anaerobic Test (WAnT). Following the WAnT were 15 minutes of supine recovery. During the recovery period, data were collected (R1). Thereafter, individuals repeated this procedure for second time (R2). Each WAnT was against 7.5% of one's bodyweight in kg. Heart rate (HR, bpm), mean arterial pressure (MAP, mmHg), respiratory rate (RR, b/min), and lactate (La, mmol/L) were measured at each time point via a chest strap, an automated sphygmomanometer, observational counting, and a finger prick, respectively. Data were analyzed using two-way repeated measures ANOVA. **RESULTS:** There were no statistical differences (p=0.90) for HR between CT (BL: 72±14, R1: 104±14, R2: 105±11 bpm), RC (BL: 71±15, R1: 104±12, R2: 106±12 bpm), or CG (BL: 72±12, R1: 109±14, R2: 110±12 bpm). There were no statistical differences (p=0.53) in MAP between CT (BL: 75±5, R1: 75±5, R2: 72±10 mmHg), RC (BL: 73±13, R1: 74±7, R2: 65±11 mmHg), or CG (BL 77±8, R1: 79±8, R2: 70±7 mmHg). Furthermore, there were no statistical differences (p=0.08) for RR between CT (BL: 20±5, R1: 24±2, R2: 20±6 b/min), RC (BL: 13±3, R1: 22±6, R2: 17±2 b/min), or CG (BL: 13±4, R1: 22±1, CG R2: 20±4 b/min). There were no statistical differences (p= 0.20) for La between CT (BL: 2.0±1.0, R1: 11.0±1.9, R2: 12.3±1.3 mmol/L), RC (BL: 1.8±1.0, R1: 10.3±1.3, R2: 11.8±2.3 mmol/L), or CG (BL: 1.4±0.43, CG R1: 12.0±0.9, R2: 14.2±2.0 mmol/L). **CONCLUSION:** There were no statistical differences in HR, MAP, RR, or La between CT, RC, or CG. It is unlikely that these cardiorespiratory variables will be improved during recovery following a WAnT as a result of wearing CG.

8:45-9:00 am

BLOOD PRESSURE RESPONSES TO EXERCISE AT DIFFERENT TIMES OF DAY

Amy Boettcher, Hannah Penfold, Katharine Currie

BACKGROUND: Elevated resting blood pressure (BP), or hypertension, is a well-known risk factor for cardiovascular disease (CVD). Exaggerated exercise BP (EEBP), which describes an elevated BP at submaximal and maximal exercise intensities, is also associated with increased CVD morbidity and mortality. Due to BP's circadian rhythm and varying chronotypes in the population, it is unknown if exercise performed at certain times of the day will elicit higher BP responses, thus complicating the identification of EEBPs. **PURPOSE:** To determine how exercise BPs change throughout the day in normotensive adults. **METHODS:** 31 healthy adults [female=15, mean age ± standard deviation (SD)=23±4 years] completed a modified Bruce treadmill protocol at 3 different times of day: morning (M, 0700-0900h), afternoon (A, 1300-1500h), evening (E, 1800-2000h). Systolic BP (SBP) was measured pre-exercise (standing prior to test start), and during the last minute of each stage using an automated device. Submaximal SBP was determined from stage 4 of the test. Peak SBP was determined as the highest SBP recorded during the test. ΔSBP was calculated as peak SBP-pre-exercise SBP. Participants completed a Morning-Eveningness Questionnaire (MEQ) to determine chronotype. Pearson correlations were used to determine the relationship between MEQ score and ΔSBP during M and E tests.

Submaximal, peak and ΔSBP were compared between test times with one-way repeated measures analysis of variance or non-parametric Friedman tests with significance set at P<0.05. **RESULTS:** Submaximal SBP (P=0.295), peak SBP (P=0.087) and ΔSBP (P=0.546) were similar across time points. Submaximal SBPs (median, interquartile range) were M:154,140-174 mmHg; A:154, 143-171 mmHg; E:159, 146-174 mmHg. Submaximal EEBP was defined as SBP≥170 mmHg at stage 4; 15 participants had EEBP during at least one test, with 5 having EEBP during all tests. MEQ scores were correlated with ΔSBP during the E test suggesting individuals that were more evening types had a smaller increase in exercise SBP compared to those that were more morning or intermediate types (r=0.363, P=0.045); M ΔSBP and MEQ score were not correlated (r=0.034, P=0.854). **CONCLUSION:** Time of day had no effect on BP response to exercise. Given the clinical value of EEBP, it is notable that 48% of our normotensive sample had EEBP during at least one test. Therefore, determining the relationship between chronotype and exercise BP responses throughout the day is warranted.

Free Communication/Slides #2: Studio 1, 9:15-10:15 am

Session Moderator: Judi Juvancic-Heltzel, University of Akron

9:15-9:30 am

RELATIONSHIPS BETWEEN DEPRESSION AND BODY COMPOSITION IN COLLEGIATE ATHLETES AND NON-ATHLETES

Carlissa Baker, Nakayla Adams, Tamara Hew-Butler

BACKGROUND: The pre-pandemic incidence of depression amongst university students ranged from 10-85% (Ibrahim A 2013), with 21-23.7% of NCAA Division I athletes reporting depression (Wolanin A 2016). Depression rates, and weight gain, appeared to increase post-pandemic, with 62.9% of college students reporting depression with a weak positive correlation noted between body mass index (BMI) and depression (Duan H 2022). **PURPOSE:** The aims of this study are to 1) determine the incidence of depression at our university and 2) explore relationships between depression and body composition in collegiate athletes and non-athlete's post-pandemic. **METHODS:** A convenience sample of collegiate athletes and non-athletes, from a NCAA Division II school, presented to our laboratory in 2022 and were screened for depression using the Center for Epidemiological Studies Depression - Revised (CESD-R) scale. The threshold for depression, on this scale, was any score ≥16. Height and weight were obtained using a stadiometer and total body composition was assessed using a dual energy x-ray absorptiometry (DXA) scanner (Hologic, Horizon A). One-way ANOVA was used to compare depression scores across sport teams while relationships between body composition and depression scores were assessed using Pearson's r. **RESULTS:** 164 males and 59 females participated in our screening tests. The mean depression score for males was 4.97±5.8, with non-athletes (9.44±6.9) having the highest and tennis players (2.1±4.0) having the lowest average depression scores. The mean depression score for females was 11.1±11.6, with non-athletes (18.2±11.9) having the highest and weightlifters (6.5±6.3) having the lowest average depression scores which were significantly different (F(2,53)=5.01;p=0.001; athletes versus non-athletes). Statistically significant (p<0.05) relationships between depression scores and body composition were noted only when male and female data were combined. A positive relationship was noted between depression score vs. body fat percentage (r=0.30;p=0.000) with negative relationships noted between depression scores vs. total lean mass (r=-0.26;p=0.000), bone mineral density (r=-0.23;p=0.001), and visceral adipose tissue (r=-0.21;p=0.002).
CONCLUSIONS: 1) Non-athletes and females have the highest depression scores and 2) small, but significant, relationships exist between body composition variables versus depression scores only when the male and female cohorts are combined.

9:30-9:45 am

ASSESSING VO2 MAX: BEYOND THE METABOLIC CART

Edward Kerr, Tamara Hew-Butler

BACKGROUND: Direct measurement of maximal aerobic capacity (VO2max) requires use of a metabolic cart in a controlled laboratory setting. However, direct measurement of a subject's VO2max has limitations, such that the

assessment cannot be performed in the field, requires technical expertise, and requires exercise to volitional exhaustion. As a result, a submaximal cardiorespiratory assessment known as the Rockport Walking Test (RWT) was developed, where the needed equipment is a level 1-mile surface, a stopwatch, and a scale to measure body weight. **PURPOSE:** The primary aim of this study is to determine the validity and reliability of the RWT (submaximal) compared with the peak speed treadmill running VO2Peak (maximal) test. **METHODS:** Thirty collegiate students (16 females, 14 males) completed both a RWT and VO2Peak test, on a treadmill, in randomized order conducted one week apart. For the RWT, mile time (self-selected pace on treadmill), heart rate (chest-strap monitor), sex, and weight were inputted into the RWT equation to estimate VO2max. For the VO2Peak test, a metabolic cart (ParvoMed TrueOne 2400) measured VO2max using an 8-to-12-minute VO2peak protocol where the intensity of the first stage was an easy walk or jog based on the participant's ability. Then, treadmill speed was increased 0.5 mph every minute until volitional exhaustion. Differences between the RWT and VO2Peak test were calculated using paired-sample t-tests and relationships analyzed using Pearson's r. Data presented as means±SD with significance set at $p<0.05$. **RESULTS:** VO2max was 3.14±4.7mL/kg/min higher using the RWT compared with the VO2Peak running test. However, the mean differences between the RWT vs. the VO2Peak test were not (statistically) significantly different (40.8±10.1 vs.37.7±9.1mL/kg/min; $p=0.21$). A significant correlation was noted between the RWT vs. VO2Peak test ($r=0.89$; $p<0.0001$). Males had a higher VO2max test compared with females for both the RWT (45.9±7.7 vs. 36.3±10.0mL/kg/min; $p=0.007$) and VO2Peak test (43.4±7.1 vs. 32.6±7.6mL/kg/min; $p=0.0005$). **CONCLUSIONS:** The RWT slightly (~3mL/kg/min), but non-significantly, overestimated VO2max, when compared with the VO2Peak running test. Therefore, both the walking (submaximal) and running (maximal) VO2max tests can be used interchangeably when performed on a treadmill for research, clinical, and performance purposes.

9:45-10:00 am

TRAINING WITH COMPRESSION GARMENTS ENHANCES VERTICAL JUMP PERFORMANCE IN UNTRAINED HEALTHY MEN

Joshua T. Mayne, Mikayla M. Meade, Jesse M. Jansen, Benjamin S. Minier, Curtis A. Cornell, Faith C. Kurtz, Justin A. O'Dell, Gabe M. Lysak & James R. Sackett

BACKGROUND: Acutely wearing compression garments (CG) improves vertical jump performance. Furthermore, chronically wearing CG during high-intensity training reduces the risk of injury and lessens soreness. However, the effects of exercise training in CG on vertical jump performance remain unknown. **PURPOSE:** This experiment tested the hypothesis that training in CG improves vertical jump performance compared to not training in CG. **METHODS:** Sixteen untrained males (age: 21±3 y; BMI: 25±3 kg/m2) were randomly assigned to one of two experimental groups: training while wearing CG (CG; n=8) and training without wearing CG (CT; n=8). Both groups completed a countermovement vertical jump before (PRE) and after (POST) four weeks of training. The training sessions consisted of body weight exercises including skater jumps, I-Y-T's, glute bridge, lunges, push-ups, squat jumps, tricep dips, and dead bugs. The intensity of training increased weekly by adding repetitions and reducing rest time. A vertical jump device was utilized to measure displacement (cm) and a wearable accelerometer was used to measure force (N), power (W), acceleration (m/s2), and velocity (m/s). Data are presented as a change score from PRE. Data were analyzed utilizing a two-way repeated measures ANOVA. **RESULTS:** There were no significant differences for the change in displacement from PRE to POST between conditions ($p=0.99$) or across time ($p>0.15$) (CG: 2.9±4.8 cm; CT: 2.9±3.9 cm). There were no significant differences for the change in peak force from PRE to POST between conditions ($p=0.78$) or across time ($p>0.11$) (CG: -89.8±139.8 N; CT: -111.0±164.1 N). There were no significant differences for the change in peak power from PRE to POST between conditions ($p=0.63$) or across time ($p=0.10$) (CG: -411.4±625.8 W; CT: -228.2±828.9 W). There were no significant differences for the change in peak acceleration from PRE to POST between conditions ($p=0.72$) or across time ($p>0.18$) (CG: -0.8±1.2 m/s2; CT: -1.1±2.0 m/s2). However, the change in peak velocity from PRE to POST was significantly greater ($p=0.03$) during CG (0.2±0.2 m/s) vs. CT (0.04±0.2 m/s) and was significantly greater across time during CG ($p=0.02$) but not CT ($p=0.74$). **CONCLUSION:** These results indicate that training in CG increases vertical jump velocity compared to not training in CG. Training with CG appears to benefit vertical jump performance and may be incorporated into certain training regimens for improved performance.

10:00-10:15 am

THE EFFECT OF WEARING COMPRESSION GARMENTS ON MUSCLE OXYGENATION PROFILE FOLLOWING ANAEROBIC EXERCISE IN HEALTHY ADULTS

Faith C. Kurtz, Adam M. Coughlin, FACSM, Jaye E. Fuller, Jesse M. Jansen, Benjamin S. Minier, Curtis A. Cornell, & James R. Sackett

BACKGROUND: Wearing compression garments (CG) reduces the feeling of muscle soreness and damage after anaerobic exercise. However, it is unknown whether an enhanced recovery can be attributed to the oxygenation profile of the muscles. **PURPOSE:** To examine the effects of wearing CG during recovery from anaerobic exercise on total hemoglobin (THb) and oxygen (O_2) saturation levels of the calf and quadriceps muscles. **METHODS:** Five healthy adults (age: 20.4±1.7 y; BMI: 22.8±1.9 kg/m2, 2 F) completed three separate visits: not wearing the CG (CT), wearing the CG only during recovery (RC), and wearing the CG the entire visit (CG). Baseline (BL) values were recorded after 10 min of supine rest. Subjects then completed a Wingate Anaerobic Test (WAnT) where they cycled against 7.5% of their body weight for 30 seconds. After the WAnT, subjects were placed in the supine position to recover for 15 min while calf THb, calf O_2 saturation, quadriceps THb, and quadriceps O_2 saturation were collected (R1). Thereafter, subjects completed a second WAnT followed by the same recovery procedure while each value was recorded again (R2). THb and O_2 saturation were gathered from muscle oxygen monitors. Data were analyzed via two-way repeated measures ANOVA. **RESULTS:** There were no statistical differences between conditions (p=0.72) for calf THb during CT (BL: 12.1±0.5, R1: 12.2±0.5, R2: 12.3±0.6 g/dL), RC (BL: 12.1±0.5, R1: 12.1±0.5, R2: 12.2±0.5 g/dL), or CG (BL: 12.1±0.6, R1: 12.2±0.5, R2: 12.2±0.5 g/dL). There were no statistical differences between conditions (p=0.61) for calf O2 saturation during CT (BL: 66.0±16.2, R1: 63.7±23.9, R2: 72.1±8.4%), RC (BL: 72.9±7.1, R1: 73.6+8.2, R2: 74.7±9.2%), or CG (BL: 67.9±11.1, R1: 73.0±10.8, R2: 75.4±8.7%). There were no statistical differences between conditions (p=0.93) for quadriceps THb during CT (BL: 12.1±0.6, R1: 12.2±0.7, R2: 12.3±0.7 g/dL), RC (BL: 12.2±0.3, R1: 12.2±0.4, R2: 12.2±0.3 g/dL), or CG (BL: 12.1±0.6, R1: 12.0±0.8, R2: 12.1±0.9 g/dL). There were no statistical differences between conditions (p=0.91) for quadriceps O_2 saturation during CT (BL: 73.7±20.0, R1: 73.1±23.8, R2: 74.4±25.4%), RC (BL: 72.8±26.5, R1: 73.7±26.5, R2: 74.8±26.4%), or CG (BL: 74.1±14.6, R1: 77.2±14.0, R2: 85.2±4.3%). **CONCLUSION:** There were no statistical differences between CT, RC, and CG for calf or quadricep THb or O_2 saturation. It does not appear that wearing CG alters the muscle oxygenation profile in response to repeated 30 second WAnT tests.

Free Communication/Slides #3: Studio 1, 10:30-11:15 am

Session Moderator: Ron Otterstetter, University of Akron

10:30-10:45 am

RACE-RELATED STRESS AND EFFECTS ON METABOLISM AFTER A 12 - WEEK EXERCISE PROGRAM

Christopher Carey, Navin Kaushal, and NiCole Keith, FACSM

BACKGROUND: Existing research underscores the link between psychosocial stress and metabolic indicators. **PURPOSE:** This study aims to explore the association between race-related stressors and their impact on weight, waist circumference, body mass index (BMI), and blood pressure within a traditionally marginalized and under-resourced community. **METHODS:** Participants (n = 11) underwent a 12 - week, exercise program at a community center. All participants identified as African American, aged between 35 and 44 years, with at least some reported level of college education. Baseline measurements, including weight, waist circumference, body mass index (BMI), systolic and diastolic blood pressure (SBP and DBP), mean arterial pressure (MAP), and psychosocial assessments (Perceived Stress Scale - PSS, Racial and Ethnic Microaggressions Scale - REMS, and Index of Race Related Stress scale - IRRS), were obtained at baseline and following the exercise program. Spearman correlations were employed for analysis. **RESULTS:** Baseline correlations revealed significant associations between intra-related measures. There were also associations between two metabolic indicators and a psychosocial stressor (BMI and IRRS individual racism $r = -0.785$, $p \leq 0.05$; waist circumference and IRRS individual racism $r = -0.700$, $p \leq 0.05$). Post-exercise program, correlations between intra-related measures persisted. DBP and IRRS cultural racism, individual racism, and global racism were also associated ($r = -0.700$, $r = -0.733$, and $r = -0.638$, respectively; $p \leq 0.05$). MAP also showed similar correlations (MAP and IRRS cultural racism $r = -0.616$, $p \leq 0.05$; MAP and IRRS individual racism $r = -0.608$, $p \leq 0.05$; MAP and IRRS global racism $r = -0.620$, $p \leq 0.05$). **CONCLUSION:** This study identified significant correlations primarily within intra-related measures. Correlations between psychosocial stressors and metabolic indicators at times displayed unexpected outcomes. Future research should strive to explore qualitative methods to explore negative correlations between metabolic indicators and psychosocial stressors.

10:45-11:00 am

INTEGRATING THIGH ACCELEROMETER AND WRIST ACTIGRAPHY DATA TO ESTIMATE 24-HOUR ACTIVITY IN PREGNANCY

Jacob B. Gallagher, PhD, Melissa A. Jones, PhD, D. Erik Boonstra, MS, Jaclyn D. Borrowman, MS, Mackenzie Unke, BS, Bethany Barone Gibbs, PhD, Kara M. Whitaker, PhD MPH FACSM

BACKGROUND: 24-hour activity (physical activity, sedentary behavior, and sleep) is important for health during pregnancy. No single device is validated to assess all components of 24-hour activity, requiring participants to wear multiple devices to collect valid data. **PURPOSE:** To compare the best practice approach of using a thigh accelerometer, wrist actigraphy, and a sleep diary (T+W+D) to less rigorous procedures, such as thigh accelerometer and diary only (T+D), and thigh accelerometer alone (TA) in a cohort of pregnant participants. **METHODS:** In this comparative measurement study, data collected during the 2nd trimester from 40 randomly selected participants in the Pregnancy 24/7 cohort study were included in this secondary analysis. In the T+W+D approach, an R program developed by our team removes diary-reported non-wear time and integrates wrist actigraphy determined sleep. In the T+D approach, sleep time is estimated from the diary and removed from the thigh accelerometer data. In the TA approach, averages of data are exported directly from the software using the CREA algorithm. Repeated ANOVA and Intraclass correlations (ICCs) compared each approach. Post hoc paired t-tests using a Bonferroni correction further explored significant findings from the omnibus ANOVA. **RESULTS:** MVPA from T+W+D (18.7 min/day) was significantly greater than T+D (13.9 min/day, $p < 0.01$) and TA method (16.8 min/day, $p<0.01$). Standing time derived from T+W+D (234 min/day) was significantly greater than T+D (229 min/day, $p<0.01$) and TA methods (226 min/day, $p<0.01$). Sleep time from T+W+D (507 min/day) was significantly less than T+D (523 min/day, $p<0.01$) and TA (548 min/day, $p<0.01$). There were no significant differences between the three approaches for total sedentary time ($p=0.20$), steps per day ($p=0.16$), stepping time ($p=0.10$), sit-to-stand transitions ($p=0.08$), and wear time ($p=0.46$). ICCs for steps per day, stepping time, MVPA, standing time, and sit-to-stand transitions were >0.95. The ICCs for sedentary time (ICC=0.75) and sleep (ICC=0.68) were significant but less strong than the physical activity measures. **CONCLUSION:** There was moderate to high consistency between the approaches on all measures. There were significant differences in MVPA, standing time, and sleep. These findings suggest that future studies should clearly describe the approach used to quantify 24-hour activity to allow for more accurate interpretation and comparison to other studies.

11:00-11:15 am

ASSESSING POSTPARTUM PHYSICAL ACTIVITY DETERMINANTS AND DESIRED INTERVENTION COMPONENTS IN INDIVIDUALS WITH A HISTORY OF HYPERTENSIVE DISORDERS

JD Borrowman, MS; William T. Story, PhD, MPH; Lucas J. Carr, PhD; Gary L. Pierce, PhD; Bethany Barone Gibbs, PhD; Kara M. Whitaker, PhD, MPH, FACSM

BACKGROUND: The prevalence of hypertensive disorders of pregnancy (HDP) is increasing in the United States, where HDP affects up to 16% of pregnancies and is associated with a 2-4-fold greater risk of cardiovascular disease (CVD). Physical activity (PA) is a modifiable risk factor for CVD. Despite the known benefits of PA, little is known concerning the factors influencing postpartum PA after HDP. **PURPOSE:** To assess postpartum PA behavioral determinants after HDP, compare determinants by activity level, and examine interest in a postpartum PA intervention. **METHODS:** Postpartum individuals residing in Iowa who were <1 years postpartum and experienced a HDP completed online surveys assessing demographics, health, PA, behavioral determinants of PA, and desired intervention components. Individuals were classified as active or inactive using the 2018 PA guidelines for Americans. Independent t-tests for continuous variables and Fisher's exact tests for categorical variables evaluated differences between groups. Relative risk was calculated for each determinant to compare the likelihood of each response between groups. Likert scales were scored 1-5. **RESULTS:** Participants (N=72) were 30±6 years old, mostly white (84%), in a relationship (97.2%), had at least a bachelor's degree (69.5%), and 54% (n=39) met PA guidelines. Those meeting guidelines were more likely to be diagnosed with hypertension since delivery (44% v. 22%, $p=0.03$). Those not meeting guidelines had lower CVD knowledge (17.4±6.90 v. 19.8±5.06 of 26 total points, $p=0.07$) and were more likely to report difficulty with being active everyday given current resources (1.69±0.93 v. 2.10±0.94, $p=0.07$). Similarities between groups included high self-efficacy levels for PA (85% v. 88%), perceived positive subjective norm toward PA (87% v. 81%), and the barrier of childcare for PA (29% v. 36%). All indicated interest in a postpartum PA intervention, with desirable intervention attributes including a partner PA program (72%), online PA videos (49%), and use of a PA monitoring device (48%). Currently inactive individuals expressed greater interest in health coaching (3.40±1.07 v. 2.92±1.20, $p=0.08$), social media PA intervention (3.44±0.95 v. 2.85±1.19, $p=0.02$) and information on PA while breastfeeding or pumping (3.75±1.23 v. 3.15±1.24, $p=0.04$). **CONCLUSION:** Individuals with HDP are interested in postpartum PA interventions desiring involvement of partners and technology such as Fitbits and online PA videos.

Schedule – Friday Morning: Poster Session

Poster Session #1: Regency Ballroom E&F (2nd Floor), 7:30-8:45 am

Board #1

THE EFFECTS OF FOAM ROLLING, VIBRATIONAL FOAM ROLLING AND PERCUSSION MASSAGE ON FLEXIBILITY, BALANCE AND EXPLOSIVE POWER

Eli Washburn, Jaimy Dyer

BACKGROUND: The warmup is a crucial part of any practice or workout to maximize performance and reduce the risk of injury. Different forms of myofascial release such as foam rolling (FR), vibrational foam rolling (VFR) and percussion massage (PM) are commonly used as part of a warm up. There is varying data on the specific effects of these myofascial release methods and how they compare to each other. **PURPOSE:** To investigate three myofascial release techniques (FR, VFR, PM) effects compared with control (CNT) on flexibility, balance, and explosive lower body power and the exertion level required to apply each (RPE, Avg HR). **METHODS:** Twelve healthy, recreationally active participants between the ages of 18-25yrs completed 5 sessions. The first session was a familiarization trial, and the remaining 4 were used to assess the interventions (FR, VFR, PM, and CNT) in randomized order. The traditional sit and reach (SNR) and knee to wall (KW) tests were used to assess flexibility of the hamstrings and calves respectively. The Y-balance (YB) test assessed balance, and a standing countermovement vertical jump test (VJ) was used to measure lower body power. All variables were measured pre-and post-intervention in each session. Each intervention lasted for 7 minutes, with myofascial release methods applied for 30s on each major muscle groups of the lower body. Paired samples t-tests were used to compare PRE to POST-test measures for each of the interventions. One-way ANOVA w/ Scheffe Post-Hoc was used to test for differences between the interventions. **RESULTS:** Improvements in all tests were seen following FR (Means: SNR pre=30.29, post=32.71 cm, KW L&R (pre=L-14.5, R-14.33 post=L-14.92, R-15.08 cm, YB L&R (pre=L-81.22, R-81.57 post=L-83.35, R-83.58, VJ (pre=20.46, post=21.04). Comparing the interventions FR & VFR led to greater changes in SNR pre-post than CNT (Means: 2.42 & 2.29 vs. .54cm). FR also outperformed PM & CNT in VJ (Mean change: .58 vs. -.38 & -.33). RPE was higher in FR & VFR groups when compared to PM & CNT (Mean change: 11.9 & 11.4 vs. 8.0 & 6.08). **CONCLUSION:** All three of the myofascial release interventions have an effect on flexibility and balance. Further research is needed to confirm these findings and better understand how the techniques influence lower body power and the impact of PM on flexibility and balance.

Board #2

MITOCHONDRIAL-TARGETED ANTIOXIDANT ACUTELY INCREASES VASCULAR ENDOTHELIAL FUNCTION IN NON-EXERCISING MIDDLE-AGED AND OLDER ADULTS

Mikaela K. Brown, Nicholas A. Carlini, Matthew P. Harber, FACSM, Bradley S. Fleenor

BACKGROUND: Physical inactivity (i.e., non-exerciser) is a primary risk factor for cardiovascular disease (CVD) and is associated with vascular endothelial dysfunction. Mitochondrial-derived oxidative stress (mtROS) contributes to endothelial dysfunction. However, the influence of mtROS in physical inactivity-related endothelial dysfunction has yet to be established. **PURPOSE:** To determine if greater mtROS promotes physical inactivity–related endothelial dysfunction in middle–aged and older adults (MA/O, ≥45 y). **METHODS:** In a double-blind, randomized, placebo-controlled crossover study design MA/O adults were divided into two groups; exercisers (EX, n=11) and non-exercisers (NEX, n=12). Vascular endothelial function from brachial artery flow mediated dilation (FMDBA) was assessed before (pre-ingestion) and ~1 h after MitoQ (single dose, 80 mg) or placebo supplementation. A two-way repeated measures ANOVA with a Bonferroni post-hoc analysis was used to determine the effects of MitoQ and placebo on FMDBA. **RESULTS:** Compared to placebo, MitoQ increased FMDBA in NEX (4.9 +/- 0.4 vs 7.0 +/- 0.4 %, $p<0.05$) by +2.1% (+37% relative) and brachial artery diameter (0.18 +/- 0.02 vs 0.24 +/- 0.02 %, $p<0.05$) by +0.06 mm (+34% relative) whereas no changes were observed for FMDBA (6.8 +/- 0.5 vs 7.0 +/- 0.3 %, $p>0.05$) or brachial artery diameter (0.25 +/- 0.02 vs 0.26 +/- 0.02 %, $p<0.05$) in EX. **CONCLUSION:** These data indicate physical inactivity-related endothelial dysfunction is mediated, in part, via greater mtROS. MitoQ may be a viable strategy to improve endothelial function and overall cardiovascular health in physically inactive MA/O adults.

FUNDING: Funding for this study was provided, in part, by Ball State University ASPiRE internal research grant (N. A. Carlini).

Board #3

MITOQ ACUTELY ENHANCES MYOCARDIAL PERFUSION IN NON-EXERCISING MIDDLE-AGED AND OLDER ADULTS WITH LOWER CARDIORESPIRATORY FITNESS

Maximus G. Betscakos, Nicholas A. Carlini, Bradley S. Fleenor, Matthew P. Harber FACSM

BACKGROUND: Non-exercising middle-aged and older adults (MA/O) with lower cardiorespiratory fitness (CRF) have lower myocardial perfusion which can be potentially enhanced with mitochondrial-targeted antioxidants. The acute mitochondrial-targeted antioxidant effects on myocardial perfusion are currently unknown. **PURPOSE:** To determine the acute effects of the mitochondrial-targeted antioxidant, MitoQ, on myocardial perfusion and if these effects are associated with CRF. **METHODS:** In a double-blind, randomized, placebo-controlled crossover study design twenty-two (10M/12F, age 62.4 2.5 y) MA/O adults (≥45 y) were divided into two groups: exercisers (EX, n=11) and non-exercisers (NEX, n=11). CRF (VO2max) was assessed from an incremental ramp protocol on a cycle ergometer. Myocardial perfusion via the subendocardial viability ratio (SEVR) from pulse wave analysis (PWA, SphygmoCor XCEL) was assessed before (pre-ingestion) and ~1 h after MitoQ (single dose, 80 mg) or placebo supplementation. A two-way repeated measures ANOVA with a Bonferroni post-hoc analysis was used to determine the effects of MitoQ and placebo on SEVR. An unpaired independent samples t-test was used to determine differences in the absolute and relative change in SEVR between NEX and EX. Pearson correlations were used to assess the relations between baseline CRF and SEVR and the change in SEVR with MitoQ and CRF. **RESULTS:** MitoQ did not increase SEVR in the whole cohort (153.5 ± 7.6 vs 158.2 ± 6.7 %, p>0.05). However, when divided into groups by exercise status, MitoQ increased SEVR in NEX by 7.1% (+5% relative) (both, p<0.05). No changes were observed for MitoQ on SEVR in EX (p>0.05). Baseline SEVR was positively correlated with CRF (n=16, r=0.69, p<0.05) and the change in SEVR with MitoQ trended to be inversely associated with CRF (r=-0.49, p=0.055). **CONCLUSION:** These findings demonstrate the potential for MitoQ as a viable strategy to improve myocardial perfusion in NEX adults which is also associated with lower CRF.

FUNDING: Funding for this study was provided, in part, by Ball State University ASPiRE internal research grant (N. A. Carlini).

Board #4

THE INFLUENCE OF SIMULATED GREEN EXERCISE ON HEMOSTATIC RESPONSES TO MENTAL STRESS

Morgan Mydloski, Ian Holder & Paul Nagelkirk FACSM

BACKGROUND AND PURPOSE: Acute psychological stress has been linked to the occurrence of acute coronary events through psychophysiological responses. Green exercise is a proven modality for eliciting positive responses to physiological and psychological states. Therefore, the purpose of this study was to determine the impact of an acute bout of simulated green exercise on coagulation responses to a subsequent acute mental stressor. **METHODS:** Nine apparently healthy college-aged students (6 men, 3 women; years: 23.1 ± 1.5) reported to the laboratory on two separate occasions. They underwent a thirty-minute bout of simulated green exercise or time-matched seated rest, followed by an acute mental stressor. Blood was drawn to assess coagulation responses to the mental stressor via factor VII (FVII), fibrinogen, prothrombin time (PT), and activated partial thromboplastin time (aPTT). **RESULTS:** There was a significant main effect of time on FVII ($p = 0.018$, $\eta2 = 0.635$) and a nonsignificant trend of time on fibrinogen ($p = 0.133$, $\eta2 = 0.292$). A significant main effect of trial ($p = 0.012$, $\eta2 = 0.563$) and time-by-trial interaction ($p = 0.015$, $\eta2 = 0.542$), as well as a nonsignificant trend of time ($p = 0.063$, $\eta2 = 0.367$) was observed for cortisol. Additionally, a significant main effect of trial on fatigue ($p = 0.016$, $\eta2 = 0.538$) and total mood disturbance ($p = 0.048$, $\eta2 = 0.405$), and main effect of trial on depression ($p = 0.016$, $\eta2 = 0.535$) and tension ($p = 0.003$, $\eta2 = 0.692$) were observed. **CONCLUSION:** Simulated green exercise did not mitigate the coagulation response from the acute mental stressor. However, green exercise had a significant effect on mitigating the cortisol response from the acute mental stressor.

Board #5

MITOCHONDRIAL-TARGETED ANTIOXIDANT (MITOQ) INGESTION ACUTELY BLUNTS VO2max IN PHYSICALLY INACTIVE FEMALES

Morgan Killam, Ryan P. Hughes, Nicholas A. Carlini, Bradley S. Fleenor, Matthew P. Harber

PURPOSE: To determine the acute effects of a mitochondrial targeting antioxidant (MitoQ) on cardiopulmonary and hemodynamic responses to maximal exercise. **METHODS:** Nine (n=9) physically inactive females (age 47±22 years and BMI 28.5±3.8 kg/m2) performed two trials (Placebo and MitoQ) in a double-blind randomized cross-over design. In both trials, participants performed an exercise protocol consisting of three-minute stages at submaximal workloads followed by a ramp protocol to volitional exhaustion. Participants received either Placebo or MitoQ (80mg) 1h prior to exercise. Indirect calorimetry, blood pressure, heart rate, blood lactate and rating of perceived exertion (RPE) were collected throughout the duration of the exercise bout. **RESULTS:** VO2max was higher (p=0.03) during Placebo (23.5±5.7 mL•kg•min-1) compared to MitoQ (21.0±6.6 mL•kg•min-1). Maximal ventilation was also higher (p=0.02) in Placebo (82.4±17.7 L/min) compared to MitoQ (75.0±16.8 L/min). Maximal tidal volume was higher (p=0.02) in Placebo (1.97±0.35 L/min) than MitoQ (1.83±0.40 L/min) whereas maximal breathing frequency was not different (p>0.05) between Placebo (44.9±7.0 Br/min) and MitoQ (43.6±5.0 Br/min). Maximal heart rate, blood pressure, and blood lactate were not different between trials (p>0.05). **CONCLUSION:** An acute dose of a mitochondrial targeted antioxidant blunted VO2max, which was primarily mediated by inhibition of ventilatory function. These data suggest that the acute accumulation of exercise-induced reactive oxygen species (ROS) are necessary for maximal aerobic capacity. Further research is warranted on ROS-related antioxidant cell signaling cascades, and how they relate to optimizing mitochondrial function during exercise.

Board #6

MITOCHONDRIAL-TARGETED ANTIOXIDANT (MitoQ) INGESTION ACUTELY LOWERS MAXIMAL OXYGEN PULSE AND IMPAIRS HEART RATE RECOVERY

Caden Morris, Ryan P. Hughes, Nicholas A. Carlini, Bradley S. Fleenor, Matthew P. Harber, FACSM

BACKGROUND: Reactive oxygen species (ROS) generated during exercise are necessary for the regulation of numerous physiological pathways. However, the role of ROS in regulating cardiovascular function during exercise is not well understood. **PURPOSE:** To determine the acute effects of a mitochondrial targeting antioxidant (MitoQ) on cardiovascular and hemodynamic responses during exercise. **METHODS:** Nine (n=9) physically inactive females (age 47±22 years and BMI 28.5±3.8 kg/m2) performed two trials (Placebo and MitoQ) in a double-blind randomized cross-over design. In both trials, participants performed an exercise protocol consisting of three-minute stages at submaximal workloads followed by a ramp protocol to volitional exhaustion. Participants received either Placebo or MitoQ (80mg) 1h prior to exercise. Indirect calorimetry, blood pressure, and heart rate were collected throughout the duration of the exercise bout. **RESULTS:** Cardiovascular (heart rate, oxygen pulse [O2pulse]) and hemodynamic (systolic [SBP] and diastolic [DBP] blood pressure) variables during submaximal exercise were not different between trials (p>0.05). Maximal O2pulse was lower (p=0.03) in MitoQ (9.9±2.0 mL/beat) compared to Placebo (11.0±1.9 mL/beat) while no differences were observed in maximal heart rate (MitoQ: 166±17 bpm; Placebo: 169±18 bpm; p=0.11), SBP (MitoQ: 172±20 mmHg; Placebo: 172±12 mmHg; p=0.90) and DBP (MitoQ: 73±9 mmHg; Placebo: 70±11 mmHg; p=0.15). Heart rate recovery trended (p=0.06) to be lower in MitoQ (19.1±11.3 bpm) compared to Placebo (22.6±10.5 bpm). **CONCLUSION:** An acute dose of a mitochondrial targeted antioxidant appears to lower maximal O2pulse and impair heart rate recovery in physically inactive females. These data suggest that the accumulation of exercise-induced ROS during exercise are necessary for maximum cardiac function and chronotropic response following exercise.

Board #7

ACUTE MITOQ ENHANCING EFFECTS ON VASCULAR ENDOTHELIAL FUNCTION ARE INVERSELY ASSOCIATED WITH CARDIORESPIRATORY FITNESS

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BACKGROUND: Vascular endothelial function is associated with higher cardiorespiratory fitness (CRF) and can be enhanced with mitochondrial-targeted antioxidants. The acute mitochondrial antioxidant-enhancing effects on vascular endothelial function in the context of CRF are currently unknown. **PURPOSE:** To determine if the acute effects of the mitochondrial-targeted antioxidant, MitoQ, on vascular endothelial function are associated with CRF. M**ETHODS:** In a double-blind, randomized, placebo-controlled crossover study design twenty-three (10M/13F, age 62.1 ± 2.4 y) middle-aged and older (MA/O, ≥45 y) adults were studied. CRF (VO2max) was assessed from an incremental ramp protocol on a cycle ergometer. Vascular endothelial function via brachial artery flow mediated dilation (FMDBA) was assessed before (pre-ingestion) and ~1 h after MitoQ (single dose, 80 mg) or placebo supplementation. A two-way repeated measures ANOVA with a Bonferroni post-hoc analysis was used to determine the effects of MitoQ and placebo on FMDBA. Pearson correlations were used to assess the relations between baseline CRF and FMDBA, and the change in FMDBA with MitoQ and CRF. **RESULTS:** Compared to placebo, MitoQ increased FMDBA in MA/O adults (5.8 ± 0.4 vs 7.0 ± 0.2 %, $p<0.05$) by +1.22% (+22% relative) (both, $p<0.05$) and trended to increase brachial artery diameter (0.21 ± 0.01 vs 0.25 ± 0.01 %, $p=0.12$). CRF was positively correlated with baseline FMDBA ($n=17$, $r=0.56$, $p=0.01$) whereas the change in FMDBA with MitoQ was inversely correlated with CRF ($r=-0.54$, $p=0.02$). **CONCLUSION:** These findings demonstrate the acute MitoQ-enhancing effects on endothelial function are attributable to greater mtROS bioavailability with lower CRF.

FUNDING: Funding for this study was provided, in part, by Ball State University ASPiRE internal research grant (N. A. Carlini).

Board #8

EXAMINING THE RELATIONSHIP BETWEEN EXERCISE AND SLEEP AMONG UNIVERSITY FACULTY AND STAFF

Jorge Omar Vazquez, Faith DeNardo, David Tobar, & K. Todd Keylock

BACKGROUND: There has been little research examining the exercise and sleeping patterns of faculty and staff members and what role these factors play in overall health. The information gathered in this study was used to analyze how faculty and staff can adapt their lifestyle with exercise and sleep to improve health and well-being. **PURPOSE:** To explore the relationship between exercise and sleep in faculty and staff at a university in the Midwest. **METHODS:** The study performed secondary analyses on data collected from the American College Health Association's National Faculty and Staff Health Assessment. Independent t-tests were performed to analyze exercise levels. Chi-Square and Mann-Whitney U tests were performed to analyze sleeping patterns. An alpha level of .05 was used for all analyses. **RESULTS:** In the 553 respondents, sex differences were found regarding the amount of vigorous exercise obtained each week, the amount of time needed to fall asleep, and the use of over-the-counter medication to promote sleep. Overall, 53.8% and 17.2% of respondents indicated obtaining the guidelines for aerobic exercise and highly active adults, respectively. Compared to males, females reported fewer total minutes performing vigorous activity in the past seven days (females 38.1 vs. males 55.9 minutes). A majority of females (71.1%) and males (75.5%) reported either six or seven hours of sleep per night. However, 67.4% of faculty and staff reported difficulty staying asleep in the last 12 months. A greater proportion of females (17.7%) indicated taking 31 minutes or more to fall asleep compared to males (9.4%), and a greater proportion of males (28.9%) indicated taking 5 minutes or less to fall asleep compared to females (18.7%). A total of 26.3% of respondents indicated using over-the-counter medication to fall asleep. The proportion of females (29%) was greater than males (19%) for using over-the-counter medication to promote sleep. Although 67.4% indicated difficulty falling asleep at times, there were not any sex differences found. **CONCLUSION:** In these subjects there were some sex differences in sleep patterns and amounts of exercise. Further research is needed to determine the precise relationship between exercise and sleep in faculty and staff members.

Board #9

PHYSICAL ACTIVITY AND PERCEIVED STRESS IN COLLEGE STUDENTS DURING DIFFERENT STAGE OF THE COVID-19 PANDEMIC

Amy Morgan, FACSM, Justin Hollis, Kenna Lacey, Chen Du, Robin M. Tucker, Mary-Jon Ludy

BACKGROUND: Prior to the COVID-19 pandemic, 69.8% of US college students met aerobic physical activity (PA) recommendations and 39.1% reported that stress affected their academic performance. As regular PA has been demonstrated to reduce stress and times of uncertainty have been demonstrated to increase stress, levels of PA and perceived stress (PS) during different stages of the pandemic are of interest. **PURPOSE**: To compare levels of PA and PS during April/May 2020 (EARLY) and October/November 2020 (LATER) stages of the COVID-19 pandemic. **METHODS:** University students (EARLY: N = 797, age 22.5 ± 5.7 years, BMI 26.5 ± 6.5 kg/m2, 72.4% female; LATER: N = 410, age 22.4 ± 5.8 years, BMI 26.4 ± 6.5 kg/m2, 70.5% female) completed confidential online surveys during different stages of the COVID-19 pandemic. Questionnaires included the International Physical Activity Questionnaire (long form with moderate (MPA), vigorous (VPA), and sitting minutes) and Perceived Stress Scale (PSS-10: 0-13 low, 14-26 moderate, and 27-40 high stress). Whether individuals met recommended aerobic PA levels was also determined (i.e., ≥ 150 min MPA, 75 min VPA, or equivalent combination). **RESULTS**: Individuals who met recommended PA had less PS ($p = 0.006$), greater MPA and VPA, and less sitting time ($p < 0.001$ for all). Overall, close to half of the respondents (EARLY 41%, LATER 46% reported achieving the recommended PA each week). There were no differences in MPA between EARLY and LATER (20.0 ± 40.5 vs 20.3 ± 35.6 min, $p = 0.909$), while VPA (22.5 ± 34.4 vs 16.9 ± 34.5 min, $p = 0.008$) and weekend sitting time (415.0 ± 196.0 vs 374.6 ± 195.2 min, $p < 0.001$) were greater EARLY. Likewise, there was higher total PS (22.5 ± 7.0 vs 21.5 ± 7.3, $p = 0.016$) EARLY. Individual PS components related to control of one's environment were higher EARLY as compared to LATER (e.g., unable to control the important things in life, did not feel on top of things, $p < 0.001$ for both). **CONCLUSION**: During the early stages of the COVID-19 pandemic, a lower percentage of students met the recommended levels of PA while perceiving additional stress. Those who met PA guidelines reported less PS both EARLY and LATER in the pandemic, suggesting that PA can help to reduce stress.

Board #10

MITOCHONDRIAL-TARGETED ANTIOXIDANT (MITOQ) INGESTION DOES NOT INFLUENCE SUBSTRATE OXIDATION DURING EXERCISE

Vivian Van Eck, Ryan Hughes, Nicholas Carlini, Bradley Fleenor, & Matthew Harber, FACSM

BACKGROUND: Accumulation of mitochondrial derived reactive oxygen species secondary to mitochondrial dysfunction in sedentary individuals may impair fat oxidation, which may further contribute to reduced exercise capacity. **PURPOSE:** To determine the acute effects of a mitochondrial targeting antioxidant (MitoQ) on substrate oxidation during exercise. **METHODS:** Nine (n=9) physically inactive females (age 47±22 years and BMI 28.5±3.8 kg/m2) performed two trials (Placebo and MitoQ) in a double-blind randomized cross-over design. In both trials, participants performed an exercise protocol consisting of three-minute stages at submaximal workloads followed by a ramp protocol to volitional exhaustion. Participants received either Placebo or MitoQ (80mg) 1h prior to exercise. Indirect calorimetry was collected throughout the duration of the exercise bout and substrate utilization was determined using the Frayn equations. **RESULTS:** Submaximal VO2, VCO2, and substrate utilization were not different between trials ($p>0.05$). Maximal fat oxidation was 0.28±0.06 g/min in Placebo and 0.30±0.07 g/min in MitoQ ($p=0.35$), which occurred at 34.4±8.8 Watts in Placebo and at 26.7±10.0 Watts in MitoQ ($p=0.21$). Similarly, the substrate crossover point occurred at 59±18 Watts in Placebo and 66±13 Watts in MitoQ ($p=0.35$). **CONCLUSION:** An acute dose of a mitochondrial targeted antioxidant did not influence substrate oxidation during exercise in physically inactive females. Thus, accumulation of mitochondrial derived reactive oxygen species does not appear to influence fat and carbohydrate utilization during exercise.

Board #11

TRAINING WITH COMPRESSION GARMENTS IMPROVES ANAEROBIC CAPACITY IN HEALTHY MALES

Jesse M. Jansen, Mikayla M. Meade, Benjamin S. Minier, Curtis A. Cornell, Faith C. Kurtz, Joshua T. Mayne, Justin A. O'Dell, Gabriel M. Lysak, & James R. Sackett

BACKGROUND: Acutely wearing compression garments (CG) has been shown to mitigate injury risk, reduce ground skeletal impact, and improve muscular endurance. Additionally, longitudinal studies include findings of physiological adaptation with type II muscle fibers and reduced inflammation. However, few investigations exist on the effects of

training with CG and it is unknown if training in CG will improve anaerobic performance. **PURPOSE:** Thus, the purpose of this investigation was to test the hypothesis that training with CG for four weeks improves anaerobic capacity when compared to training without CG. **METHODS:** Sixteen healthy males (age: 21±3 y, BMI: 25±3 kg/m2) trained for four weeks (3 days/wk) in two distinct groups: while wearing CG (CG; n=8) and without wearing CG (CT; n=8). Subjects performed a full-body high-intensity exercise routine, whereas the intensity progressed weekly with more repetitions and reductions in rest time. Each training day consisted of skater jumps, I-Y-T's, glute bridges, lunges, push-ups, squat jumps, triceps dips, and dead bugs. Subjects performed the Wingate Anaerobic Test (WAnT) before and after the training program. The WAnT is a standardized test where the subject cycles all-out against 7.5% of their body weight in kilograms for thirty seconds. Data collected during the WAnT included absolute (W) and relative (W/kg) mean power (MP), absolute (W) and relative (W/kg) peak power (PP), and fatigue index (FI; %). Data are presented as a change score from before training. A two-way repeated measures ANOVA was utilized to analyze data. **RESULTS:** There was a significant difference between CG and CT in change score for absolute MP (CG: 55.2±64.2 W, CT: -7.2±42.4 W, P=0.006) and relative MP (CG: 0.7±0.8 W/kg, CT: -0.1±0.6 W/kg, P=0.004). However, there were no significant differences between CG and CT in change score for absolute PP (CG: 60.1±55.3 W, CT: -13.7±125 W, P=0.148), relative PP (CG: 0.8±0.7 W/kg, CT: -0.3±1.5 W/kg, P=0.096) or FI (CG: -4.2±8.1%, CT: 0.4±8.1%, P=0.279). **CONCLUSION:** It appears that wearing CG during four weeks of exercise training improves mean power during the WAnT when compared to training without CG. This is possibly due to the enhanced blood flow and metabolic nutrient supply to active muscles, which allows for consistent intensities when exercising. Thus, it may be worthwhile for recreationally active adults to use CG when performing intense training.

Board #12

COMPRESSION GARMENTS DO NOT ENHANCE MAX BARBELL BACK SQUAT PERFORMANCE IN UNTRAINED MALE ADULTS

Curtis A. Cornell, Mikayla M. Meade, Jesse M. Jansen, Benjamin S. Minier, Faith C. Kurtz, Joshua T. Mayne, Justin A. O'Dell, Gabriel M. Lysak, & James R. Sackett

BACKGROUND: Acutely wearing compression garments (CG) has been shown to improve anaerobic performance in movements such as a vertical jump and squat. It has also been shown that training with CG decreases the risk for injury in both athletic and adult populations. However, it is unknown if training with CG increases maximal squat performance over time. **PURPOSE:** Thus, the purpose of this study was to test the hypothesis that training in CG would improve maximal barbell back squat performance and muscular activation of the serratus anterior when compared to not training in CG. **METHODS:** Sixteen untrained male adults (age: 21±3 y, BMI: 25±3 kg/m2) completed a four-week training program. The training program consisted of three bodyweight supersets: i) skater jumps, I-Y-T's, and glute bridges; ii) lunges and pushups; and iii) squat jumps, tricep dips, and dead bugs. Intensity gradually increased each week by the number of set and repetitions performed per superset and a decreased rest time. Subjects were randomly assigned to one of two training groups: a control group that did not wear the CG during training (CT; n=8) and a group that wore the CG during training (CG; n=8). Data were collected prior to the training program (PRE) and after the training program was completed (POST). Each subject completed a five-repetition maximum barbell back squat (kg) during PRE and POST. Electromyography was utilized to measure muscular activation of the serratus anterior. This variable was recorded as a percentage (%) of a maximal voluntary isometric contraction (MVIC). All data are presented as a change from PRE. Data were analyzed via a two-way repeated measures ANOVA and p value was set a priori to $p<0.05$. **RESULTS:** There was a statistically significant increase in barbell back squat from PRE to POST for both CT (7.1±6.9 kg; p=0.021) and CG (8.3±6.8 kg; p=0.005) but there were no statistical differences between groups at either time point (p=0.717). There were no statistical differences for muscular activation of the serratus anterior from PRE to POST for either group (CT: -6.3±23.9%, CG: 8.8±47.5%; p=0.892) and there were no statistical differences between groups at either time point (p=0.433). **CONCLUSION:** In summary, there were no significant differences in maximal barbell back squat or muscular activation of the serratus anterior in CT or CG. Thus, training in CG does not appear to improve barbell back squat performance when compared to not training in CG.

Board #13

TRAINING WITH A FULL BODY COMPRESSION GARMENT DOES NOT IMPROVE PERFORMANCE DURING A 40-METER SPRINT IN HEALTHY MEN

Benjamin S. Minier, Mikayla M. Meade, Jesse M. Jansen, Curtis A. Cornell, Faith C. Kurtz, Joshua T. Mayne, Justin A. O'Dell, Gabriel M. Lysak, & James R. Sackett

BACKGROUND: Compression garments (CG) have been shown to reduce injury and improve recovery during strength or endurance training. A novel full body CG is purported to improve athletic performance through an increase

in core muscle activation. Research on this CG has not demonstrated performance benefits in an acute setting, and no studies have been conducted on this CG concerning chronic effects. **PURPOSE:** Thus, the purpose of this study was to test the hypothesis that training in the CG will improve performance during a 40 m sprint when compared to not training in the CG. **METHODS:** Sixteen untrained males (age: 21±3 y, BMI: 25±3 kg/m^2) were divided into two groups: one that wore the CG during training (CG; n=8) and one that didn't wear the CG during training (CT; n=8). Both groups participated in a standardized body weight training program for four weeks completing a 40 m sprint before (PRE) and after (POST) training. The training program consisted of three sessions per week and included the following exercises: skater jumps, I-Y-Ts, hip thrusts, lunges, pushups, triceps dips, squat jumps, and dead bugs. The intensity progressed each week via reductions in rest time and increases in repetitions. Sprint time (s) and sprint speed (m/s) were measured using a laser timing system. A laser was placed at 0 m, 20 m, and 40 m to measure 20 m sprint time and speed, flying 20 m sprint time and speed, and 40 m sprint time and speed. Data are presented as a change from PRE and were analyzed using a two-way repeated measures ANOVA. **RESULTS:** There were no statistically significant differences for CG and CT for 20 m sprint time (CG: 0.07±0.18 s, CT: 0.03±0.16 s; condition: p=0.70, time: p=0.36) or speed (CG: -0.10±0.26 m/s, CT: -0.11±0.35 m/s; condition: p=0.98, time: p=0.31). There were no statistically significant differences for CG and CT for flying 20 m sprint time (CG: 0.08±0.31 s, CT: -0.08±0.05 s; condition: p=0.25, time: p=0.98) or speed (CG: -0.11±0.80 m/s, CT: 0.29±0.17 m/s; condition: p=0.26, time: p=0.62). Lastly, there were no statistically significant differences for CG and CT for 40 m sprint time (CG: 0.12±0.54 s, CT: 0.00±0.15 s; condition: p=0.59, time: p=0.59) or speed (CG: 0.11±0.27 m/s, CT: -0.12±0.10 m/s; condition: p=0.06, time: p=0.93). **CONCLUSION:** Training in CG does not improve performance during a 40 m sprint compared to training without CG. It appears training in CG does not enhance sprinting performance in healthy untrained males.

Board #14

CORRELATION ANALYSIS OF DIFFERENT LIMITS OF STABILITY BALANCE TESTING PROTOCOLS

Kaitlyn Lance, Trevor Lopatin, Bradley Kendall, Daniel Goble, Joshua Haworth

BACKGROUND: The Limits of stability (LoS) test assesses dynamic postural sway, which is how well a person can maneuver within their base of support. Various versions of this test have been developed, using slight variations in instructions and scoring. The Biosway utilizes a targeted LoS protocol where participants move towards a set of eight points near the predicted edge of stability, from which a composite score is calculated as the average success at reaching these targets. The Btracks LoS protocol uses an untargeted protocol where participants self-select the area they explore, with the goal to travel the largest possible area. It is unclear how these two forms of LoS relate, considering their differences in instructions and scoring. **PURPOSE:** This investigation tested the relationship between the LOS protocols of two different devices, in order to better define dynamic postural sway. **METHODS:** Forty participants (age =20.1 ± .9 years; 20 males, 20 females) completed the LOS test on both a Biosway and BTrackS force plate. Biosway composite score is the main value provided and is calculated from the average of the percent of target distance achieved to each target. Lean angle values are also provided, which were used in our study to calculate path lengths and subsequently area equivalence scores. BTrackS delivers the overall area score directly from its software. Pearson correlations tested relationships between BTrackS area scores and Biosway composite and area equivalence scores, separately. Analysis was conducted in Microsoft Excel, with $\alpha = 0.05$. **RESULTS:** Biosway composite score (unitless) and BtrackS total area (cm2)were found to have a significant moderate correlation ($r = .0.488$, $p < 0.05$). With the biosway area equivalent scores (cm2), the relationship becomes highly correlated ($r = .074$, $p < 0.05$). **CONCLUSION:** The significant moderate correlation between the main score delivered by each software (composite and overall area), brings caution to their interchangeability. The higher correlation between area scores suggests that both tests appear to measure a similar behavior, e.g. dynamic postural sway. However, a difference remains which might be attributed to the (un)targeted instructions.

Board #15

COMPARISON OF MEASURED RESTING METABOLIC RATE WITH PREDICTIVE EQUATIONS IN DIVISION III ATHLETES

Gabrielle Moore, Emma Konrad, Matthew Beekley, FACSM

BACKGROUND: Knowledge of resting metabolic rate is important for athletes, but it is cumbersome to measure resting metabolic rates. Prediction equations for resting metabolic rate have been developed but may not be accurate for all athletes. **PURPOSE:** To measure resting metabolic rate in Division III athletes and compare the results to ten previously developed prediction equations. **METHODS:** Seventeen Division III athletes (four males, thirteen females, ages 18-22) from various sports were asked to report to the laboratory after abstaining from strenuous exercise for at least 24 hr and caffeine and food for at least 12 hr. Subjects were allowed to rest for 15 minutes, then resting metabolic

rate measurement commenced using a Parvo Medics TrueOne 2400 metabolic cart with canopy system in a quiet, dimly lit, thermoneutral room. Thirty minutes of data was collected with the first ten minutes and last five minutes discarded. Body composition was measured using a BodPod. A Dunnett's test (SPSS software) was used for statistical analysis (each prediction equation being compared to actual measured resting metabolic rate). **RESULTS:** Measured resting metabolic rate (1464±246 kcal/24 hr) did not significantly differ from Watson (1492±134; $p > 0.279$), Nelson (1404±310; $p > 0.183$) Tinsley (1637±329; $p > 0.011$) and Maffies (1417±102; $p > 0.134$) prediction equations. Measured resting metabolic rate was significantly different from Harris Benedict (1698±245; $p < 0.005$), Owen (1598±196; $p < 0.005$), Mifflin St Jeor (1690±192; $p < 0.005$), WHO (1570±223; $p < 0.005$), Altman Dittmer (1886±186; $p < 0.005$), and Johnstone (1031±229; $p < 0.005$) prediction equations. **CONCLUSION:** In a variety of Division III athletes, the prediction equations of Watson, Nelson, Tinsley, and Maffies were not significantly different from measured resting metabolic rate. Note, however, that the Watson, Nelson, and Tinsley equations require measurement of fat and fat-free mass. We thus conclude the Maffies equation is the most useful in predicting resting metabolic rate easily in Division III athletes.

Board #16

EXAMINING THE MODERATING EFFECT OF WEIGHT STATUS ON THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND MENTAL HEALTH IN COLLEGE STUDENTS

Aryanna Grant & Catherine Gammon

BACKGROUND: College students report high rates of mental health challenges. Encouragingly, research shows the benefits of physical activity (PA) for mental health, but few studies have examined possible moderators of this relationship, such as weight status. Understanding if the relationship between PA and mental health differs in strength/existence for college students of different weight statuses can help universities provide targeted mental health support to students. **PURPOSE:** Examine if the relationship between PA and mental health is moderated by weight status among college students. M**ETHODS:** In 2019, 757 college students (mean age=24.8 years, 71.4% female) completed the American College Health Association's National College Health Assessment. Participants self-reported minutes of moderate- and vigorous-intensity PA in the past 7 days and completed validated measures of mental health indicators (resilience, loneliness, psychological well-being, distress). Self-reported height and weight were used to calculate body mass index and classify participants as healthy weight or overweight. Multiple linear regression was used to examine the main and interactive effects of weight status and PA on mental health (α=.05). **RESULTS:** Weight status and PA explained 1.3% of the variance in psychological wellbeing; there was a borderline statistically significant moderator effect of weight status - the addition of the interaction term explained a further 0.5% of the total variance (p=.050). Analyses revealed a non-significant relationship between PA and wellbeing in healthy weight students (b=0.001, SE=0.001, p=.445) and a significant positive relationship in overweight students (b=0.004, SE=0.001, p=.001). Weight status and PA explained 3.5, 1.2, and 0.8% of the variance in resilience, distress, and loneliness scores, respectively; adding the interaction term to these models did not significantly improve the explained variance. **CONCLUSION:** The relationship between PA and resilience, loneliness and distress does not appear to differ for healthy weight and overweight college students. Weight status appears to influence the relationship between PA and psychological wellbeing - PA was positively associated with wellbeing among overweight students, but not healthy weight students. Given the higher rates of mental health challenges among overweight individuals and the potential for PA to promote their wellbeing, this finding is worth exploring in an experimental study.

Board #17

MUSCLE OXYGENATION RESPONSES OF LOWER LEG FROM PEDALING INTERRUPTIONS DURING ONE HOUR OF SEATED VIDEO GAMING

Madalyn Hickey, Gabrielle Peters, Garrett Falk, Nicholas Lerma

BACKGROUND: Recreational video gamers spend approximately 7.5 hours a week playing video games with professional gamers accumulating up to 5.5-10 hours per day. Increased sitting time is linked to obesity, arterial stiffness, vascular diseases, and musculoskeletal disorders. Specifically, inactivity may lead to reduced mitochondrial density in the cells which leads to impaired muscle oxygenation responses. Near-infrared spectroscopy (NIRS) combined with blood flow occlusion can be used to measure muscle oxygenation and microvascular responsiveness in lower limbs. **PURPOSE:** The purpose of this study is to analyze lower limb muscle oxygenation during a) an FMD protocol and b) sedentary behavior interruptions when gaming. **METHODS:** Eligible participants were enrolled in a randomized cross-over control trial and visited the lab twice separated by 4-7 days. During each visit a flow-mediated dilation protocol (FMD) was performed before and after 60 minutes of video game play at each visit. Two 3-minute seated pedaling interruptions took place during one of the two video game playing sessions. A MOXY near-infrared

device was applied to the tibialis anterior (TA) and soleus (Sol) for continuous measurement of total hemoglobin concentration (THb) and muscle oxygenation (SmO2%). A mixed model ANOVA was performed to measure differences in THB and SmO2% during FMD and pedaling vs non-pedaling gaming sessions. **RESULTS:** Eight males and two females (age 22.5 +/- 6) completed data collection. There was a significant effect for time in the SmO2% for TA and Sol throughout the FMD protocols (p = .005), but no differences between pedaling vs non-pedaling days. Specifically, a 54% reduction in SmO2% during the final minute of occlusion, 6% reduction 1-min post occlusion, 10.8% increase 2-min post occlusion, and 4.7% increase 3-min post-occlusion. During the 60-min of gaming, there was a visible relationship between THb and pedaling sessions, but no statistically significant interaction for treatment over time with THb or SmO2% . **CONCLUSION:** The MOXY was sensitive to changes in SmO2% during the FMD protocol. Changes in THb may indicate changes in local blood flow from sedentary behavior interruptions. A larger sample size and post-ischemia reperfusion kinetics between treatment groups should be explored.

Board #18

FORMER COLLEGE ATHLETES: PERCEPTIONS AND PLANS FOR MAINTAINING EXERCISE POST-SPORT

Christian A. Clark, Samantha M. Vermeesch, Paula-Marie M. Ferrara

BACKGROUND: College athletes in the United States exhibit various declines in physical and mental health following retirement from sport. These declines in health are not well understood, however one cause may be reduced exercise rates following retirement from regular sports training. To date, it is unknown how former athletes' perceptions of health and fitness change after retirement and affect their exercise behavior post-sport. **PURPOSE:** The purpose of this study was to understand former Division III (DIII) athletes' perceptions of health and fitness following college graduation and sports retirement, as well as explore what their future plans for exercise maintenance were with the absence of sports training. **METHODS:** Recently graduated student-athletes from Hope College completed semi-structured interviews via Zoom. Participants' interviews were transcribed, then analyzed using Consensual Qualitative Research (CQR) methods. From the analysis, domains, categories, and core ideas were constructed to elucidate participants' lived experiences relating to exercise and their perceptions of health. **RESULTS:** Participants included 19 former DIII athletes (22±1 years, 37% male, 84% White). The CQR analysis yielded six key domains. Three pertained to participants' perceptions of health and fitness: "Reasons Why Former Athletes are Exercising", "Barriers that Limit an Active Lifestyle", and "Perceptions of What Exercise "Is" ". Three described their plans for maintaining future exercise: "Not a Priority", "Figuring It Out", and "Current Tactics to Engage in Exercise". **CONCLUSION:** These results align with previous research: former athletes' perceived a need for a post-sport break following retirement, and they avoided exercise activities associated with negative sport experiences. While not quantitatively measured, former athletes reported less activity than when still training in college. This was due to a lack of knowledge regarding exercise and health maintenance, as many participants were not aware of the Physical Activity Guidelines for Adults and habitually over- or underestimated healthy exercise thresholds. Former athletes also contended with the influx in autonomy for exercise as they retired; those who were engaging with exercise indicated primarily completing activities familiar to them, and preferred to exercise with family and friends to stay accountable. Researchers may use these results to better prepare athletes for their retirement in the future.

Poster Session #2: Regency Ballroom E&F (2nd Floor), 9:00-10:15 am

Board #1

DYNAMIC POSTURAL STABILITY IN COLLEGE FOOTBALL PLAYERS WITH CHRONIC ANKLE INSTABILITY

Madison Flewelling, Kyoungyoun (Anne) Park-Braswell, Jesse Clement, Spencer Hathaway, Cameron Lain, & Melissa Cook

BACKGROUND: Chronic ankle instability (CAI) is a result of recurrent ankle sprains. This condition is accompanied by a wide range of symptoms such as pain, weakness, and limited range of motion in the ankle joint. Lateral ankle sprains (LASs) are the most common injury incurred by collegiate football players, accounting for 31.4% of all lower body injuries. Consequently, evidence suggests that dynamic postural stability can be inversely affected by the presence of CAI. **PURPOSE:** The purpose of this study was to determine if CAI negatively affects dynamic postural control in college football players. **METHODS:** Thirty college football players volunteered for this research (age=20.1±1.27 yr; body weight=105.06±20.7 kg; height=1.86±0.065 m). Fifteen participants with ankle instability who have a history of at

least 2 ankle sprains or instances of giving away in the last 6 months are assigned into the CAI group. Fifteen participants with less than 2 ankle sprains or instances of giving away are assigned to the healthy control group. Time to stabilization tests (TTS) during single leg jump landing was used to measure dynamic postural control. TTS is calculated using the peak ground reaction force (GRF) in anterior/posterior (A/P) and medial/lateral (M/L) direction. An independent t-test was used to compare differences in TTS between CAI and control groups in A/P and M/L direction separately. **RESULTS:** There was no statistical significance for TTS in M/L direction (t(28)p=1.50, p=.144) and A/P direction (t(28)=.58, p=.57) between CAI and control group. Even though there was no statistical significance between groups, individuals with CAI took relatively longer to stabilize in the M/L direction (2.02±.85 seconds vs. 1.59±.74 seconds). **CONCLUSIONS:** Despite the lack of a statistically significant difference between groups, individuals with CAI took relatively longer to stabilize in the M/L direction. This indicates that the CAI group may have poorer dynamic postural stability when compared to their control group counterparts. This potential lack of stability may increase the risk of musculoskeletal injury in this population. Possible limitations in this study include large variances in the BMI of participants. As well as not factoring in rehabilitation following an ankle sprain. Future research could be improved by implementing stricter recruitment for participants with similar BMIs and similar rehabilitation patterns following an ankle sprain.

Board #2

EFFECT OF DIFFERENT DURATIONS OF WHOLE-BODY VIBRATION ON DYNAMIC POSTURAL STABILITY

Lainey Anthony, Kyoungyoun (Anne) Park-Braswell, Madeline Lawrence, Jacob Keith, Dalton Kinney, & Melissa Cook

BACKGROUND: Increased postural stability in athletics has been linked to a decrease in injury risk as well as an increased ability to complete desired movement patterns required by the sport. Whole-body vibration (WBV) is a technique that has been tested throughout the world of sports and rehabilitation to try to increase postural stability as well as muscular strength and power, vertical jump height, and flexibility. However, it is not yet known what duration of WBV, if any at all, is most effective at increasing dynamic postural stability. **PURPOSE:** To determine if 3 minutes or 5 minutes of WBV is more effective than no vibration at all in increasing dynamic postural stability in collegiate athletes. **METHODS:** This study had one outlier, so 15 healthy collegiate athletes (21.07 ± 1.06 yrs; 78.43 ± 10.82 kg; 178.97 ± 5.51 cm) were used for analysis. Baseline postural stability tests were measured before WBV through the bilateral and unilateral drop jump tests. 3 minutes of WBV was completed and then the drop jump tests were repeated. At least 48 hours later, participants returned for 5 minutes of vibration followed by the drop jump tests. **RESULTS:** The vibration intervention did not elicit statistically significant changes in vertical ground reaction force (GRF) of double leg post vibration, $F(2, 28) = .344$, $p < .712$, with GRF 39.01 ± 16.07 N at 0 minutes of vibration, 36.69±17.79 N post 3 minutes of vibration, and 37.84±16.83 N at post 5 minutes of vibration. The intervention also did not yield any statistically significant changes for the stance leg ($p = .925$) or the dominant leg ($p = .786$) when comparing 0, 3, and 5 minutes of post vibration. **CONCLUSION:** There were slight decreases in GRF on double leg and when comparing dominant and stance leg, but this decrease was found statistically insignificant. However, dominant leg GRF consistently decreased between 0, 3, and 5 minutes. Further research should be done to determine if vibration therapy has a positive impact on one's postural stability. In further research, more participants could help lead to a significant finding.

Board #3

THE VALIDITY OF BIOELECTRICAL IMPEDANCE WHEN TESTING RESTING METABOLIC RATE, COMPARED TO INDIRECT CALORIMETRY USING A METABOLIC CART

Melissa Cook, Melody Branan Miller, Faith Jackson, & Ryan Whiteman

BACKGROUND: This research was collected with the intent of finding a faster and less expensive method for measuring clients resting metabolic rates (RMR) for applications in clinical settings. **PURPOSE:** The purpose of this study is to discover if bioelectrical impedance analysis (BIA) can produce valid results in testing an individual's RMR compared to indirect calorimetry using a metabolic cart (MC). **METHODS:** Thirty-one participants (n=31) above the age of 18 were recruited to complete both a 3 minute BIA scan and a 30-minute RMR test on the MC. Predicted RMR values were recorded first through a BIA. Measured RMR values were recorded using a ventilated canopy hood connected to a metabolic cart (MC). The two values were correlated using an SPSS Pearson's r correlation. **RESULTS:** Researchers found that there was a strong positive correlation between the two variables, r (30)=[0.868], p=[<0.001]. Both the MC and the BIA scan appear to result in statistically significantly similar metabolic requirement values. **CONCLUSION:** The conclusion is that the BIA is a suitable and valid replacement for the MC when it comes to

measurement or RMR values. Further research may need to be done to expand upon the substitutionary use of BIA. Clinicians of many kinds should consider incorporating the BIA for metabolic testing to increase knowledge of patients' nutritional demands, patient education regarding their metabolic rate, tracking progress throughout programs, along with bridging the difficult conversation about prescriptive weight loss and gain.

Board #4

PHYSIOLOGICAL DIFFERENCES ON A STANDARD TREADMILL VERSUS A LOWER BODY POSITIVE PRESSURE TREADMILL

Lucy Martin, Ella Khahr, Taylor Waterway Vongunten, & Melissa Cook

BACKGROUND: The Lower Body Positive Pressure Treadmill (LBPPT) decreases body weight which lessens ground reaction forces on the body by using air differential technology. The LBPPT can decrease body weight by up to 80%. Moreover, because this chamber uses air pressure, body fluids are pushed into the thoracic cavity. This increase of fluid into the thoracic cavity can increase BP at a faster rate. However, data on this piece of equipment has varied results on how the treadmill affects the human body. Conducting new research on how the LBPPT affects heart rate (HR) and blood pressure (BP) after exercise could help to clear up the current division within the data. While comparing this data to HR and BP after exercise on a standard treadmill (ST), the comparison can be made to determine if these values could be dangerous to someone with cardiovascular issues. **PURPOSE:** The purpose of this research is to examine the physiological and psychological differences while running on a treadmill at full body weight compared to running at reduced body weight through a LBPPT. **METHODS:** Researchers studied HR, BP, enjoyability, and rate of perceived exertion (RPE). 30 participants (16 F/14 M) volunteered to run on both treadmills at two different times. Participants baseline resting HR and BP were measured. The participant ran the test for 6 min at self-selected speed. When this test terminated, HR, BP and RPE were measured, and the participant answered 3 enjoyability questions. **RESULTS:** There was statistical significance between RPE on the ST versus the LBPPT. LBPPT reported significantly less perceived exertion ($p<.001$). HR was significantly higher on the ST versus the LBPPT ($p<.001$). One enjoyability question was also significantly different, concluding LBPPT was more enjoyable for participants ($p<.001$). Systolic and diastolic BP was used to calculate mean arterial pressure (MAP) to compare the treadmills. MAP did not show statistical significance ($p=.088$), although trending in the direction that MAP would increase more when running on the LBPPT compared to the ST. **CONCLUSION:** All reported values indicated that participants exerted less effort while running on the LBPPT and enjoyed it more, which was supported by a higher HR and a higher RPE reported on the ST. Further research should be completed to determine what is enjoyable about the LBPPT and more participants used to see if the MAP value will show greater significance difference.

Board #5

EFFECTS OF CELSIUS© ON ANAEROBIC PERFORMANCE

Kendra Coryell, Jaclyn Grubbs, Hannah Whitehouse, & Melissa Cook

BACKGROUND: The Celsius company claims that drinking a can of Celsius© (CD) before exercise will burn body fat, give essential energy, and accelerate your metabolism by thermogenesis. The claims have been clinically tested and confirmed in a variety of clinical trials. The blend of ingredients that comprises the CD enacts thermogenesis which increases metabolism and caloric burn. This study will focus on the potential physiological benefits of CD on anaerobic performance. The symptoms of exercise addiction to aerobic and anaerobic exercises were shown to be a prevalent problem in the world of exercise. If these people are also ingesting large amounts of caffeine pre workout, the effects on each person could be different. Sicova stated that some people are genetically gifted with fast caffeine metabolizers compared to slow caffeine metabolizers (Sicova et al., 2021). This shows that caffeine may improve some people's anaerobic performances just because of their genetic factors. These are benefits in understanding the effects that Celsius© has on anaerobic performance compared in addition to aerobic performance. The study may also support or oppose the initial claims of the drink. **PURPOSE:** The purpose of this study was to evaluate the effects of the CD on short-term energy (anaerobic) performance using a 30 second bike sprint test known as Wingate. **METHODS:** Each participant was tested on 2 separate days, drank either the placebo or CD, waited 15 minutes post consumption, and then performed a 30 second "all out" bike sprint on the Wingate bike. Paired t-tests were conducted to compare the average and peak power of both the CD and placebo. **RESULTS:** Heart rate and temperature pre and post consumption were compared using a Wilcoxon test. There was no significant increase in HR nor temperature pre to post consumption. There was no significant difference in peak power ($M=781.5$, $SD=286.3$) and average power ($M=543.2$, $SD=157.8$), t (-.265) $p<.001$, t (-.240) $p<.001$ when consuming CD versus placebo. **CONCLUSIONS:** Based on the results of this study, CD does not influence anaerobic performance given that the peak and average power for both males and females were not affected. Furthermore, thermogenesis and increased heart rate are not activated as quickly as originally

claimed. Future research needs to be completed to determine at what point in a workout the claims of thermogenesis and increased caloric burn begin.

Board #6

THE EFFECT 100MG OF CAFFEINE HAS ON SIMPLE REACTION TIME

Isaiah Henry, Christa Vogel, Lexi Weldy, Jessica Keller

BACKGROUND: 79.4% of college students consume caffeine regularly, yet there is little research about how this drug affects their reaction time. This study used the ruler drop test to determine reaction time before and after caffeine consumption. The ruler drop test is a simple, inexpensive way to measure reaction time and is considered as reliable as a computerized reaction time test. Caffeine is a psychoactive stimulant commonly consumed to impact psychological attributes; however, previous research has shown caffeine increases cognitive and functional performance. There has been little to no research done on reaction time and caffeine in college-age individuals. This study investigated the impact of 100 milligrams of caffeine on reaction times in this population. Based on former research, this study hypothesized that caffeine would improve reaction time in habitual and non-habitual caffeine-using college students. **PURPOSE:** The purpose of this study is to determine if consuming 100 mg of caffeine affects human reaction time in college-aged individuals. **METHODS:** 35 participants' reaction times were tested using the ruler drop test without consuming caffeine for at least 12 hours. The ruler drop test was performed using an apparatus to reduce potential anticipation. Then participants were given caffeinated chewing gum and chewed it for 10 minutes before retesting their reaction time. **RESULTS:** There was significant statistical improvement in overall reaction time was found from pre-caffeine trials to post-caffeine trials (P=.006). The results show a significant improvement in reaction time when comparing reaction time before and after caffeine ingestion. The results showed statistically significant improvements in reaction time from 2391 ms to 2253 ms on average when comparing before and after caffeine, respectively. **CONCLUSION:** Ingesting 100 mg of caffeine did improve reaction time in college-aged individuals. Other research shows that caffeine improves muscular power, force, and work. In addition, the 10-minute chewing of caffeine gum was enough for the participants to absorb enough caffeine to have physiological effects. For the general population, these milliseconds could mean the difference between life and death For example, drivers responding to dangers/avoiding collisions or first responders reacting to threatening situations.

Board #7

QUANTITY AND INTENSITY OF MOVEMENT DURING VIRTUAL REALITY GAMES IN CHILDREN

Brenden M. Boots, Carolyn L. Boone, Easton Hewitt, Daniel Berg, Keith E. Naugle, Kelly M. Naugle

BACKGROUND: Sedentary lifestyles have been on the rise in the US with only 20% of children/ adolescents reporting meeting the minimum amount of recommended physical activity. In recent years virtual reality (VR) gaming has grown in popularity and accessibility. Because the technology is so new, very little is known about physical activity trends during game play. Two of the most popular VR games currently available are Gorilla Tag (GT) and Beat Saber (BS). No studies to our knowledge have evaluated either game in children. **PURPOSE:** To investigate the quantity and intensity of arm and whole-body movement while playing GT and BS in youth and to determine if there is a relationship between movement during game play and the enjoyment of the games. **METHODS:** Eighteen participants (7-13 years) were included in the study. Participants played two VR games (Gorilla Tag and Beat Saber) in a random order in a single study session. Participants played the first game for a 5-10 minute familiarization period. After the familiarization period participants rested for 5 minutes and then played the same game for another 15 minutes. Then, participants rested for 10 minutes and during that time they completed the Physical Activity Enjoyment Scale-child version (PACES). Following the 10 minutes of rest, the same procedure was used for the second game. During game play, participants wore accelerometers on the dominant wrist and waist to collect physical activity (PA) data including: percentage of time spent in sedentary time, Light PA (LPA), and moderate to vigorous PA (MVPA). Dependent t-tests were used to compare PA data between games. Bivariate correlations were used to determine the association of PA and enjoyment during gameplay. **RESULTS:** The results revealed that participants had more MVPA of the arm during GT (96.7%±2.6) compared to BS (88.9%±8.1; p=.002). Participants had more MVPA and LPA of the waist during GT (MVPA=20.0%±11.9; LPA=20.7±5.3) compared to BS (MVPA=8.1%±8.3; LPA=9.6±8.6; p's<.001). Sedentary time of the arm (p=.004) and waist (p<.001) were significantly lower during GT compared to BS. Sedentary time (r=-.48, p=.038) and MVPA (r=.57, p=.013) during GT were correlated with scores on the PACES. **CONCLUSION:** According to the accelerometer data, subjects were more active while playing GT compared to BS. Also, the more time a participant spent in MVPA during GT, the higher they rated their enjoyment of the game.

Board #8

RELATIONSHIPS BETWEEN OBJECTIVELY MEASURED PHYSICAL ACTIVITY, REAL TIME PAIN MEASUREMENTS, AND QUALITY OF LIFE IN OLDER ADULTS WITH MUSCULOSKELETAL PAIN

[1]Priscilla Stone; [1]Monica Teegardin; [1]Anthony Kaleth, FACSM; [1]Kelly Naugle

BACKGROUND: Older individuals frequently have chronic musculoskeletal pain, which has a number of complications for one's health. Regular physical activity (PA) is a well-established therapeutic strategy for individuals battling chronic pain. The relationships between different facets of PA, real-time pain measures, and quality of life (QOL) in older adults experiencing musculoskeletal pain are poorly understood. **PURPOSE:** To determine whether objectively measured PA, after controlling for intensity of daily pain, predicts overall QOL in older adults with musculoskeletal pain. **METHODS:** Using a real-world observational technique, pain intensity metrics generated from ecological momentary assessments (EMAs), and PA levels obtained via accelerometry were measured for 1 week in the daily environment of thirty older adults (ages 55-85) with musculoskeletal pain. Measures of sedentary time, light PA (LPA), and moderate to vigorous PA (MVPA) were extracted from the accelerometers. Participants completed the daily EMAs of bodily pain via a phone app. Participants were notified up to 6 times per day to respond to pain intensity questions via this app. Pain measures extracted from the data included average pain intensity, maximum pain, minimum pain, and standard deviation of pain. Participants completed a series of questionnaires, including the 36-item Short Form Survey (SF-36) to measure QOL. Pearson correlations were performed to examine relationships between PA, real-time pain intensity, and SF-36 summary scores. Based on significant correlations, hierarchical regressions were performed to determine predictors of the Physical Component Summary score (PCS) and the Mental Component Summary score (MCS) of the SF-36. **RESULTS:** The results indicated that the PCS score correlated with sedentary time ($r=-.538$, $p=.003$) and LPA ($r=.433$, $p=.021$), while the MCS score correlated with sedentary time ($r=-.460$, $p=.018$). The regression analysis showed that average sedentary time (Beta=-.418, $p=.031$) was the only significant predictor of PCS, accounting for 21% of the variance. The regression analysis for MCS was not significant, $p=.077$. **CONCLUSION:** This study suggests that greater sedentary time is related to worse physical health-related QOL in older adults with musculoskeletal pain, even after controlling for pain levels and MVPA.

Board #9

PHYSICAL ACTIVITY AND PERCEIVED EXERTION DURING VIRTUAL REALITY IN YOUTH

Carolyn Boone, Brenden Boots, Daniel Berg, Easton Hewitt, Kelly Naugle, Keith Naugle

BACKGROUND: Many youth currently play Virtual Reality (VR) games, but minimal is known about the physical activity levels that occur while playing VR games. According to the 2017 Youth Risk Behavior Survey, only 26.1% of pre- adolescents/adolescents in the United States reported levels of physical activity in line with the U.S Department of Health Guidelines of 60 minutes of moderate-to-vigorous activity daily. Current evidence shows active video games in adults can produce energy expenditure of moderate intensity. However, the intensity of physical activity during active VR games in youth is still unknown. **PURPOSE:** The aim of this study was to look at the intensity levels of physical activity and perceived exertion in children while playing active VR games (Specifically the VR games Gorilla Tag and Beat Saber). **METHODS:** We have collected data on 19 subjects (14 Male) between the ages of 7 - 13 years. The study used a VR headset to play Gorilla Tag (GT) and Beat Saber (BS) for 15 minutes each in a single session. Ratings of Perceived Exertion (RPE) were measured every 3 minutes and at the end of gameplay with the OMNI scale. Heart rate (HR) was measured every second during gameplay. Bouts of rest were utilized between the 2 games that were played. Dependent t-tests were used to analyze the outcomes between games. **RESULTS:** Results indicated that average percentage of heart rate reserve (%HRR: GT=30.8±12.1, BS=19.9±8.9, $p<.001$) and maximum %HRR (GT=48.1±14.1, BS=35.1±9.2, $p=.002$) were significantly different between games. No differences in average RPE ($p=.501$) were found between games; however, maximum RPE was greater for BS (5.9±1.7) compared to GT (4.2±1.6), $p=.001$. **CONCLUSION:** Gorilla Tag elicited a higher intensity of physical activity compared to Beat Saber in children, although the perceived intensity was not higher in Gorilla Tag. Generally, the participants reported getting tired and being tired during game play. Physical activity intensity ranged from light to moderate during Gorilla Tag, but only approached light during Beat Saber.

Board #10

PATIENT-SPECIFIC ADAPTIVE DYNAMIC CYCLING IS ASSOCIATED WITH IMPROVEMENT IN PD MOTOR SYMPTOMS

Brittany Smith, Younguk Kim, Lara Boman, Robert Melczak, Angela Ridgel, FACSM

BACKGROUND: High-cadence dynamic cycling is an effective therapy for improving motor symptoms in individuals with Parkinson's Disease (PD), as measured by the Unified Disease Parkinson's Rating Scale-Motor III (UPDRS-III). However, there is significant variability in individual responses to this therapy. Our lab developed a patient-specific adaptive dynamic cycling (PSADC) paradigm that manipulates entropy of cadence to optimize exercise prescriptions for individuals at various stages of disease progression. **PURPOSE:** To evaluate the effectiveness of 12 sessions of PSADC on motor symptom improvement (UPDRS-III score) in individuals with PD. **METHODS:** Twenty-three individuals with idiopathic PD (were randomized into two groups: PSADC (n=13) or active control (n=10). All individuals completed 12 sessions (3 sessions per week for 4 weeks) of dynamic cycling on a SMART (Speed Manipulated Adaptive Rehabilitation Therapy) bicycle. Each session consisted of a 5-minute warm-up at 60 revolutions per minute (rpm), 30-minute exercise session (80 rpm), and 5-minute cool-down (60 rpm). Individuals in the PSADC group followed an adaptive exercise prescription in which resistance level was optimized on a weekly basis, based on the individual's entropy of cadence and cycling effort. Individuals in the active control group remained at a constant resistance level for the entirety of the intervention. UPDRS-III was assessed in all participants prior to and following the 12-session intervention. Two-way analysis of variance (ANOVA) and paired samples t-tests were performed to detect statistical differences in UPDRS-III score between the groups. **RESULTS:** There was a significant group by time interaction ($F= 18.746$, $p <0.001$). The PSADC group showed a significant reduction (improvement) in UPDRS-III score (Pre: 32.8, Post: 27.5; $p<0.001$), while the active control group showed no significant change in UPDRS-III score (Pre: 28.2, Post: 32.4, $p=0.08$). **CONCLUSION:** 12 sessions of PSADC significantly improved UPDRS-III score, compared to non-adaptive high-cadence dynamic cycling. These results suggest that optimizing entropy of cadence is valuable for motor symptom improvement. Future studies will develop machine learning algorithms designed to predict appropriate clinical exercise prescriptions for individuals with PD.

Board #11

CONTINUED USE OF VIRTUAL PLATFORMS FOR EXERCISE AFTER PANDEMIC-RELATED RESTRICTIONS WERE LIFTED MAY POSITIVELY IMPACT PHYSICAL ACTIVITY

Jessica Smith-Ricketts, Gretchen Elsey, Jacob E. Barkley

BACKGROUND: The COVID-19 pandemic led to the closure of many exercise facilities nationwide, which likely limited access to physical activity (PA) or forced individuals to adapt to COVID-19 restrictions to continue exercising. **PURPOSE:** To determine whether individuals adapted to facility closures by using virtual exercise platforms (e.g., fitness apps) and to compare current measures of PA in individuals who continued to use virtual platforms presently versus those that did not. **METHODS:** During the spring of 2023, college students who owned an Apple iPhone ($N = 165$, $n = 101$ female) completed a survey assessing if they used virtual exercise platforms during the COVID-19 pandemic and whether they continue to use these platforms. Average daily steps from the previous six months were then obtained using the Health app on the Apple iPhone. Daily steps were compared between individuals who used virtual platforms during COVID-19 versus those that did not and between individuals who continued to use virtual, online platforms versus those who did not. **RESULTS:** Sixty-three percent of participants (n=102) reported using virtual platforms when facilities closed during the pandemic. Of those individuals, 34% (n=35) continued to use virtual platforms when facilities opened again. There was no significant difference ($t= 0.52$, $p= 0.30$) in PA between individuals who used virtual platforms during COVID-19 (5731±2220 steps) compared to those who did not (5542±2328 steps). However, individuals who continued to use virtual platforms (6371±2366 steps) presently had greater daily steps ($t=2.25$, $p= 0.01$) versus individuals who stopped using virtual platforms (5343±2121 steps). **CONCLUSION:** As reported previously, individuals adapted to facility closures by accessing other outlets (e.g., virtual platforms) to maintain their PA. While use of virtual platforms during the pandemic did not predict current PA, the continued use of virtual platforms after the pandemic-related restrictions were lifted was associated with greater PA. This supports findings that individuals who use fitness apps may participate in greater PA behavior than those who do not.

Board #12

CORRELATIONS BETWEEN PERCEIVED CHANGES IN PHYSICAL ACTIVITY, SEDENTARY BEHAVIOR, AND STRESS DURING THE COVID-19 PANDEMIC TO CURRENT MEASURES OF THESE SAME VARIABLES

Gretchen Elsey, Jessica Smith-Ricketts, and Jacob E. Barkley

BACKGROUND: There is evidence that the COVID-19 pandemic and its associated restrictions placed on daily life may have negatively impacted overall health, both physically and psychologically, as well as specific health behaviors such as decreased physical activity (PA) and increased sedentary behavior or sitting. It is important to understand if these potential changes during the pandemic may be predictive of current health and health-related behaviors in the current environment where pandemic-related restrictions are no longer being implemented. **PURPOSE:** To assess the potential relationships between perceived changes in PA, sitting, and stress during the COVID-19 pandemic to current assessments of these same variables. **METHODS**: In April 2022, 208 (Mean ± SD: 21.0 ± 1.71 yrs) college-aged participants completed a survey in which they indicated perceived changes in PA (reported as "inactivity"), sitting, and stress during the COVID-19 pandemic. Participants also self-reported their current total PA, daily sitting, and anxiety. Multiple Pearson correlation analyses were performed to assess the relationships between perceived changes in PA, sitting, and stress during the pandemic to current measures of PA, sitting, and anxiety. **RESULTS:** Greater perceived inactivity (i.e., reduced physical activity) during the pandemic was associated with lower current total physical activity ($r = -0.28$, $p < 0.001$) and greater daily sitting ($r = 0.19$, $p = 0.007$). Greater perceived sitting during the pandemic was associated with lower current total physical activity ($r = -0.26$, $p < 0.001$) and trended toward greater current daily sitting ($r = 0.14$, $p = 0.059$). Lastly, greater perceived stress during the pandemic was associated with greater current anxiety ($r = 0.35$, $p < 0.001$). There were no additional significant correlations ($r \leq 0.11$, $p \geq 0.09$). **CONCLUSIONS:** Perceived increases in inactivity and sitting during the pandemic predicted currently lower physical activity and greater sitting. Additionally, greater perceived stress during the pandemic predicted greater current anxiety. These data suggest that individuals who perceived negative changes in health behaviors and stress during the pandemic may still be experiencing these negative outcomes even though pandemic-related restrictions have largely been removed.

Board #13

HYDRATION AND PERCEIVED EXERTION FOLLOWING REPEATED EXERCISE IN THE HEAT

Emily Tagesen, Jennifer Rivera, Ryan Gant, Anthony Pinzone, Ellen Glickman, FACSM, Adam Jajtner

BACKGROUND: Exposure to heat expedites the anticipated rise of core temperature during exercise. As body temperature increases, continued exercise may become uncomfortable, resulting in greater perceived exertion. Consuming water during exercise allows for an increased sweat response, which will contribute to delayed increases in core temperature, thus limiting increases in perceived exertion, and increasing voluntary exercise. **PURPOSE:** To compare water intake and perceived exertion between an initial and repeated exercise trial in a hot condition. **METHODS:** Thirty moderately trained men (22±3 yrs, 3.6±0.9 L•min-1) completed two exercise sessions of 90 minutes of cycling at 60% VO2max in a hot condition (35°C). Each trial was separated by two weeks. Upon arrival, participants provided a urine sample to confirm hydration via urine specific gravity assessment (USG<1.125). Prior to entering the environmental chamber, participants were provided a pre-weighed water bottle. Every five minutes during exercise, the bottle was weighed and then replaced with a new pre-weighed bottle. Every 10 minutes, participants were also asked to rate their perceived exertion (RPE) via Borg's scale. Water intake was summed in 10-minute intervals and changes in drinking behavior were analyzed via repeated measures analysis of variance (ANOVA) between trial and time. A cumulative sum of water intake during each 10-min interval was also calculated and correlated with RPE . **RESULTS:** Water intake was not different between trials ($F=0.108$, $p=0.744$, $\eta p2=0.004$) or over time ($F=1.695$, $p=0.156$, $\eta p2=0.055$). RPE displayed an anticipated increase over time ($F=90.157$, $p<0.001$, $\eta p2=0.818$) and a nonsignificant difference between trials ($F=4.204$, $p=0.054$, $\eta p2=0.174$). Lastly, correlational analysis indicated that water intake was not related to RPE. **CONCLUSIONS:** It is possible that the experienced population enrolled in this investigation would not alter water intake between two identical exercise trials or over the duration of exercise. As expected, RPE increased during exercise, without a difference between trials. The absence of a relationship between

water intake and RPE may be explained by the lack of increase in intake over time and/or by the potential that trained individuals may readily expel heat, regardless of water intake.

Board #14

MUSCLE AND IMMUNE CELL BIOENERGETICS IN PEOPLE WITH MULTIPLE SCLEROSIS WITH MILD TO MODERATE DISABILITY

Kathryn A. Kern, Jerri-Ann Lyons, Ahmed Obeidat, Valerie Gigot, & Dr. Alexander Ng, FACSM

BACKGROUND: It is unclear whether mitochondrial bioenergetics in systemically circulating immune cells are mirrored in regional muscle in people with Multiple Sclerosis (pwMS). Multiple Sclerosis is an autoimmune and inflammatory disease affecting the central nervous system. In MS, peripheral blood mononuclear cells (PBMC) wrongfully attack myelin sheath surrounding central nervous system motor axons. This autoimmune response is driven by a cascade of immunological mechanisms which are ultimately controlled by cellular metabolism. Aside from immune cell bioenergetics, it is known that pwMS have impaired muscle mitochondrial oxidative capacity, as measured by time to recovery (Tc) of oxygen uptake after a brief bout of muscle contractions. Forearm flexor muscles were chosen since they might indicate muscle energetics, independent of ambulatory activity. **PURPOSE:** To investigate the relationship between immune cell (PBMC) bioenergetics and muscle mitochondrial oxidative capacity in the forearm flexor muscles of pwMS. **METHODS:** Twenty-one pwMS of mild to moderate disability status were included. Participants were either taking B cell modifying therapies or had not received a disease modifying treatment for 6 mo. Bioenergetics of PBMC were measured by the Seahorse Extracellular Flux Analyzer (n=17) and muscle bioenergetics were measured using near infrared spectroscopy (NIRS) (n=19) on the less affected arm. Shapiro-Wilk test was used to determine normality and Spearman bivariate correlations were used to determine associations between variables of interest. **RESULTS:** Tc was moderately associated with PBMC ATP production from mitochondrial pathways (OXPHOS) (Rho=0.563, p=0.029). In addition, resting muscle metabolism was moderately correlated with PBMC ATP production from glycolytic pathways (rho=0.539, p=0.038). **CONCLUSION:** There is a moderately strong relationship between PBMC bioenergetics and muscle energetics in ambulatory pwMS of moderate disability, possibly indicating systemic mitochondrial impairments from inflammatory or oxidative stress. Oxidative pathways in both muscle and immune cells could potentially be used as biomarkers for one another, in order to represent whole body mitochondrial energetics of pwMS. These markers could be used to measure efficacy of treatments, like prescriptive exercise, on whole body energetic health of special populations.

Board #15

IMPACT OF SHORT-TERM ASSISTIVE TRANSPORTATION USE ON HEMODYNAMICS AND VASCULAR FUNCTION IN HEALTHY ADULTS

Jackson P. Yeager, Sydney Ayton, Ashley Betz, Rachael A. Binion, Yi Liu, Marissa Scerbo, Rebecca Skujins, , Eric Slattery, Kyle L. Timmerman, FACSM, Paul T. Reidy, Kevin D. Ballard, FACSM

BACKGROUND: Physical inactivity is associated with an increased risk for metabolic and cardiovascular disease. The use of an assistive transportation device (electric scooter) may lead to a reduction in activity that would impair health. **PURPOSE:** We investigated the effect of short-term access to an assistive transportation device (electric scooter) as a proxy for reduced physical activity on hemodynamics and vascular function in healthy adults. We hypothesized that a one-week reduction in physical activity through the use of an electric scooter would adversely alter resting hemodynamics and vascular function. **METHODS:** Arterial pulse wave analysis (PWA) and pulse wave velocity (PWV) were assessed in healthy adults (n = 7; age 23±4 y (mean±SD); BMI 27.5±11.2 kg/m2) at baseline (day 0), following one week in which participants had access to an electric scooter (day 7), and following one week without the electric scooter (day 14). Participants were instructed to ride the electric scooter when they would typically walk. Heart rate (HR), brachial blood pressure (BP), central BP, pulse pressure (PP), mean arterial pressure (MAP), augmentation pressure (AP), augmentation index normalized to an HR of 75 bpm (AIx75), and carotid-femoral PWV were measured at each visit. One-way repeated measures ANOVA was used to determine differences between visits. **RESULTS:** Brachial, but not central, systolic BP increased ($P<0.05$) from day 0 to day 7 (113±8 mmHg to 118±9 mmHg). Diastolic BP, HR, PP, MAP, AP, AIx75, and PWV did not differ between visits. **CONCLUSION:** Access to an assistive transportation device increased brachial systolic BP in healthy individuals. Future research is warranted to determine if longer periods of assistive transportation device usage contribute to adverse changes in cardiovascular health.

FUNDING: Funding by Miami University EHS seed Grant and USS funds

Board #16

EFFECTS OF ACCESS TO AN ASSISTIVE TRANSPORTATION DEVICE (E-SCOOTER) ON REDUCING STEP COUNT

Rebecca Skujins, Jackson P. Yeager, Rachael Binion, Yi Liu, Ashley Betz, Sydney Ayton, Marissa Scerbo, Kyle Timmerman FACSM, Kevin Ballard FACSM, Eric Slattery, Paul Reidy

BACKGROUND: Forms of transportation have changed drastically over the past decade. New technology can be more convenient and time efficient. However, it replaces the physical act of walking. **PURPOSE:** To determine the effects of access to an assistive transportation device (seated e-scooter) on physical activity levels. **METHODS:** We assessed physical activity in young adults (n = 9; age 22±4 y; BMI 26±10 kg/m2) with ActivPal accelerometers for three consecutive weeks: a baseline week, a week of access to a seated e-scooter, and a week without access to the e-scooter. We hypothesized that daily physical activity would decrease during the e-scooter week and would not return to baseline physical activity levels during the week when participants did not have access to the e-scooter. **RESULTS:** Participants who rode the e-scooter for an average of >1 time per day had a reduction of 1711±2481 steps/d, whereas those who rode the e-scooter for an average of <1 time per day increased their daily steps by 2400±367 steps/d. A negative correlation ($r = -0.657$, $p=0.039$) was observed between the number of times the e-scooter was used and the change of steps between the baseline week and e-scooter week. In those who used the e-scooter an average of >1 time per day, there was no association ($r = -0.490$, $p = 0.324$) between step reduction during the e-scooter week and recovery of step count back to normal activity the following week. **CONCLUSION:** We found a negative association between the times participants rode the e-scooter during the week and reduction and daily steps. Participants who rode the e-scooter an average of >1 time per day as a substitute for walking decreased their daily step count. Participants who rode the e-scooter and reduced their daily steps recovered their daily steps back to baseline when they did not have access to an e-scooter.

FUNDING: Funding by a Miami University EHS seed Grant and USS funds

Board #17

IMPACT OF ONE-WEEK MOTORIZED SCOOTER USE ON GLUCOSE CONTROL

Rachael A. Binion, Yi Liu, Sydney Ayton, Ashley Betz, Marissa Scerbo, Rebecca Skujins, Jackson P. Yeager, Kevin D. Ballard, FACSM, Eric Slattery, Kyle L. Timmerman, FACSM, Paul T. Reidy

BACKGROUND: Assistive transportation devices are becoming more popular with young adults. The negative health effects of physical inactivity are well known. However, the effect on health outcomes of assistive transportation devices that reduce physical activity, such as motorized scooters, is unclear. **PURPOSE:** We examined glucose control in healthy adults before and after riding a motorized scooter for one week. **METHODS:** In this three-week study, participants (n= 8; age: 22.5±3.8 y (mean±SD); BMI: 26.9±9.9 kg/m²) performed their normal physical activity for one week (Run-in), were instructed to use a motorized scooter to commute instead of walking during the second week (Scooter), and returned to normal physical activity during the third week (Recovery). A continuous glucose monitoring sensor was placed on each participant's upper arm at the beginning of the Run-in to measure glucose every 15 min throughout the three-week intervention. Daily glucose readings were analyzed using R software with the iglu version 3.0.0 package to calculate outcomes of glucose control. An oral glucose tolerance test was performed at the end of each week to examine 120-minute blood glucose values and blood glucose Area Under Curve (AUC). Data were analyzed using a one-way ANOVA with Tukey multiple comparison test. **RESULTS:** Mean and median 24hr glucose levels significantly increased from the Run-in week to the Scooter week (mean: Run-in=92.9 mg/dL, Scooter=98.4 mg/dL, Recovery=100 mg/dL; median: Run-in=90.0 mg/dL, Scooter=95.5 mg/dL, Recovery=95.6 mg/dL). Standard deviation, coefficient of variation, and mean amplitude of glycemic excursions were similar between the three weeks. There were no differences in 120-minute blood glucose values or AUC between the three weeks. **CONCLUSION:** Mean and median 24-hour glucose levels increased during the week when participants used a motorized scooter. These increased 24-hour mean glucose readings were not recovered to initial run-in levels following a week of return to normal activity.

Riding an assistive transportation device for one week did not appear to have an effect on 24-hour glucose variability. Postprandial blood glucose values were not impacted by scooter use.

Board #18

EXERCISE TESTING: DOES THE NUMBER OF TESTS OR TIMING OF TESTS IMPACT PERCEIVED EFFORT?

Hannah E. Penfold, Amy E. Boettcher, Katharine D. Currie

BACKGROUND: Ratings of perceived exertion (RPE) are a standard assessment during exercise testing. Research has questioned the test-retest reliability of RPE scores. Furthermore, emerging evidence suggests time of day and chronotype may alter RPE during exercise. **PURPOSE:** The purpose of this study was to determine the effect of time of day and test number on submaximal and maximal RPE during a standardized exercise test. **METHODS:** Thirty-one healthy young adults (23±4 years, 48% female, 65% white) completed a modified Bruce treadmill test on three separate days; one scheduled in the morning (0700-0900h), one scheduled in the afternoon (1300-1500h), and one scheduled in the evening (1800-2000h). Test order was random. Effort was assessed at submaximal (stage 4) and maximal (prior to test termination) intensities using the Borg 6-20 RPE scale. Chronotype was assessed using the Morning-Eveningness Questionnaire (MEQ); scores were used to classify individuals as morning-types, evening-types or intermediate. Data were checked for normality and the effects of time of day and test number on RPE were assessed using repeated measures analyses of variance or Friedman tests for normally and non-normally distributed data. Significance was set at $P<0.05$. To explore the effect of chronotype on RPE, correlations between MEQ scores and maximal RPE from the morning and evening tests were performed. **RESULTS:** Data are presented as mean±SD (median). There was no difference in submaximal ($P=0.610$) or maximal ($P=0.395$) RPE between the first, second or third exercise tests. Maximal RPE was 16.6±2.2 (17.0), 16.6±2.3 (17.5), and 16.0±2.5 (16.5) on tests 1, 2 and 3, respectively. There were also no differences in submaximal ($P=0.147$) or maximal ($P=0.921$) RPE between the morning, afternoon and evening tests. Maximal RPE was 16.4±2.1 (17.0), 16.5±2.5 (17.0), and 16.4±2.4 (17.0) during the morning, afternoon and evening tests, respectively. For chronotype, 23% identified as morning-type, 65% as intermediate and 13% as evening-type. MEQ scores and maximal RPE were not correlated for the morning test ($P=0.715$) or evening test ($P=0.294$). **CONCLUSION:** Our data suggests RPE is not affected by the number of exercise tests performed or the time of day the test is administered. While these findings may have both clinical and performance applications, our findings are not in agreement with prior research and therefore further examination of this topic is warranted.

Poster Session #3: Regency Ballroom E&F (2nd Floor), 10:30-11:45 am

Board #1

ADVANCING ATHLETE CARE: EFFICACY OF WRIST DENERVATION FOR POST-TRAUMATIC OSTEOARTHRITIS IN ATHLETES - A CLINICAL INVESTIGATION

Billal Siddiq, Nikolaos Gravvanis, Georgios Tsikouris, & Andreas Stamatis, FACSM

BACKGROUND: Post-traumatic wrist arthritis, constituting the third most prevalent manifestation of wrist arthritis, can manifest within a span of months to years after a severe wrist injury. This form of wrist arthritis engenders intense pain, thereby jeopardizing patients' routine engagements and occupational capacities. Wrist denervation, emerging as an intervention to alleviate pain in wrist arthritis sufferers, presents a strategy distinct from the intricate surgical modalities aimed at addressing the root pathological factors. **PURPOSE:** To evaluate the clinical ramifications ensuing from wrist denervation as a means of mitigating pain stemming from osteoarthritis. **METHODS:** The study cohort comprised of three individuals engaged in the discipline of martial arts, all of whom confronted pronounced wrist pain attributable to post-injury wrist osteoarthritis. Clinical evaluations were predicated on a comparative analysis of pre- and post-wrist denervation Disability Arm Shoulder and Hand (DASH) scores. Surgical intervention encompassed the release of the posterior and anterior interosseous nerves, coupled with the dorsal branches of the ulnar nerve. The incision site, located 4 cm proximal to the distal radioulnar joint on the distal forearm, facilitated this procedure. In conjunction with wrist

arthroscopy, the identification of a bony bridge between the styloid process of the radius and the scaphoid bone prompted the removal of osteophytes in all patients. **RESULTS:** The study encompassed exclusively male participants, with an average age of 48.6 years (range: 43-55). The mean pre-operative DASH score, standing at 54.4 (range: 54.1-55), demonstrated a notable decline (82.4%) to 9.6 (range: 9.1-10.8) within a 24-month period post-wrist denervation, indicative of a profound improvement in clinical outcomes. Impressively, this alteration signifies excellence in clinical progress. Furthermore, all martial arts athletes were able to resume their athletic activities within a mere 5 months after the surgical intervention. **CONCLUSION:** Wrist denervation has emerged as a highly efficacious strategy within the purview of managing wrist pain precipitated by post-traumatic osteoarthritis. This innovative approach not only fosters substantial relief but also facilitates the resumption of daily routines and sporting engagements for afflicted individuals.

Board #2

AGE DOES NOT CHANGE REINFORCEMENT-BASED LOCOMOTOR LEARNING

Leo Barzi, Tyler Wood, Ph.D., Emerson Sebastião, Ph.D., Matt Wilson, Ph.D., Christopher M. Hill, Ph.D.

BACKGROUND AND PURPOSE: New locomotor patterns are obtained through trial-and-error practice. Often skill learning is enhanced via providing external reinforcement to enhance correct actions or minimize incorrect movements. Aging impairs both locomotion and skill learning with reinforcement. However, we currently have a dearth in our understanding of how reinforcement-based locomotor learning changes with age. Thus, the purpose of this study is to determine the effects of age on reinforcement-based locomotor learning compared between a sample of young and older adults. **METHODS:** We recruited 33 healthy young and 17 healthy older adult participants (n=50). Each age category was divided into three groups [Reward (young=11; older=6), Punishment (young=11; older=6), Sensory (young=11; older=5)]. During treadmill walking, at a rate of 90 steps/minute, right knee angular kinematics were acquired using two IMUs affixed to the thigh and shank. Feedback of the right knee's angular movement during the swing phase was displayed on a screen corresponding to group. Baseline walking was collected for 250 steps. Participants were then visually cued to learn a new walking pattern by matching their knee flexion to a desired angle (+30˚ of baseline walking) for 500 steps. Reward and Punishment groups were provided a graded number scale corresponding to a monetary gain or loss respectively. The Sensory group was provided a bar graph with the current knee angle and a line representing the desired angle. A mixed ANOVA was used to detect differences in error magnitude between groups and conditions. Specifically, we compared average error during the first 50 steps (Early) and the last 100 steps (Plateau) of the learning period. **RESULTS:** All groups decreased error as they progressed from Early to Plateau ($p<0.001$) [Mean difference ± standard error, Error=15.609±1.411˚], however, no age ($p=0.930$) or group ($p=0.239$) differences were noted. **CONCLUSIONS:** This finding demonstrates that aging does not impair reinforcement-based locomotor learning and can effectively promote similar outcomes to young adults. This finding signifies that age does not impair the capacity to utilize reinforcement to learn a new locomotor pattern and can enhance walking function for this population similar to that of a younger cohort.

Board #3

MULTI-INGREDIENT PRE-WORKOUT SUPPLEMENTATION DOES NOT INFLUENCE MUSCLE ACTIVATION FOLLOWING A FATIGUING ISOKINETIC PROTOCOL

Matthew Herring, Benjamin Connors, Rachel Kowal, Peter Chomentowski, Emerson Sebastiao, Christopher Hill, Andrew Jagim, Clayton Camic

BACKGROUND: Multi-ingredient pre-workout supplements (MIPS) have been shown to enhance overall force retention and muscular endurance during prolonged or intermittent high-intensity exercises, likely mediated by caffeine content. Currently, however, the exact underlying mechanisms responsible for these benefits on neuromuscular function are poorly understood. **PURPOSE:** To examine the acute effects of a MIPS on muscle activation of the leg extensors during a fatiguing isokinetic protocol. **METHODS:** Twelve male subjects (mean age ± SD = 23.1 ± 2.2 years; body mass = 84.7 ± 9.0 kg; resistance training = 5.0 ± 3.4 hr·wk−1) visited the laboratory on three occasions. The first visit was structured as an orientation session to familiarize the subjects with testing procedures. For the second and third visits, each subject was randomly assigned to ingest one serving of the MIPS or placebo 30 minutes before completing a fatigue protocol on an isokinetic dynamometer that consisted of 60 maximal, alternating concentric and eccentric muscle actions of the leg extensors at 60º·s−1. Immediately before (PRE) and after (POST) the protocol, subjects were assessed for isometric peak torque at a 120˚ angle

at the knee. Electromyographic (EMG) signals were recorded during the isometric muscle actions from the vastus medialis, rectus femoris, and vastus lateralis using wireless electrodes. Two-way (time: PRE and POST; condition: MIPS, placebo) repeated-measures analysis of variances (ANOVAs) and paired-samples t-tests were used to analyze normalized EMG amplitude (%) and isometric peak torque. **RESULTS:** There was no significant time x condition interaction ($p = 0.316$) for isometric peak torque, but there were main effects for condition (MIPS: 205 ± 48 N·m vs. placebo: 185 ± 44 N·m, $p = 0.044$) and time (PRE: 225 ± 53 N·m vs. POST: 165 ± 42 N·m, $p < 0.001$). For EMG amplitude, there were no significant ($p > 0.05$) interactions or main effects for condition, but there were main effects for time in all three muscles (vastus medialis: POST = 145 ± 65% vs. PRE = 100 ± 0%, $p = 0.036$; rectus femoris: POST: 149 ± 62% vs. 100 ± 0%, $p = 0.019$; vastus lateralis: POST: 143 ± 52% vs. PRE: 100 ± 0%, $p = 0.014$). **CONCLUSION:** Our findings indicated acute MIPS supplementation had no effect on muscle activation as reflected by EMG amplitude, despite resulting in greater isometric peak torque before and after the fatigue protocol compared to placebo.

Board #4

DEVELOPMENT OF A SCALE TO MEASURE ENJOYMENT OF ROCK CLIMBING PHYSICAL ACTIVITY

Jordan Fleury, Madeline Casanova, Megan Nelson

BACKGROUND: Sport enjoyment has been identified as a primary factor associated with engaging in physical activity (PA) and is defined as a positive affective response to a sport experience reflecting generalized feelings of joy. Understanding why individuals enjoy specific types of PA may provide insight into factors associated with engaging and adhering to PA behaviors. **PURPOSE:** To identify factors that are associated with enjoyment of rock climbing PA. We hypothesized that climbers enjoy their sport due to four factors: physical, psychological, environmental, and social components of climbing. **METHODS:** We developed 27-items related to each of the four hypothesized factors. Responses to items were measured using a 7-point Likert scale (1=not important at all; 7=extremely important). The survey was administered electronically via Qualtrics and participants were recruited through a link posted on MountainProject.com. Exploratory factor analysis using maximum likelihood extraction and direct oblimin rotation was utilized to determine how items grouped according to the hypothesized structure. Cronbach's alpha was used to assess the reliability of each latent factor. **RESULTS:** A total of n=336 climbers completed the survey. Respondents were aged 35.3±12.8y and primarily identified as white (n=196, 89.7), male (n=275, 81.8%), and perceived their climbing skill level as either intermediate (n=159, 47.3%) or advanced (n=157, 46.7%). Most respondents participated in several types of climbing, including indoor (n=282), bouldering (n=198), sport (n=296), and traditional (n=287). Five factors with eigenvalues >1 explaining 68.3% of the variance were extracted and included in the final solution. Items that clustered on the five factors were related to enjoyment of 1) thrill seeking, 2) physical health benefits, 3) social interactions, 4) psychological challenges, and 5) environment. All subscales had alpha reliability coefficients ≥0.75. Participants rated physical health benefits, psychological challenges, and the environment as the most important factors related to enjoying climbing. **CONCLUSION:** Climbers indicated they enjoyed participating in rock climbing PA because of the physical-health benefits, thrill, social interactions, psychological challenge, and environment. Physical activities that provide ample psychological challenges and can be performed in various environments, in addition to providing health benefits may be important for engaging and adhering to PA.

Board #5

THE EFFECT OF CARRYING A WEIGHTED BACKPACK ON FOOT STRIKE KINETICS IN COLLEGE STUDENTS

Paige Judson, Gracie Witt, Lukus Klawitter

BACKGROUND: College students most commonly utilize backpacks as a tool for carrying textbooks and other classroom materials. Due to the nature of college campuses, carrying a large percentage of body weight in the form of classroom material in backpacks is essential. At minimum, the load carried in a backpack is roughly 10% of an individuals' total body weight. The placement of the load can have a multitude of effects on the human body including altering walking mechanics. **PURPOSE:** To determine the impact of carrying a load equal to 10% of body weight in a

standard backpack on walking foot strike kinetics in college students. **METHODS:** We used a within-subject cross-sectional design to address the purpose of our study. Four healthy college students (age: 18-24 yrs) who were able to carry 10% of their total body weight via traditional backpack participated in the study. Participants were asked to walk at their normal stride length and cadence across an AMTI force platform. Following a 5-minute rest, participants then walked at the same stride length and cadence carrying a load equal to 10% of their body weight via backpack. Peak breaking Fz force, peak propulsive Fz force, and impulse were measured using an AMTI force platform integrated with Noraxon software. Dependent t-tests and mean differences were used to compare the difference in peak breaking Fz force, peak propulsive Fz force, and foot strike impulse between the weighted and unweighted conditions. **RESULTS:** There were statistically significant differences in peak breaking Fz force (mean diff. 61.21 N, SD±50.78, $p<0.05$), peak propulsive Fz force (mean diff. 121.4 N, SD±65.88, $p<0.05$), and impulse (mean diff. 61.3 N, SD±6.58, $p<0.05$), between unweighted and weighted backpack walking conditions. **CONCLUSION:** We found that the reaction forces applied to the body when walking while carrying 10% of body weight in a backpack are quite robust. The large difference between the unweighted and weighted conditions may suggest that carrying a 10% load in a backpack has the potential to dramatically affect walking mechanics which could lead to consequences, such as low-back pain. The findings from our case study indicate the need for further and more in-depth research on the effects of carrying a heavy load via backpack in college students.

Board #6

UNMASKING THE MINIMALIST MIRAGE: A COMPARATIVE STUDY OF BAREFOOT RUNNING AND CONVENTIONAL FOOTWEAR ON PERFORMANCE, PERCEPTION, AND PHYSIOLOGY

Jean-Pierre Khouzam, Carmen Swain, Sarah Kessler, & Jessica Hyland

BACKGROUND: The resurgence of "barefoot running" has prompted the development of specialized footwear to mimic this practice while offering foot protection. Runners endorse these shoes for improved performance and reduced injuries. Although prior research suggests biomechanical benefits, the comprehensive impact of minimalist footwear ("BAREFOOT") versus conventional shoes ("SHOD") on performance and psychology remains understudied. Christopher McDougall's "Born to Run" highlighted a barefoot-running tribe's extraordinary endurance, suggesting human predisposition to running and influencing minimalist footwear trends. Despite public interest, empirical backing is limited. **PURPOSE:** To examine the efficacy of specialized footwear mimicking "barefoot running" by examining differences in performance, subjective ratings, and physiological variables during a race situation in the BAREFOOT and SHOD conditions. **METHODS:** Trained male barefoot runners (22.71 ± 3.9 years, 70.71 ± 2.8 inches, 171.54 ± 26.9 lbs.) ran a 2-mile time trial, blinded to time, on two separate occasions. During the two occasions runners either ran in the BAREFOOT or SHOD condition. The collected measures included: time to completion, average velocity, VO2, RER, heart rate, responses to the Feeling Scale (FS), and Rating of Perceived Exertion Scale (RPE). **RESULTS:** There were no significant differences for time to completion or RPE measures. The BAREFOOT condition scored significantly higher ($p=0.011$) on the average FS compared to the SHOD condition (1.375 ± 1.93, 0.607 ± 1.71, respectively). The FS measure taken at race completion was also statistically higher in the BAREFOOT condition compared to the SHOD condition (0.429 ± 3.06, 0.016 ± 2.37 respectively). Peak VO2 was significantly higher ($p= .027$) for the BAREFOOT versus SHOD condition (52.058 ± 8.10 ml/kg·min, 49.850 ± 6.82 ml/kg·min, respectively). Peak RER was significantly higher ($p= .019$) for the BAREFOOT versus SHOD condition (1.019 ± 0.05, 0.997± 0.04, respectively). There was no significant difference for average RER, average VO2, average speed, heart rate, peak speed, or peak heart rate. **CONCLUSIONS:** Running in a minimalist shoe feels easier for those who have trained in them. Trained BAREFOOT runners feel better at all levels of effort in the BAREFOOT condition, despite no improvements in race time and decreased performance economy in a middle-distance time trial.

Board #7

EFFECTS OF MUSIC ON SWIM PERFORMANCE

Lily Arledge, Ashley Lesniak, Curt Dixon, Angela Hillman

BACKGROUND: Music is an ergogenic aid used during exercise and has been known to have an impact on performance, but it has not been researched heavily in swimming. **PURPOSE:** To investigate the effects of music and various musical qualities on swim performance, RPE, and exercise enjoyment (EE). **METHODS:** 12 participants, 6 male recreational (Age: 20.5±1.2yr, Ht: 177.5±1.3cm, Wt: 75.0±6.9kg, BF: 15.3±4.8%) and 6 competitive female swimmers (Age: 20.0±1.4yr, Ht: 165.9±7.0cm, Wt: 66.6±4.9kg, BF: 28.0±7.7%) participated. Participants were asked to complete a pool warmup of up to 10 minutes followed by four 200-yard swims. Participants were randomly exposed to conditions: fast-tempo music (FT;160 bpm), slow-tempo music (ST;80 bpm), control (C;no music), and metronome

(M) matching the 160 bpm tempo of FT. Participants were exposed to each condition for 4 minutes before trials. Impacts of musical quality (beat, tempo, melody, etc.) on swim time (min), RPE, and EE during the exercise bout were collected after each trial. A RMANOVA was used to analyze data. **RESULTS:** There was no significant difference in swim performance (FT: 3.3±1.0, ST: 3.3±1.1, C:3.3±1.0, M: 3.3±1.0; p = 0.685). There was no significant difference in RPE (FT:14.2± 2.5, ST:13.2±3.0, C:13.9±2.8 M:14.6±3.4; p=0.132); there was a significant interaction effect between swimming status and RPE ($F(3,30) = 4.373$; p = .013). Competitive swimmers had higher RPE (FT:13.8±3.3, ST:12.3±3.7, C:13.5±3.5, M:12.7±4.0) for FT compared to ST (p=.017), and higher RPE for FT compared to M (p=.013). There was a significant difference in EE (FT:4.6±1.3, ST:4.7±1.1, C:1.8±1.6, M 4.1±1.5, p=0.022). For musical quality questions, participants reported a higher score for FT (p<.001) and ST (p=0.001) compared to C (p<.001) and M (p<.001), indicating higher motivation in the FT and ST compared to the C and M. **CONCLUSION:** There was no difference in swim performance between any of the conditions. There was no difference in RPE between any of the conditions; however there was a significant interaction effect between competitive status and RPE, furthermore, it was found that competitive swimmers had a higher RPE for the FT compared to the ST, and a higher RPE for the FT compared to the M. There was a significant difference in EE between the four trials. There was a significant difference in responses to the musical quality questions, and participants reported higher scores in FT and ST trials compared to C and M trials.

Board #8

THE IMPACT OF ADVERSE CHILDHOOD EXPERIENCES ON OVERALL AND CELLULAR HEALTH IN ADULTHOOD

Riley J. Corrigan, Luke D. Brown, Joseph Bianco, Cheryl A Howe, FACSM

BACKGROUND: Appalachian counties are disproportionately affected by accessibility, health, and socioeconomic challenges. These challenges exacerbate the relationship between Adverse Childhood Experiences (ACEs) and the development of health risk behaviors and chronic disease in adulthood. Adults with high exposure to ACEs exhibit higher prevalence of alcoholism, drug abuse, depression, smoking, obesity, and related comorbidities purported to be influenced by chronic stress. **PURPOSE:** The goals of this study were to 1) determine the prevalence of ACEs and their impact on health and health-risk behaviors and 2) assess body composition, salivary cortisol, and phase angle (PhA) with high, moderate, low, or no exposure to ACEs in college-aged Appalachian adults (≥18 y). **METHODS:** College students completed an anonymous questionnaire (Phase 1) about ACEs, positive experiences, adult resiliency, perceived stress, food insecurity, and health. A subsample participated in the Phase 2 in-person portion to measure body composition, PhA, and resting/reactive cortisol. One-way ANOVAs and correlation analyses were used to analyze the sample. **RESULTS:** In Phase 1 (N=611, 86.3% ≤25 y, 64.0% female, 81.0% Caucasian, 52.4% heterosexual), only 3.6% (n=22) reported no ACEs, while 34.7% (n=212) reported ≥8. Positive experiences (r=-0.62), perceived stress (r=0.37), resiliency (r=-0.53), and food insecurity (r=0.25) were significantly correlated with ACEs score ($p<0.001$). In Phase 2 (N=42, 78.6% ≤25 y, 64.3% female, 40.5% Caucasian, 78.5% heterosexual), body fat percentage was significantly correlated with ACE level (r=0.31, p=0.044). ACEs scores were not correlated with PhA (r=-0.08), resting or reactive cortisol (r=-0.04), or visceral adipose tissue (r=0.28) ($p>0.05$). **CONCLUSION:** The prevalence of ACEs is high amongst this sample of young adults and though significant physiological changes were not seen, health perceptions and behaviors were negatively impacted. Future research should focus on an older age group to identify when specifically physiological changes due to ACEs begin to manifest.

Board #9

CHRONIC ALCOHOL CONSUMPTION INFLUENCES LIPID METABOLISM IN MOUSE SKELETAL MUSCLE

Muni Swamy Ganjayi, Austin Brown, Cory W. Baumann, FACSM

BACKGROUND: Chronic overconsumption of alcohol can cause muscle atrophy and weakness, a disorder known as alcohol-related myopathy. We have previously shown that mice who consume ethanol (EtOH) long-term produce ~15% less torque than age-matched controls, even when nutrition and physical activity are controlled. Molecular mechanisms responsible for EtOH-induced atrophy remain unclear. It is possible that EtOH's upregulation of adipocyte lipolysis may

be causing metabolic inflexibility and damage in skeletal muscle via fatty acid accumulation and oxidative stress. **PURPOSE:** This study aimed to evaluate proteins related to lipid transportation, storage, and breakdown, in addition to oxidative stress in skeletal muscle after chronic EtOH consumption. M**ETHODS:** Female mice consumed 20% EtOH for 8-10 months in drinking water and were compared to mice that consumed only water (via an independent t-test). The anterior crural muscles were dissected and utilized for immunoblotting. Lipid associated proteins included CD36 (transporter of fatty acids), perilipin-5 (lipid storage), adipose triglyceride lipase (ATGL) and monoacylglycerol lipase (MAGL). Oxidative stress was assessed by protein carbonylation. **RESULTS:** Protein carbonylation tended to be 40% greater in muscle after EtOH intake ($p=0.08$), while CD36 and MAGL decreased 33% and 47%, respectively ($p \leq 0.02$). Perilipin−5 and ATGL did not differ between the EtOH and control groups ($p \geq 0.44$). **CONCLUSION:** These findings suggest that chronic EtOH consumption may alter lipid metabolism in skeletal muscle. Specifically, EtOH appears to inhibit lipid breakdown and fatty acid transport in skeletal muscle through the downregulation of MAGL and CD36, while having little effect on storage of lipid droplets (i.e., perilipin-5). We propose that chronic EtOH intake results in a net increase in fatty acid production within the muscle, injuring the mitochondria and increasing oxidative damage. Together, our results indicate that the primary mechanism driving EtOH-induced skeletal muscle atrophy and weakness may be linked to lipid metabolism.

Board #10

ACUTE IMPACT OF AEROBIC EXERCISE ON STRESS, MOOD, AND COGNITIVE PERFORMANCE IN ADULTS WITH DOWN SYNDROME

Emily Post, Danielle Fisher, Callan Myers

BACKGROUND AND PURPOSE: Cortisol levels are sensitive to immediate changes from stress, on being exercise. In the general population, increases in cortisol during exercise has been shown to increase energy and lower fatigue, potentially impacting cognitive performance and mood. This pilot study has helped further expand on how acute exercise can impact mood, while also identifying if exercise affects the cortisol levels in adults affected by DS. Overall, this study aimed to assess the impact of an acute bout of moderate aerobic exercise on stress, mood, and cognitive performance. **METHODS:** Subjects (n=5, age:27±8 YO, height:140.3±18.97 cm, weight:63.51±18.74 kg) participated in three total visits; one familiarization (FAM), one experimental (EXP), and one control (CON). IQ was assessed at FAM via Kaufman Brief Intelligence Test Second Edition. The EXP consisted of 30 minutes of aerobic based exercise (walking while watching One Planet) compared to 30 minutes of a non-exercise task during the CON visit (sitting and watching One Planet). Variables assessed pre and post testing of the EXP and CON visits were salivary cortisol, mood (Brief Mood Introspection Scale), and cognitive performance (Comprehensive Trail Making Test). **RESULTS:** There were no significant changes in mood or cognitive performance pre/post in the CON and EXP visits ($p<0.05$). There was a trend with cognitive performance in decreasing time to complete for all individuals for both visits. There was a significant increase in cortisol following participation in 30 minutes of moderate intensity exercise during the EXP visit ($p=0.039$). **CONCLUSIONS:** Although more research needs to be conducted in a way that further examines the effects of exercise on the cortisol, cognitive performance, and mood of individuals with DS, this specific study found that the stress response results obtained appear to align with what continues to be seen within the typically developed general population regarding cortisol changes. With a limited sample size, this study does help pose the importance in further research evaluating moderate exercise and its effects on individuals with DS.

Board #11

EFFECTS OF HEAT THERAPY ON SKELETAL MUSCLE INTERSTITIAL PO2 KINETICS AND MITOCHONDRIAL RESPIRATION IN HFpEF RATS

Taylor A. Schultz, Mitchell E. Fister, Michael D. Belbis, Bohyun Ro, Luke E. Schepers, Kyoungrae Kim, Terence E. Ryan, Craig J. Goergen, Shihuan Kuang, Timothy P. Gavin, Bruno T. Roseguini, Daniel M. Hirai

BACKGROUND: Heart failure with preserved ejection fraction (HFpEF) impairs skeletal muscle microvascular function and blood flow and thus physical capacity. Limited options currently exist to treat HFpEF patients. Heat therapy (HT) has been shown to improve cardiovascular outcomes in health and other diseases, and enhance nitric oxide (NO) bioavailability and mitochondrial respiration in health. **PURPOSE:** To test the hypotheses that chronic HT would 1) elevate skeletal muscle interstitial oxygenation (PO2is) during metabolic transitions thus slowing its fall from rest to contractions (on-kinetics) and accelerating its recovery to baseline (off-kinetics) partly via enhanced NO bioavailability, and 2) improve mitochondrial respiration in a rodent model of HFpEF. **METHODS:** Male obese ZSF1 rats underwent 8 weeks (6 days/wk) of whole-body heat therapy (HT; 39°C; n=14) or control (CON; 22°C; n=13) interventions.

Spinotrapezius (SPI) muscle PO2is was determined via phosphorescence quenching from rest to submaximal contractions and recovery (1 Hz, 4-6 V) under Krebs-Henseleit (KH) and L-NG-Nitro arginine methyl ester (L-NAME). SPI, soleus (SOL), and extensor digitorum longus (EDL) basal (state 2) and maximum (state 3) mitochondrial respiration were assessed via high-resolution respirometry (expressed in pmol/s/mg). **RESULTS:** HT elevated resting SPI PO2is (CON-KH:16.5±1.1, HT-KH:19.5±0.9 mmHg; $p<0.05$) and improved (slowed) PO2is on-kinetics partly via enhanced NO bioavailability (T63on; CON-KH:20.9±1.7, CON-L-NAME:19.4±1.5, $p>0.05$; HT-KH:26.3±2.1, HT-L-NAME:20.9±1.5 s, $p<0.05$). There were no differences in muscle PO2is off-kinetics (T63off, CON-KH:85.8±4.7, HT-KH:88.1±4.7 s, $p>0.05$; end-recovery PO2is, CON-KH:13.4±1.6, HT-KH:16.9±1.8 mmHg, $p>0.05$). No differences in mitochondrial respiration for the SPI (state 2, CON:7.5±0.7, HT:7.5±0.6; state 3, CON:89.3±6.2, HT:90.8±5.5), SOL (state 2, CON:14.5±2.2, HT:17.2±2.0; state 3, CON:105.3±22.4, HT:111.9±8.5) or EDL (state 2, CON:9.9±2.0, HT:10.7±1.2; state 3, CON:128.0±13.6, HT:100.1±7.7) were observed between groups ($p>0.05$ for all). **CONCLUSION:** Consistent with our hypothesis, HT enhanced skeletal muscle PO2is from rest to contractions partly via NO-mediated mechanisms. In contrast, HT had no effects on skeletal muscle (SPI, SOL or EDL) state 2 or 3 mitochondrial respiration. These data support that chronic whole-body HT promotes beneficial adaptations within the oxygen transport pathway in a pre-clinical model of HFpEF.

Board #12

EFFECTS OF RECOVERY METHODS ON MOTOR UNIT RECRUITMENT FOLLOWING FATIGUE

Macy C. Goldthorpe, Jazmin Antonio Reyes, & Brittany N. Followay

BACKGROUND: Motor unit recruitment, measured via electromyography (EMG) is indicative of fatigue. The impact of various recovery mechanisms on motor unit recruitment following fatiguing exercise is unclear. **PURPOSE:** To examine the effects of recovery methods on motor unit recruitment following fatigue. **METHODS:** Eight physically active individuals (23.6 + 3.5 yrs) reported to the lab on four separate occasions to complete a cycling protocol alternating between 125% of their peak power output for 30 seconds and 50 Watts for 10 seconds until volitional fatigue, followed by one of three recovery protocols: cold water immersion (CWI), pneumatic compression boots (PCB), and foam rolling (FOAM). EMG data was recorded from the vastus lateralis (VL) during maximal voluntary isometric contractions (MVICs) and analyzed for root mean square (RMS) before fatigue (BASE), immediately following fatigue (PF), immediately following each recovery protocol (PREC), and 24 hours post fatigue (24H). Data was analyzed using repeated measures ANOVA. **RESULTS:** A recovery x time interaction ($F = 3.821$, $p = 0.006$) was observed for RMS of the VL. A main effect of time was observed for FOAM ($p < 0.001$), with significantly greater RMS at PF(0.362 + 0.024; $p < 0.001$), PREC (0.358 + 0.026; $p < 0.001$), and 24H (0.343 + 0.027; $p < 0.001$) compared to BASE (0.227 + 0.024). No significant difference was observed between PF and PREC ($p > 0.05$). A main effect of time was also observed for PCB ($F = 15.831$, $p < 0.001$) with significantly greater RMS at PF (0.417 + 0.026) compared to BASE (0.23 + 0.027; $p < 0.001$). RMS was significantly lower at PREC (0.222 + 0.027; $p < 0.001$) and 24H (0.218 + 0.022; $p < 0.001$) compared to PF (0.417 + 0.026). No significant differences were observed between BASE and PREC ($p = 0.267$) or BASE ($p = 0.181$) and 24H. A main effect of time was also observed for CWI ($F = 101.026$, $p < 0.001$) with significantly greater RMS at PF (0.444 + 0.024) compared to BASE (0.227 + 0.024; $p < 0.001$). RMS was significantly lower at PREC (0.219 + 0.02; $p < 0.001$) and 24H (0.21 + 0.025; $p < 0.001$) compared to PF (0.444 + 0.022). No significant differences were observed between BASE and PREC ($p = 0.314$). However, RMS at 24H was slightly lower than BASE ($p < 0.001$). **CONCLUSIONS:** Data suggest that PCB and CWI result in greater improvements compared to FOAM following fatigue, indicated by reduced motor unit recruitment after recovery.

Board #13

THE EFFECT OF HAND CLEANLINESS ON BIOELECTRICAL IMPEDANCE ANALYSIS MEASUREMENTS COMPARED TO AIR DISPLACEMENT PLETHYSMOGRAPHY

Emma L Derdowski, Sydney L Koppinger, Jeremy L Knous, Kisha M Osterhoff, Jerry A Delgado, & Adam M Coughlin, FACSM

BACKGROUND: Bioelectrical impedance analysis (BIA) is a cost-effective, easily transportable, and reliable method of estimating body composition. CDC recommendations for handwashing continue to be advocated, however it is unclear how these recommendations affect BIA accuracy. **PURPOSE:** The purpose of this study was to determine the effect of "unclean" hands, hands washed with soap and water, and hand sanitizer on the accuracy of body composition assessed by a hand-held bioelectrical impedance analyzer as compared to air displacement plethysmography. **METHODS:** Air displacement plethysmography (BP) was performed on 78 participants (23.1±5.8 years, 68.1±4.3 in, 174.0±37.1 lbs, 40 women). Participants underwent BIA assessments with hands that were unwashed for at least two hours prior to reporting to the lab (B1), again after following CDC recommendations for soap and water washing (B2),

and for a third time following CDC recommendations for hand sanitizer usage (B3). **RESULTS:** A repeated measures ANOVA, with a Greenhouse-Geisser correction, determined that mean scores for percent body fatness differed significantly between assessment types ($F(1.033, 79.51) = 29.18$, $p < 0.001$). Post hoc testing using the Bonferroni correction revealed no difference in BIA conditions (B1-19.5±6.9%, B2-19.6±6.9%, B3-19.6±6.9%), yet all were significantly lower than BP (BP-22.2±8.9%). There were statistically significant correlations between BP and all BIA conditions ($r = 0.88$, $p<0.05$). Using a Bland-Altman analysis, there were statistically significant positive correlations between BP and all BIA conditions ($r = 0.49$, $p<0.05$). Interestingly, the standard error of the estimate was lowest for soap and water washing (B1 - 3.26, B2 - 3.20, B3 - 3.22), albeit modest differences between conditions. **CONCLUSION:** There was a difference between percent fat values from BP and BIA conditions (B1, B2, and B3) following a means comparison analysis. Additionally, correlations yielded strong statistical similarities between BP and BIA. While no hand conditions differed from each other, the predictability of the BIA lessened as the percent values increased. Furthermore, the standard error of the estimate revealed that percent fat estimations were lowest following washing hands with soap and water. Cleanliness of hands does not appear to affect BIAs ability to estimate body composition. Although, BIAs ability to estimate does weaken as percent fat values increase.

Board #14

THE INFLUENCE OF PHYSICAL ACTIVITY, PERCEIVED ACADEMIC CONTROL, AND BMI ON ACADEMIC SUCCESS

Jenna Woolley, Samantha McCowen, Jade Falk, Erin Vanderbunt

BACKGROUND: Physical activity has been shown to improve cognition and brain health; however, much of this research has focused on children and older adults. While a positive association between physical activity and academic success among elementary and adolescent children has been well documented in the literature, limited and inconclusive data exists on this relationship among college students. **PURPOSE:** The purpose of this study was to explore the associations between physical activity (PA), body mass index (BMI), and perceived academic control (PAC) and their effect on academic success in college students. **METHODS:** An electronic questionnaire was completed by 299 undergraduate students at a regional, Midwestern university. In addition to basic demographic information, the questionnaire included height and weight to calculate BMI, self-reported physical activity of the previous 7 days using the International Physical Activity Questionnaire (IPAQ) short form, an 8-item Perceived Academic Control Scale, and self-reported current grade point average (GPA). Subjects were categorized into "meeting" physical activity guidelines if they reported 2 or more days of muscle strengthening activities and at least 150 minutes per week of moderate physical activity, 75 minutes per week of vigorous physical activity, or the equivalent combination of moderate and vigorous physical activity. Linear regression analysis was used to determine the association between these variables. **RESULTS:** The Pearson correlation coefficients revealed a significant positive correlation between perceived academic control and academic performance ($r = 0.353$, $p < 0.001$) and a significant negative correlation between BMI and academic performance ($r = -0.157$, $p < 0.003$). The correlation between meeting physical activity guidelines and academic performance was weakly positive but not statistically significant ($r = 0.079$, $p < 0.087$). **CONCLUSION:** Higher BMI was associated with lower academic performance, regardless of physical activity level. Given the potential influences that body weight and physical activity level have on academic performance, and the potential response bias of self-reported data in this study, these findings support the need for further investigation into these relationships using objective physical activity measurements and official school transcripts.

Board #15

RELATIONSHIP BETWEEN PHYSICAL FUNCTIONING, HEALTH PERCEPTION, AND PERCEIVED STRESS IN ADULTS WITH PRE-DIABETES

Eyoatam Workneh, Joanna Vasudevan, Diane Dungan, Scott Fenstermacher, Erik Hayes, & Bradley Kendall

BACKGROUND AND PURPOSE: In the United States, 13% of adults have diabetes while another 34% have either prediabetes or elevated hemoglobin A1C. It is estimated that 629 million people will have diabetes by 2045. To address this problem, programs such as the National Diabetes Prevention Program have been developed to help individuals with diabetes and pre-diabetes lose weight and better control their blood sugar. However, these programs are often focused only on physiological aspects - failing to address other complications associated with diabetes such as poor psychological health and physical function. Researchers have suggested this may be because less is known about other complications people with diabetes might experience. Therefore, the purpose of this study was to examine relationships between A1C, body weight, physical functioning, and perceptions of health and stress in pre-diabetic adults. **METHODS:** Participants were adults (N=46, Mean age=68.1 ± 15.2) who volunteered to participate in a diabetes prevention program. These individuals were referred by their physician and were considered at risk for pre-diabetes or

diabetes (mean A1c=5.7±.7, mean BMI=33.7±6.6). During their initial visit, participants completed the Senior Functional Fitness Test (SFT), the RAND 36-Item Health Survey (SF-36), and the Perceived Stress Scale (PSS). **RESULTS:** A1C was only significantly correlated with mobility ($r = .301$, $p < 0.05$). Starting body weight was significantly correlated with perceived stress ($r = .296$, $p < 0.05$), perceived physical functioning ($r = -.319$, $p < 0.05$), pain ($r = -.309$, $p < 0.05$), and general health ($r = -.470$, $p < 0.01$). Moreover, perceived physical functioning was associated with aerobic capacity ($r = .516$, $p < 0.01$), mobility ($r = -.637$, $p < 0.01$), lower body strength ($r = .524$, $p < 0.01$), and gait speed ($r = -.725$, $p < 0.01$) as well as perceived energy/fatigue ($r = .441$, $p < 0.01$), pain ($r = .310$, $p < 0.05$), and perceived general health ($r = .471$, $p < 0.01$). **CONCLUSION:** These findings highlight various relationships between body weight, functional abilities, and perceptions of one's stress, health and functional abilities. This study provides more information on potential secondary complications associated with pre-diabetes and diabetes and how they relate to overall health and function. Future studies and programs may provide greater benefit to their participants by focusing on psychological wellbeing and physical function in addition to weight loss.

Board #16

THE EFFECTS OF REST, MODERATE INTENSITY, AND HIGH INTENSITY EXERCISE ON SECRETORY IMMUNOGLOBULIN A LEVELS IN COLLEGIATE CROSS COUNTRY RUNNERS

Oliva Jeanette, Catie Robbins, Austin Layton, Brayden Layton, Dan King, Daniel Kaluka, Brandon Dykstra, & Bradley Kendall

BACKGROUND: Secretory immunoglobulin A (SIgA) levels are recognized as a physiological marker of the health of the human mucosal immune system. Previous research has shown absolute SIgA concentration levels decrease immediately following high intensity and long duration exercise while moderate intensity exercise may result in an increase in absolute SIgA concentration levels. However, only a few of the previous studies investigated salivary flow rate (SFR) and secretion rate (SR) in addition to absolute concentration levels. **PURPOSE:** To investigate the impact of moderate and high intensity exercise on changes in absolute SIgA concentrations, SFR, and SR. **METHODS:** Unstimulated saliva was collected from 11 (6 males, 5 females) collegiate track distance runners (Age= 19.1±.8) before and after seated rest, a high intensity workout, and a moderate intensity workout. Participants completed each condition two times, separated by at least one month, during the competitive season. Saliva samples were measured for volume to determine salivary flow rate (SFR, µg/min). Biochemical analyses were performed using an enzyme-linked immunosorbent assay (ELISA) to determine absolute SIgA concentrations (µg/ml). Additionally, SIgA secretion rate (SR, µg/min) was computed from SFR and absolute SIgA concentrations. Independent one-way ANOVAs were conducted to determine if changes in absolute SIgA concentration, SFR, and SR were different following rest, moderate intensity exercise, and high intensity exercise. Significance was set at $p < 0.05$. **RESULTS:** There was a significant difference in absolute SIgA concentration ($F(2,65) = 4.976$, $p < 0.05$) and SFR ($F(2,64) = 10.183$, $p < .001$) but not SR ($F(2,64) = .123$, $p = .884$) between the two exercise sessions and resting condition. Post hoc analyses revealed that both moderate and high intensity exercise resulted in significant SIgA concentration increases and significant decreases in SFR ($p < 0.05$) compared to no changes following the resting conditions. **CONCLUSION:** Contrary to previous studies, the current findings demonstrate that acute exercise results in increased absolute SIgA concentration levels and decreased SFR in competitive runners. Future research should measure other variables such as cortisol, in addition to SIgA, to better understand how exercise intensity impacts the direction and degree to which absolute SIgA concentration, SFR, and SR change following exercise.

Board #17

SECRETORY IMMUNOGLOBULIN A IN RESPONSE TO MARATHON TRAINING AND RECOVERY

Emma Clarke, Claycee West, Catie Robbins, Dan King, Daniel Kaluka, Bradley Kendall, Brandon Dykstra

BACKGROUND: Secretory immunoglobulin A (SIgA) levels are recognized as a physiologic marker of the health of the human immune system. Previous research has shown SIgA concentrations are affected by exercise, with varying responses depending on the characteristics of the exercise (intensity, duration, etc.) and the characteristics of the individual (training status, body composition, etc.) However, the effects of multiple-week, high-volume aerobic exercise training on SIgA has yet to be investigated. **PURPOSE:** To investigate the effects of marathon training and recovery on SIgA concentrations in two individuals: one sub-elite marathoner and one recreational marathoner. **METHODS:** Two individuals volunteered to participate in this 15-week study. One was a sub-elite (SE) marathoner (male, 23 years), one was a recreational (R) marathoner (male, 33 years). SE trained 7 days/week, with weekly training volume ranging from 81 to 120 miles and peaking 3 weeks before the race. R trained 4 days/week, with weekly training volume ranging from 15 to 36 miles and peaking 3 weeks before the race. Unstimulated saliva was collected for 5 minutes in the morning once per week for 12 weeks leading up to the marathon and for 3 weeks following the marathon. Samples were

measured for volume to determine salivary flow rate (SFR), biochemical analysis was performed using an enzyme-linked immunosorbent assay (ELISA) to determine absolute SIgA concentrations, and SIgA secretion rate (SR) was calculated from SFR and absolute SIgA concentrations. **RESULTS:** SE and R completed their marathons in 2:20:01 and 3:57:14, respectively. Over 12 weeks of marathon training, SIgA concentrations ranged from 53.8 to 127.7 µg/ml (SE) and from 56.0 to 126.8 µg/ml (R). SFR ranged from 141.2 to 238.8 µl/min (SE) and 150.5 to 1031.2 µl/min (R). SR ranged from 7.6 to 30.5 µg/min (SE) and 12.6 to 60.9 µg/min (R). Over the 3 weeks post-marathon, SIgA concentrations ranged from 83.2 to 221.6 µg/ml (SE) and from 81.7 to 92.0 µg/ml (R). SFR ranged from 96.0 to 241.2 µl/min (SE) and 594.9 to 620.3 µl/min (R). SR ranged from 20.1 to 21.4 µg/min (SE) and 50.7 to 56.1 µg/min (R). **CONCLUSION:** Despite very discrepant training volumes and performances, the effect of marathon training and recovery on SIgA was generally similar in both runners. With these preliminary data, future research should examine a larger sample size of runners to further investigate the relationship between marathon training and immune function.

Board #18

THE EFFECTS OF STATIC VERSUS DYNAMIC STRETCHING ON LOWER EXTREMITY POWER OUTPUT AND FLEXIBILITY IN COLLEGIATE DANCERS

Meloney George, Robert Banaga, Stacey Buser, Stephanie Davis-Dieringer, Ronald Otterstetter FACSM

BACKGROUND: Collegiate dancers require a large range of motion throughout all joints. Previous research has shown static (STA) stretching to be most effective at improving flexibility, due to this factor, warmups for dance are primarily based on STA stretching to allow dancers to reach their maximum flexibility. Previous research has also shown that STA stretching before activity can have negative effects on an athlete's power output, and a large amount of power is essential for dance. **PURPOSE:** Determine the effect of STA and dynamic (DYN) stretching on lower extremity power and flexibility in collegiate dancers. **METHODS:** Subjects (N=10) were recruited from the U of A Dance Team. Data collection involved 3 sessions with different stretching protocols. DYN warm-up, STA warmup, or no warmup (CON) were completed before different sessions. Biodex testing was performed to assess individual power output of right and left knee extension and flexion and a flexibility test was performed to test hamstring flexibility. Paired t-test were used to assess significance. Significance was set at $p < 0.05$. **RESULTS:** Significance ($p<0.05$) was found in right knee extension mean peak torque (98.8 DYN vs 91.0 ft/lbs STA), left knee extension mean peak torque (73.5 ft/lbs CON vs 99.4 ft/lbs DYN), right knee mean flexibility (18.9 in. CON vs 20.5 in. STA) and left knee mean flexibility (18.5 in. CON vs 20.5 in. STA). No other measurements showed significance. **CONCLUSION:** There was a functional difference in lower extremity power output for all power measures, but only some to a statistically significant level. Previous research has demonstrated similar power output results in dancers following DYN vs. STA warmups where no significant difference was observed. The results contradicted previous research which resulted in a significant increase in flexibility from DYN versus STA stretching in dancers. Future research should analyze flexibility and power output in dancers after being accustomed to dynamic warmups for a longer period of time, analyze a different group of athletes, and analyze results after performing warmups of equal length.

Afternoon Schedule – Friday, October 13th: Symposia

Symposium #10: Discovery Room, 2:30-3:20 pm

MINDS IN THE MAKING: ENGAGING UNDERGRADUATES IN RESEARCH

Session Moderator: Carol Weideman, Western Michigan University

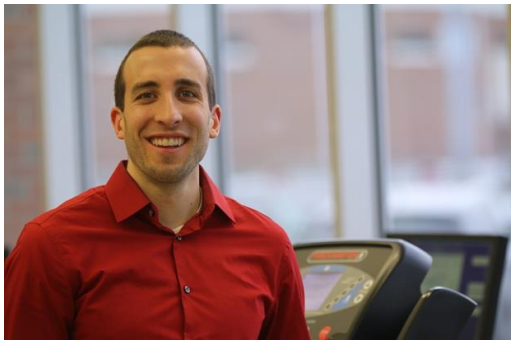
Presenters and Institutional Affiliations:

Emily Van Wasshenova, Ph.D.
Oakland University, Rochester, MI

Biography: Dr. Emily Van Wasshenova is an assistant professor at Oakland University in Rochester, Michigan. Her main research focuses on health behaviors, including physical activity and nutrition behavior. In addition to working with undergraduate students on her research projects, Dr. Van Wasshenova is the faculty director for the Community Health Engagement and Empowerment Research (CHEER) Lab which provides undergraduate students with research skills training and opportunities to engage in real-world health research and service through faculty-led research projects. She is a member of the board of directors for MWACSM.

Brian Rider, Ph.D., FACSM
Hope College, Holland, MI

Biography: Dr. Brian Rider is an associate professor of Kinesiology at Hope College in Holland, Michigan. He is a certified strength and conditioning specialist (CSCS) through the National Strength and Conditioning Association (NSCA) and a Fellow of the American College of Sports Medicine (FACSM). His mentorship of undergraduate students in research has led to regional and national presentations as well as multiple publications. His student-centered research focuses on examining commercially available activity tracking devices and ergogenic aids for improved exercise performance.



Alex Montoye, Ph.D., FACSM
Alma College, Alma, MI

Biography: Dr. Montoye is an associate professor at Alma College in Alma Michigan. His research involves device-based measurement of physical behaviors including physical activity, sedentary behavior, and sleep. His work utilizes both consumer-focused and research-grade wearables. A recent research venture is the use of ischemic preconditioning as an ergogenic aid in healthy and athlete populations. In the last 10 years, Dr. Montoye has mentored numerous undergraduate students in research projects, which have frequently resulted in student presentations and sometimes also in publication.

Adam Coughlin, Ph.D., FACSM
Saginaw Valley State University, University Center, MI

Biography: Dr. Adam Coughlin is a Professor of Kinesiology at Saginaw Valley State University and has been teaching for over 23 years. Dr Coughlin's undergraduate degree was a BA in Exercise Science: Pre-PT from Adrian College, and an MS and Doctorate in Exercise Science from Michigan State University. His current research involves athlete and team training volume tracking as well as the physiological effect of all things rock climbing, as well as any project, big or small, that is inspired by [or for] undergraduate students. Over a dozen previous students have gone on to obtain their PhDs, several returning to the region as professors. Countless other students have completed their MS degrees over the years, in various fields. Undergraduate research has been utilized by hundreds of students over the years to prepare them for their next professional steps.

Session Overview: Although beneficial, undergraduate research—especially for faculty at smaller-sized institutions with higher teaching and service workloads—can present unique challenges. This symposium will provide practical information and guidance to engage and mentor undergraduate students in research, highlighting best practices from the existing literature and focusing on inclusive recruitment and methods. The session will feature four speakers who describe their experiences engaging undergraduate students in research. This topic is timely, innovative, and relevant to a variety of MWACSM attendees. Only 11.9% of institutions in MWACSM are classified as Very High Research Activity (R1) - therefore many MWACSM members will not be advancing to post doctoral programs or R1 institutions and will encounter the challenges associated with conducting undergraduate research at smaller-sized institutions. This symposium is appropriate for anyone who is currently including undergraduates in research or those who plan to do so in the future.

Learning Objectives:

1. Attendees will be able to describe the best practices for working with undergraduate students with inclusive recruitment and methods.
2. Attendees will be able to identify unique ways, such as offering students course credit, to encourage research involvement.
3. Attendees will be able to explain a centralized approach to training undergraduates for research.
4. Attendees will be able to identify ways of navigating research with students at small schools with limited funding resources. The difference in “presentable” vs. “publishable” projects will be discussed as well as collaborating across institutions to share resources.

<u>Symposium #11:</u> Vision Room, 2:30-3:20 pm

THE EFFECTS OF CARBOHYDRATE TYPE ON METABOLIC AND VASCULAR RESPONSES POST-EXERCISE

Session Moderator: Gary Long, University of Indianapolis

Presenters and Institutional Affiliations:

Daniel Freidenreich, Ph.D.
University of Wisconsin - La Crosse, La Crosse, WI

Biography: Daniel Freidenreich, PhD completed his doctorate in Kinesiology at the University of Connecticut and then his Post-Doctorate at the Ohio State University. He is currently an Assistant Professor at The University of Wisconsin- La Crosse in La Crosse, WI. His research interests fall into three categories: nutrition, exercise and immunology. He studies how dietary modifications and supplementation affect metabolism, metabolic disease and sports performance. He also investigates the impacts of nutrition and exercise interventions on immune function, muscle damage and fatigue. Daniel spent 9 years as a personal trainer working with clients of all ages.

Session Overview: Post exercise carbohydrate ingestion promotes recovery, but acute hyperglycemia can decrease vascular function. Optimization of carbohydrate type can improve recovery while minimizing harmful effects on vascular function. In a randomized, crossover, single-blind study, 10 healthy recreationally trained adults aged 18-40 y consumed drinks containing multiple transportable carbohydrate (MTC), oligosaccharide, starch (1.0 g/kg of body weight), or water (control) after a 30-minute treadmill run at 65% VO2 max. Plasma glucose, carbohydrate and fat oxidation, energy expenditure and microvascular function were assessed before and up to 1 hour post exercise. Compared to water, MTC and oligosaccharide, but not starch, increased plasma glucose AUC post-exercise. Muscle reperfusion increased immediately after exercise and remained elevated through 60 min in all trials, suggesting that while exercise improved vascular function temporarily post exercise, carbohydrates had no effect on the vascular response. Muscle oxygen consumption did not change during any trial. Of the carbohydrates, MTC showed the highest carbohydrate oxidation and lowest fat oxidation. There were no differences in energy expenditure AUC post-exercise between trials. In conclusion, none of the carbohydrates that are typically consumed post-exercise impaired vascular function and may be safe choices for recovery. Additionally, the utility of MTC on glycogen restoration remains to be investigated.

Learning Objectives:
1. Summarize the current knowledge on the type, timing and dose of carbohydrate consumed post-exercise to promote recovery.
2. Understand the potential negative effects of fructose and hyperglycemia on vascular function.
3. Provide better recommendations to athletes regarding post-exercise carbohydrate supplementation to optimize recovery while protecting vascular function

<u>Symposium #12:</u> Discovery Room, 3:30-4:20pm

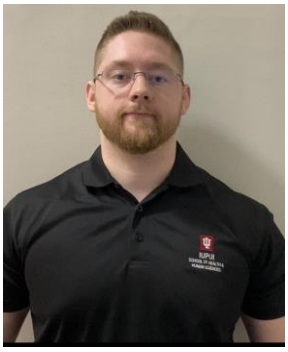
PROGRESSIVE RESISTANCE TRAINING: DOES BIGGER EQUAL STRONGER?

Session Moderator: Cory Baumann, Ohio University

Presenters and Institutional Affiliations:

Monica Hubal, Ph.D., FACSM
Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN

Biography: Monica Hubal currently works at Indiana University-Purdue University Indianapolis. She is an Associate Professor of Kinesiology and is affiliated with the Indiana Center for Musculoskeletal Health. Dr. Hubal's main research interests are elucidating what factors make some people more prone to obesity, type 2 diabetes, and cardiometabolic disease (especially earlier in life) and identifying ideal intervention strategies to regain health. With dual training backgrounds in exercise physiology and genetic medicine, much of her research involves integrating genetic and molecular data with physiological phenotype information.



Dakota Deiwert, M.S.
Indiana University-Purdue University Indianapolis (IUPUI), Indianapolis, IN

Biography: Mr. Deiwert is a Ph.D. candidate and teaching assistant at Indianapolis University-Purdue University of Indianapolis. He received his master's degree in Exercise Physiology at Ball State University in 2020. His current research interests are the underpinnings of delayed onset muscle soreness and resistance exercise, and how they relate to individuals with obesity and/or type 2 diabetes.

Session Overview: Progressive resistance training (RT) results in mean improvements in muscle strength and size, though a high degree of variability exists among individuals in both strength and size responses. We previously documented this variation in both strength and size changes (Hubal et al, MSSE, 2005) in the largest RT study published to date. The FMS study data represent >1200 untrained subjects tested before and after 12 weeks of RT - 2x per week of 5 exercises for biceps and triceps. Strength was assessed both isometrically (maximal voluntary contraction) and dynamically (1 repetition maximum) in the elbow flexors. Magnetic resonance imaging assessed muscle size in two dimensions (cross-sectional area) and in three dimensions (muscle volume). New retrospective analyses of FMS data document relationships between strength and size changes - showing significant correlations prior to and following RT in strength and size (with weak correlation coefficients), and lack of a significant correlation between relative gains in strength and size; all of which are modified by sex. This talk will be largely a tutorial format, with Dr. Hubal reviewing drivers of muscle strength and size changes with RT and discussing their relationship to one another. Mr. Deiwert will discuss new findings from the FMS cohort, quantifying strength and size correlations and highlighting sex differences.

Learning Objectives:
1. Review basic tenets of progressive resistance training - including individual traits of strength gain and hypertrophy.
2. Conceptualize variation in exercise response with regard to strength and muscle size.

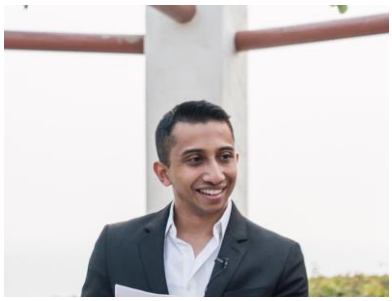
3. Understand the relationships between absolute and relative strength and size changes, including the important role that sex differences make in exercise response.

<u>Symposium #13:</u> Vision Room, 3:30-4:20 pm

DATA ANALYTICS IN SPORTS MEDICINE: CONTEXT, CONCEPTS, AND PRACTICAL APPLICATIONS

Session Moderator: Paul Reidy, Miami University

Presenters and Institutional Affiliations:



Avinash Chandran, Ph.D.
Datalys Center for Sports Injury Research and Prevention, Indianapolis, IN

Biography: Dr. Chandran currently serves as the Director of the NCAA Injury Surveillance Program at the Datalys Center for Sports Injury Research and Prevention. He is a quantitative Epidemiologist, and his research interests include injury epidemiology and surveillance, longitudinal study design and analytical methods, as well as Bayesian inference using observational data. His research program centers on the application of advanced quantitative methods in injury epidemiology, and in the study of athlete health and wellness across the lifespan. Dr. Chandran has co-authored over 90 peer-reviewed publications in sports medicine, and also holds academic appointments at UNC Chapel Hill, the George Washington University, and A.T. Still University.

Adrian Boltz, MSH
Datalys Center for Sports Injury Research and Prevention, Indianapolis, IN

Biography: Adrian is the Research Associate for the National Collegiate Athletic Association Injury Surveillance Program at the Datalys Center for Sports Injury Research and Prevention. In addition to working at the Datalys Center, he is a doctoral student at the University of Michigan in Ann Arbor. His research interests include sports injury epidemiology, and using advanced statistical techniques to predict recovery time using concussion symptomatology, clinical assessments, and physiological (sleep-, neuroimaging-, and protein biomarker-related) changes following concussion.

Neel Rao, MPH
Datalys Center for Sports Injury Research and Prevention, Indianapolis, IN

Biography: Neel is a research assistant with the Datalys Center working primarily with the NCAA Injury Surveillance Program. Neel received a Master of Public Health in Epidemiology from the University of Pittsburgh, and a Bachelor of Science in Sport and Exercise Psychology with a minor in Health Promotion from West Virginia University. He intends to pursue a PhD in Epidemiology in the coming years. His research interests include healthy aging, chronic pain determinants and treatments, physical and psychological effects of physical activity, and epidemiological research methods.

Session Overview: The intersection of data analytics and sports medicine has gained momentum in recent years as high-throughput data have become ubiquitous in sports science. Injury surveillance programs represent one such source of high-throughput data, and surveillance efforts form a critical part of the injury prevention paradigm. Advancements in data analytics as well as injury surveillance methods over time have presented new possibilities for developing sophisticated hypotheses related to injury etiology and evidence-based prevention programs. Data-driven decisions on primary, secondary, and tertiary injury prevention efforts are reliant on harmonizing advanced analytical techniques with high-fidelity data sources such as injury surveillance. Accordingly, this session will serve as a primer on aligning large data frameworks and advanced analytical techniques in guiding prevention and management efforts for sports injuries.

The symposium will be structured as follows: i. (0-10 mins): Introduction to the data analytic process within the context of sports medicine; ii. (10-25 mins): Overview of various data repositories and assets in sports medicine, with an emphasis on sports injury surveillance; iii. (25-35 mins): Presentation of how large, heterogeneous data assets have guided emerging evidence on injuries such as sport-related concussions; iv. (35-45 mins): Contextualization of data-driven clinical insights for improving patient outcomes; v. (45-50 mins): Questions and Answers.

Learning Objectives:
1. Define data analytics and its value proposition in the context of sports medicine.
2. Identify examples of theoretically informed data analytic applications in sport-related concussion research.
3. Apply guiding principles of data analytics to formulate questions seeking data-driven insights for clinical problems.

<u>Symposium #14:</u> Vision Room, 4:30-5:20 pm

THE AGING ATHLETE

Session Moderator: Katie Spillios, University of Mount Union

Presenters and Institutional Affiliations:

Kevin Gries, Ph.D.
Concordia University, Mequon, WI

Biography: Kevin Gries is an Assistant Professor in Physical Therapy at Concordia University of Wisconsin. Dr. Gries's research focus is investigating the effects of exercise on skeletal muscle metabolism and function. Specifically, he is interested in the effects of different exercise training paradigms on muscle fiber size, function, and metabolism in a fiber-type specific manner in young/old and men/women. He received his Post-Doctoral training in the Muscle Physiology and Metabolism Lab at Mayo Clinic, PhD in Human Bioenergetics at Ball State University, M.S. in Human Performance at Wisconsin–La Crosse, and B.S. in Exercise Physiology at Concordia University of Wisconsin.

Session Overview: The purpose of this session is to discuss the physiology of the aging athlete. Given it has been over 50 years since Frank Shorter won the gold medal in the Olympic marathon and started the running boom, we are now seeing a generation of lifelong exercisers in their 70's who still compete at high levels. These individuals defy our cultural expectations of becoming more sedentary as they get older. In contrast to these individuals, United States Census data is projecting a large increase in the elderly population in the next few decades as the Baby Boomer generation reaches retirement age. This will result in a substantial economic burden on the individual as well as on publicly funded health care due to diseases that are associated with aging. Fortunately, exercise has been shown to minimize these disease risks. This presentation will discuss data related to cardiorespiratory fitness, skeletal muscle size and function, and cellular aspects within the muscle to appreciate the effects of aging, how these can result in diseases, and how lifelong exercise may affect these physiological systems. This presentation will also be discussing sex differences as it has also been 50 years since the Title IX legislation, and there is now more data to suggest that men and women age differently as well as respond to exercise differently.

Learning Objectives:
1. Following this session, attendees should be able to understand the effects of aging on parameters related to cardiorespiratory fitness and muscle physiology.
2. Following this session, attendees should be able to appreciate the potency of exercise on age-related physiological detriments.
3. Following this session, attendees should be able to appreciate sex differences as a result of aging and exercise.

<u>Symposium #15:</u> Discovery Room, 4:30-5:20 pm

BRAIN POWER: UTILIZING FNIRS AND EEG TO MONITOR CHANGES IN CEREBRAL ACTIVITY FOLLOWING ACUTE AND CHRONIC EXERCISE INTERVENTION

Session Moderator: Henry Wang, Ball State University

Presenters and Institutional Affiliations:

Terence Moriarty, Ph.D.
University of Northern Iowa, Cedar Falls, IA

Biography: Terence Moriarty, PhD is currently an Assistant Professor of Exercise Physiology in the Department of Kinesiology at the University of Northern Iowa. Dr. Moriarty's educational background includes a BS in Sport and Exercise Sciences from the University of Limerick, Ireland, a MA in Exercise Physiology from Central Michigan University, and a PhD in Exercise Physiology from the University of New Mexico. Terence is most passionate about studying the effects of both acute and chronic exercise on cognitive function in clinical and healthy populations. He enjoys playing all team sports, especially soccer.

Session Overview: Individualized exercise programming is a well-known effective way to improve physical and cognitive performance in humans when appropriately prescribed and supervised. This process should be highly specific and may often require manipulation of various training parameters to elicit the desired neurophysiological adaptations. But what exactly happens in the brain to allow these improvements to take place? Although exercise-induced adaptations to the cardiovascular, muscular, and respiratory systems have been well studied for decades, much less is known regarding changes in brain activity. Over the past two decades, modern functional neuroimaging techniques (fNIRS and EEG) have allowed us to be able to measure specific patterns of metabolic and neuronal activity of several different brain areas during cognitive tasks and/or exercise, thereby providing us with an unprecedented opportunity to examine how brain function supports cognitive and/or exercise performance. In this talk, I will aim to explore the following: 1. The basics of how each device operates. 2. The effects of an acute exercise session on changes in brain activation patterns during exercise and cognitive tasks. 3. The effects of chronic exercise on changes in brain activation patterns during exercise and cognitive tasks.

Learning Objectives:
1. Explain the basics of how both fNIRS and EEG devices work to collect cerebral data.
2. Understand how metabolic and neuronal activity changes during exercise following acute and chronic interventions.
3. Understand how metabolic and neuronal activity changes during cognitive testing following acute and chronic interventions.
4. Describe current research on the topic and provide the audience with possible future directions.

Afternoon Schedule – Friday, October 13th: Special Events

Student Lounge: Network Room (2nd Floor), 2:30-5:00 pm

Time	Professional Guest	Professional Guest	Professional Guest
2:30-3:00 pm	Connie Fiems, PT, DHSc	Avinash Chandran, PhD, MS	Kela Webster, BS

3:00-3:30 pm	Connie Fiems, PT, DHSc	Andrew Jagim, PhD, CSCS*D, CISSN	Kela Webster, BS
3:30-4:00 pm	Bram Wood, MS, CSCS	Ned Shannon, MS, LAT, ATC	Sandy Knecht, MS, RCEP
4:00-4:30 pm	Bram Wood, MS, CSCS	Ned Shannon, MS, LAT, ATC	Sandy Knecht, MS, RCEP
4:30-5:00 pm	Derek Kingsley, PhD, FACSM	Avinash Chandran, PhD, MS	

Meet The Professionals

Professional	Background Information
Avinash Chandran, PhD, MS	NCAA Injury Surveillance Program Director, Datalys Center for Sports Injury Research and Prevention Sports Injury Epidemiology, Sports Medicine Research, Concussion Research
Connie Fiems, PT, DHSc	Chief Scientific Officer, Rock Steady Boxing Physical Therapy, Community-Based FItness, Parkinson's Disease
Andrew Jagim, PhD, CSCS*D, CISSN	Director of Sports Medicine Research and Associate Professor, Mayo Clinic Health System Sports Science, Sports Nutrition, Transitioning from Academia to Healthcare
Derek Kinglsey, PhD, FACSM	Program Coordinator and Associate Professor, Kent State University Graduate School, Networking, Research
Sandy Knecht, MS, RCEP	Senior Clinical Exercise Physiologist and Internship Coordinator, Cincinnati Children's Hospital Clinical Exercise Physiology, Clinical Internships
Ned Shannon, MS, LAT, ATC	Client Access Coordinator, ProTeam Tactical Performance Athletic Training, College Athletics, Tactical Performance
Kela Webster, BS	Director of Customer Experience, American College of Sports Medicine ACSM Certification Eligibility, Recertification
Bram Wood, MS, CSCS	Head Speed & Agility Coach, Mooresville High School (IN) Strength & Conditioning, Coaching

Afternoon Schedule – Friday, October 13th: Free Communication / Slides

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Free Communication/Slides #4: Studio 1, 2:30-3:15 pm

Session Moderator: Steven Elmer, Michigan Tech University

2:30-2:45 pm

POST ACTIVATION POTENTIATION IS GREATER IN HUMAN TRICEPS BRACHII VERSUS TRICEPS SURAE MUSCLES

William S. Zoughaib, Madison J. Fry, Ahaan Singhal, Richard L. Hoffman, Andrew R. Coggan FACSM

BACKGROUND AND PURPOSE: Post activation potentiation (PAP) is an intriguing characteristic of muscle physiology where an increase in twitch force is observed after voluntary activation. This phenomenon is believed to be largely due to phosphorylation of the myosin regulatory light chain by skeletal muscle light chain kinase. In animal models, PAP has been recognized as an inherent property of fast twitch muscle fibers. However, it has been suggested that in humans PAP occurs more or less independently of muscle fiber type. **METHODS:** During an initial screening visit, 7 healthy men and women (18-44 y) underwent an electrical muscle stimulation protocol where two sets of a series of four twitches were elicited both pre and post a 6 s maximal voluntary contraction (MVC) in both the triceps surae (~75% slow twitch) and triceps brachii (~75% fast twitch) muscles. Peak twitch torque (PTT), relative rate of torque development (RTD), and PAP were determined. **RESULTS:** Both MVC (80.6±38.9 vs. 44.5±18.8 Nm; p=0.0003) and unpotentiated PTT (12.0±5.7 vs. 3.0±2.4 Nm; p=0.003) were greater in the triceps surae vs. the smaller triceps brachii. On the other hand, unpotentiated RTD was higher in the triceps brachii vs. the triceps surae (2305±214 vs. 1433±110 %/s; p=0.00003). Post activation potentiation averaged 286±156% in triceps brachii versus 21±19% in triceps surae (p=0.003). **CONCLUSION:** The triceps surae, a slow muscle, exhibits greater absolute voluntary and twitch torques whereas the triceps brachii, a fast muscle, exhibits faster RTD and greater PAP.

2:45-3:00 pm

UNDERSTANDING THE RELATIONSHIP BETWEEN EXECUTIVE FUNCTION FATIGUE AND HEAVY ROPE EXERCISE

Emily K. Erb, Stacie M. Humm, Anthony G. Pinzone, J. Derek Kingsley FACSM

BACKGROUND: Students experience executive function fatigue daily and exercise may combat such fatigue. **PURPOSE:** To examine the influence of heavy rope exercise (HRE) on executive function fatigue in young, healthy individuals. **METHODS:** Sixteen (Mean ± SD: Age 24±3yrs) resistance-trained individuals completed two randomized conditions, HRE and control (CON). Participants completed cognitive stressors lasting 30min to induce executive function fatigue before (Rest), 10min following (Post 1) and 30min following (Post 2) both conditions. Cognitive stressors included the Flanker Task (FT), N-Back Task (NB), and the Go-No-Go Test (GNG). The FT (for both compatible and incompatible stimuli), NB (for distractor and target stimuli in both 1-Back (1B) and 2-Back (2B) tasks), and GNG were assessed for accuracy (ACC) and reaction time (RT). **RESULTS:** There were condition by time interactions for FT compatible ACC (Post 1: HRE: 0.73 ± 0.17; CON: 0.94 ± 0.08; Post 2: HRE: 0.98 ± 0.04; CON: 0.73 ± 0.20, $p<0.001$), FT incompatible ACC (Post 1: HRE: 0.73 ± 0.26; CON: 0.87 ± 0.26; Post 2: HRE: 0.98 ± 0.02; CON: 0.68 ± 0.30, $p<0.001$) and NB 1B target RT (Post 1: HRE: 441.8 ± 106.5ms; CON: 459.2 ± 76.1ms; Post 2: HRE: 462.4 ± 105.3ms; CON: 453.0±62.8ms, p=0.041) such that following HRE they were increased, and following CON they were decreased, from Post 1 to Post 2. FT compatible RT (Post 1: HRE: 572.8 ± 109.1ms; CON: 419.8 ± 301.3ms; Post 2: HRE: 252.2 ± 254.4ms; CON: 550.2 ± 112.9ms , $p<0.001$) and FT incompatible RT (Post 1: HRE: 560.3 ± 117.3ms; CON: 499.8 ± 350.7ms; Post 2: HRE: 273.4 ± 302.8ms; CON: 580.6 ± 150.4ms, $p<0.001$) such that following HRE they decreased, and following CON they were increased, from Post 1 to Post 2. Main effects of time were noted for FT compatible ACC ($p<0.001$) and FT incompatible ACC (p=0.04) such that FT compatible ACC at Rest (0.94 ± 0.01) was greater than Post 1 (0.83 ± 0.02) and Post 2 (0.85 ± 0.80) while FT incompatible ACC Rest (0.91 ± 0.03) was augmented compared to Post 1 (0.84 ± 0.03). There was also a main effect of time (p=0.013) such that Rest (477.2 ± 21.1ms) was increased compared to Post 1 (433.3 ± 12.0ms) for NB 1B target RT. **CONCLUSIONS:** Cognitive stressors can limit aspects of executive function fatigue such as selective attention and working memory. However, acute HRE can mitigate this by increasing accuracy and improving reaction time related to the attention component of executive function fatigue.

3:00-3:15 pm

HABITUAL VAPING AND ITS EFFECTS ON PULMONARY FUNCTION IN COLLEGE AGED MEN AND WOMEN

Nikki Lescano, Eric Slattery, Morgan Manski, Anthony Camerieri, Kyle Timmerman, FACSM

BACKGROUND: The use of electronic cigarettes (e-cigs), otherwise known as vaping, has dramatically increased among college students within recent years. Vaping has been marketed as a safer alternative to cigarettes, however, there is minimal research studying potential adverse effects of vaping. **PURPOSE:** To identify any potential relationships between e-cig use and clinical indicators of pulmonary function. **METHODS:** Pulmonary function of 17 vaping (VAPE) and 35 control (CON) subjects were assessed through performance of a forced vital capacity (FVC) test. Forced expiratory volume in 1 second (FEV1.0) and FVC were measured using a spirometer. Height and body compositions were measured using a stadiometer and bioelectrical impedance. Subjects completed the International Physical Activity Questionnaire (IPAQ) to assess physical activity levels, and the Patient Health Questionnaire (PHQ-9) and the General Self Efficacy survey (GSE) to assess depressive symptoms and self-efficacy. Inclusion criteria for potential VAPE subjects required participants to be habitual users of e-cigs for at least 6 months. Exclusion criteria for potential VAPE subjects included regular use of combustible cigarettes or any other combustible inhalant that is not an e-cig. Exclusion criteria for potential CON subjects included regular use of any combustible inhalant. Comparisons between groups were made using 2-tailed, unpaired t-tests. **RESULTS:** FEV1.0/FVC was found to be significantly lower in VAPE subjects (76.61±9.22%) compared to CON subjects (82.05±7.72%) ($p=0.03$) and a medium effect size (cohen's $d=0.65$). IPAQ scores, PHQ-9 and GSE scores, body composition, and physical activity level between VAPE and CON subjects did not differ significantly ($p > 0.05$). **CONCLUSION:** These preliminary data suggest that habitual use of e-cigs appears to be associated with decreased FEV1.0/FVC percentages, suggesting that vaping may contribute to decreased expiratory lung capacities. Further research is needed to assess if vaping will cause clinically significant impairments over time. This study has limitations due to the small sample size per group and the self reported data for the IPAQ, PHQ-9, and GSE.

Free Communication/Slides #5: Studio 1, 3:45-4:45 pm

Session Moderator: Ron Otterstetter, University of Akron

3:45-4:00 pm

DOES COMBINED PLATELET-RICH PLASMA AND CONCENTRATED PLATELET-POOR PLASMA OUTPERFORM PLATELET-RICH PLASMA ALONE? A PATIENT-BLINDED, RANDOMIZED CONTROLLED TRIAL

Michael Baria, Levi Weitzel, Tyler Barker, Christopher Kaeding, David Flanigan, Timothy Miller, & Robert Magnussen

BACKGROUND: Platelet-rich plasma (PRP) is used to treat patellar tendinopathy in athletes. While repeat injections have been suggested to optimize benefits, multiple intra-tendinous procedures disrupt sport-related activity and may increase the risk of tendon rupture. Therefore, further concentrating the anabolic profile of autologous blood products may improve clinical impact and eliminate a need for repeat procedures. Platelet-poor plasma (PPP) is a routinely discarded byproduct of PRP preparation. Concentrating PPP (cPPP) using a polyacrylamide device produces a solution enriched with insulin-like growth factor (IGF)-1. IGF-1 exerts an anabolic effect on tenocytes, thus, the addition of cPPP to PRP (PRP+) may improve clinical outcomes. **PURPOSE:** To compare patient-reported outcomes (PROs) of a single injection of PRP versus PRP+ for patellar tendinopathy. **METHODS:** 14 patients with symptomatic patellar tendinopathy were randomized to receive a single injection of either leukocyte-rich (LR)-PRP or LR-PRP+. PRP was created from 54cc of autologous whole blood processed using a buffy coat device (centrifuged at 3200rpms for 15 minutes). 25mL of PPP was loaded into the polyacrylamide device and concentrated via centrifugation at 2000 rpms for 2 minutes to create cPPP. All injections were performed under ultrasound guidance. PROs (Victorian Institute of Sport Assessment-patellar tendon (VISA-P), visual analog scale-Pain (VAS-P) with Sport, Tegner activity scale, and Blazina) were assessed at baseline, 1-, 3-, and 6-months. VISA-P at 6 months was the primary outcome. **RESULTS:** Five patients received PRP, and six patients received PRP+. Mean ages were 36±16 years versus 36±11 years, respectively. VISA-P was improved at 1-, 3-, and 6-months (PRP: 66.4±17.8; PRP+: 78.2±15.3) compared to baseline (PRP: 43.5±18.5; PRP+: 45.9±12.5) ($p < 0.05$). VAS-P Sport was decreased at 1-, 3-, and 6-months (PRP: 23.8±28.2; PRP+: 13.0±20.7) compared to baseline (PRP: 68.8±20.2; PRP+: 65.0±15.2) ($p < 0.05$). There was no difference between groups at any time point. **CONCLUSION:** A single injection of either PRP or PRP+ resulted in clinically meaningful improvements for patients with patellar tendinopathy as early as 1-month. There was further improvement by 3-months that was sustained for the duration of the study. The addition of cPPP to PRP was not superior compared to PRP alone.

4:00-4:15 pm

SURVEY OF NCAA DIVISION II ATHLETES' NUTRITION KNOWLEDGE
Elizabeth Newcomb-Yi, Rachel Darr, Hillary Mellema

BACKGROUND: Individuals participating in physical activity need to fuel their bodies adequately for optimal performance. Proper nutrition is essential for sufficient energy production required for athletics. Saginaw Valley State University (SVSU) athletes' knowledge was obtained through a series of surveys. **PURPOSE:** To apply concepts from nutrition to the student athlete population at SVSU, decipher their knowledge, and establish a statistical need for future educational intervention. **METHODS:** Varsity athletes were asked 17-sports nutrition knowledge questions focusing on topics of macronutrients, micronutrients, weight management, supplements, and hydration in an online survey. Total percentage correct was calculated. Participants provided information regarding the sources of which they obtain their nutrition knowledge. **RESULTS:** Sixty-two surveys were completed with a mean score of 48.74% (8.29/17). Survey scores were poor in the areas of daily macronutrient intake values (15.87%), ergogenic aids (15.87%), and vitamin toxicity (20.63%). Athletes exhibited a greater knowledge of carbohydrate loading (71.43%), pre-exercise meals (82.54%), and supplementation (85.71%). A statistically significant crosstab (X^2 (1)=7.219, p = .007) revealed that most frequently reported top sources of information were registered dietitians/nutritionists (n = 29), athletic trainers (n = 25) and strength and conditioning specialists (n = 24) with athletes mostly recommending registered dietitian/nutritionists (n = 28), followed by athletic trainers (n = 17) and then strength and conditioning specialist (n = 16) to others. Of 59 participants, 79.66% (n = 47) are aware that SVSU's athletic department provides dietetic services. Of those aware, 74.47% (n = 35) state that a registered dietitian/nutritionist is one of their top three sources of nutrition information. An ANOVA with nutrition knowledge scores as the dependent variable showed that utilizing a coach (t=-1.900, p=0.063) or dietitian (t=-0.306, p=0.761) for nutrition information revealed statistical significance F(5, 42)=2.308, p=0.049. **CONCLUSION:** Based on data analysis, education intervention is warranted in the areas of ergogenic aids, macronutrient intake, and vitamins to improve athlete's nutrition knowledge. When athletes acquire information from coaches vs dietitians, overall scores trend lower however more participants are needed to confirm.

ACKNOWLEDGEMENTS: Funding provided by SVSU Undergraduate Student Led Research Grant.

4:15-4:30 pm

THE EFFICACY OF LIFESTYLE BEHAVIORAL COUNSELING ON PHYSICAL ACTIVITY, DIET, AND SLEEP ACTIVITIES IN YOUNG AND MIDDLE AGE CANCER SURVIVORS
Nicholas Farkas, Lauren Steinke, Jessica Gorzelitz, Katherine Mellen, Erin, Litton, Chooza Moon, Meina Zhang, & Lucas Carr

BACKGROUND: The 2019 International Expert Roundtable by Campbell et al. recommends that cancer survivors should avoid inactivity. Further, the American Cancer Society (ACS) recommends cancer survivors engage in 150-300 minutes of moderate-intensity physical activity (PA) every week, consume five cups of fruits and vegetables each day, and sleep 7-8 hours every night. Unfortunately, most survivors fail to meet the recommendations. Despite low lifestyle behavioral compliance, few lifestyle-focused programs exist for addressing unique needs of cancer survivors . **PURPOSE:** To test the efficacy of a health coaching lifestyle survivorship program on PA, diet, and sleep behaviors among adult cancer survivors. **METHODS:** Young and middle-aged cancer survivors (<age 65) were recruited through electronic medical record queries, mass emails, and provider referrals. Participants received three health education videos on PA, diet and sleep, a Fitbit activity monitor to wear daily, and five health coaching sessions with a trained student health coach over eight weeks. Coaching sessions focused on improving lifestyle behaviors and life after cancer. PA (ActivPAL), sleep (Acttrust 2) and diet (automated self-administered 24-hour dietary recall used to calculate healthy eating index (HEI) score) were measured at baseline and eight weeks. Changes in primary behavioral outcomes over time (baseline to eight week post-intervention) will be analyzed with a paired t test. **RESULTS:** Participants (N=32, 75% female, mean BMI = 31.0+5.8 kg/m2 standard deviation (SD) mean age = 42.9+10.7 years) completed 6,668+2,518 steps/day at baseline, with mean 15.7+9.5 minutes/day walking >= 100 steps/minute pace/cadence. Participants slept an average of 7.1 +1.0 hours/night with a mean sleep efficiency score of 85.8. Mean HEI scores were 52.2+12.7 (out of a total possible score of 100) at baseline. Only 16% of participants met the dietary recommendation of consuming 5 cups of fruits and vegetables/day. Lastly, 16% of participants met the ACS dietary recommendation of consuming an average of 5 cups of fruits and vegetables/day. **CONCLUSION:** Baseline analyses suggest participants were meeting sleep duration recommendations, but most were not meeting PA or diet recommendations. Nationwide mean HEI score is a 58 out of 100, whereas this sample was below that average at 51. Post-intervention analyses will be completed in mid-September.

4:30-4:45 pm

HOW BIGS GET BIGGER: BODY COMPOSITION CHANGES IN COLLEGIATE FOOTBALL PLAYERS ACROSS A SEASON
Nakayla Adams, Carlissa Baker, Tamara Hew-Butler

BACKGROUND: Data obtained from professional football players suggest that players >250lbs accumulate fat at a greater proportion per pound, than football players at lower body weights (Bosch TA 2014). Our data suggests that collegiate football players gain 3.6kg (3%) of total mass, 3.6kg (4%) of lean mass and 0.1kg(<1%) of body fat over a 4-year collegiate career, with high individual variability (Hew-Butler 2022). **PURPOSE:** The primary aim of this longitudinal study was to (1) assess changes in total, lean, and fat mass in collegiate football players and (2) assess relationships between lean mass versus fat mass changes by player position groups across a single season. **METHODS:** Members of a collegiate football team underwent body composition testing using a dual energy x-ray absorptiometry (DXA) Scan. Scans were obtained in August 2022 (pre) and again in March 2023 (post). Players were sub-divided into three position groups: BIGS (offensive and defensive lineman), SKILLS (receivers, running backs, safeties and cornerbacks), and COMBOS (all other players). Differences in player group positions were analyzed using 1-way ANOVA. Data expressed as means±SD with significance set at $p<0.05$. Change=(post-pre). **RESULTS:** 80 collegiate football players, with a mean age of 19±1 years, height of 1.84±2.7m, and weight of 100±20kgs, completed pre- and post-season body composition testing. BIGS were the largest and SKILLS the smallest players with regards to total mass ($F=103.1$; $r^2=0.73$; $p<0.001$), lean mass ($F=73.5$; $p<0.0001$; $r^2=0.66$), body fat% ($F=51.8$; $p<0.0001$; $r^2=0.58$) and bone density (Z-score $F=9.11$; $p=0.0003$; $r^2=0.19$). Non-significant increases seen in total mass (2.9±4.0kg), lean mass (0.9±2.5kg), body fat%(1.1±1.6%), and bone density (z-score:0.09±0.18) across the season. Significant relationships were seen between changes in lean mass vs. changes in fat mass ($r^2=0.09$; $p=0.006$). Relationship between changes in lean mass vs. changes in fat mass were strengthened when the BIGS were removed ($r^2=0.29$; $p<0.001$) with the slope of the relationship without the BIGS ($Y=0.72*X+0.01$) showing more linearity than the slope of the relationship for the BIGS alone ($Y=0.03*X+0.95$; $r^2=0.00$;$p=0.85$). **CONCLUSIONS:** Modest increases in total (~3%), lean (~1%), fat (~1%) and bone (~1%) mass were seen in collegiate football players across a season. BIG players gain more fat (per increase in lean mass) per body weight compared with smaller players, with a plausible lean mass threshold (~90kg).

Schedule – Friday Afternoon: Poster Session #4

Poster Session #4: Regency Ballroom E & F (2nd Floor), 2:15-3:30 pm

Board #1
HOUSEHOLD CHAOS IS RELATED TO PHYSICAL ACTIVITY IN CHILDREN FROM LOW-INCOME HOUSEHOLDS
Ananya Singh, Laura Rosok, Christopher J. Kinder, Naiman A. Khan, Shelby A. Keye

BACKGROUND: Household chaos, defined as disorganization and instability in the home, and physical activity (PA) have numerous potential implications on childhood development. Children from low-income households are more likely to experience high levels of household chaos and may have limited opportunities to engage in moderate to vigorous PA (MVPA), leaving them vulnerable to the potentially detrimental effects of household chaos on cognition and long-term health as influenced by PA engagement. **PURPOSE:** This study explored relationships between household chaos, MVPA and cognition in children from high- and low-socioeconomic status (SES) households. **METHODS:** Children 7-13 years (N = 35) wore wGT3X-BT accelerometers for 7 days to assess time spent in MVPA. A modified Eriksen Flanker task was administered to assess attentional inhibition, and parents completed the Confusion, Hubbub, and Order Scale (CHAOS) survey, which uses a 15 item, four-point rating scale to quantify household chaos. Pearson bivariate and partial correlations controlling for age, sex, and wear time were conducted to explore the relationship between MVPA, CHAOS, and attentional inhibition. Participants were then split into groups based on SES, and correlations were conducted again. **RESULTS:** Bivariate correlations revealed a significant relationship between time spent in MVPA per day and congruent accuracy ($r = 0.42$, $p = 0.02$), reaction time ($r = -0.45$, $p = 0.01$), incongruent accuracy ($r = 0.39$, $p = 0.04$), and total CHAOS ($r = -0.52$, $p < 0.01$). Partial correlations revealed that household CHAOS was significantly related to MVPA ($r = -0.500$, $p = 0.008$), but no relationship was found between CHAOS and MVPA or cognition. Between groups, partial correlations revealed a relationship between MVPA and total CHAOS in low ($r = -0.77$, $p = 0.01$) but not high-SES households ($r = -0.16$, $p = 0.58$). **CONCLUSION:** Our results indicate that household

chaos was related to time spent in MVPA in children from low-SES households, while neither CHAOS nor MVPA were related to cognition. These results indicate that SES may play a role in the relationship between household chaos and PA participation in children, and PA may be particularly beneficial to children from low-SES, more chaotic households.

FUNDING: This study was funded by the Illinois Association for Health, Physical Education, Recreation and Dance, the University of Illinois Personalized Nutrition Initiative, and the Egg Nutrition Center.

Board #2

EXAMINING DIFFERENCES IN MOTIVATION SOURCES BETWEEN MALE AND FEMALE NCAA DIVISION II STUDENT-ATHLETES DURING COVID-19

Lindsay Neighbors, Mindy Hartman Mayol, FACSM, Trent E. Cayot, Nathanial R. Eckert, Gary M. Long, Richard Robinson, Riggs Klika & Brian Reagan

BACKGROUND: While previous research has shown a trend over time that female student-athletes (SAs) have exhibited lower intrinsic motivation scores when compared to their male counterparts, few studies have examined differences between male and female SAs' motivation sources in Division II SAs. Presently, no research has been performed comparing these differences during the COVID-19 pandemic for collegiate SAs as a whole. **PURPOSE:** To assess and compare motivation sources between male and female SAs during the time of the COVID-19 pandemic. **METHODS:** Participants consisted of 158 male (n = 87) and female (n = 71) NCAA Division II SAs who completed an online demographics questionnaire and the 18-item Sport Motivation Scale II (Pelletier et al., 2013) designed to measure six motivation sources: intrinsic (IR), integrated (INTR), identified (IDR), introjected (ITR), external (EXT), and amotivation (AMR) regulation/motivation. Independent samples t-tests were performed with an alpha level of $p \leq 0.05$ to examine if differences between SAs' sex existed for each motivation source. It was hypothesized that male SAs would have higher intrinsic-based motivation scores (IR, IDR, INTR) than female SAs during the pandemic. **RESULTS:** The analyses demonstrated no statistically significant differences in motivation sources used during the pandemic between male and female SAs ($p > .05$): IR (MM=16.18, SDM=3.68; MF=15.96, SDF=3.87); INTR (MM=16.72, SDM=3.62; MF=16.79, SDF=3.33); IDR (MM=17.08, SDM=3.78; MF=17.15, SDF=3.06); ITR (MM=14.41, SDM=4.25; MF=14.82, SDF=4.11); EXT (MM=8.15, SDM=4.82; MF=8.63, SDF=3.82; and AMR (MM=7.59, SDM=4.74; MF=6.62 SDF=3.78). **CONCLUSION:** Study findings indicated that sex is not a statistically significant factor for motivation source differences in this sample of SAs during COVID-19. Sports performance professionals and coaches should consider better understanding motivation sources in SAs and possible changes over time in intrinsic motivation, specifically. It is important to note that the pandemic might have affected the overall motivation of SAs as a whole due to lockdown protocols and disruptions in training and practice.

Board #3

PRE-SEASON FITNESS TESTING PERFORMANCE DIFFERS BY PLAYING STATUS AND POSITION IN DIVISION II COLLEGIATE SOCCER PLAYERS

Zachary Smith, Gary Long

BACKGROUND: Collegiate soccer is a demanding sport that requires athletes to be well trained physically, technically, tactically and psychologically. In an attempt to determine athletes' readiness to play, coaches often carry out "pre-season" physical fitness tests. While significant work has been done to understand test performance in professional soccer, there is a lack of study on collegiate players based in the US. In particular, normative data on collegiate soccer fitness testing is lacking, and it is uncertain if test performance varies across playing status and position at this level of competition. **PURPOSE:** We sought to analyze preseason testing performance in Division II soccer players, and determine if they vary across playing status and position. **METHODS:** 46 healthy, male collegiate soccer players were tested on agility (5-10-5m shuttle), power (vertical jump), run-recovery (Yo-Yo intermittent running) and sprinting performance (20m sprint) prior to the fall season. Unpaired T-test was used to determine if differences in performance existed between 1st (n=28) and 2nd (n=18) teams. One-way ANOVA was used to investigate differences across position groups (CD, central defender, n=7; WD, wide defender, n=9; CM, central midfielder, n=12; WM, wide midfielder, n=8; F, forward, n=5, GK, goalkeeper, n=5). Statistical significance was set at p= <0.05. **RESULTS:** 1st team players covered significantly more distance in the Yo-Yo intermittent running test when compared to 2nd team (1931±465 vs. 1616±497m, p=0.03), however no other differences were detected between teams. Forwards

demonstrated significantly better sprint ability than both CD (2.66±0.08 vs. 2.81±0.09, p=0.002) and CM (2.66±0.08 vs. 2.78±0.05, p=0.01). **CONCLUSION:** Intermittent running ability may discriminate between players of different standards. Forwards demonstrated the highest sprinting speeds, which may be reflective of their in-game demands. Coaches should consider variations in off-season training plans to reflect these differences and adequately prepare players for game-play.

Board #4

THE IMPACT OF PAIN TESTING FAMILIARIZATION ON PAIN PERCEPTION

Alyssa M. Valadez, Leah Richards, Jhovana Brena, Gabriel Brual, Nicholas Foy, Kelly M. Naugle, Trent E. Cayot, Nathanial R. Eckert

BACKGROUND: Quantitative sensory testing (QST) provides an effective means to better understand the pain process for better pain management. Due to individual differences within the pain experience, QST demonstrates large variability across patients potentially masking intervention-based differences. In response to this, testing techniques such as familiarization of pain testing methods may provide an avenue by which to reduce such variation. **PURPOSE:** The purpose of this study was to determine if pain testing familiarization impacts subsequent pain testing scores both within and across multiple pain testing sessions. **METHODS:** 23 participants(12(m)/11(f); 22.5 ± 2.5 yrs) underwent 4 separate training sessions. Participants underwent a familiarization trial immediately followed by two trials of experimental testing within each session. Familiarization testing included pressure pain threshold (PPT), pressure pain tolerance (PPTs), heat threshold (HT), heat tolerance (Htol), and heat 50 (H50). Experimental testing that followed familiarization included all the same tests with the exception of the Htol test to avoid sensitizing the subjects. Familiarization testing was conducted on a subject's midthigh on the non-dominant leg followed by experimental testing on the same location of a randomized leg. **RESULTS:** No significant differences were seen in PPT (trial - $F(3,304) = 0.088$, $p = 0.967$; session - $F(3,304) = 1.242$, $p = 0.294$) and the PPTs (trial - $F(3,304) = 0.892$, $p = 0.446$; session - $F(3,304) = 0.324$, $p = 0.808$) tests when comparing the familiarization with testing trials or across the sessions. HT demonstrated a significant main effect (trial - $F(3,304) = 3.330$, $p = 0.020$; session - $F(3,304) = 2.7$, $p = 0.026$) however post-hoc analysis produced no significant differences of note. Finally, the H50 did produce significantly lower temperatures after familiarization within a given trial ($F(3,304) = 31.41$, $p < 0.000$) as well as differences were seen across sessions ($F(3,304) = 3.83$, $p = 0.001$). **CONCLUSION:** When testing for moderate levels of heat pain, familiarization should be considered necessary. Based on the results of this study, the use of familiarization should be dependent on the type of stimulus being applied and may not be necessary for all types of pain stimuli. More research is still needed in order to support or deny the need for familiarization to be included in pain testing research to increase the accuracy of future studies.

Board #5

THE RELATIONSHIP BETWEEN A SPORT SPECIFIC FUNCTIONAL MOVEMENT ASSESSMENT AND EXIT VELOCITY

Noah Pownall & Chad Odaffer

BACKGROUND: Exit velocity (EV) is widely accepted as one of the key determinants when looking at a player's success as a batter. Understanding the fundamentals of human movement that lead to a higher exit velocity is currently unknown in the field of research. Sport specific movement screens already exist that attempt to relate movement ability to sport injury as well as performance. Establishing a relationship between movement ability and EV, via movement screens, may lead to the implementation of new assessment and training programs that better equip players with the tools necessary for success. **PURPOSE:** The study aims were to determine if there is a relationship between specific human movement abilities and EV during the baseball swing. **METHODS:** 16 participants, all position players on the University of Indianapolis baseball team, participated in two days of data collection. During the first session, players each performed 12 swings hitting a ball off of a hitting tee. The EV was recorded on all 12 swings utilizing a Pocket Radar (Pocket Radar, Inc.). The top 6 swings were used for data analysis purposes in order to account for variance in contact with the sweet spot of the bat. On day two of data collection, participants were put through a functional movement assessment that consisted of 15 different tests; these tests were scored on a pass/fail grading scale. These tests analyzed the movement ability of different body segments used during the baseball swing. **RESULTS:** Positive but weak significant correlations were found between AEL ($r = .291$, $p = .005$) and EV as well as AER ($r = .244$, $p = .005$) and EV. Nonsignificant positive correlations were found between EV and SH ($r = .122$, $p = .333$), AIL ($r = .279$, $p = .157$), and AIR ($r = .208$, $p = .229$). **CONCLUSION:** Based on the present findings, many of the common baseball functional movement screens may not be part of an effective method of predicting EV in college baseball players. However, function of the ankle (inversion and eversion) may play a significant role in the movements required to create

high EV. **APPLICATIONS:** Due to the lack of evidence in the current literature, sports science researchers and practitioners should continue to investigate movement ability as a factor in EV, along with other physical factors. Practitioners should consider including ankle mobility as part of a baseball hitting training regimine to maximize EV.

Board #6

SEASON-LONG HEART RATE VARIABILITY TRACKING IN COLLEGE INDOOR TRACK AND FIELD ATHLETES

Blake Ellis (student), Richard Robinson, Department of Kinesiology, Health, and Sport Sciences, University of Indianapolis, Indianapolis, Indiana, USA

BACKGROUND: Heart rate variability (HRV) has recently been tracked in athletes alongside physical stressors such as training volume and intensity to monitor recovery levels. Athletes with lower HRV values may have impaired recovery from training loads compared to those with higher values. **PURPOSE:** The aim of this study was to measure HRV of collegiate indoor track and field athletes throughout an indoor track season. **METHODS:** 13 NCAA Division II indoor track athletes including a sprinter, a heptathlete, and distance runners were assessed. Over the 3-month indoor track season, morning HRV measurements were taken three times weekly with the HRV4Training app via mobile device. Self-report measures of training intensity, training volume, sleep quality, physical condition, mental energy, muscle soreness, sickness, injury, and any other significant events were also recorded. **RESULTS:** The group whose HRV increased over the season had significantly better self-reported sleep quality ($p = 0.006$). Significant changes in HRV were found after low-intensity training (LIT) and high-intensity training (HIT) days ($p = 0.024$). **CONCLUSION:** Track and field athletes wishing to raise HRV and improve recovery from training should aim to improve sleep quality. The differential effects of low vs. high intensity workouts on HRV support the polarized training program concept.

Board #7

PHYSICAL ACTIVITY IN PREGNANCY AND PELVIC FLOOR DYSFUNCTION

Lisa VanWiel, Bethany Barone Gibbs, & Kara M. Whitaker, FACSM

BACKGROUND: Pelvic floor dysfunction (PFD) is a common, but adverse pregnancy outcome that affects approximately 32% of people postpartum. Previous research suggests that targeted pelvic floor interventions in pregnancy may prevent the development of PFD, however, access to qualified providers may be limited. Light to moderate intensity physical activity in pregnancy may be more accessible and preliminary data suggest it may protect against postpartum urinary incontinence. **PURPOSE:** To report PFD prevalence in a pregnancy cohort and examine associations of objectively measured physical activity across pregnancy with postpartum PFD. We hypothesized that greater light physical activity (LPA) and moderate-to-vigorous physical activity (MVPA) in each trimester of pregnancy would be associated with decreased rates of postpartum PFD. **METHODS:** Participants (N=236; mean age 31.4 ± 4.0 years) were recruited from the Universities of Iowa and Pittsburgh and enrolled in the ongoing Pregnancy 24/7 cohort study. Data on physical activity were collected in each trimester of pregnancy using a thigh-worn activPAL3 micro device and 7 days x 24-hour wear protocol. From this, the average daily duration of LPA and MVPA in each trimester were calculated. Medical charts were reviewed to abstract information on postpartum PFD diagnosis (binary outcome) and grade of perineal laceration (ordinal outcome). Wilcoxon-Mann Whitney tests and t-tests were used to compare LPA and MVPA in those with and without PFD. Chi-square analysis assessed associations between MVPA guidelines (meeting guidelines vs. not) and PFD. Spearman correlations assessed the association between LPA and MVPA with grade of perineal laceration. **RESULTS:** Approximately 32% of participants experienced PFD (n=76). Greater LPA and MVPA were not associated with PFD in any trimester. Those who met MVPA guidelines in the first trimester were less likely to develop PFD than those who did not meet MVPA guidelines (36% vs 63%, p=0.015); no associations were observed in the second or third trimesters. Greater LPA and MVPA were not associated with degree of perineal laceration in any trimester. **CONCLUSIONS:** Meeting MVPA guidelines in the first trimester is associated with decreased risk of PFD. Prenatal healthcare providers should promote MVPA in pregnancy to decrease the risk of PFD, but more targeted interventions may be needed to decrease the risk of severe perineal laceration.

Board #8

PERCEIVED STRESS ACROSS PREGNANCY IN RURAL AND URBAN POPULATIONS

Raegan Krumboltz, Jaclyn Dziewior Borrowman, Kara Whitaker, FACSM

BACKGROUND: Perceived stress during pregnancy has been linked to adverse health outcomes such as preterm birth, low birth weight, and postpartum depression. It is unclear which trimester of pregnancy has the highest reported stress. We predicted that the 3rd trimester would be the highest due to concerns about delivery. Increased risk for poor health outcomes as well as distance to providers may contribute to increased stress for rural residents. We predicted that the rural participants would report higher perceived stress scores across all trimesters. **PURPOSE:** Investigate how perceived stress changes across all three trimesters of pregnancy. Determine the difference in perceived stress scores between rural and urban participants. **METHODS:** Pregnant persons in Iowa and Pennsylvania were recruited at <13 weeks' gestation for the Pregnancy 24/7 Cohort Study. Perceived stress was assessed at each trimester using the Perceived Stress Scale (PSS). Scores range from 0 to 40 with higher scores indicating higher perceived stress. A t test assessed differences between the first and third, first and second, and second and third trimesters. A t test assessed the difference between rural and urban status. P<0.05 defined significance. **RESULTS:** Participants (N=241) had a mean age of 31±4 years and were most often white (88%), married (93%), and had an income of over $100,000 (57%). 15% identified as rural residents. The perceived stress score in the first trimester of pregnancy was significantly higher than both the second (mean difference= 1.23, SD= 5.19, p < 0.01) and third trimesters (mean difference=0.96, SD=5.65, p<0.01). Although not statistically significant, the third trimester was slightly higher than the second trimester (mean difference= 0.27, SD= 5.02, p <.40). Rural participants reported more stress than non-rural participants in all three trimesters of pregnancy (mean difference: 1.65, 2.87, and 1.76, respectively), although only the second trimester was statistically significant (p<0.03). **CONCLUSIONS:** Participants reported the highest stress scores during the first trimester. Rural participants reported higher perceived stress in all trimesters, with the second trimester being statistically significant. Further research should be done with a larger sample of rural participants and look at potential causes for higher perceived stress scores for rural participants.

Board #9

TESTING THE EFFICACY OF A LIFESTYLE SURVIVORSHIP PROGRAM ON CANCER-RELATED HEALTH OUTCOMES AND PSYCHOSOCIAL MECHANISMS OF ACTION AMONG ADULT CANCER SURVIVORS

Lauren Steinke, Nicholas Farkas, Jessica Gorzelitz, Erin Litton, Katherine Mellen, Chooza Moon, Meina Zhang, Mary Schroeder, Lucas Carr

BACKGROUND: The American Cancer Society (ACS) recommends cancer survivors follow the recommended guidelines for physical activity (PA), diet, and sleep to improve cancer-related health outcomes. The ACS recommends healthcare systems establish comprehensive survivorship programs supportive of engaging in healthy lifestyle behaviors following active treatment. However, few lifestyle-focused programs exist for addressing the unique needs of cancer survivors. **PURPOSE:** To test the efficacy of a lifestyle-based program on cancer-related health outcomes and psychosocial mechanisms of action among adult cancer survivors. **METHODS:** Young and middle-aged cancer survivors (<age 65) were recruited through electronic medical records, mass emails, and provider referrals. Participants engaged in 5 health coaching sessions with a trained student health coach and received 3 health education videos focused on sleep, PA, and diet for cancer survivors over an 8-week period. Participants received a Fitbit to monitor PA and sleep. Cancer-related health outcomes were measured using the Patient Reported Outcomes Measurement Information System (PROMIS) Global Health Scale including physical function, pain, pain interference, fatigue, depression, sleep disturbance, and social roles. Psychosocial Mechanisms of Action were measured using a modified questionnaire from the Multi-Process Action Control (MPAC) Theory including attitudes, opportunity and capability, intentions and behavioral skills for health, habits and health identity. Paired t-tests will be used to assess changes from pre- to post-test. **RESULTS:** At baseline, participants (n=32, 75% female, mean BMI=31.0+5.8 kg/m2, mean age=42.9+10.7 years) reported the following mean MPAC scores out of 15: affective attitudes (12.9), instrumental attitudes (14.4), capability (12.0), opportunity (13.0), and intention to improve behavior (12.6). The mean PROMIS scores out of 20 were: physical function (5.6), anxiety (8.0), depression (6.0), social roles (8.5), pain interference (7.4), fatigue (11.4), and sleep disturbance (11.2). **CONCLUSION**: Baseline values suggest participants understand the importance of engaging in healthy behaviors given high baseline MPAC scores for instrumental attitudes. Per baseline PROMIS values, participants reported lower scores than an otherwise healthy population for fatigue and sleep disturbance. Analysis is ongoing to evaluate changes from pre- to post-test to address efficacy of the program.

Board #10

GREEN SPACE EXPOSURE AND MATERNAL DEPRESSION, PHYSICAL ACTIVITY, AND ADVERSE BIRTH OUTCOMES

Tess F. Filip, Jacob Gallagher, Melissa Jones, Bethany Barone Gibbs, & Kara M. Whitaker, FACSM

BACKGROUND: Green space (GS) is associated with moderate-to-vigorous-intensity physical activity (MVPA), and in pregnancy specifically, may mitigate maternal depression and adverse birth outcomes (ABO). However, the relationship between these variables is unclear. **PURPOSE:** Explore associations between GS and maternal depression, MVPA, and risk of ABO (low birth weight, small for gestational age, intrauterine growth restriction, and preterm birth). **METHODS:** Pregnant individuals (n=194) were recruited for a multi-site study (Pregnancy 24/7 Study); data from the University of Iowa are reported. GS exposure was calculated using OpenStreetMap tags, with percentage of GS area at each census tract. Euclidean distances in meters (m) were computed to accessible GS (e.g., parks) from addresses, with buffers of 300m and 500m surrounding addresses. The Center for Epidemiologic Studies Depression Scale was completed each trimester and averaged to assess depressive symptoms. An accelerometer worn on the thigh over 7 days each trimester was averaged to assess MVPA. Chart abstraction examined ABO. Adjusted and unadjusted linear and logistic regressions examined GS associations with maternal depression, MVPA, and ABO (using standardized (SD) exposures and outcomes). Adjusted models included population density, area deprivation index, age, pre-pregnancy BMI, parity, race, marital status, and infant sex. **RESULTS:** GS variables were not significantly associated with maternal depression. Greater GS exposure was associated with greater MVPA (β=0.18 SD, SE=0.07, p=.013); this association was no longer significant after adjustment for covariates. Living a greater distance to accessible GS was associated with less MVPA (β=-0.15 SD, SE=0.07, p=.033), which remained significant after adjustment (β=-0.15 SD, SE=0.07, p=.035). Living within 500m of accessible GS was associated with greater MVPA than those not within 500m of GS (β=0.41 SD, SE=0.16, p=.034), also after adjustment (β=0.39 SD, SE=0.16, p=.016), while living within 300m was not significant. No associations between GS variables with ABO were observed. **CONCLUSION:** Greater GS exposure and living closer to accessible GS are associated with greater MVPA, although effect sizes are small. The largest effect on MVPA was found among those living within 500m of GS. Future work will explore these associations in a larger sample across 3 sites with varying built environments (e.g., rural versus urban), increasing generalizability.

Board #11

EXAMINING THE EQUIVALENCY AND PREDICTIVE POWER BETWEEN TWO NOVEL SIT-TO-STAND POWER TESTS: A CROSS-SECTIONAL STUDY

Garrett M. Steinbrink, Taylor L. Danielson, Katharine E. O'Connell-Valuch, Scott J. Strath, FACSM

BACKGROUND: Muscle power (POW) is a robust predictor of physical function, mobility, and mortality in aging and disease. With a rapidly aging population, the accurate assessment of POW is an important public health priority. Due to its feasibility and safety in aging and clinical populations, the sit-to-stand (STS) test has garnered popularity as a tool to quantify POW, with multiple STS methods being validated and utilized in large, population-based cohorts. Whether estimates from different STS methods are equivalent, however, remains unknown. Furthermore, different STS POW methods' abilities to predict physical function and mobility in middle-aged and aging adults have not yet been compared. **PURPOSE:** Examine the equivalency and predictive power between two STS POW tests, in a sample of middle-aged and aging adults. **METHODS:** 28 volunteers, 40+ years of age (mean age = 57.3 years; 68% female), participated in this cross-sectional study. Body-mass normalized STS POW was assessed from a validated equation (EQ) and a linear position transducer (LPT). Performance in the timed up-and-go (TUG), usual (UGS) and fast gait speed (FGS), and fast-paced 400-meter walk test (400MWT) were assessed. Two paired samples, one-sided t-tests (TOSTs), using an equivalency bound of g = ±0.20, tested the equivalence between the STS POW methods. Multiple linear regression was used to predict physical function and mobility outcomes from each STS POW estimate. **RESULTS:** There were large differences between STS POW methods (mean difference = 2.71 W/kg; g = 2.26). As such, there was insufficient evidence to reject the null hypothesis of non-equivalence between methods ($t(27) = 11.26$, $p = 1$). EQ-derived STS POW was a stronger predictor of TUG, explaining an additional 3.5% of variation, compared to LPT-derived STS POW. Conversely, LPT-derived STS POW better predicted UGS, FGS, and 400MWT performance, explaining an additional 5.6%, 4.8%, and 14.8% of variation, respectively, compared to EQ-derived STS POW. **CONCLUSIONS:** EQ and LPT STS POW methods do not provide equivalent estimates, so the direct comparison between studies employing different methodologies is not recommended. Based on these preliminary findings, LPT-derived POW may be a stronger predictor of physical function and mobility in middle-aged and aging adults. Additional data, particularly in individuals with greater physical function limitations, should be collected to confirm these results, however.

Board #12

A MULTIMODAL EXERCISE INTERVENTION IMPROVES COGNITIVE FUNCTION IN OLDER ADULTS

Stephanie Rasco, Emily Swanson, Holden Sevening, Ava Schupbach, Maira Alevato, Kelsey Bourbeau, Terence Moriarty

PURPOSE: To investigate the effects of a multimodal exercise intervention on cognitive performance and aerobic capacity, and whether these changes are associated with alterations in prefrontal cortex (PFC) oxygenation (O2Hb) among older adults. **METHODS:** Sixteen participants (M=3, F=13, age: 61.9±4.1 years) were recruited from a local health and wellness club and completed a six-week multimodal exercise intervention three times per week. Participants completed a cognitive test battery (attention, processing speed, and executive function) and submaximal treadmill evaluation prior to and again upon completion of 18 individualized multimodal exercise sessions. Twelve participants (M=3, F=9, age: 63.1±4.0 years) also completed a three month follow up evaluation. A functional near-infrared spectroscopy (fNIRS) device was used to measure left and right prefrontal cortex (LPFC and RPFC) oxyhemoglobin (O2Hb) during the cognitive evaluation. A repeated measures one-way ANOVA was used to determine pre-, post- and three-month post differences in cognitive performance scores, aerobic capacity and PFC O2Hb. **RESULTS:** Participants showed an improvement in cardiorespiratory fitness (+5.9 ml/kg/min (estimated VO2max) and this remained 6.3 ml/kg/min higher than pre-testing at the three-month post time point. All three cognitive constructs improved significantly following the 6-week multimodal exercise intervention while executive function also remained elevated at the three-month post-testing time point ($p < 0.05$). The RPFC and LPFC displayed no significant changes in O2Hb across all three cognitive tests. A significant negative association between changes in aerobic capacity and RPFC O2Hb during the processing speed test (r: -0.51, p: 0.042) was detected. In addition, significant negative associations between aerobic capacity and LPFC O2Hb during the processing speed (r: -0.60, p: 0.015) and executive function (r: -0.62, p: 0.011) tests were detected. There were no significant differences between changes in PFC measurements and changes in cognitive test scores. **CONCLUSION:** A 6-week multimodal exercise program can improve cognitive performance in older adults. The negative associations between estimated maximal aerobic capacity and changes in PFC O2Hb suggests an improved neural efficiency with increased aerobic fitness.

Board #13

IMPROVING POSTURAL BALANCE THROUGH THE IMPLEMENTATION OF INDIVIDUALIZED WEDGE-SHAPED FOOT ORTHOTICS

Daniel Walsh, Alonso Figueroa, Anton Poral, Jonathan Ross, Erica Lee, Payam Zandiyeh

BACKGROUND: Increased foot pronation can impact the interaction between the human body and ground reaction loading during physical activities, affecting the biomechanics of the joints upper in the chain, which could predispose individuals to joint pathology. **PURPOSE:** To determine the longitudinal effect of using a subject-specific pronation-correcting shoe insole on improving postural balance in healthy subjects. We hypothesize that these insoles improve postural balance and will be more effective after continuous use, mainly when visual feedback is absent. **METHODS:** Thirty healthy participants were recruited and tested in this longitudinal IRB-approved study. Each subject's pronation angle was measured on a custom-built platform instrumented with a digital inclinometer; the pronation angle was measured to one-digit precision, and a subject-specific wedge-shaped insole was selected to cancel out the measured pronation angle. Subjects were tested twice; 1) immediately after pronation measurement, 2) after one week of continuous use. During each test session, participants were fitted with flat-soled shoes and asked to perform a single-leg balance on a force platform. They were asked to maintain their balance for 30 seconds without shifting their foot on the force plate. The following study conditions were tested: Eyes (open and closed), Insoles (with and without wedge-insole), and Time (baseline and 1-week later). The center of pressure analysis outcomes included: Ellipse Area, root means square in Anterior-Posterior and Medial-Lateral excursions. For statistical analysis, a repeated measures analysis of variance followed by a Bonferroni correction was used to compare the postural balance outcomes ($\alpha = 0.05$). The Insoles × Time and Insoles × Eyes interactions were statistically examined. **RESULTS:** No differences were detected between the study conditions. However, subjectively, participants reported better balance and reduced tiredness in their lower limbs after daily activities after one week of pronation correction insole uses. **CONCLUSION:** Our study findings could not objectively demonstrate that using wedge-shaped insoles can improve postural balance among active young individuals. The data from this study can serve as the baseline for future studies in patients with diagnosed lower limb pathologies as to whether these insoles can benefit them differently than healthy, young, and active subjects tested in the current study.

Board #14

COMPARISON OF AMBULATORY BLOOD PRESSURE MEASUREMENTS COLLECTED WITH AM AND PM START TIMES

Wesley T. Blumenburg, Vy Nguyen, Javier Cooper, Jill M. Slade, and Katharine D. Currie

BACKGROUND: High blood pressure (BP) is the leading risk factor for cardiovascular disease, with 46.7% of Americans having hypertension. Hypertension is diagnosed using a combination of in-office and out-of-office BP measurements, often utilizing ambulatory BP monitoring (ABPM) when clinic BPs are suspected to be inaccurate. While time of day may affect clinic BPs, paucity remains about whether the start time of ABPM (AM or PM) impacts BP readings. **PURPOSE:** To determine if 24hr, awake, and asleep BP measurements and morning systolic BP surge differ between AM and PM device start times. **METHODS:** Fourteen hypertensive postmenopausal females (68±8 yrs) wore an ABPM and a wrist activity monitor for 24-hrs on two non-consecutive days. Both devices were started in the AM (between 0900-1100h) for one day and PM (1800-2000h) for the other. For analysis of 24hr, awake, and asleep BP, as well as morning systolic BP surge, ABPM devices were programmed to obtain BP readings in 60-min intervals throughout the day and night with a 30-min period 2 hours directly upon awakening. Awake and asleep periods were determined from actigraphy data. Morning systolic BP surge was calculated using two different methods. The first is sleep through morning surge, which is the difference between systolic BP during the first two hours after awakening and the average of three systolic BPs during the asleep period centered on the lowest value during this period. Secondly, pre-awakening morning surge, is the difference between the average BP during the 2hr post-awakening and the average BP during the two hours before awakening. BP and morning systolic BP surge from AM and PM start times were compared using paired t-tests and Wilcoxon signed rank tests depending on normality. **RESULTS:** There was no difference in 24hr, asleep, and awake BPs between AM and PM device start times (all $P>0.05$). Additionally, there was no difference ($P>0.05$) in sleep through morning surge (AM: 19.5±12.4 mmHg vs. PM: 23.9±11.0 mmHg), but the pre-awakening morning surge was significantly ($P=0.01$) higher with the PM start time (21.7±12.8 mmHg) compared to the AM start time (6.7±15.7 mmHg). **CONCLUSION:** These preliminary findings suggest that ABPM device start time has a minimal effect on BP readings in post-menopausal females with hypertension. However, further research is needed to elucidate factors contributing to the differences in pre-awakening morning systolic BP surge.

Board #15

A COMPARISON OF RESTING METABOLIC RATE USING INDIRECT CALORIMETRY, THE InBody 770 AND PREDICTION EQUATIONS

Katelyn Golden, Angela R Hillman

BACKGROUND AND PURPOSE: Many equations exist to predict resting metabolic rate (RMR) when it is not possible to measure it using indirect calorimetry with a metabolic cart or handheld device. Additionally, specialized whole-body bioelectrical impedance (BIA) machines can utilize measured body composition parameters to estimate RMR. However, how the estimations compare to measured RMR via indirect calorimetry is not clear. The purpose of this study was to compare RMR values from BIA, prediction equations and different forms of indirect calorimetry. **METHODS:** Adult males (n=22; age: 33 ± 13 years; height: 180 ± 8 cm; weight: 85 ± 16 kg) and females (n=37; age: 33 ± 13 years; height: 165 ± 6 cm; weight: 75 ± 25 kg) reported to the lab for a BIA analysis (InBody 770) followed by 40 minutes of RMR measurement via indirect calorimetry with a metabolic cart (MCG Ultima) and a handheld device (MedGem). Comparisons between measured RMR, predicted RMR provided by the BIA (BMR+10%), and RMR prediction equations were made. **RESULTS:** There was no significant difference measured in RMR values from the MGC Ultima and BIA ($p = 0.27$, mean difference (md): 35 kcal/day). However, measured RMR was significantly greater than all estimation equations (De Lorenzo ($p<0.001$, md=123 kcal/day), FAO Age 18-30 ($p<0.001$, md=693 kcal/day), FAO Age 30-60 ($p<0.001$, md=848 kcal/day), Oxford Age 18-30 ($p<0.001$, md=732 kcal/day), and Oxford Age 30-60 ($p<0.0.025$, md=882 kcal/day)), but significantly lower than Harris-Benedict ($p=0.002$, md=92 kcal/day) and Livingston equations ($p<0.001$, md=650 kcal/day). There was a significant difference in the measured values from the MGC Ultima and the MedGem ($p<0.001$, md=341 kcal/day). **CONCLUSION:** In comparison to measured RMR from the metabolic cart, most of the prediction equations were significantly higher for RMR (average 279 kcal/day). Furthermore, it was discovered that the measured RMR from the MGC Ultima is significantly higher than the value calculated from the MedGem. The InBody 770 BIA appeared to be accurate compared to the MGC Ultima.

Board #16

CAN VIRTUAL REALITY GAMES REDUCE PAIN SENSITIVITY
Xzaliya Alexis Cervantes, Keith Naugle, Kelly Naugle

BACKGROUND: The impact of physically active and non-active virtual reality (VR) games on young, healthy people's sensitivity to experimentally generated pain remains unclear. Exercise and VR both have effects on reducing pain sensitivity in healthy individuals. It is unknown if physically active VR, compared to non-physically active VR or exercise alone, has a larger pain-reducing impact. **PURPOSE:** The study examined whether playing active VR games, which demand more movement, have a stronger hypoalgesic impact than playing non-active VR games and exercise of a similar aerobic intensity. **METHODS:** Twenty young adults completed 5 sessions. In sessions 1-4, subjects played one VR game per each session. The order of the games played were randomized and counterbalanced. For session 5, subjects rode a stationary bike at a similar intensity as the highest intensity played during VR game play (determined by heart rate(HR)). Each session included 2-5 minutes of game or bike familiarization followed by at least 10 minutes of rest, and then 15 minutes of game play or biking. The subject wore a HR monitor and accelerometers on the wrist and thigh during play. The VR games included Holopoint (HP) at level 2 and 3, Hot Squat (HS), and Relax Walk VR (RW). Pressure pain thresholds (PPTs) were measured on the bicep and thigh at the beginning of the session (pretest-1), immediately prior to gameplay (pretest-2), and immediately following each gaming bout (posttest). Ten minutes of rest separated the pretest-1 and pretest-2 PPT's. The data were analyzed with repeated measures ANOVAs. **RESULTS:** Results for the bicep revealed no changes in PPT's from the pretest-1 to pretest-2 trials. However, PPT's increased from pretest to posttest at the bicep in all conditions, p=.004. For the PPT's on the thigh, the analyses revealed a condition x time interaction, p=.019. No changes in PPT's from pretest-1 to the pretest-2 trials were found. PPT's increased from the pretest to the posttest following HP level 3 (pre=16.6±2.1, post=17.9±2.2), HS (pre=16.7±2.1, post=18.1±2.2), and bike (pre=17.3±2.2, post=20.6±3.0). Based on the HR data, the highest exercise intensity occurred during HS and bike, followed by HP level 3, then HP level 2 (p<.001). **CONCLUSION:** All conditions exerted a hypoalgesic effect on the bicep. Only the conditions which were completed at a higher aerobic intensity (HS, HP at level 3, and bike) exerted a hypoalgesic effect on the thigh.

Poster Session #5: Regency Ballroom E & F (2nd Floor), 3:45-5:00 pm

Board #1

COMPARISON OF CARDIOVASCULAR EXERCISE TESTS: A NEW PROTOCOL
Heidi Williams, Savannah Shadday, Jada Tooley, Kyra Noerr

BACKGROUND AND SIGNIFICANCE: The Standard Bruce Protocol, first published in 1963, is the oldest and the most studied cardiovascular exercise stress test. Commonly used in both research and clinical methods, the Bruce protocol is limited in feasibility with many styles of treadmills due to its steep incline requirements. The Kline protocol uses similar calculated METS per three-minute stage compared to the Bruce protocol by using a lower incline with faster speeds. The Bruce protocol is completed on a clinical treadmill that can achieve greater than a ten percent incline. The Kline protocol is modified to be completed on most traditional treadmills that can only achieve a ten percent incline. Validating a cardiovascular exercise stress test using a more traditional treadmill option could provide opportunities to assess submaximal exercise levels in various exercise settings, including general fitness facilities or home-based gyms. **RESEARCH QUESTION:** Does the Kline protocol produce similar heart rate, blood pressure, rate of perceived exertion, and lactate thresholds compared to the Bruce protocol? **PROPOSED METHODS:** Using a randomized, crossover design, 20 apparently healthy young adults (18-25 years old) will complete either the Bruce or the Kline protocol. One week later, subjects will return and complete the other protocol. Subjects' resting, exercise, and recovery heart rate will be measured using electrocardiography (EKG) to 85% of their age-predicted maximum heart rate. Additionally, blood pressure, pulse oxygen, and blood lactate will be collected in the last 15 seconds of each three-minute stage, immediately during supine recovery and every 3 minutes of supine recovery until heart rate returns to resting levels. Rate of perceived exertion, leg pain, dyspnea, and angina will be subjective data collected at the end of each stage and during recovery. **PROJECTED LIMITATIONS AND OBSTACLES:** The subjects' ability to maintain the staged speeds may be a limitation. Application of findings will also be limited to submaximal tests.

Board #2

ASSESSING THE EFFECT OF PROLONGED SITTING ON THE SIT-TO-STAND TASK IN YOUNG ADULTS

Shaquitta Dent, Jefferson Streepey, and NiCole Keith, FACSM

BACKGROUND AND SIGNIFICANCE: The use of the sit-to-stand (STS) task has been widely used across clinical populations to discriminate fallers from non-fallers. However, the influence of the acute effect of prolonged sitting on transferring from a stable position (i.e., sitting) to an unstable position (i.e., standing) is not well understood. **RESEARCH QUESTION:** This pilot study will aim to determine if postural sway (i.e., balance control) in the anterior-posterior (AP) and medial-lateral (ML) directions during the STS task will be significantly increased following 50 minutes of sitting measured in healthy young adults (i.e., 18 to 39 years of age). **PROPOSED METHODS:** Participants will be excluded if they have a history of a disorder that may cause impaired balance or decrease their ability to transition and stand in place. Participants will be instructed to stand upright from a chair with their arms across their chest at a normal speed on top of a force plate for 10 trials at 60 seconds followed by a rest period of 1-minute between each trial. Following the pre-test, participants will be instructed to sit quietly for 50-min. At the end of the 50-min period, the participants will perform a second STS task for 3 trials at 60s, same as the baseline test. Postural sway will be assessed via COP data in the AP and ML direction for excursion (i.e., total sway path), area (i.e., total dispersion of COP displacement), and velocity (i.e., how fast COP displacement occurs) for the total duration of the trial and four separate phases of the STS movement: signal onset to countermovement, countermovement to peak vertical ground reaction force (vGRF), peak vGRF to onset steady standing, and steady standing for 30s. A power analysis will be conducted to determine the desired sample size. Using IBM SPSS statistical software version 28 (IBM, Armonk, NY), Shapiro-Wilk analysis will determine normality and a Repeated Measures ANOVA will compare the difference between pre- and post- STS mean values. This study will use a power of 0.8 and alpha of $p < 0.05$. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the participants' prior activities to testing such as riding in a car or sitting at a desk for a period of time, the results of the study may be influenced by extrinsic factors.

Board #3

CAN EXERCISE PRIOR TO EACH DOXORUBICIN TREATMENT PREVENT SIGNIFICANT CARDIOTOXICITY IN CANCER PATIENTS UNDERGOING TREATMENT?

Nicholas B. Kelly, NiCole R. Keith, FACSM

BACKGROUND AND SIGNIFICANCE: The treatment of cancer can incur damage to organs and organ systems that are not targets of cancer therapies. Certain chemotherapies, especially doxorubicin which is used in the treatment of breast cancer can be especially damaging to the heart. This damage called cardiotoxicity is a major concern for both clinicians treating, and patients undergoing treatment. Exercise has been shown to offset and ameliorate cancer treatment related toxicities, and a single bout of exercise has been shown to reduce damage to the heart associated with the very first doxorubicin treatment (where the majority of cardiotoxicity occurs). It is however unknown whether this damage is prevented in subsequent treatments where there is no bout of exercise before. **RESEARCH QUESTION:** Can a bout of moderate intensity exercise performed prior to each doxorubicin treatment prevent cardiotoxicity and protect the heart in breast cancer patients undergoing treatment? **PROPOSED METHODS:** All participants will undergo a baseline assessment including a graded treadmill test to determine estimated VO2max, an echocardiogram to capture baseline clinical cardiac measures (Left-ventricular ejection fraction, ventricular twist, and longitudinal strain), and a blood draw that will assess biomarkers related to subclinical cardiotoxicity (NT-proBNP, cardiac troponins). Cancer patients undergoing treatment will be randomized into 2 study arms, exercise and control. Cancer patients in the exercise arm will perform a single bout of moderate-intensity cardiorespiratory exercise (75% of HRmax) for 30 minutes, 24 hours prior to each doxorubicin treatment during their cancer therapy. Control arm participants will undergo normal clinical care with no supervised exercise. A post-treatment assessment including the same battery of tests will be administered upon completion of treatment, and compared to pre-test results within and between groups to analyze changes to cardiac health status. **PROJECTED LIMITATIONS AND OBSTACLES:** Limitations to the treatment include not being able to control any exercise that participants decide willingly to do outside of the experimental bout before each treatment and compliance with exercise intensity in duration for the intervention group. Obstacles to this study will be recruiting participants before they begin treatment, as this window can be short and stressful for cancer patients.

Board #4

IDENTIFYING BARRIERS AND FACILITATORS TO IMPLEMENTING A COMMUNITY-BASED PHYSICAL ACTIVITY INTERVENTION IN MINORITY COMMUNITIES: A MIXED METHODS STUDY
Rafael A. Alamilla, Navin Kaushal, & NiCole R. Keith, FACSM

BACKGROUND AND SIGNIFICANCE: Our group recently conducted a community-based physical activity (PA) intervention aimed at increasing PA behaviors among underrepresented minorities (URM). A notable outcome of this investigation was an inability to recruit and retain URM participants. Moreover, the study team was presented with unanticipated barriers to study participation and protocol adherence (i.e., preference to exercise at home, lack of physical literacy, etc.) that potentially influenced study outcomes. Results suggest the need for more work to identify barriers and facilitators to participation in PA studies, in general and among URM in particular. At a broader level, little work has been done to fully characterize the barriers and facilitators to PA interventions. A recent systematic review identified 13 studies that described barriers and facilitators to PA-and only one U.S.-based study. Additionally, there was no mention of how the identified barriers and facilitators differed across different racial, social, and environmental parameters. **RESEARCH QUESTION:** The purpose of this proposed investigation is to implement a mixed methods framework to describe the barriers and facilitators to engaging in PA interventions among minority community members. **PROPOSED METHODS:** A mixed methods, cross-sectional investigation will aim to identify existing barriers and facilitators to PA using a theory driven approach (socio-ecological model; social determinants of health). Psychological constructs (social support, self-efficacy, physical literacy, etc.), current PA levels (IPAQ), and descriptions of community built environments (access to PA resources, presence of PA-friendly amenities, complete streets, etc.) will be evaluated. To further elucidate quantitative findings, the investigative team will conduct qualitative interviews/focus groups with key community stakeholders and residents. Proposed inclusion criteria are being residents or working within a predominantly minority community within a pre-specified Midwestern metropolitan area and being > 18yrs. **PROJECTED LIMITATIONS AND OBSTACLES:** Limitations of this investigation include not measuring outcome variables at multiple timepoints and limiting study recruitment to one metropolitan area. Potential obstacles include overcoming mistrust held by community members and identifying community sites where individuals can participate in the study.

Board #5

MUSCLE FUNCTION ASSOCIATED WITH THE 1RM AND AMRAP SQUAT TEST
Andrew J Veith, Monica Hubal

BACKGROUND AND SIGNIFICANCE: Muscle fiber type dominance is a popular topic of discussion and concern for athletes, coaches, and people who are generally invested in exercise performance, and rightfully so. Currently, the gold standard for assessing fiber type composition is the muscle biopsy, which is invasive, requires specific equipment, and professionals trained in the techniques of obtaining and analyzing the biopsy sample. All of these factors would make the muscle biopsy method either unappealing or entirely unfeasible for a majority of the aforementioned parties. Thus, a more feasible alternative should be found, in order to give those interested a much more accessible means of accurately determining the fiber type distribution of an individual. One such method is AMRAP (as many reps as possible) testing for a given exercise, and using the amount of reps performed as the gauge to determine fiber type, which has appears to be effective, though more research is needed. **RESEARCH QUESTION:** Is there a relationship between half-relaxation time and squat 1RM/AMRAP scores? Is there a relationship between half-relaxation time and/or squat 1RM/AMRAP scores with athletic assessment scores? **PROPOSED METHODS:** Subjects will complete demographic and training history questionnaires. Subjects will be familiarized with the back squat standards for the study. They will then perform a triple broad jump, 40 m sprint, and a 3-cone drill. Skinfolds will be used to assess body composition. At the end of this visit, subjects will also be given a 1-week tapering protocol specific to the back squat to alleviate fatigue and prepare them for back squat testing. On their next visit 1 week later, they will establish a new 1RM for the back squat, with 5 total allotted attempts. Subjects will rest for 5-10 minutes while 80% of their new 1RM is loaded onto the bar. After their rest period is over, they will perform the back squat for as many reps as possible until failure. **PROJECTED LIMITATIONS AND OBSTACLES:** There is the potential for a subject to fail to adhere to the tapering protocol, ingesting more than 300 mg of caffeine the day of squat testing, failing to meet the squat depth standard, performance enhancing drug use. Some subjects may also feel uncomfortable having their skinfolds measured. Some responses in the training history questionnaire will likely be approximations. The study protocol also requires multiple visits 1 week apart, potentially interfering with subjects' schedules.

Board #6

RESISTANCE TRAINING AS PHYSIOLOGICAL AND PSYCHOLOGICAL PRECONDITIONING FOR EXERCISE-AVERSE PEOPLE WITH PREDIABETES
Mitchell Smith, Monica Hubal FACSM

BACKGROUND AND SIGNIFICANCE: Landmark research studies such as the 2002 Diabetes Prevention Program demonstrated the effectiveness of endurance exercise in reducing T2D. While average responses to aerobic training in these programs are positive, the inherent variability in exercise response creates a subpopulation of at-risk individuals that respond poorly to aerobic training plans, which could lower their outcome expectations associated with endurance exercise and, in turn, negatively impact their long-term metabolic risk. Obese individuals can have higher baseline strength compared to their normal weight peers, and therefore may have higher exercise self-efficacy with resistance exercise than with endurance-based exercise. **RESEARCH QUESTION:** The primary objective of this study is to test the feasibility of a 12-week progressive resistance training protocol as psychological and physiological preconditioning for aerobic exercise in very low-fitness individuals with prediabetes and exercise aversion. We hypothesize that the protocol will produce significant improvements in cardiorespiratory fitness and insulin sensitivity, as well as strength gains which will boost exercise self-efficacy. Waist circumference, HDL, triglycerides, and blood pressure are expected to remain relatively unchanged. Accumulating mastery experiences with resistance training should reduce aversion to exercise by lowering a perceived barrier and improving outcome expectancy. **PROPOSED METHODS:** 44 obese adults with prediabetic HbA1c values, low exercise self-efficacy, and very low fitness will be randomized to either receive 12 weeks of personal training or control. The intervention group will exercise twice per week for 12 weeks using 4 compound, multi-joint exercises. Loads will be progressed linearly session to session. Cardiorespiratory fitness, maximal strength, total physical activity, exercise self-efficacy, HOMA-IR, and metabolic syndrome markers will be assessed at baseline and follow up. **PROJECTED LIMITATIONS AND OBSTACLES:** Exercise self-efficacy and outcome expectancy require measurement via questionnaire, which have the potential to be biased by beliefs or social norms that may not generalize to others. The identification and recruitment of eligible participants may be a barrier due to relatively narrow inclusion criteria including the need to live within proximity to the training facility to attend the weekly sessions.

Board #7

CEREBRAL BLOOD FLOW DURING ECCENTRIC, CONCENTRIC AND ISOMETRIC CONTRACTIONS
Lara Boman, Brittany Smith, & Angela Ridgel, FACSM

BACKGROUND AND SIGNIFICANCE: Resistance training improves motor function in people with Parkinson's disease (PD) and promotes structural changes in the brain of older adults. However, it is not clear how cerebral blood flow changes with specific contraction types (e.g. eccentric, concentric, isometric) or how these changes vary between healthy older adults or individuals with PD. Evaluating samples of healthy young adults, healthy older adults and individuals with PD will allow for an evaluation of how cerebral response to resistance exercise varies with age and disease state. If a specific contraction type elicits increased blood flow to clinically significant regions of the brain in people with PD, future research could evaluate the impact of resistance training programs utilizing specific contraction type on motor function in people with PD. This work could allow for resistance training prescriptions tailored specifically for individuals with PD. **RESEARCH QUESTION:** How do cerebrovascular activity patterns, as measured with functional near-infrared spectroscopy (fNIRS), change during eccentric, concentric and isometric contractions in healthy young adults, healthy older adults and people with PD? **PROPOSED METHODS:** A sample of healthy young adults, healthy older adults and people with PD (Hoehn & Yahr Stage I-III) will be recruited to complete four types of bicep curl (full repetitions, isometric hold at 90 degrees, assisted eccentric-only repetitions, assisted concentric-only repetitions) for 15 seconds each. An fNIRS cap will be fitted to measure cerebrovascular activity in the motor and prefrontal cortices while individuals are completing the exercise. A washout period will separate trials. Dumbbell weight will be standardized across participants and consistent across trials. There will be no conversation, music, or visual stimulus present during exercise and surroundings will be standardized for all participants. Band pass filtering will be used to process fNIRS data. **PROJECTED LIMITATIONS AND OBSTACLES:** fNIRS technology allows for measurement of cerebral blood flow in superficial regions of the brain, however, this technology does not allow for evaluation of blood flow in deep regions of the brain, some of which may be relevant to PD.

Board #8

RELIABILITY AND VALIDITY OF THE HEART RATE COMPONENT OF WEARABLE TECHNOLOGY FOR ASSESSING PERFORMANCE OF NCAA ATHLETES
Katherine Curtis, & Karin Pfeiffer FACSM

BACKGROUND AND SIGNIFICANCE: Wearable technology offers athletic programs the ability to monitor various parameters of athletic performance that can complement training strategies and rehabilitation programs. Heart rate monitors are commonly used to prescribe and monitor intensity during exercise, especially during aerobic events. Heart rate monitors are commonly used in sports with a high aerobic requirement such as soccer and field hockey. Female athletes are historically underrepresented in sports performance research, and it is important to ensure that they are included in future research. Heart rate monitors sewn into sports bra-like garments have been introduced to increase the utility of wearable technology. However, the device has not been deemed reliable and valid by a third-party investigator, leaving a gap in the literature on its usefulness. **RESEARCH QUESTION:** Assess the reliability and validity of the heart rate monitor component of a wearable technology device at varying exercise intensities in female athletes. **PROPOSED METHODS:** A total of 24 NCAA female field hockey players will be recruited to participate in the study. The study consists of two separate visits. Anthropometrics (height, weight) of the participants will be collected at their first visit. The participants will wear their assigned heart rate monitor as well as a three-lead electrocardiogram for both visits. The exercise protocol will be randomly selected for each visit. Depending on the selection, the participant will either perform a submaximal or maximal test on a treadmill. The submaximal test consists of four stages that last three minutes each. During the first stage the participant will lie supine for resting conditions. In stage two the participant will perform aerobic exercise at 5km/hr (3.1 mph) on the treadmill. In stage three participants will run at 10km/hr (6.2 mph), and stage four increases to 12.5 km/hr (7.8 mph). The VO2max protocol consists of the same stages performed in the submaximal protocol but at the end of stage four the grade of the treadmill will be increased by 2% every minute until volitional exhaustion. Intra-device reliability will be assessed by intraclass correlation coefficient (ICC). Validity will be assessed through Pearson correlation and Bland-Altman test. **PROJECTED LIMITATIONS AND OBSTACLES:** Fitting the garment for each participant is a potential obstacle because the garments have a limited size range.

Board #9

METABOLIC COST OF HUMAN LOCOMOTION ON SOFT TERRAIN
Kyle Wehmanen & Steven Elmer

BACKGROUND AND SIGNIFICANCE: For over 150 years researchers have investigated the energy cost of human locomotion; however, direct comparison between different locomotive modes, such as walking, running, or cycling, has largely been limited to a laboratory setting or has been estimated. While it is generally accepted that bicycling has better transport economy (i.e., total energy required to move a give distance) than walking or running on firm surfaces, there is significantly less data on soft terrain such as sand. R**ESEARCH QUESTION:** Which mode of locomotion, foot (walking/running) or bicycling, is most economical for travel on soft terrain? We hypothesize that bicycling will have a lower metabolic cost at a given speed compared to foot travel, thus resulting in greater transport economy when traveling on sand. Answering this question may have implications for human-powered exploration in desert and polar environments and potentially even Mars. **PROPOSED METHODS:** Twelve healthy adults with running and bicycling experience will travel on soft sand terrain (200-meter loop, 0% grade) while on foot or on a bicycle. During the bicycling trials, participants will ride a specialized bike equipped with oversized tires. Participants will complete eight sub-maximal exercise trials at two walking speeds, two running speeds, and four matched bicycling speeds. During all trials, participants will wear a portable metabolic system (Cosmed K5; Chicago, IL, USA) that will measure oxygen consumption (VO2). VO2 at rest will be measured prior to each trial. Differences between resting VO2 and VO2 for the steady state duration of each exercise trial will be used to calculate net VO2, which will then be converted into metabolic energy (J). Metabolic energy for each trial will be divided by distance covered and participant body mass to calculate transport economy (J/kg/m). A 2(mode) x 4(speed) repeated measures ANOVA will be used to determine if either mode or speed is a significant predictor of transport economy. If mode or speed is found to be significant (alpha-level < 0.05), differences between levels will be assessed using post-hoc Tukey tests. **PROJECTED LIMITATIONS AND OBSTACLES:** Standardization and control of the 'softness' of the sand surface between individual trials and multiple days of testing could prove difficult. To minimize this impact, we will conduct all testing at a proving ground on designated test courses where sand softness can be adjusted to an extent.

Board #10

THE EFFECTS OF TRANSCRANIAL DIRECT CURRENT STIMULATION ON PREFRONTAL CORTEX HEMODYNAMICS AND HANDGRIP TIME-TO-FAILURE: A RESEARCH PROPOSAL
Yousef Qadumi, Lukus Klawitter, Joshua Carlson, Eric Naugle, Lily Carter, Matthew Kilgas

BACKGROUND AND SIGNIFICANCE: Age-related changes to the neuromuscular system can have a negative effect on motor function and performance, which gradually constraints daily activities and independent living in older adults. Transcranial direct current stimulation (tDCS) is a neuromodulation technique that has been linked to improvements in the neuromuscular system. By depolarizing the neuronal membrane potential, tDCS may increase the neuronal firing rate in targeted brain regions which may delay the termination of exercise. Additionally, various measures of handgrip strength have been used to assess characteristics of muscle function and are non-fatiguing, and inexpensive, making handgrip time-to-failure (TTF) a practical assessment of muscle endurance in older adults. **RESEARCH QUESTION:** Does tDCS improve handgrip TTF, and induce changes in central and peripheral blood flow in older adults? **PROPOSED METHODS:** In this randomized, single-blinded, SHAM-controlled, cross-over design, 35 participants will complete a handgrip TTF task after undergoing tDCS or SHAM conditions. Next participants will undergo 20 minutes of tDCS or SHAM stimulation, the anode electrode will be placed over the dorsolateral prefrontal cortex, and the cathode will be placed over the right orbitofrontal cortex according to the EEG international 10/20 system. Following stimulation NIRS electrodes will be placed on the forehead of the participant, additionally, a functional NIRS electrode will be placed over the flexor carpi radialis. Both NIRS systems will be used to detect changes in oxygenated vs. deoxygenated hemoglobin. Subjects will then perform a TTF task by maximally squeezing a handgrip dynamometer until they can no longer maintain 50% of MVC. A one-way analysis of variance will be used to analyze the effect of group (tDCS and SHAM) on TTF. A separate 2x4 repeated measures ANOVA will be used to analyze the effect of group and time (25%, 50%, 75%, and 100% TTF) and the interaction between group and time on the prefrontal cortex and muscle oxygenation. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to time constraints and working with older adults we will not be able to include a true control group. SHAM stimulation may induce a placebo effect that could alter TTF in both groups.

Board #11

BALANCE AND COMPETITION SCORES IN YOUTH FIGURE SKATERS
Alyssa Kormos, Daniel Goble, Joshua Haworth

BACKGROUND AND SIGNIFICANCE: On-ice performance for figure skaters depends on strength, agility, and high levels of motor control - including balance ability. Mixed opinions leverage varied evidence for the type and timing of balance training needed for peak performance, though general consensus supports its use to develop overall motor proficiency. Literature has indicated sport specific differences in balance behavior, for instance between ballet dancers and track athletes or American football and ice hockey athletes. One aspect of balance that is understudied is the relative contribution of static and dynamic balance abilities with respect to figure skating skill. No previous literature focuses on balance relating to competition outcomes in figure skating. **RESEARCH QUESTION:** Do static and dynamic balance relate to figure skating performance? **PROPOSED METHODS:** Participants will be recruited from a nationally competitive local figure skating club, with members aged 5 to 65 years. All participants will be asked to complete informed assent/consent, according to their age, as approved by the university IRB. Procedures will be completed before or after practice. Following assent/consent, participants will self-report height, weight, age, and history with figure skating (i.e. years of experience and competition level). Following, balance will be tested using separate static and dynamic tests on a force plate. The static test consists of four 20s trials wherein participants are asked to stand as still as possible while looking straight ahead with eyes closed, hands on hips, and feet shoulder width apart. The dynamic test consists of two 60s trials wherein participants are instructed to sway in all directions in order to cover the largest area possible, with eyes open and directed towards a computer screen displaying a blue area, depicting their area of travel, overlaid on an image of the force plate. Competition scores will be collected from a public report after the team's next national competition, no more than one month following testing. Stepwise multiple regression will be used to establish the set of factors, and their relationship, between competition scores with static balance, dynamic balance, age, and years of experience. **PROJECTED LIMITATIONS AND OBSTACLES:** Competition scores are complex and subjective. We will focus our analysis on the "skating skills" component, which better reflects the technical aspects of performance.

Board #12

DOES INSULIN RESISTANT SKELETAL MUSCLE IMPAIR ENDOTHELIAL CELL ANGIOGENESIS VIA EXTRACELLULAR VESICLES

Lundon Burton, Linda Adeyemo, Ivan Bobadilla, Dr. Tim Gavin, FACSM

BACKGROUND AND SIGNIFICANCE: Obesity is a major public health concern, is present in 43% of US adults, and leads to 2.4 y loss in life expectancy. Obesity increases the risk for many comorbidities including insulin resistance (IR). IR leads to vascular complications including endothelial dysfunction in obesity, type 2 diabetes mellitus, and cardiovascular disease. There is extensive cross-talk communication between skeletal muscle fibers and capillary endothelial cells (EC), which is important for cross-tissue regulation. Skeletal muscle extracellular vesicles (EVs), which contain mRNA, proteins, microRNA, are important in cell-to-cell communication and under normal conditions promote key components of angiogenesis including EC proliferation, migration, and tube formation. However, the mechanisms for skeletal muscle insulin resistance impairment of EC function is poorly understood. **RESEARCH QUESTION:** Does insulin resistance in skeletal muscle impair endothelial cell function and angiogenesis via extracellular vesicles? **PROPOSED METHODS:** Insulin resistance will be induced in primary human skeletal muscle myotubes by a 2-day incubation in an obesogenic media (tumor necrosis factor alpha (TNF-α), oleate + palmitate, and insulin). Following incubation, media from IR and control myotubes will be collected and EVs will be isolated using size exclusion chromatography. Human umbilical vein endothelial cells (HUVEC) will be incubated with skeletal muscle-derived EVs and HUVEC proliferation, tube formation, and migration will be measured. Student's t-test will be used to determine differences between conditions. Significance will be established at $P < 0.05$. **PROJECTED LIMITATIONS AND OBSTACLES:** It is possible the current obesogenic media incubation will not induce IR in skeletal muscle myotubes. If so, then other methods (Luo et al., 2019; Alvero et al., 2004) to induce insulin resistance be used.

Board #13

BILATERAL DEFICIT AND ITS RELATIONSHIP TO ACCELERATION IN DIVISION II MEN'S SOCCER ATHLETES

Scott O'Neill, Chad Odaffer, & Gary Long

BACKGROUND AND SIGNIFICANCE: Bilateral deficit (BLD) occurs when the force produced during a bilateral (both sides of the body) movement is less than the sum of the forces produced unilaterally (on one side of the body). Investigation regarding BLD and its potential impact on sports performance is gaining interest, however, there is limited data on its importance in team-sport athletes. In those activities that demand single-leg actions (e.g. running, jumping, kicking) it may be the case that improving the BLD could positively impact performance. Specifically, if it can be determined that BLD is related to speed and acceleration, this may provide novel insight into training methods to enhance player performance. Additionally, there is a relative paucity of research in this area, and as such, normative BLD data in college athletes is necessary. **RESEARCH QUESTION:** Is BLD related to speed and acceleration in college soccer players? **PROPOSED METHODS:** 64 healthy, male collegiate soccer players will be recruited for the study. Speed and acceleration will be measured via a 40m sprint test with timing gates placed at 0m, 5m, 10m, 20m, and 40m. BLD will be measured using the horizontal standing broad jump (SBJ) test which will account for participants' horizontal force capability, measured in distance traveled (m) and calculated using the following equation: {(Bilateral distance)/[(unilateral distance right) + (unilateral distance left)] * 100} - 100. A correlation analysis will determine if any relationship exists between BLD and speed, as well as acceleration at each distance point. **PROJECTED LIMITATIONS AND OBSTACLES:** Our study investigates BLD on one day and relates it to two performance metrics. Further study might involve multiple teams, added performance metrics, and repeated measures. Additionally, we recommend further work on athletes in different unilateral focused sports (i.e. basketball, lacrosse, track) to investigate if any similar relationships exist.

Board #14

KNOWLEDGE OF RELATIVE ENERGY DEFICIENCY IN SPORT (RED-S) AMONG COACHES OF HIGH SCHOOL FEMALE RUNNERS

Mackenzie Unke, Dr. Jessica Gorzelitz, Dr. Lucas Carr, Dr. Kara Whitaker, FACSM

BACKGROUND AND SIGNIFICANCE: Female endurance athletes have an increased risk of the female athlete triad (the Triad) and relative energy deficiency in sport (RED-S). The Triad and RED-S are conditions that involve health and performance consequences associated with low energy availability. Little is known about the knowledge of RED-S among high school running coaches who work with female runners. The purpose of this needs assessment study is to explore factors associated with coaches' knowledge, confidence, and educational training of RED-S to determine if a

RED-S coaching education intervention is needed for this population. If a lack of RED-S knowledge is found, this study will provide the formative work to develop an education intervention to increase the awareness and knowledge of RED-S among high school coaches to prevent athlete injury. **RESEARCH QUESTION:** What knowledge, confidence, and educational training do high school coaches who work with female runners have of RED-S? **PROPOSED METHODS:** This will be a cross-sectional study examining the knowledge, confidence, and educational training related to RED-S of Iowa and Wisconsin high school coaches who work with female runners. The recruitment approach will involve partnering with Iowa and Wisconsin Athletic Associations, who will email an electronic questionnaire to their affiliated high school running coaches. The questionnaire will include an assessment of participant characteristics, a 37-item validated knowledge and confidence RED-S questionnaire, three overall confidence questions, questions related to RED-S specific education, and exploratory questions with open-ended responses. Knowledge, confidence, and impact (knowledge x confidence) scores will be analyzed using descriptive statistics. Levels of knowledge and impact will be determined by separating participants into tertiles (low, moderate, high). Chi-square tests will be used to assess how participant characteristics (e.g., coach's gender) are associated with knowledge and impact scores (low, moderate, high). A logistic regression model will assess associations between participant characteristics and RED-S knowledge and impact while controlling for potential confounders (e.g., state coached in). **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the cross-sectional research design, we will not be able to demonstrate causality and this study may be subject to selection bias.

Board #15

THE EFFECT OF AEROBIC EXERCISE STAIR 'SNACKS' ON PSYCHOLOGICAL BURNOUT

Dylan Darsidan, Max O'Dell, Alissa Stiles, Ella Kittleson, Maddie Moran, Ashley Aird, Katie Fare, Lauren Connell & Kelsey Bourbeau

BACKGROUND AND SIGNIFICANCE: In an era marked by increasing psychological burnout, research focused on interventions aimed to reduce stress and burnout is crucial. Burnout not only affects individuals' well-being but also has significant societal and economic implications. Limited evidence suggests that exercise, specifically aerobic exercise, may play a role in attenuating burnout across a variety of populations. The use of traditional exercise interventions, however, may not be practical as time constraints are often reported as a barrier to seeking treatment of burnout. Thus, the purpose of this study is to examine the impact of sprint exercise "snacks" on burnout. Findings from this study may implicate using exercise "snacks" as a treatment for burnout. **RESEARCH QUESTION:** Does a 6-week stair "snack" intervention improve burnout in healthy individuals when compared to a non-exercise control group? **PROPOSED METHODS:** In this study, subjects experiencing burnout, as determined with the Maslach burnout inventory (MBI), will be randomized into either a stair snack (SS, n = 10) group or a non-exercise control group (CG, n = 10). Throughout the 6-week intervention, subjects in the SS group will perform 3 bouts of 20-second stairwell sprints at an 'all out' intensity, 3x/day, 3x/week. Subjects in the CG will be asked to continue with their current lifestyle habits. All subjects (n = 20) will be asked to wear a wrist activity monitor (Polar, Inspire 2) throughout the 6-weeks. Subjects will visit the exercise physiology lab pre- and post-intervention and the following data will be collected: 1) Psychological Burnout (MBI), 2) Depression and Anxiety Levels (BDI-II, STAI), 3) Sleep Quality (SQS) 4) Body fat (ADP), 5) Aerobic fitness (VO2max), 6) Executive Function (Stroop, N-back, WCST), and 7) Heart Rate Variability (HRV). A two-way repeated measures ANOVA will be used to examine between and within group changes in all variables from pre- to post-intervention. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the nature of the control group, subjects will not be blinded to their group assignment which may influence their perception of burnout. In addition, external factors (school or work-related circumstances) could influence burnout symptoms independent of the intervention. Further, we will be recruiting strictly from the university setting (students, faculty, and staff) which may limit the generalizability of results to other populations.

Board #16

IMPACT OF EV DERIVED FROM OXIDATIVELY STRESSED PRIMARY HUMAN SKELETAL MUSCLE MYOTUBE ON ANGIOGENESIS

Ivan Alonso Bobadilla, Linda Adeyemo, Lundon Burton, & Tim Gavin, FACSM

BACKGROUND AND SIGNIFICANCE: Skeletal muscle atrophy and endothelial cell (EC) dysfunction occur concurrently in aging, type II Diabetes Mellitus, and obesity. The communication between the vasculature and skeletal muscle (SkM) plays an important role in tissue homeostasis. Extracellular vesicles (EV) are secreted by cells and are critical in cell-to-cell communication. The content (mRNAs, proteins, and microRNAs) and quantity of EV depend upon the cell type and environmental conditions. For instance, EV derived from oxidatively stressed primary human muscle satellite cells impairs EC angiogenesis. However, skeletal muscle is comprised primarily of mature myofibers

and not satellite cells. **RESEARCH QUESTION:** Do EV derived from oxidatively stressed primary human skeletal muscle myotubes (HSkM) impair EC angiogenesis? **PROPOSED METHODS:** Primary HSkM will be exposed to 200 μM H2O2 for 48 hr. EV will be collected from condition media of H2O2 treated and control HSkM by size exclusion chromatography. EV quantity and size will be measured by NanoSight analysis. Human umbilical vein endothelial cells (HUVEC) will be treated with HSkM-derived EV and HUVEC proliferation, migration, and tube formation will be measured. Paired Student's t-tests will be used to identify differences between conditions. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to its nature, using this cell culture model only allows us to evaluate the influence of secreted EV from myotubes onto EC without including other factors such as impaired oxygen and nutrient delivery in disease states. Another potential obstacle is cell death. Although the selected H2O2 concentration has been proven to induce changes in myoblast-derived EV, excessive cell death is accompanied by an augmented production of apoptotic bodies, which could mask any effect of smaller-sized EVs.

Board #17

THE PROTECTIVE EFFECT OF ESTRADIOL ON HUMAN SKELETAL MUSCLE AGAINST OXIDATIVE STRESS-INDUCED ENDOTHELIAL DYSFUNCTION

Linda Adeyemo, Ivan Alonso, Lundon Burton & Tim Gavin, FACSM.

BACKGROUND AND SIGNIFICANCE: Low circulating levels of estradiol have been associated with age-related skeletal muscle dysfunction, sarcopenia, functional limitations, and declines in metabolic and endothelial function. Endothelial dysfunction contributes to metabolic disorders, neurodegenerative diseases, cardiovascular diseases, and aging. This is due in part to elevated levels of reactive oxygen species (ROS). Both endothelial and skeletal muscle cells communicate by the exchange of extracellular vesicles (EVs), which contain RNA, lipids, and proteins reflecting the metabolic health of the originating cells, as well as regulating cellular functions. The study is significant as it examines: 1) if endothelial cell oxidative stress is communicated to skeletal muscle via EVs; and 2) if estradiol can prevent the deleterious effects of endothelial cell oxidative stress on skeletal muscle function. Therefore, this study aims to investigate whether estradiol can protect skeletal muscle against oxidative stress- induced endothelial dysfunction. **RESEARCH QUESTION(S):** Does oxidative stress-induced endothelial cell dysfunction impair myoblast proliferation and myotube formation via EVs? Does estradiol protect skeletal muscle against oxidative stress-induced endothelial dysfunction? **PROPOSED METHODS:** Human Umbilical Vein Endothelial cells (HUVECs) will be exposed to 75μM H2O2 for 48 hr. EVs will be collected from the media of H2O2 and Control HUVECs. Primary human skeletal muscle satellite cells (HMuSC) pretreated with 100 μM of estradiol will be exposed to HUVEC-derived EV. HMuSC proliferation and myotube formation will be measured. A two-way analysis of variance (ANOVA) will be used to identify differences between conditions (HUVEC treatment x HMuSC treatment). **PROJECT LIMITATIONS AND OBSTACLES:** The ability to replicate in vitro the complex in vivo communication between endothelial and muscle cells is a limitation. Successful isolation of EVs from HUVECs may be difficult due to the effects of the treatment on HUVEC viability and EV production.

Evening Schedule – Friday, October 13th: Special Events

<u>Clinical Exercise Physiology Panel:</u> Cosmopolitan Ballroom, 5:00-6:00 pm

CLINICAL EXERCISE PHYSIOLOGY - PROFESSIONALISM & ADVANCEMENT

Session Moderator: Judi Juvancic-Heltzel, University of Akron

Presenters and Institutional Affiliations:

Garett Griffith, Ph.D.

Northwestern University, Evanston IL

Biography: Dr. Garett Griffith received his MS in Clinical Exercise Physiology from Ball State University in 2014, MPH in Health Policy and Administration from the University of Illinois at Chicago in 2016, and PhD in Health Sciences from Rush University in 2022. He is certified through the ACSM as a Clinical Exercise Physiologist. His research has focused on physical activity- and exercise-mediated responses of the cardiovascular and autonomic systems in adult and pediatric clinical patient populations with chronic conditions. Garett is an Assistant Professor in the Department of PT and Human Movement Sciences.

Sandra K. Knecht, M.S., RCEP
Cincinnati Children's Hospital Medical Center, Cincinnati, OH

Biography: Ms. Sandy Knecht is a master's prepared Clinical Exercise Physiologist with over 20 years' experience in cardiopulmonary exercise testing in pediatric and adult congenital patients. She is currently a Senior Clinical Exercise Physiologist at Cincinnati Children's Hospital. Sandy holds the American College of Sports Medicine ACSM -CEP certification and the RCEP distinction. Sandy is active in several professional organizations and is currently serving on the Midwest ACSM (MWACSM) board of directors as the co-chair of the clinical committee and the Clinical Exercise Physiology Association (CEPA) as a member of the fellowship committee. She also holds committee positions with ACSM's CCRB, EIM pediatric committee, and the SHI Youth Sports & Health committee. Previously, she has held positions as the Member-At-Large with both MWACSM and CEPA and a member of CEPA's registry committee. Sandy has ongoing involvement in research projects, publications, and our cardiopulmonary lab's educational and internship programs.

Cassandra Ledman, M.S., RCEP, NBC-HWC
Purdue University, West Lafayette IN

Biography: Ms. Cassandra Ledman is a Clinical Associate Professor at Purdue University teaching courses within Clinical Exercise Physiology and Health and Wellness coaching. She is a Registered Clinical Exercise Physiologist (RCEP) and National Board Certified Health and Wellness Coach (NBC-HWC). Cassandra has over 15 years of experience in the clinical setting as an exercise physiologist rehabilitating and educating patients with chronic conditions, specializing in cardiovascular disease. She is very involved with the development of undergraduate and graduate curriculum to support the clinical exercise physiology and health coaching professions; and is very passionate about contributing to the growth of our industry and development of exceptional future professionals.

Session Overview: This clinical panel presentation is geared for both faculty and students to learn more about careers in Clinical Exercise Physiology. Panelists will highlight progress for recognition and professionalism of the CEP. Outlook and opportunities in the profession working as an allied health care provider and efforts for professionalization. A focus on the benefits of ACSM-CEP certification, clinical internships, careers within healthcare and research settings, along with the journey to become recognized as Qualified Healthcare Providers (QHP) will be discussed. Time will be spent engaging attendees in questions and answers.

ACSM Special Interest Group Meet & Greets: Studio I and Network Room (2nd Floor) 5:00 - 6:00 pm

Strength & Conditioning Specialities

Representative: Dr. Cardyl Trionfante
Mission: To support and promote an interdisciplinary forum for the exchange of information, the focus of research, and the development of a cooperative relationship between strength and conditioning professionals and the medical and applied sciences.

Nutrition

Representative: Dr. Rachel Darr
Mission: To promote the science of nutrition within ACSM, to be a reliable nutrition resource for ACSM and to critically evaluate nutrition and sport nutrition information in the marketplace.

Exercise Science Education

Representative: Dr. Rachele Kappler, FACSM
Mission: To develop and promote methods to enhance the lecture and laboratory exercise sciences pedagogy so as to improve students' cognitive skills.

Minority Health & Research

Representative: TBD
Mission: To provide a multidisciplinary forum for focused discussion and collaborative

research on minority health issues, with particular emphasis on preventable disease conditions and cardiovascular disease risk factors.

Built Environment & Active Transportation

Representative: TBD

Mission: To provide a multidisciplinary forum to promote and collaborate on research, educational programming, and advocacy for healthier built environments and active transportation.

Morning Schedule – Saturday, October 14th: Symposia

Symposium #16: Discovery Room, 8:00-8:50 am

THE HEALTH CONCERNS AND PHYSIOLOGICAL DEMANDS OF THE FIREFIGHTING PROFESSION

Session Moderator: Adam Coughlin, Saginaw Valley State University

Presenters and Institutional Affiliations:

Andrew Jagim, Ph.D.
Sports Medicine, Mayo Clinic Health System, La Crosse, WI

Biography: Dr. Andrew Jagim is currently the Director of Sports Medicine Research for the Mayo Clinic Health System in La Crosse, Wisconsin, and an Associate Professor of Family Medicine. Dr. Jagim is also a certified strength & conditioning specialist with distinction through the National Strength & Conditioning Association and a certified sports nutritionist through the International Society of Sports Nutrition. His primary research area focuses on the physiological demands of various sports and tactical professions with implications for injury, performance, and health. Dr. Jagim also studies the safety and efficacy of dietary supplements and how they influence performance and health.

Annette Zapp, M.A., CSCS*D, CISSN
Fire Rescue Wellness, Chicago, IL

Biography: Annette Zapp is a nearly 20-year fire service veteran who holds the rank of Lieutenant and owns Fire Rescue Wellness, a coaching business dedicated to elevating the mental and physical wellness of firefighters worldwide. In 2020, she served on an Illinois Senate task force focused on mitigating first responder suicide. AZ is a recognized industry leader in the firefighter health and wellness field, co-authoring the ISSN Position Stand on Tactical Athlete Fueling, and a proud member of the newly formed Associated Firefighters of Illinois Resiliency Committee. She also hosts the FRW podcast

Session Overview: Firefighting is a physically and mentally demanding occupation that is often under-resourced when it comes to health and fitness support. As a result, fire departments are often faced with training themselves or seeking guidance from outside sources, whether they are evidence-based or not. As such, there is an urgent need for trained exercise professionals to assist this population in regard to their health and fitness needs. The purpose of the session is to provide an overview of the health concerns and lifestyle challenges of working as a firefighter. Firefighters have an elevated risk of cardiovascular disease, with cardiac events representing the most likely cause of on-shift deaths in firefighters, and cancer and suicide the most common off-duty causes of overall mortality. Environmental hazards, disrupted sleep cycles, and high-stress environments have previously been shown to be contributors to these risks. Additionally, the trauma and subsequent mental health implications present several challenges for this population. By identifying the occupational demands, we can better prepare sports medicine personnel and fitness practitioners on how to help this population. This session will also highlight the physiological demands of firefighting activities and identify predictors of occupational performance to help identify specific targets through a needs analysis to best direct fitness interventions.

Learning Objectives:
1. Understand the complex health risks, psychological demands, and lifestyle challenges that firefighters face on a daily basis.
2. Identify the specific physiological demands of firefighters.
3. Explain the predictors of occupational performance in firefighters.

Symposium #17: Vision Room, 8:00-8:50 am

SCIENCE COMMUNICATION AND ADVOCACY: CURRENT TOPICS AND INTEGRATION WITH YOUR CAREER

Session Moderator: April Crommett, Cedarville University

Presenters and Institutional Affiliations:

Steve Elmer, Ph.D.
Michigan Technological University, Houghton, MI

Biography: Dr. Steven Elmer is an Associate Professor and Graduate Program Director in the Department of Kinesiology and Integrative Physiology at Michigan Technological University. His goals are to find better ways to restore musculoskeletal function, maintain health, and improve performance in healthy and clinical populations. Specifically, his research is focused on: 1) skeletal muscle contraction, 2) coordination of locomotor tasks, and 3) exercise interventions to improve physical function. He also currently serves on several regional and national committees including the American Physiology Society - Science Policy Committee, American Kinesiology Association - Publications Committee, and Michigan Physiological Society - Executive Committee (past-President).

Session Overview: Throughout the COVID-19 pandemic, communication of health information was paramount to keeping individuals and their communities safe. During this time, science unfolded in real time, interacted with policy making, and impacted society. Unfortunately, the amount of misleading information circulating made it difficult to convey critical health information, resulting in the World Health Organization classifying the situation as an "infodemic." Moreover, misinformation was estimated to have cost between $50 and $300 million worth of harm per day. Accordingly, the U.S. Surgeon General called upon educators, researchers, and universities, to help combat health misinformation and build a healthy information environment. This action call was a stark reminder that the role of a scientist is not only to disseminate key findings to experts in the field but also to communicate information in a non-technical way to other audiences including policy makers, journalists, and the public. Many scientists, however, do not have formal training in science communication and advocacy. Providing training in these areas to students, trainees, and faculty would help to develop a stronger workforce that can communicate more effectively. Accordingly, this session will provide guidance for how to 1) communicate science to public audiences and 2) advocate for the importance of scientific research.

Learning Objectives:
1. Recognize the gap between science and society.
2. Identify ways to communicate and engage with public audiences.
3. Take action to advocate for the exercise science community.

Symposium #18: Discovery Room, 9:00-9:50 am

CANNABIS AND RECOVERY FROM EXERCISE: IS IT EFFECTIVE?

Session Moderator: Kerrie Berends, Calvin University

Presenters and Institutional Affiliations:

Anthony Pinzone, M.S.
Kent State University, Kent, OH

Biography: Anthony Pinzone, MS, is a third-year PhD student at Kent State University studying exercise physiology. His primary research interests are autonomic and vascular responses to stress and exercise, and the use of ergogenic aids to enhance exercise performance and recovery.

Emily Erb, M.S.
Kent State University, Kent, OH

Biography: Emily is a fourth-year doctoral candidate studying Exercise Physiology. Her primary research focuses on evaluating the impact of high-intensity interval training on the cardiovascular system, blood flow, and executive function. She also examines the impact of supplementation on exercise

performance and recovery. In her free time, Emily enjoys running, cycling, gardening and reading.

Stacie Humm, M.S.
Kent State University, Kent, OH

Biography: Mrs. Humm is a native of the Upper Peninsula of Michigan and received her undergraduate and master's degrees from Northern Michigan University. She is a life-long campus recreation professional. She enjoys gardening, her dogs and is an accomplished ultra-endurance trail competitor.

J. Derek Kingsley, Ph.D., FACSM
Kent State University, Kent, OH

Biography: Dr. J. Derek Kingsley, FACSM is an Associate Professor and Program Coordinator in the Exercise Science and Exercise Physiology program at Kent State University. He completed his doctorate in Exercise Physiology at Florida State University. He is certified by the American College of Sports Medicine and the National Strength and Conditioning Association. The research conducted in his laboratory, the Cardiovascular Dynamics Laboratory, investigates the effects of resistance exercise and resistance exercise training on autonomic and vascular health.

Session Overview: Cannabis, both cannabidiol (CBD) and delta-9-tetrahydrocannabidiol (THC), has the potential to enhance recovery from aerobic and resistance exercise due to analgesic and anti-inflammatory effects, as well as the ability to enhance sleep quality. Both compounds also assist in acutely reducing subjective descriptions of pain intensity while down-regulating pro-inflammatory cytokines. Multiple acute and chronic effects of using cannabis make it a potentially promising intervention for enhancing recovery from aerobic and resistance exercise. However, the effects of cannabis on recovery are not well understood as there are limited data directly examining the relationship. In addition, recovery from exercise is multi-faceted and complex. Collectively, there are non-cannabis modalities and supplements being used for their ability to maintain exercise or athletic performance in the days or hours following strenuous activity and to mitigate muscle soreness. Consequently, there is substantial overlap between the mechanistic benefits of cannabis for recovery and those of the non-cannabis modalities and supplements currently available and designed specifically for recovery.

Learning Objectives:

1. Understand the physiological effects of cannabidiol (CBD) and tetrahydrocannabinol (THC) and their dosing methods.
2. Explain current non-cannabis methods of recovery.
3. Comprehend the physiological effects of current non-cannabis methods of recovery.
4. Grasp the role of CBD and THC in recovery.

Morning Schedule - Saturday, October 14th: Free Communication/Slide

Free Communication/Slides #6: Studio 1, 8:30-9:45 am

Session Moderator: Avinash Chandran, Datalys Center for Sports Injury Research and Prevention

8:30-8:45 am

VALIDITY TESTING OF THE PERCEIVED ENVIRONMENT AND MUSCLE-STRENGTHENING EXERCISE QUESTIONNAIRE IN U.S. ADULTS

Palmer, Tylor, Zeigler-Hill, Virgil, Rajaee, Mozhgon, Drignei, Dorin, Reznar, Melissa, Regensteiner, Judy, DeSandre, Mackenzie, Gada, Sagar, Bistayi, Alex, Selou, Angelina, Barkho, Helen, Brown, Elise

BACKGROUND: Muscle-strengthening exercise (MSE) provides many health benefits, and it is important to understand barriers to participation in this type of activity. While environmental factors that impact physical activity are well established, environmental influences on MSE behaviors are largely understudied. **PURPOSE:** To determine the concurrent and construct validity of the newly developed Perceived Environment and Muscle-Strengthening Exercise Questionnaire (PEMSE-Q) in U.S. adults. **METHODS:** This study was conducted in a combined national sample of two independent groups (group 1: healthy adults, n=237 [female(f), n=125; male(m), n=111; intersex, n=1], mean age [±standard deviation, SD]=36.1±10.7 years; group 2: type 2 diabetes [T2D], n=221 [f, n=122; m, n=99], mean age=46.5±10.9 years) using an online research participant recruitment tool, Prolific.co. The PEMSE-Q included 77 items that measured the physical environment (home MSE equipment and convenient facilities), accessibility of home MSE equipment, and social support for MSE. Participants completed the PEMSE-Q and other questionnaires online. Concurrent validity was assessed by having participants complete the Social Support and Exercise Survey (SSES) using Pearson correlation, and a single item from the Physical Activity Neighborhood Survey (PANES) using simple linear regression. Construct validity was determined by comparing participants' responses related to convenient MSE facilities to objectively measured facilities within the participants' zip codes using chi-square tests of association and logistic regression. **RESULTS:** Significant, moderate correlations were found for PEMSE-Q social support and SSES family ($p<0.001$, $r=0.449$) as well as friends ($p<0.001$, $r=0.469$). A significant relationship was also found between PEMSE-Q social support and the PANES item ($p=0.003$). No significant associations were found for convenient facilities and objectively measured facilities. **CONCLUSION:** The PEMSE-Q appears to be a valid tool for assessing MSE social support. The lack of correlation related to convenient facilities may have been attributed to a limitation of Prolific.co, as the platform does not allow researchers to ask participants for their home address. More work is needed in determining the accuracy of convenient facilities items using a method that would allow for geographic information systems assessments rather than a proxy measure such as zip code.

8:45-9:00 am

NORMATIVE PERCENTILE RANKING BEST REVEALS SENSORIMOTOR IMPAIRMENTS OF POSTURAL SWAY IN TYPE 2 DIABETES

Trevor Lopatin, Michael Ko, Elise Brown, Daniel Goble, Joshua Haworth

BACKGROUND: Type 2 Diabetes (T2D) has three main complications that directly interfere with the sensory components of postural sway: peripheral neuropathy, retinopathy, and vestibular dysfunction. It is unclear as to how large of a role each of these complications play in the postural instability of people with T2D. **PURPOSE:** This investigation compared the findings of three statistical methods to assess what each reveal about the sensory impairments of T2D. **METHODS:** Two groups of 10 were recruited for this study. T2D group - 10 adults with T2D (mean age 53.55 ± 10.6 years) were recruited from a physician's office. Comparison group - 10 healthy sex age matched adults who had participated in a previous study. Each T2D participant had anthropologic measurements and neuropathy scores. Participants completed the modified Clinical Test of Sensory Integration of Balance (mCTSIB) by standing as still as they can on a portable balance plate for four 20-sec trials. Each trail altered either the vision (eyes open or closed), surface (solid or foam), or both. Participant path lengths and percentile rank scores were recorded for each trail. Separate 2-Way, mixed model ANOVAs (2x4) were conducted for path length and percentile ranks. Follow-up, pairwise t-tests were used to evaluate differences between conditions. Frequency plots were used to display the

distribution of percentile ranks of the T2D group for the four trials into four bins (0-25%, 26-50%, 51-75%, 76-100%). **RESULTS:** A significant main effect ($p < 0.05$) was found between groups for both path length and percentile rank, with the T2D group performing worse. A significant main effect ($p < 0.001$) between conditions was found for path length. Pairwise testing revealed increased path length in each subsequent condition ($p<0.05$). No specific interactions between groups and conditions for either path length or percentile rank was found ($p > 0.05$). The frequency plot revealed that a majority of the T2D group ranked below the 50th percentile in all conditions. The vestibular condition was the only condition to follow a bimodal distribution. **CONCLUSION:** These findings show that examining the postural sensory impairments in T2D with an individualized normative approach should be used to provide effective patient-centered care. Though limited, the findings also suggest that impairments to the vestibular system may have a more drastic effect on postural stability than the proprioceptive or visual system.

9:00-9:15 am

USING ADDITIONAL MEASURES OF HANDGRIP STRENGTH TO PREDICT AEROBIC CAPACITY IN WHEELCHAIR USERS

Eric Naugle, Lukus Klawitter, Megan Nelson, Matthew Kilgas, Yousef Qadumi

BACKGROUND: Manual wheelchair users have been shown to have low physical health, decreased physical capacity, and impaired ability to perform activities of daily living. Field tests and laboratory protocols for assessing physical capacity in this population have specific boundaries. The measurement of handgrip strength (HGS) using electronic handgrip dynamometers has been shown to be a reliable measure of muscle function and a convenient assessment of overall muscle strength as well as the most widely used, non-fatiguing method to measure muscle strength due to ease of use. **PURPOSE:** To determine the correlation of maximal handgrip strength, handgrip rate of force development, handgrip fatigability, handgrip isometric control, and handgrip asymmetry to a six-minute wheelchair propulsion test in ambulatory young adults. **METHODS:** 10 recreationally active ambulatory individuals (18-35 yrs) volunteered for this study. Height, weight, and hand dominance were recorded followed by the assessment of HGS using electronic handgrip dynamometry. Once grip tasks were completed, aerobic capacity was assessed using the Six-Minute Push Test (6MPT). **RESULTS:** Handgrip fatiguability showed strong correlation ($r=-0.722$) with push test outcomes while the correlation between maximal grip strength, rate of force development and handgrip asymmetry showed weak correlation ($r=0.327, 0.225, 0.182$). Correlation between handgrip isometric control and the 6MPT was insignificant ($r<0.10$). **CONCLUSION:** Moderate to strong relationships were shown between additional measures of HGS and wheelchair propulsion test outcomes indicating these measures of HGS may be predictors of aerobic capacity in those who use manual wheelchairs. Moderate to strong relationships were also shown between the additional measures and maximal handgrip strength as well showing the possible strength of these measures. Additional research is necessary to further understand these relationships.

ACKNOWLEDGEMENTS: Northern Michigan University's Excellence in Education Grant was used to help fund this research.

9:15-9:30 am

COMPLETE UPPER BODY BAR PROVES BENEFICIAL FOR ENHANCED UPPER BODY STRENGTH TRAINING

Ben VonGunten, John Andamasaris, Emma Burns, Caroline Ashton, Henry Wang, & Clark Dickin

BACKGROUND: Upper body strength training has been widely focused on the musculature of the chest, shoulders, and upper arms, with little attention on the muscles of the forearm. Recently, the Complete Upper Body Bar (CUBB) has been developed to train the muscles of the forearm by allowing for pronation and supination, while simultaneously providing the same training of the rest of the upper body without altering shoulder and wrist kinematics. **PURPOSE:** To investigate the effectiveness of the CUBB compared to a typical barbell and dumbbell as it relates to the EMG activity of the forearm during a bench press. **METHODS:** 19 healthy males (18-26 yrs.) volunteered for this study. Anthropometric data was taken and then EMG sensors were placed on the right pronator and supinator muscles; additionally, a sensor was placed on the triceps brachii and pectoralis major. A full plug-in-gait marker set with modifications for the upper body was applied to the participant. The participant went through a bench press test in a series of three different conditions: dumbbell, barbell, and CUBB. Each set in the three different conditions consisted of three repetitions guided by a 60 BPM metronome. Also, the load was the same across the conditions. All trials were recorded using a 12-camera Vicon motion capture system for full analysis of body kinematics. EMG data was collected using a Delsys Trigno wireless system and compared across each condition. A maximal voluntary contraction (MVC) was recorded for each muscle with a sensor in order to normalize muscular contraction levels for each participant.

RESULTS: Preliminary data shows that the CUBB allowed for higher levels of muscular activation in the forearm compared to dumbbells and a standard barbell. In the supinator muscle, muscular contraction levels were 35% higher using the CUBB. In the pronator muscle, a 30% higher activation level was observed. Additionally, muscular activation of the triceps brachii and pectoralis major were similar across the three conditions. **CONCLUSION:** The CUBB has demonstrated the ability to increase activation of the forearm muscles during typical upper-body training such as a bench press. Additionally, it simultaneously trains typical upper body muscles like a standard barbell or dumbbell would. As a result, the CUBB could be a viable option to improve overall strength training of the upper body.

9:30-9:45 am

EXAMINING THE DOSE-RESPONSE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND MENTAL HEALTH AMONG COLLEGE STUDENTS

Ashley Wright, Sofia Ivanko, & Catherine Gammon

BACKGROUND: Research indicates the benefits of physical activity (PA) for mental health, but the existence and shape of a 'dose response' relationship between PA and mental health is not well understood. This is particularly true for college students - a demographic with relatively high rates of mental health challenges. Understanding the dose response relationship between PA and mental health in college students may help develop effective wellness interventions. **PURPOSE:** Examine the existence and shape of a dose response relationship between PA and mental health in college students. **METHODS:** 757 college students (mean age=24.8 years, 71.4% female) completed the American College Health Association's National College Health Assessment. Participants self-reported minutes of moderate- and vigorous-intensity PA (MVPA) in the past 7 days and completed validated questionnaires assessing resilience, loneliness, wellbeing, and distress. A one-way analysis of variance with Tukey post-hoc testing was used to compare average mental health variable scores across clinically relevant doses of MVPA (0-74, 75-149, 150-299, 300-449 and 450+ minutes per week; α=.05). **RESULTS:** Mental health scores improved (i.e., higher resilience and wellbeing scores, lower distress and loneliness scores) as PA dose increased, in a dose-response manner. For example, as PA dose increased, average distress score decreased: 0-74 minutes=9.15, 75-149 minutes=8.91, 150-299 minutes=8.06, 300-449 minutes=7.72, 450+ minutes=6.65. For all mental health variables, the average psychological scores of the least and most active groups were significantly different. For example, the most active group had better wellbeing (47.71) and resilience (6.61) scores than the least active group (43.02 and 5.77, respectively, $p<.05$). Statistically comparing mental health scores for other PA doses revealed an inconsistent pattern of significant and non-significant differences. **CONCLUSION:** We observed graphical evidence of a dose-response relationship between PA and four different mental health indicators among college students, although this was not consistently supported by statistically significant differences between PA doses. The findings align with a growing body of evidence reporting a beneficial effect of PA on mental health. To elucidate the dose-response relationship between PA and mental health among college students, further research with objective PA measures and an experimental study design is needed.

Morning Schedule – Saturday, October 14th: Free Communication/Poster

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Poster Session #6: Regency Ballroom E and F, 8:00-9:15 am

Board #1

EFFECT OF FATIGUE ON SHOULDER DYNAMIC STABILITY IN OVERHEAD AND NON-OVERHEAD ATHLETES: A RESEARCH PROPOSAL

Abby Knight, Matthew Kilgas

BACKGROUND AND SIGNIFICANCE: Participation in overhead sports comes with an increased risk of shoulder injury because of repetitive motion. During the overhead motion, the lumbopelvic and scapular muscles provide dynamic stability for the shoulder. However, studies have shown muscular fatigue can decrease shoulder proprioception and neuromuscular control. Recent studies have demonstrated how muscular fatigue can decrease shoulder dynamic stability, potentially increasing the risk of injury by increasing stress of joint structures during the overhead motion.

Further research into the effects of fatigue on shoulder dynamic stability is significant because it will improve sport participation decisions that may reduce the risk of shoulder injury. **RESEARCH QUESTION:** Is shoulder dynamic stability similarly affected in overhead and non-overhead athletes following an upper body fatiguing protocol? **PROPOSED METHODS:** This repeated measures study will consist of 24 recreationally active participants divided into two groups: overhead athletes and non-overhead athletes depending on their physical activity. Baseline shoulder dynamic stability will be measured using the Upper Quarter Y-Balance Test (UQYBT). Participants will then complete a supervised upper body fatigue protocol consisting of dead hangs, supine barbell row hold, bent elbow side plank, banded full can hold, and bear box crawl. Participants will complete 3 sets of 3 repetitions; repetitions will be completed to volitional failure. Shoulder dynamic stability will be reassessed at 1, 5, and 10 minutes after completion of the upper body fatigue protocol. A mixed effects model will be used to determine the effect of group (Overhead and Non-Overhead), time (Baseline, 1-, 5-, and 10-minutes post exercise), and the group x time interaction. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the recruitment of recreational athletes, the results of this study may not be generalizable to more competitive athletes. In addition, all overhead activities/sports may not be represented in the population further limiting the ability to generalize the results across overhead activities/sports.

Board #2

PUNISHMENT FEEDBACK PRESERVES LOCOMOTOR RETENTION IN OLDER ADULTS

Elise Craven, Leo Barzi, Tyler Wood, Ph.D., Emerson Sebastião, Ph.D., Matt Wilson, Ph.D., Christopher M. Hill, Ph.D
Northern Illinois University

BACKGROUND AND PURPOSE: Older adults have demonstrated mixed effects to reinforcement feedback in the context of skill learning and retention. However, providing different valence of reinforcement has yet to be applied in the context of locomotor adaptation. Thus, there remains a dearth regarding how reinforcement valence, age, and locomotor adaptation interact. **METHODS** 50 participants, 33 healthy young (YA) and 17 older adults (OA), were divided each into three distinct groups: Reward (YA=11; OA=6), Punishment (YA=11; OA=6), and Sensory (YA=11; OA=5). Participants engaged in treadmill walking at 90 steps/minute. Angular kinematic data of the right knee were collected using two Inertial Measurement Units (IMUs) securely attached to the thigh and shank. These IMUs provided real-time feedback on the angular movement of the right knee during the swing phase of walking. The type of feedback displayed on the screen was tailored to each participant's assigned group. The data collection process began with the acquisition of baseline walking, encompassing 250 steps. Subsequently, participants were visually cued to adapt to a new walking pattern by aligning their knee flexion with a predefined angle, set at +30 degrees relative to the baseline walking position for 500 steps. Following the adaptation phase, a retention period devoid of feedback was introduced, lasting for 500 steps. A mixed ANOVA was employed to detect any significant differences in error magnitude. Specifically, we compared the average error during the last 100 steps of the adaptation period (Adaptation) with the last 100 steps of the retention period (Retention). **RESULTS:** All groups learned the task during the Adaptation period. However, OAs displayed a robust motor memory with punishment feedback compared to YAs ($p=0.930$) [Mean difference ± standard error, Error=15.992±3.790˚]. While YA displayed greater retention with Sensory feedback than OAs ($p=0.003$) [Error=17.268±4.287˚]. **CONCLUSIONS:** Older adults had stronger motor memories of the locomotor adaptation tasks with reinforcement feedback, specifically punishment. This reflects changes to cortical processes associated with age, such as decreases in dopamine. Thus, OAs may be using different neural pathways to facilitate locomotor memory, in comparison to YAs.

Board #3

CARDIOVASCULAR FUNCTIONAL CAPACITY IN CHRONIC KIDNEY DISEASE PATIENTS: INSIGHTS FROM THE FIT-INDY STUDY

Nikita Firozali Samanani, PharmD[1]; Eliott Arroyo, PhD[1]; Drake Dillman, MS[1]; Nolan Groninger, B.S[1]; Heather N. Burney, MS[2]; Cody Altherr, MS[1]; Gayatri Narayanan, MS[1]; Kenneth Lim, MD, PhD[1]

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BACKGROUND: Patients with chronic kidney disease (CKD) exhibit a significantly increased risk of cardiovascular disease beginning in the early stages of kidney impairment. However, whether cardiovascular functional capacity is reduced in early-stage CKD and the pattern of its impairment is largely unknown. **PURPOSE:** The goal of this study was to evaluate the natural history of cardiovascular functional capacity (by VO_2Peak) as assessed by Cardiopulmonary Exercise Testing (CPET) and its relationship with kidney function. **METHODS:** We analyzed data from 45

patients in the ongoing Cardiorespiratory Fitness in Patients with Chronic Kidney Disease in Indiana (FIT-INDY) Study, an ambulatory referral cohort of patients who have undergone CPET as part of their standard of care from 2005 to 2023. Participants were stratified into three groups by estimated Glomerular Filtration Rate (eGFR): eGFR ≥60 (n=30); eGFR 30-59 (n=9); and eGFR <30 (n=6). Comparisons between the groups for demographic and CPET measures were made by ANOVA for continuous variables and chi-squared test for categorical variables. Associations between eGFR and VO_2Peak were assessed using multiple linear regression modeling. **RESULTS:** Patients in the lowest eGFR group <30 (65±10.1 y) were significantly older compared with the other groups (eGFR 30-59=48.4±17.6 y; eGFR ≥60=37.6±11.7 y; p=0.001). No significant differences in sex were observed between groups. We report an incremental impairment in VO_2Peak observed with declining kidney function (eGFR ≥60, 21.3±8.9 $mL \cdot min^{-1} \cdot kg^{-1}$; eGFR 30-59, 13.3±2.4 $mL \cdot min^{-1} \cdot kg^{-1}$; eGFR<30, 9.9±1.8 $mL \cdot min^{-1} \cdot kg^{-1}$). Participants in the lower two eGFR strata had reduced VO_2 at anaerobic threshold (VO_2AT) compared with the eGFR ≥60 group (p<0.001). Additionally, maximal workload declined serially with declining kidney function (eGFR ≥60, 111.4±75.9 W; eGFR 30-59, 80.4±22.5 W; eGFR<30, 59±27.3 W; p<0.001). Multiple linear regression modeling demonstrated that eGFR was significantly associated with VO_2Peak after adjustment for age (ß [SE]=1.33 [0.50], p=0.012). **CONCLUSION:** Our study highlights that patients with mild to moderate CKD exhibit impaired cardiovascular functional capacity. These findings emphasize the importance of early cardiovascular assessment and management in individuals with CKD, and the need for further studies examining cardiovascular functional alterations in patients with kidney failure.

Board #4

A VISUAL SYSTEM PROMOTES EQUITY IN PHYSICAL FITNESS PROGRAMMING FOR ADULTS WITH INTELLECTUAL DISABILITIES

Anthony Dujmovic-Bračak, Carmen Swain, Alisa Blazek, Emily Post, Jackie Goodway

BACKGROUND: Adults with intellectual disabilities (ID) are more sedentary and at increased risk of poor health than the general U.S. population. Physical activity (PA) is recommended for all adults due to its health benefits, but those with ID face greater barriers to implementing and maintaining consistent PA. Determination of appropriate training modalities for this population could enhance physical fitness (PF), exercise adherence, and ultimately decrease disparities in healthy behaviors exhibited by those with ID. **PURPOSE:** As those with ID are strong visual learners, the Valemee Visual System (VVS) for exercise training was designed to provide visual support and structured programming to this population. This study assessed a training intervention using the VVS to determine its effectiveness in increasing PF, self-efficacy, and independence in adults with ID. **METHODS:** The VVS was used to guide 22 adults (14 male, 8 females, 26.91±4.77 yrs., 30.55±7.18 BMI) with mild to moderate ID through an 8-week total body exercise program. Measurement of prompts during exercise programming were recorded. Tests of PF included hand grip dynamometer, 30 second sit to stand (SSTS), 6 repetition maximum bench press (6RM), 400-meter walk test (400 MWT), and sit and reach (S&R). Questionnaires measuring exercise self-efficacy (Self-Efficacy Survey for Exercise Behaviors) were administered before and after the intervention. **RESULTS:** There were significant improved measures of PF, including right grip strength (13.32±10.02 to 15.09±10.68 kg), 30SSTS (10.05±3.05 to 15.00±7.58); 6RM (27.74±11.76 to 37.43±14.56 kg), 400 MWT (459.2±140.40 to 414.9±135.50 sec), and S&R (26.50±18.19 to 29.05±18.18 cm). Increases in self-efficacy for exercise were demonstrated in the total survey score (3.08±1.07 to 4.17±0.69), and it's two subsets "Sticking to It" (2.96±1.09 to 4.11±0.81) and "Making Time" (3.38±1.16 to 4.15±0.87) following the intervention. Frequency of prompts delivered by study personnel decreased significantly from Week 1 to Week 8 by 62.2%. **CONCLUSION:** The observed improvement in PF outcomes have clinically relevant implications for decreasing disease pathologies. The program also revealed benefits in behavioral outcomes tightly correlated to exercise adherence and participation. The VVS could be an effective tool for enhancing PF accessibility and adherence in adults with ID, ultimately leading to healthier lifestyles and decreased disease risk.

Board #5

BALANCE RECOVERS SLOWLY OVER REPEATED KNEE CRUTCH EXPOSURE

Christian Maron, Aron Jendre, Daniel Goble, Charles Marks, Joshua Haworth

BACKGROUND: The hands-free knee crutch is a contemporary assistive mobility device that has been shown to alter postural control upon first use. Using this device affords a more natural bipedal stance, and minimizes the negative impacts experienced during traditional axillary crutch use, e.g. upper body fatigue and skin irritation. However, very little is available in the literature regarding balance after repeated exposure to this device. **PURPOSE:** The main goal of this study is to identify how balance changes during repeated use of the knee crutch. **METHODS:** Eleven healthy, college-aged participants completed balance testing with the knee crutch over the course of 5 weeks. The BTrackS Balance Test (BBT) and the BTrackS Limits of Stability (BLOS) were used to assess static and dynamic balance, respectively. Week 1 included baseline (no crutch; BL) balance testing, crutch fitting with self-selected time for familiarization with ambulation, and balance testing (with knee crutch; C0). Revisit weeks 1-4 included a refamiliarization period (self-selected time) followed by balance testing (with knee crutch; C1-4). Separate paired t-tests were used to determine differences between BL and C0, and C0 and C4, for each BBT and BLOS scores. Trend analysis was used to determine the best fit regression of BBT and BLOS scores over C0-C4 timepoints, separately. **RESULTS:** BBT pathlength increased from 24.9±2.0 cm at BL to 58±6.2 cm at C0, indicating more sway during static stance ($p<0.001$). BLOS reduced from 368.9±26.6 cm^2 at BL to 192.1±17.8 cm^2 at C0 ($p<0.001$). Repeated use of the knee crutch (C0 v C4) did not significantly change the BBT pathlength. However, the BLOS area significantly increased after repeat visits from 192.1±17.8 cm^2 at C0 to 238.2±30.9 cm^2 at C4 ($p<0.05$), without returning to BL values. Quadratic trends were found to be most correlated for both the BBT and BLOS scores ($r^2=0.8113$ and $r^2=0.9529$, respectively), indicating a nonlinear reversion to BL for both static and dynamic balance. **CONCLUSION:** Our results indicate that the knee crutch causes a reduction in postural control during balance testing. Repeated exposure led to different recovery towards BL. Static balance followed a nonlinear recovery without significant improvement, though dynamic balance showed significant recovery towards baseline. These findings highlight that static and dynamic sway are regulated by different mechanisms and improve knowledge of balance with knee crutch devices.

Board #6

THE ASSOCIATION BETWEEN PEAK GROUND REACTION FORCE AND KNEE CARTILAGE THICKNESS IN DIVISION I FEMALE ATHLETES

Christian Burke, Katherine Collins, and Matthew Harkey

BACKGROUND: High-performance sports place significant biomechanical demands on athletes, particularly on the knee joint, a common site for sports-related injuries. Traditional metrics for evaluating knee joint health have limitations and may not fully capture the complexities of athletic performance and injury risk. Therefore, understanding the relationship between dynamic forces like peak landing force during athletic activity and static measures such as knee cartilage thickness assessed by ultrasound is imperative for risk assessment and preventive strategies. **PURPOSE**: The primary objective of this study is to explore the association between peak vertical ground reaction force during a jump-landing test and the thickness of knee joint cartilage as assessed through ultrasound imaging in female Division I NCAA athletes. **METHODS**: The study included 40 female athletes participating in Division I NCAA sports—field hockey (n=13), soccer (n=16), and basketball (n=11). The average age was 19.9 ± 1.5 years, with a mean height of 170 ± 7.6 cm and mean weight of 66.9 ± 10.3 kg. During a single research laboratory visit, participants underwent knee ultrasound imaging followed by a jump-landing test. Knee cartilage thickness (in millimeters [mm]) was assessed bilaterally using a transverse scan with the knee maximally flexed. Peak vGRF were normalized to participants' body weight (xBW) and averaged across five trials. Pearson correlation analyses were employed to evaluate the relationship between peak landing force and knee cartilage thickness separately for the right and left limb. **RESULTS**: For peak vGRF, the athletes presented with a mean ± standard deviation of 1.94±0.40 xBW in the left limb and 2.18±0.50 xBW in the right limb. The average cartilage thickness in the left and right knee was 2.00±0.30mm and 2.02±0.26mm, respectively. A moderate, positive correlation was observed in the left knee ($r=0.37$, $p=0.02$), but no significant correlation was found in the right knee ($r=0.12$, $p=0.47$). **CONCLUSION**: The study indicates a moderate, positive association between peak landing force and knee cartilage thickness in female athletes' left legs. This suggests that leg dominance may play a role in this relationship. The non-dominant limb, often used for stability, may experience different, consistent loading patterns compared to the dominant limb, warranting further investigation.

Board #7

COMBINING MVPA AND MOTIVATIONAL STRATEGIES TO IMPROVE THE MENTAL HEALTH AND WELL-BEING OF SEDENTARY MIDDLE-AGED ADULTSs

Rebecca Petit, BS, Shaine Henert, PhD, ACSM-EP, Beth Moxley[1] , PhD, RN, FPCNA, Rachel Kowal[2] , MS

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[2] Kinesiology & Physical Education Department, Northern Illinois University

BACKGROUND: Depression and anxiety are increasing public health concerns as rates have increased recently. Because 1 out of 4 adults with mental distress will develop CVD within their lifetime, managing one's mental health can help prevent CVD and preserve one's quality of life. Regular PA modulates stress reactivity, protects against CVD, and helps manage mental distress. However, depressed and anxious individuals find it difficult to increase their PA due to their symptoms, so intentional motivational strategies are necessary. Research is needed to better understand the impact of guideline-based PA programming and motivational strategies on the mental well-being of sedentary middle-aged adults. **PURPOSE**: To examine the effects of meeting weekly PA recommendations on levels of anxiety and depression in sedentary middle-aged adults. M**ETHODS:** Twenty-nine sedentary, healthy, middle-aged adults (40-60 years of age) were recruited to complete pre- and post-test assessments of anxiety and depression. Twenty of the participants successfully completed an individualized 4-week guided PA program based on national physical activity guidelines appropriate for their age and current fitness level. Nine of the participants did not successfully complete the program. All participants used an activity tracker to monitor and record their heart rates, daily steps, and time in MVPA. Weekly check-ins with the participants included motivational messaging and collection of HR and PA data. Separate two-way mixed ANOVAs (exercise group x time) were performed to determine if there were differences in anxiety and depression between the two groups over time. **RESULTS:** There was a statistically significant interaction between the exercise group and time on anxiety scores, $F(1, 27) = 4.38$, $p < .05$, partial $\eta 2 = .14$. For the group that did successfully complete the exercise program, anxiety levels decreased slightly from pre- to post-test, 7.05 + 6.08 and 6.20 + 4.12, respectively, but not significantly, $p = .439$. For the group that did not successfully complete the exercise program, anxiety levels increased nearly significantly from pre-test to post-post, 5.22 + 5.72 and 8.44 + 5.29, $p = .086$. There was not a statistically significant interaction between the exercise group and time on depression scores, $F(1, 27) = .001$, $p > .05$. However, the main effect of exercise group showed that there was a statistically significant difference in mean depression scores between the two groups $F(1, 27) = 6.25$, $p < .05$, partial $\eta\ 2 = .188$. The mean depression scores for those who did successfully complete the exercise program were 4.96 (95% CI, .890 to 9.02) points lower than for those who did not, a statistically significant difference, $p < .05$. The main effect of time did not show a statistically significant difference in depression scores at the different time points, $F(1, 27) = 2.24$, $p > .05$. **CONCLUSIONS**: Meeting recommended PA guidelines can improve feelings of anxiety and depression in healthy, sedentary, middle-aged adults.

Board #8

EFFECTS OF RECOVERY ON MOTOR RECRUITMENT OF THE VASTUS MEDIALIS AND BLOOD LACTATE FOLLOWING FATIGUE

Jazmin Antonio Reyes, Macy C. Goldthorpe, Brittany N. Followay

BACKGROUND: Motor unit recruitment and blood lactate are indicative of fatigue and may impact performance. The effects of recovery mechanisms on these variables are of interest to athletes, but remain unclear. **PURPOSE:** To examine the effects of recovery methods on motor unit recruitment and blood lactate levels following fatigue. **METHODS:** Eight physically active individuals (23.6 $\pm$ 3.5 yrs) reported to the lab on three separate occasions to complete a cycling protocol alternating between 125% of their peak power output for 30 seconds and 50 Watts for 10 seconds until volitional fatigue, followed by three recovery protocols: cold water immersion (CWI), pneumatic compression (PC), and foam rolling (FOAM). Electromyography (EMG) data was recorded from the vastus medialis (VM) during maximal voluntary isometric contractions (MVICs) and analyzed for root mean square (RMS) before fatigue (BASE), post-fatigue (PF), post-recovery (PREC), and 24 hours post (24H). Blood lactate (BLa) was collected at the same timepoints. Data was analyzed using repeated measure ANOVA. **RESULTS:** A recovery x time interaction ($p = 0.03$) was observed for RMS of the VM. A main effect of time was observed for FOAM ($p < 0.001$), with significantly greater RMS at PF (0.35 $\pm$ 0.02; $p < 0.001$) and PREC (0.36 $\pm$ 0.02; $p < 0.001$) compared to BASE (0.22 $\pm$ 0.01). No significant difference was observed between PF and PREC ($p > 0.05$) or PF and 24H (0.32 $\pm$ 0.01; $p > 0.05$). A main effect of time was also observed for PC ($p < 0.001$) with significantly greater RMS at PF (0.41 $\pm$ 0.02) compared to BASE (0.22 $\pm$ 0.01; $p < 0.001$). RMS was significantly lower at PREC (0.23 $\pm$ 0.01; $p < 0.001$) and 24H (0.21 $\pm$ 0.02; $p < 0.001$) compared to PF. A main effect of time was also observed for CWI ($p < 0.01$) with significantly greater RMS at PF (0.41 $\pm$ 0.01; $p < 0.001$) and PREC (0.40 $\pm$ 0.02; $p = 0.012$) compared to BASE (0.21 $\pm$ 0.02). RMS was significantly lower at 24H (0.21 $\pm$ 0.02; $p < 0.001$) compared to PF. No significant differences were observed in BLa at PF between recovery mechanisms ($p = 0.09$). There was a main effect of recovery ($p = 0.006$) with significantly lower BLa following PC (4.0 $\pm$ 0.18) and CWI (3.9 $\pm$ 0.23) compared to FOAM (7.78 $\pm$ 0.44). No significant differences were observed between PC and CWI ($p = 0.71$) **CONCLUSIONS:** Data suggest that PC and CWI may result in lowered BLa following fatigue compared to FOAM. Additionally, PC appears to have the greatest impact on motor unit recruitment and recovery.

Board #9

UNDERSTANDING ADOLESCENT AND YOUNG ADULT CANCER SURVIVORS NEEDS, PREFERENCES, BARRIERS, AND MOTIVATION TO PHYSICAL ACTIVITY

Melissa M. Sherman[1], Nicholas Kelly[1], Navin Kaushal[1], Keith Avin[1], Kelly M. Naugle[1], Jamie Renbarger[2], Tammy J. Sajdyk[2], Tarah Ballinger[2], NiCole Keith[3]

Indiana University School of Health and Human Sciences[1], Indiana University School of Medicine[2], Indiana University School of Public Health-Bloomington[3]

BACKGROUND: The needs of cancer patients are multifaceted. Physical activity (PA) improves physiology and cognition including QoL, fatigue, depression, anxiety, and emotional well-being. Despite the positive effects of PA, adolescent and young adult cancer (AYA) survivors (15-39 yrs) do not meet the American College of Sports Medicine recommended PA guidelines of 150 min/wk of aerobic exercise and 2d/wk of strength training to illicit positive health outcomes. AYA survivors have unique physical and psychological experiences that may affect their PA preferences. Determining the motivation, barriers, and preferences of AYA survivors may elicit increased and eventual sustained PA participation. **PURPOSE:** To better understand the PA and exercise experiences of AYA survivors of cancer prior to diagnosis, during treatment, and post-treatment. **METHODS:** AYA survivors from a larger study participated in a qualitative analysis utilizing focus groups (n = 11). Discussed categories included past and present PA participation both pre- and post-cancer, PA preferences, PA barriers, facilitators, and motivation, and technology use. **RESULTS:** Participants', (mean age 31.09± 6.96 y) reported that cancer and cancer treatment effects decreased PA participation during treatment, and more than half (81%) reported side effects, specifically more easily fatigued, still exist. Participants agreed (100%) that performing PA, and specifically exercising after cancer treatment gave them a sense of control over their own physical and mental health, by decreasing risk of cancer recurrence, promoting their overall well-being, and decreasing stress, anxiety, and depression. Participants shared that having a trainer or wellness coach was a key component to beginning regular PA and exercise post-treatment because of the accountability and relationship formed with the trainer that were provided (72.7%). Because of bodily changes, participants felt more confident with a trainer specialized in cancer who could make exercise accommodations (63%). **CONCLUSION:** Cancer-related fear and anxiety were common among participants but were offset by a sense of control and accountability experienced during the larger study. A multi-disciplinary approach with wellness coaching and individualized PA guidance is suggested for future programming in this population group.

Board #10

CAPSAICIN'S EFFECTS ON THE MICROVASCULATURE

Aaron Wahl, Nik Carpenter, and Jacob Caldwell

BACKGROUND: Increased incidence of cardiovascular disease is linked to oxidative stress and microvascular endothelial dysfunction via reductions in nitric oxide (NO) bioavailability. Capsaicin has been shown to vasodilate skeletal ex vivo muscle arterioles via transient receptor potential 1 (TRPV1). However, no translational study has investigated topical capsaicin and microvasculature function. We hypothesized that applying topical capsaicin would increase microvascular responsiveness compared to capsaicin controls. **METHODS**: Healthy college-aged subjects will be randomized into the following treatments: 1) time control; 2) capsaicin on the exercising forearm and 3) capsaicin on the non-exercising forearm. Visits are at least 48 hours apart. Baseline measurements of blood pressure and post-occlusive reactive hyperemia (PORH) with near-infrared spectrophotometry (NIRS) were performed. Measurements were collected at baseline (pre) and specific time points once capsaicin was applied, Initial placement of capsaicin (T0), 30 minutes post placement (T30), and 60 minutes post placement (T60). **PRELIMINARY RESULTS** (n=1): Resting muscle oxygen consumption with capsaicin on the non-exercising arm is consistent (pre: -0.14, T0: -0.16, T30: -0.16, T60: -0.17 and with capsaicin on the exercising arm pre: -0.18, T0: -0.21, T30: -0.19, T60: -0.19 %/s). Microvascular responsiveness with capsaicin on the non-exercising arm appears to increase after each PORH test (pre: 1.17, T0: 1.26, T30: 1.42, T60: 1.78 %/s). Microvascular responsiveness with capsaicin on the active forearm appears to increase up to 30 minutes post-application (pre: 1.12, T0: 1.49, T30: 1.74, T60: 1.66 %/s). **CONCLUSION**: Our preliminary results indicate that capsaicin on the exercising forearm shows promise in improving microvascular responsiveness up to 30 minutes post-application.

Board #11

CAPSAICIN'S EFFECTS ON THE EXERCISE PRESSOR REFLEX

Nikolaus Carpenter, Aaron Wahl, Jacob Caldwell

BACKGROUND AND SIGNIFICANCE: Exaggerated blood pressure responses during physical activity contribute to the overall development, risk, and mortality of cardiovascular disease. Specifically, the exercise pressor reflex (EPR) contributes to the exaggerated blood pressure responses and is formed by the type III (mechanical) and type IV (metabolic) afferents in the periphery. Recent advances have been made to non-pharmacologically reduce exaggerated EPR responses with the use of topical capsaicin in males. Reducing the exaggerated blood pressure response would dramatically reduce adverse cardiovascular events during physical activity. However, the interaction between capsaicin, the EPR, and biological sex are unknown and further research is warranted. **RESEARCH QUESTION:** The proposed study will experimentally investigate the effects of topical capsaicin on blood pressure and ventilatory responses during handgrip exercise (HGE) in men and women. **PROPOSED METHODS:** Male and female (n=40) subjects will be recruited and randomly assigned to three experimental groups: 1) capsaicin applied to the exercising arm; 2) capsaicin applied to the non-exercising arm (systemic control); and 3) capsaicin free (time control). Blood pressure will be measured with beat-to-beat (FinaPres), peripherally and centrally adjusted plethysmography (SphygmoCOR EXCEL) prior to and at various time points after capsaicin application. Ventilation will be recorded via gas exchange analysis (TrueOne 2400 Parvo Medics). Post exercise circulatory ischemia (PEMI) will be achieved with a rapid inflation cuff (Hokanson) 10 seconds prior to the end of handgrip exercise (HGE). HGE will consist of 30% MVC at 20 contractions/minute. Time points: baseline, T0, T30, T60, HGE, and PEMI will be utilized to record the effects of capsaicin. Pilot data in one young male has shown capsaicin decreased delta mean arterial pressure during PEMI (Time control: Δ 59, Capsaicin: Δ 56) A decrease in delta ventilation was also recorded with capsaicin during PEMI (Time control: Δ 6., Capsaicin: Δ 3). **PROJECTED LIMITATIONS AND OBSTACLES:** Possible limitations include not measuring capsaicin balm diffusion through the skin and muscle, MSNA, and capsaicin receptor activation.

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October 16-18, 2024
Amway Grand Plaza Hotel
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