



2024 Midwest Chapter of The American
College of Sports Medicine Annual Meeting

Long Program

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Grand Rapids, Michigan



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ACSM CEC Certificate

Participant Name

Midwest Chapter of the American College of Sports Medicine

Provider Name

2024 Midwest Chapter of the American College of Sports Medicine
Annual Meeting (Grand Rapids, Michigan)

Course Title

Approved Provider Number: #650390

CECs: 12.0

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Special Events

Wednesday (10/16)

- | | |
|--------------------|--|
| 2:00 pm – 3:30 pm | Board of Directors Meeting (Pearl) |
| 5:30 pm – 7:30 pm | Registration (Center Concourse) |
| 6:00 pm – 7:30 pm | Health Initiatives On Campus Showcase (Center Concourse) |
| 7:30 pm – 10:00 pm | MWACSM Social (Imperial Ballroom) |

Thursday (10/17)

- | | |
|--------------------|---|
| 8:00 am – 12:00 pm | Registration (Center Concourse) |
| 8:00 am – 12:00 pm | Graduate School Fair (Center Concourse) |
| 8:00 am – 5:00 pm | Exhibitor Fair (Crown Foyer) |
| 12:00 pm – 2:00 pm | Keynote Presentation & Lunch (Ambassador Ballroom) |
| 2:00 pm – 3:30 pm | Badge Pick-Up (Center Concourse) |
| 2:30 pm – 4:30 pm | Student Lounge (Berkey) |
| 4:30 pm – 5:30 pm | Leadership & Mentoring Program Speed Dating Event (Berkey) |
| 8:00 pm – 10:30 pm | Quiz Bowl (Ambassador Ballroom) Sponsored By Cleveland University – Kansas City |



Friday (10/18)

- | | |
|---------------------|---|
| 10:00 am – 12:00 pm | Keynote Presentation, Brunch, & Business/Awards Meeting (Ambassador Ballroom) |
|---------------------|---|



Thursday (10/17) Morning Presentations

Professional Presentations

8:00 am – 8:50 am A TUTORIAL FOR YOUR FIRST ULTRA-MARATHON:
FITNESS, FUEL, AND FOCUS
Stacie Humm, J. Derek Kingsley, FACSM (Grandview)

Ultra-marathons, also known as "ultras", are endurance running events characterized by either distance (greater than 26.2 miles) or time (6-hour, 12-hour, 24-hour), and can be completed on roads or off-road on paved or dirt trails. Understanding the fitness required, the fuel needed, and the focus that must be maintained to train for, and to complete, an ultra-marathon is complex. In addition, the popularity of ultra-marathons has consistently increased over the years, with over 8000 individuals in 2000 to greater than 300,000 individuals in 2023. Participation in an ultra-marathon requires careful planning both pre-race and race-day as there is an increased risk for participating in terms of musculoskeletal injuries, dehydration, skin irritations like blisters and chaffing, and mental fatigue. Thus, having a plan both pre-race and race-day is imperative to success. Therefore, this symposium will discuss how to develop a training regime, the nutritional requirements, and how to maintain focus for both pre-race and race-day for an ultra-marathon.

8:00 am – 8:50 am EXERCISE AS ANTI-AGING MEDICINE FOR CHRONIC
DISEASES: CANCER AND HIV
Alexis Ortiz, FACSM (Pearl)

The accelerated aging process from cancer and HIV infection contributes to many health-related comorbidities, such as gait deficiencies and cardio-motor-cognitive alterations (CMCAs) affecting health-related quality of life (HR-QOL), especially those living in under-served areas. Cancer and HIV survivorship is now more of a chronic condition and their comorbidities are the leading cause of disability and death, ahead of cardiovascular disease alone. Several investigations demonstrate the benefits of physical activity and participating in exercise programs in these populations, finally improving their HR-QOL and reversing some of the accelerated aging process. However, additional evidence reveals alterations and deficits affecting CMCAs profile in these individuals, even those physically active. Therefore, special considerations are needed to target each individual's impairments when considering exercise prescriptions for these groups. This session proposes specific testing and exercise prescriptions consideration targeting cardio-motor-cognitive alterations in those living and surviving cancer and HIV. This information is vital to discuss and understand with the new generation of future health and exercise professionals to help decrease the disparity in precision exercise is medicine prescription.

8:00 am – 8:50 am LONGITUDINAL AEROBIC PERFORMANCE AND
LIFESTYLE BEHAVIOR ASSESSMENTS OF COLLEGIATE
ATHLETES

Devin Laurent, Emily Post (Heldane)

VO2 max testing is the gold standard assessment used within athletic populations to evaluate current aerobic capacity and cardiorespiratory fitness performance. This format of testing is especially important for aerobic-based sports which provides athletes with useful information that can help implement proper, effective, and safe training protocols to improve athletic performance. College athletes navigate university life, balancing sports responsibilities and various lifestyle behaviors that could impact a person's aerobic performance. Our primary goal is to utilize this gold standard aerobic testing method to observe cardiorespiratory fitness performance at multiple time points throughout their athletic career of collegiate athletes at a division II level. VO2max data is typically used to ensure the proper intensity, distance, pacing, and linear progression to avoid overtraining while getting the best performance benefits. Furthermore, understanding the association between lifestyle behaviors among collegiate athletes and aerobic performance may help provide future insight for necessary behavioral modifications. A secondary goal of this research is to appropriately train and implement human performance research at a small liberal arts institution with strong undergraduate representation within Exercise Science. This research is in progress and preliminary data will be presented.

9:00 am – 9:50 am

CLINICAL EXERCISE PHYSIOLOGY: OPPORTUNITIES AND CONSIDERATIONS FOR AN EVOLVING FIELD
Garett Griffith, Cassandra Ledman (Grandview)

This interactive panel presentation highlights the academic and career trajectories for students and professionals interested in the field of clinical exercise physiology. Increases in the prevalence of chronic health conditions such as obesity, hypertension, and physical inactivity, coupled with an aging U.S. population, will continue to drive the need for clinical exercise physiologists to promote the maintenance and improvement of health through exercise and physical activity prescriptions. Clinical exercise physiologists are qualified to work in many professional settings, and it is important for both students, young professionals, and educators to be aware of what opportunities are available after graduation, as well as what requirements exist to find employment in these areas. The landscape of clinical exercise physiology is evolving as academic requirements for the field change over time, and clinical exercise physiologists work towards increased independence in clinical settings. This interactive panel presentation is ideal for both students who want to better understand these interrelated dynamics, young professionals who are looking to network and grow in their careers, and academic program coordinators striving to provide professional opportunities and academic pathways that align with industry trends and demands.

9:00 am – 9:50 am

NAVIGATING NEAR-IR SPECTROSCOPY FOR HANDS ON LEARNING: MUSCLE PERFUSION AND METABOLISM
B. Ryan Davis, Edward Pelka, John McDaniel (Pearl)

Recently there has been a large increase in research that utilizes near-infrared spectroscopy (NIRS) to non-invasively assess muscle perfusion, muscle oxygen consumption and skeletal muscle oxidative capacity. However, the NIRS technology and these research techniques are often difficult to fully understand and can lead to misinterpretation of the results. Learning how to operate and analyze the NIRS based data will allow students to have hands-on learning opportunities in classrooms and laboratories focused on muscle perfusion and metabolism. Additionally, better understanding of these techniques could provide additional research tools. Thus, the purpose of this session will be to help students and educators understand and use near infrared spectroscopy (NIRS) in the classroom and laboratory setting. We will start with a brief overview of the NIRS technology and various NIRS devices. We will then discuss its use in the classroom and research settings to investigate muscle perfusion, muscle oxygen consumption and skeletal muscle oxidative capacity. This will include a brief review of the literature as well as a discussion on cover how to translate the data collected from the NIRS device into a format that can be analyzed and presented in both the classroom and research setting. We will finish by covering the limitations and considerations of using NIRS.

9:00 am – 9:50 am

**ENHANCING OCCUPATIONAL READINESS AND HEALTH
OUTCOMES IN TACTICAL ATHLETES THROUGH
UNIVERSITY-COMMUNITY PARTNERSHIPS**

Jacquelyn Zera, FACSM, Bridget Melton (Heldane)

Working with and training tactical athletes, including law enforcement, military personnel, and firefighters, is a growing focus for practitioners and researchers. Tactical athletes must maintain high fitness levels to enhance occupational readiness and meet their roles' demands. Comprehensive wellness programs are crucial for preparing first responders and mitigating the negative health outcomes associated with their occupations, such as psychological stress, musculoskeletal injuries, and cardiovascular disease risk. This presentation will showcase the successful approaches of two university-community partnerships in providing service, education, and research to improve first responders' health and wellness. Presenters will review current research trends, identify existing research gaps, and discuss promising methods for enhancing first responder health and wellness. Faculty research mentors will share their experiences establishing and maintaining effective partnerships with first responder agencies. The presentation will emphasize how universities can create valuable experiential learning opportunities for students through these partnerships. It will also provide practical insights into navigating the challenges of working with tactical athletes, ensuring both educational institutions and community agencies benefit from the collaboration.

10:00 am – 10:50 am

**TIPS AND TRICKS TO ENGAGE PHYSICAL ACTIVITY
THROUGHOUT THE LIFESPAN. PROMOTING LIFELONG
PHYSICAL ACTIVITY: STRATEGIES FOR ALL AGES**

Judith A. Juvancic-Heltzel, Stephanie Davis-Dieringer
(Grandview)

As fitness professionals, one of our goals is to promote movement throughout the day in addition to clients meeting minimum physical activity guidelines. Many do not have access to traditional exercise equipment. Additionally, providing variety increases engagement and adherence. This interactive session will incorporate hands on tips and tricks for the fitness professional to engage, motivate and teach clients, using non-traditional tools, how to incorporate movement throughout the day. As we know research has shown that even if minimum physical activity requirements are met, extensive sitting throughout the day increases the risk of developing comorbidities. The purpose of this interactive session is to educate fitness professionals on how to engage clients using non-traditional tools to foster movement throughout the day making it a lifelong habit. Fitness professionals will:
Walk away with strategies to educate clients on the importance of keeping active throughout the day. Gain the ability to creatively problem-solve and adjust strategies in situations where conventional exercise equipment is unavailable. Build a network of colleagues by actively participating with role playing and hands on activities.

10:00 am – 10:50 am

**STRATEGIES FOR MOVING STUDENT RESEARCH
FORWARD AND EMBRACING CHALLENGES**

Steven Elmer, John Durocher (Pearl)

The COVID-19 pandemic brought forth a major health threat to society and altered our lives in many ways. In higher education, students and faculty had to adjust to new approaches for classroom teaching and laboratory research. For teams who conducted human subject research that involved community participation and/or clinical populations, research during this time was especially challenging. In this session, we will highlight the strategies we used to help undergraduate and graduate students move their research forward during the pandemic. Specifically, we will present examples of how students aligned their research with COVID-19, conducted remote or limited contact human subjects research, performed teaching-focused scholarly work, and engaged in community outreach. Subsequently, we will invite the audience to share the research challenges they encountered and strategies they used. Finally, we will discuss how these experiences have helped us to offer 1) more options for engaging students in research, 2) better tools for navigating unanticipated research challenges, and 3) a broader perspective on what it means to engage students in research and scholarly activities. We hope this session will encourage students and

faculty to reflect upon the lessons learned from the pandemic, consider potential strategies for moving research forward when challenges occur, and embrace challenges as part of experiential learning.

10:00 am – 10:50 am **BRAIN GAINS: TOP SUPPLEMENTS FOR COGNITIVE ENHANCEMENT AND BRAIN PHYSIOLOGY**
Terence Moriarty (Heldane)

In an age where cognitive demands are ever-increasing, the pursuit of effective supplements to enhance cognitive function and brain physiology has garnered significant interest. This presentation delves into the science behind the most effective supplements known to boost cognitive performance and support brain health. Terence will explore key nutrients, including omega-3 fatty acids, nootropics, and creatine, and their impact on neurogenesis, brain oxygenation, and overall brain physiology. By examining recent research findings and clinical trials, Terence aims to provide a comprehensive overview of how these supplements influence neurotransmitter levels, cerebral blood flow, and neuroprotective mechanisms. Furthermore, he will discuss the practical implications for daily use, optimal dosages, and potential side effects, ensuring that attendees gain a holistic understanding of how to integrate these supplements into their routines for maximum cognitive benefit. Join us for an insightful session that combines scientific rigor with practical application, offering valuable knowledge for anyone looking to enhance their cognitive abilities and maintain brain health through supplementation.

11:00 am – 11:50 am **EXPLORING THE IMPACT OF USING WEARABLE MOVEMENT SENSORS IN COLLEGIATE SPORT: FROM RESEARCH TO PRACTICE AND REHABILITATION TO COMPETITION**
Alexander Montoye, FACSM, Karin Pfeiffer, FACSM,
Bill Burghardt, Matt Harkey (Grandview)

Wearable sensors have been used for decades to better understand how human movements and patterns contribute to health and human performance. Recent advances in technology and analytics, the integration of more diverse sensors (e.g., GPS, heart rate monitors) in devices, and a growing recognition of their applications has led to the expanded utilization of movement sensors in sports settings. Our symposium will offer an in-depth look at the use of several movement sensors in a Division I collegiate sport and orthopaedic surgery rehabilitation setting. The symposium will cover 1) the logistics of data capture, processing, and analysis for understanding athlete performance and rehabilitation; 2) facilitating buy-in from coaches, athletes, clinical staff, and administrators; 3) reporting findings to coaches, athletic trainers, orthopaedic surgeons, and other stakeholders; 4) using data for athletics decision-making (e.g., when to rest players, what types of training to implement); and 5) preliminary research findings and anticipated future directions. Examples of preliminary findings to be discussed will include comparison of on-field metrics during training vs. competition and assessing the predictive value of metrics such as muscular power for on-field performance, tracking training volumes across sports seasons, and assessing joint biomechanics during gait and landing throughout the rehabilitation of injured athletes.

11:00 am – 11:50 am **DESIGNING EXERCISE INTERVENTIONS: THE IMPORTANCE OF EXPLORATORY, FLEXIBLE, AND ITERATIVE EARLY-STAGE RESEARCH**
Kelley Strohacker, FACSM, Paula-Marie Ferrara,
Cory Beaumont (Pearl)

Despite the wealth of evidence supporting exercise as a critical health behavior for physical and mental well-being, a large proportion of adults struggle to exercise with sufficient regularity. A variety of behavioral interventions demonstrate initial success in exercise initiation, but long-term adherence following treatment remains elusive. Thus, experts now promote that behavioral treatments and interventions should be optimized prior to efficacy testing within a randomized controlled trial. Processes for optimization, however, are not widely taught in Exercise Science programs at the undergraduate or graduate levels. The primary purpose of this presentation is to demonstrate how

pre-efficacy approaches to research have been implemented in exercise-related research, with a highlight on methods for qualitative approaches and ecological momentary assessment. A secondary purpose is to discuss how engaging in these methods can build translatable skills for practical application in health and fitness professions. The goal of this session is to facilitate meaningful discussion about the need for and benefits of conducting studies explicitly designed to answer early-stage research questions when endeavoring to build robust treatments for exercise behavior that work under real-world conditions.

Student Presentations – Poster #1 (9:00 am – 10:00 am; Kendall Room)

Poster #1

COMPARATIVE ANALYSIS OF ANTERIOR KNEE PAIN IN FEMALES AFTER ACL RECONSTRUCTION USING PATELLAR AND QUADRICEPS TENDON GRAFTS

Kate Mumford, Jessica Tolzman, Arjun Parmar, Corey Grozier, Matthew Harkey

Background: Despite significant advancements in anterior cruciate ligament Reconstruction (ACLR) knee pain following surgery continues to be a pressing concern, particularly for female patients. Knee pain could be a result of the harvest location of the graft, putting the patellar tendon graft at a higher risk of postoperative knee pain. **Purpose:** To compare the magnitude of self-reported knee pain between patients following ACLR that received either a patellar tendon or quadriceps tendon graft. **Methods:** A cross-sectional study was conducted on 21 participants. During a singular visit participants completed a demographic survey to collect information regarding their graph type, and the Knee Injury and Osteoarthritis Outcome Score (KOOS) pain subscale. Both the patellar and quadricep tendon are strong candidates, with similar rates of postoperative stability and function in return to sport results. KOOS, or Knee injury and Osteoarthritis Outcome Score is a survey that allows patients to self-report their short-term and/or long-term pain following a knee injury. KOOS is scored from five separate categories: Pain, other Symptoms, Function in daily living (ADL), Function in Sport and Recreation (Sport/Rec), and knee-related Quality of Life (QOL). **Results:** Participants included 9 quadricep tendon grafts (age: 17.23±1.76 years, height: 167.09±4.34 cm, weight: 73.93±10.38 kg, time since surgery: 5.47±1.62 months) and 12 patellar tendon grafts (age: 20.58±6.37 years, height: 169.78±7.33 cm, weight: 64.04±10.46 kg). There was no significant difference in KOOS pain between the quadricep and patellar group (t19: .877, p=0.391, d=.387). **Conclusion:** Although no significant difference was observed in KOOS pain scores between quadriceps and patellar tendon graft types in females, this study highlights the importance of further research. Future studies could benefit from comparing KOOS data after return to sport, employing a longitudinal approach, or exploring other graft types. While our findings did not show a significant difference in postoperative pain, they contribute valuable insights that will guide future ACL research and allow for advancements in data collection and clinical practices.

Poster #2

IMPACT OF SHORT-TERM ASSISTIVE TRANSPORTATION USE ON HEMODYNAMICS AND ARTERIAL STIFFNESS IN HEALTHY ADULTS

Jackson P. Yeager, Ashley Betz, Rachael A. Binion, Yi Liu, Rebecca Skujins, Asya Walsh, Lauren Lefkowitz, Sydney Ayton, 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. Access to an assistive transportation device (e.g., electric scooter) may lead to a reduction in physical activity that impairs cardiovascular health. **PURPOSE:** We investigated the effect of short-term access to an e-scooter as a proxy for reduced physical activity on hemodynamics and arterial stiffness in healthy adults. We hypothesized that a one-week reduction in physical activity through the use of an e-scooter would adversely alter hemodynamics and arterial stiffness. **METHODS:** Arterial pulse wave analysis (PWA) and carotid-femoral pulse wave velocity (PWV) were

assessed in 9 healthy adults (3 men, 6 women; age = 20 ± 2 y (mean \pm SD); BMI = 22 ± 2 kg/m²) at baseline (day 0), following one week in which participants had access to an e-scooter (day 7), and following one week without access (day 14). Participants were instructed to ride the 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 (AIx), and carotid-femoral PWV were measured at each visit. Subjects were included in our analysis if they had >7000 steps/day at baseline, decreased their steps by >1500 steps/d when they had access to the e-scooter and used the scooter more than once per day on average. A one-way ANOVA was used to determine differences between study visits. RESULTS: Carotid-femoral PWV did not differ between day 0 (6.0 ± 0.5 m/s) and day 7 (5.9 ± 0.6 m/s), but was lower ($P < 0.05$) at day 14 (5.6 ± 0.4 m/s). No changes were observed for BP, HR, PP, AP, AIx, MAP, or AIx. CONCLUSION: Short-term use of e-scooter did not negatively alter hemodynamics or arterial stiffness in healthy adults. Future research is warranted to determine if longer periods of assistive transportation device use adversely affect cardiovascular health. Funding by Miami University EHS seed Grant and USS funds

Poster #3

EFFECTS OF ACCESS TO AN ASSISTIVE
TRANSPORTATION DEVICE (E-SCOOTER) ON PHYSICAL
ACTIVITY

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

BACKGROUND: Assistive transportation in the form of electric bikes and scooters (E-scooter) is becoming extremely popular. However, since e-scooters replace walking, they may impact physical activity behavior. PURPOSE: To determine the effects of access to an assistive transportation device (seated e-scooter) on physical activity and sedentary time during and after a period of access to an e-scooter. METHODS: We assessed steps and sitting time in young adults ($n = 20$ 10M/10F; age 21.5 ± 4 y; BMI 24.4 ± 7.1 kg/m², 8533 ± 3611 steps per day) 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 more daily physical activity at baseline would result in a greater decrease during the e-scooter week and would not return to baseline physical activity levels in the following week when participants did not have access to the e-scooter. RESULTS: Participants decreased 1611 ± 2727 steps per day when given access to the e-scooter. There was no change in total sitting time, total stepping time, or total seated transport time as measured by ActivPal accelerometer. When the e-scooter was removed, those variables remained the same at baseline except for sitting time, which had a trend to increase 25 ± 57 min. Those with higher step counts at baseline had a more significant decrease in steps when given access to an e-scooter, while those with lower steps increased steps when given access to an e-scooter ($r = -0.568$, $p = 0.009$). A positive association ($r = 0.764$, $p < 0.001$) was observed between step reduction during the e-scooter week and recovery of step count back to regular activity the following week. CONCLUSION: Participants who reduced their daily steps e-scooter did not fully recover their physical activity after removing the e-scooter. Those who increased their daily steps during e-scooter access had low activity at baseline but could maintain the increased steps when they did not have access to an e-scooter. An e-scooter reduces physical activity behavior in those with high daily steps but increases it in those with low steps. An e-scooter may help those with low steps become more active.

Poster #4

IMPACT OF STEP REDUCTION DURING E-SCOOTER USE
ON INTERSTITIAL GLUCOSE CONTROL IN ADULTS

Ashley C. Betz, Jackson P. Yeager, Yi Liu, Rachael Binion, Sydney Ayton, Asya Walsh, Rebecca Skujins, Lauren Lefkowitz, Eric Slattery, Kyle L. Timmerman, Paul T. Reidy, Kevin D. Ballard, FACSM

BACKGROUND: Physical inactivity is associated with adverse health effects such as impaired blood glucose control. The effect of short-term reductions in physical activity via assistive transportation use on glucose control is

unexplored. **PURPOSE:** We hypothesized that a short-term reduction in physical activity (steps/d) would adversely affect glucose levels. **METHODS:** Healthy adults (n= 5F/7M; age: 20.5±2.0 y (mean±SD); BMI: 22.2±2.1 kg/m²) performed one week of normal activity (Baseline) and one week of reduced physical activity (E-scooter use, Scooter). Participants were instructed to use the e-scooter when they would normally walk, when possible. Continuous glucose monitors were placed on each participant's upper posterior arm at the beginning of the Baseline and Scooter weeks. Interstitial glucose levels were measured every 15 minutes and analyzed using R software with the iglu version 3.0. Physical activity was measured via accelerometry. Inclusion criteria included >7000 steps/day during the Baseline week and decreased step count by >1500 steps/d during the Scooter week. Data was analyzed using a one-sample T-test. Data are Mean with 95% CI. **RESULTS:** 24-hour mean glucose change [3.79 (-0.17-7.75) mg/dl, P=0.058] and 24-hour glucose standard deviation change [1.44±(-0.01 to 2.89); P=0.052] were increased following one week of E-scooter use compared to Baseline. 24-hour glucose coefficient of variation change was unaffected [0.94±(-0.74 to 2.61), P=0.245]. **CONCLUSION:** Step reduction with short-term E-scooter use adversely altered glucose control in healthy adults. Continued data collection and future studies will further elucidate the impact of short-term reduction in physical activity on glucose control.

Poster #5

**CHANGES IN TISSUE REACTANCE AND REISTANCE
ASSESSED USING WHOLE-BODY BIOIMPEDANCE
ANALYSIS FOLLOWING ACL INJURY IN D2 COLLEGIATE
ATHLETES**

Edward Finos, William Herwig, Brian M. Hatzel, & Ross A. Sherman

BACKGROUND: Bioelectrical impedance analysis (BIA) is commonly used to assess body composition and fluid status. BIA can also be used to measure tissue resistance (R) and reactance (Xc), which are related to inflammation and cell damage, respectively. Research has shown that localized BIA can identify and determine the severity of muscle injuries in elite athletes, but work has yet to be conducted either using whole-body, segmental BIA (WB-BIA) or investigating ligamentous injuries using any BIA technique. **PURPOSE:** The goal of this project is to assess changes in R and Xc measured using WB-BIA following acute ACL injuries in NCAA Division 2 athletes. **METHODS:** Eight D2 athletes (20 yrs; two males and six females) who were healthy and fully participating in team sessions, and subsequently suffered a severe ACL injury volunteered for this study. Both R and Xc were measured bilaterally in the standing position at four different time points: (i) when healthy; (ii) at time of MRI; (iii) as soon as possible before surgery ("pre-op") and; (iv) as soon as possible after surgery ("post-op"). The injured limb was considered as the experimental condition and the non-injured limb was considered as the control condition. Bilateral percentage difference relative to the control limb was calculated at each time point. The MRI was read by a musculoskeletal radiologist to confirm the clinical diagnosis. One-way ANOVA was used to determine bilateral percentage differences between time points for both R and Xc. **RESULTS:** Bilateral Xc difference changed significantly from healthy to MRI (mean diff 15.9% [95% CI 9.9 to 21.8%]), from MRI to pre-op (-9.3% [-16.3 to -2.2%]), and from pre-op to post-op (19.5% [7.1 to 31.9%]). Bilateral R difference increased significantly from healthy to MRI (9.2% [2.7 to 15.7%]) and from pre-op to post-op (6.9% [0.4 to 13.4%]). However, there was no change in bilateral R difference from MRI to pre-op. **CONCLUSIONS:** Collegiate athletes who suffered a severe ACL injury displayed clinically appropriate changes in R and Xc relative to the phase of their injury timeline. Thus, it appears that WB-BIA is capable of detecting meaningful changes in inflammation and damage associated with musculoskeletal injury. Further research is needed to investigate if these changes can be detected across different severities of injury, with lower limb muscular injuries, and with upper extremity musculoskeletal injuries.

Poster #6

**STARTING AT THE KNEES: THE ASSOCIATION OF
EFFUSION-SYNOVITIS AND HOFFA'S SYNOVITIS TO
EARLY OSTEOARTHRITIS SYMPTOMS IN PATIENTS
POST-ACLR**

Grozier CD, Parmar AS, Tolzman JE, Frederick IC, Harkey MS

BACKGROUND: Effusion-synovitis and Hoffa's synovitis are indicators of early osteoarthritis (OA) due to their link with knee inflammation. Often present after ACL injury and reconstruction (ACLR), these markers may accelerate joint degeneration, making them valuable for early-OA detection. **PURPOSE:** To examine the relationship between ultrasound-assessed effusion-synovitis and Hoffa's synovitis in the ACLR limb and the presence of early-OA symptoms in patients five months post-ACLR. **METHODS:** Thirty-two patients (Female = 14; Height = 168.6±8.9 cm; Mass = 75.5±21.7 kg; Age = 19.0±21.7 yrs; Time Since Surgery = 4.9±1.1 mo) were included. Knee ultrasound scans of the ACLR limb assessed suprapatellar effusion-synovitis and infrapatellar Hoffa's synovitis. Effusion-synovitis was graded using a validated OA ultrasound scale (0=absent, 1=mild, 2=moderate, 3=severe). Hoffa's synovitis was measured by echo-intensity (EI) of the infrapatellar fat pad, segmented one centimeter deep to the patellar tendon and limb symmetry index (LSI) values were calculated for differences between the ACLR and contralateral limbs. Effusion-synovitis and Hoffa's synovitis were categorized as binary variables: Effusion-synovitis ('yes'= grade ≥2; 'no'= grade 0-1) and Hoffa's synovitis ('yes'= EI LSI ≥21.97; 'no'=EI LSI <21.97). Early-OA symptoms were assessed using the Luyten PASS criteria, derived from the Knee Osteoarthritis Outcome Score (KOOS) subscales. Patients scoring below the criteria on two or more subscales were classified as experiencing early-OA symptoms. A binary logistic regression analyzed the association between effusion-synovitis, Hoffa's synovitis, and the Luyten PASS criteria for early-OA symptoms, with an alpha level of 0.05. **RESULTS:** From the 32 patients, 15(46%) exhibited effusion-synovitis at or above the cutoff grade, 8(25%) exceeded the Hoffa synovitis EI LSI cutoff, and 17(53%) were classified as experiencing early-OA symptoms according to the Luyten PASS Criteria. The binary ACLR effusion-synovitis (OR=1.68, CI:0.42-7.15, p=0.47) was positively associated with early-OA symptoms, though not statistically significant. Binary Hoffa's synovitis (OR=0.43, 95% CI:0.07-2.16, p=0.31) showed a non-significant negative association. **CONCLUSION:** Effusion-synovitis and Hoffa's synovitis were prevalent five months post-ACLR, though neither was significantly associated with early-OA symptoms. However, a majority of patients met the criteria for experiencing early-OA symptoms.

Poster #7

DIFFERENCES IN KNEE EFFUSION-SYNOVITIS SEVERITY BETWEEN DIFFERENT GRAFT TYPE IN PATIENTS FOUR MONTHS FOLLOWING ACLR

Faith N. Persyn, Ian Frederick, Arjun Parmar, Jessica Tolzman, Corey D. Grozier, Matthew S. Harkey

BACKGROUND: Anterior cruciate ligament reconstruction (ACLR) is a common intervention for ACL injuries, with autografts such as bone-patellar tendon-bone (BPTB), hamstring tendon (HT), and quadriceps tendon (QT) frequently used. Despite the success of these techniques, postoperative knee inflammation, specifically effusion-synovitis, remains a concern as it can impair rehabilitation, contribute to quadriceps weakness, alter walking biomechanics, and increase the risk of osteoarthritis. Effusion-synovitis, detectable via ultrasound, serves as a marker of joint inflammation and has been linked to adverse outcomes post-ACLR. **PURPOSE:** To assess the prevalence of effusion-synovitis among different graft types at 4 months post-ACLR. **METHODS:** This cross-sectional study evaluated effusion-synovitis in ACLR patients aged 14-35 years at 4 months post-surgery. Participants, referred by orthopedic surgeons, were recruited from an ongoing study and excluded if they had additional cruciate ligament injuries. Graft type was confirmed through self-report and medical chart review. Ultrasound images of the suprapatellar recess were acquired bilaterally. Effusion-synovitis was graded using the OMERACT scale, with grades ranging from 0 (none) to 3 (severe). In cases of discrepancy between images, a second assessor provided consensus. The primary aim was to compare effusion-synovitis grades between the ACLR and contralateral limbs across different graft types using the Kruskal-Wallis test, given the non-normal distribution of the data at a significance level of $p < 0.05$. **RESULTS:** Thirty-four patients were enrolled in our study (Female = 18, Height = 169.2 cm ± 9.1cm, Weight = 75.6 kg ± 21.0 kg, Age = 19.2 yrs ± 5.1yrs). There was not a significant difference found in effusion-synovitis grade across the graft types (BPTB = 6; HT = 22; QT = 6) for the ACLR Limb ($p = 0.767$; $H = 0.532$) and the contralateral limb ($p = 0.283$; $H = 2.522$). **CONCLUSION:** There was no significant difference in effusion-synovitis severity at 4-months post-ACLR across different graft types, however this may have been due to non-normally distributed patient population used. Future research should consider longitudinal prevalence of effusion-synovitis between different graft types in addition to diversifying the patient population used and could consider how effusion-synovitis severity across different graft types develops into early osteoarthritis.

Poster #8

LONGITUDINAL ANALYSIS OF KNEE CARTILAGE
THICKNESS IN DIVISION I FEMALE ATHLETES
Christian Burke, Matthew Harkey

BACKGROUND: Participating in high-performance sports places considerable strain on athletes' knee joints throughout the competitive season. It's crucial to also account for sex-based differences, particularly in landing mechanics, as these differences can impact injury risk. Female athletes are more vulnerable to lower extremity injuries, making it essential to consider these factors in their training and care. **PURPOSE:** This study investigates preseason to postseason changes in knee joint cartilage thickness among female Division I NCAA athletes. **METHODS:** We included 30 female participants from Division I NCAA field hockey (n=15) and soccer (n=15) teams. Participants were members of field hockey (n=15), soccer (n=15) and they were, on average, 19.9±1.3 years old, 167±5.1 cm tall and weighed 63.87±7.9 kg. Participants completed a single research laboratory visit that included a knee cartilage ultrasound. Knee cartilage thickness was assessed bilaterally by a single investigator using a transverse scan with the knee in maximum flexion. The lead author traced the knee cartilage in three ultrasound images bilaterally and the average cartilage thickness for the dominant and non-dominant knees were quantified. A 2x2 ANOVA was used to determine how cartilage thickness changed from pre- to post-season in the dominant and non-dominant limb. **RESULTS:** Across both limbs, there was a statistically significant difference in cartilage thickness from pre- to post-season (F=5.791; p=0.023). However, there was no significant time by limb interaction (F=0.007; p=0.932) and no significant limb main effect for cartilage thickness (F=0.054; p=0.818). **CONCLUSION:** These findings highlight the need for regular knee health assessments in female Division I NCAA athletes to identify injury risks and enable timely interventions. Future research should focus on strategies to mitigate seasonal cartilage thinning, improving athlete longevity and performance. Additionally, further studies are necessary to determine whether changes in cartilage thickness are normal adaptations or potential indicators of future knee joint health decline.

Poster #9

(RE)TEST RELIABILITY OF LIMITS OF STABILITY
TESTING OF PERSONS WITH TYPE 2 DIABETES
Mackenzie Korff, Trevor Lopatin, Joshua Haworth

BACKGROUND: A Limits of Stability (LoS) test is an assessment for evaluating dynamic balance, an aspect of maintaining stability while shifting weight within one's base of support. This assessment is particularly relevant for individuals with type 2 diabetes (T2D), who often face balance impairments due to complications such as neuropathy, retinopathy, and vestibulopathy. The BTrackS LoS test employs a uniquely untargeted approach, allowing participants to explore their stability limits freely. Previously, this protocol was validated with healthy young adults aged 20-30 (Haworth et. al, 2020). However, individuals with T2D may exhibit different postural control due to sensory impairments, highlighting the need to understand how the BTrackS protocol performs in this population. **PURPOSE:** This study aims to examine the applicability of the BTrackS protocol in a T2D population, exploring whether consistent results and movement strategies can be observed across multiple trials. **METHODS:** 73 participants with T2D completed two trials using the BTrackS LoS Protocol. During each trial, the total area explored by participants (cm²) was measured. Additionally, laterality assessed bias in the time spent on the right and left side of the platform. To assess the consistency between the two trials, Pearson correlation coefficients were calculated for the overall area explored and the laterality. **RESULTS:** Pearson correlation analysis revealed a high positive correlation between Trial 1 and Trial 2 for area explored ($r = 0.8426$; $p < .00001$). Additionally, when examining the laterality between Trial 1 and Trial 2, a moderate positive correlation was observed, ($r = 0.5714$; $p < .00001$). **CONCLUSION:** The results of this study demonstrates that the BTrackS LoS protocol shows high reliability in assessing dynamic balance in individuals with type 2 diabetes. The high positive correlation between the first and second trials suggests that a single trial may be sufficient for accurately capturing the area explored, as similar results were consistently observed. However, the moderate correlation in laterality indicates that, while overall performance is consistent, participants may use different movement strategies across trials. These findings support the use of the BTrackS protocol as a reliable tool for assessing dynamic balance in this population, acknowledging that variations in individual movement strategies should be considered when interpreting results.

Poster #10

ASSESSING THE RELATIONSHIP BETWEEN FUNCTIONAL MOBILITY AND BALANCE MEASURES IN CHILDREN WITH CEREBRAL PALSY

Christian Maron, Leila Nuri, & Joshua Haworth

BACKGROUND: Individuals with spastic cerebral palsy (SCP) present with a variety of challenges to ambulation and balance, including loss of selective motor control, increased muscle tone, and deficient equilibrium reactions. Multiple tools are available to measure functional mobility: The Timed Up and Go (TUG) test is a simple and widely used assessment of gait mobility and falls risk. The Static Balance Test (SBT) is an assessment of balance, measuring center of pressure during quiet standing. The Limits of Stability (LOS) is a dynamic assessment of balance that measures volitional base of support excursion. Relationships between these measures to assess the mobility of those affected by SCP has yet to be explored. **PURPOSE:** Explore functional mobility and balance measures in a cohort of children with cerebral palsy compared to typically developing peers. **METHODS:** Six adolescents (age = 11 ± 1 years; 4 male, 2 female) with diagnosed spastic diplegia capable of independent ambulation (GMFCS levels 1 & 2) and ten typically developing controls (age = 13 ± 2 years; 6 male, 4 female) participated. Subjects completed three trials of TUG testing; the trial with the shortest time was used. Subjects then completed four trials of SBT; one was used for familiarization while the rest produced an average score. Two trials of LOS were performed; the trial with the higher score was kept. **RESULTS:** Time to complete the TUG was 10.4 ± 4.0 seconds for the SCP group and 7.1 ± 0.8 seconds for the control group. The SBT pathlength measured 56.2 ± 30.8 cm for the SCP group and 26.3 ± 8.7 cm for the control group. The LOS area measured 273.0 ± 161.0 cm² for the SCP group and 415.8 ± 133.9 cm² for the control group. Two-tailed, two-sample equal variance t-tests showed that the two groups differed significantly in TUG ($p = 0.01$) and SBT ($p = 0.01$), but not LOS ($p = 0.075$). Pearson correlation analysis revealed a positive relationship between TUG and SBT ($R = 0.968$, $p = 0.001$) in the SCP group. **CONCLUSION:** Children with SCP and typically developing children differ on TUG and SBT performance. However, no difference was found for LOS, possibly due to the LOS test's limited sensitivity to subtle balance and stability differences. The correlation between TUG and SBT suggests they might be redundant; clinicians might prefer SBT because it's easier to administer, less physically demanding for patients, and requires less space, making it more suitable for smaller clinics.

Poster #11

RUN FOR GOOD HEALTH: BEHAVIOR CHANGE APPROACHES TO INCREASE YOUTH PHYSICAL ACTIVITY

Rylan McDaniel FACSM, Jean-Pierre Khouzam, Blake Holderman, & Carmen Swain

BACKGROUND: There is a lack of physical activity in adolescents (Kimm, et al., 2002), with an inverse relationship between age and physical activity participation (Sember, et al., 2020). From age 5-7 years, 24% of males and 23% of females meet the physical activity guidelines, while from age 13-15 years participation decreases to 14% in males and 8% for females (Van Sluijs et al., 2022). Behavior change theories such as the social cognitive theory offer powerful frameworks for fostering shifts in behavior, particularly regarding physical activity participation (Rhodes et al., 2019). By applying the social cognitive theory in-line with physical activity programming, we may influence how adolescents engage with physical activity. **PURPOSE:** To assess the impact of a fitness and behavioral intervention on aerobic functional status and physical activity engagement in underactive youth. **METHODS:** Twenty-three underactive adolescent volunteers, 13 male and 10 female, aged 13-17 years completed the Youth Risk Behavior Survey and Stage of Change Survey to assess physical activity behavior. Aerobic fitness was assessed by completing a submaximal VO₂ test. An 8-week personalized aerobic exercise prescription focused on progressive increase from walking to jogging was developed using fitness test results. Weekly behavioral counseling sessions drawn from the social cognitive theory were conducted with participants. Participants concurrently carried out exercise programming on their own time. Post-program, participants completed a submaximal treadmill test, and the Youth Risk Behavior Survey questionnaire immediately after and at a 15-week follow-up. **RESULTS:** Following programming, there was a significant increase in time spent on the treadmill (422.35 ± 103.27 sec to 465.13 ± 122.00 sec, $p = 0.009$) and estimated VO₂ max improved (39.71 ± 8.66 ml/kg min to 42.64 ± 8.81 ml/kg min, $p = 0.002$). The Youth Risk Behavior Survey revealed participants significantly

increased days in the past week they were active for at least 60 minutes, from 1.78 ± 1.04 days to 4.35 ± 1.15 days, $p = 2.24E-09$). The Stages of Change survey scores significantly improved from 2.26 ± 0.54 to 4.17 ± 0.83 , $p = 7.95E-11$). **CONCLUSIONS:** Study findings suggest that an 8-week intervention focused on behavior, personalized exercise prescription, and independent exercise holds promise as a reasonable and cost-effective approach for engaging inactive adolescents in physical activity programming.

Poster #12

A CONTINUOUS AND DISCRETE ANALYSIS OF JUMP LANDING GROUND REACTION FORCES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

Arjun Parmar, Jessica Tolzman, Corey Grozier, Ian Frederick, & Matt Harkey

BACKGROUND: After anterior cruciate ligament reconstruction (ACLR), individuals display asymmetric landing mechanics related to injury and disease. Typically, analysis of landing ground reaction force (GRF) focuses only on the magnitude of the peak vertical (V) GRF, neglecting antero-posterior (AP) and medio-lateral (ML) GRFs. Additionally, GRF waveforms changes throughout the landing task are not assessed. **PURPOSE:** Assess GRF in the V, AP, and ML directions during jump landing after ACLR using multivariate analysis discrete and continuous GRF measurements. **METHODS:** Forty-five participants with primary unilateral ACLR (42.2% female, age: 19.3 ± 5.6 years, height: 173.1 ± 8.3 cm, mass: 75.4 ± 13.3 kg, time since surgery: 7.5 ± 2.0 months) performed five drop vertical jumps. GRFs during the first landing were captured using in-ground tri-axial force plates at 1,200 Hz. GRFs were time-normalized (0-100% contact) and averaged across trials. Discrete analysis compared peak GRF magnitudes, between limbs. Continuous analysis used statistical parametric mapping (SPM) to identify significantly different regions of GRF waveform between limbs. Both discrete and continuous analyses compared GRFs between ACLR and healthy limbs using paired permutation Hotelling's T^2 tests and post-hoc paired permutation t-tests. Alpha was set a priori to 0.05 and post-hoc tests were Bonferroni corrected. **RESULTS:** The overall discrete analysis showed significant differences in peak GRF magnitude between limbs ($p < 0.01$) and post-hoc tests showed the ACLR limb experience significantly less GRF during jump landing (magnitude p-value: AP < 0.01 , ML < 0.01 , V < 0.01). The overall continuous SPM analysis revealed significant GRF differences from 0.5% to 99.4% of landing. Post-hoc tests showed: ACLR limb ML-GRF was lower at 11.5%-12.1% and 94.1%-98.0% of landing, but higher at 75.9%-76.2% and 77.4%-78.7% of landing; AP-GRF was higher at 0.2%-2.8%, 7.1%-66.3%, and 84.1%-96.9% of landing; V-GRF was consistently lower throughout landing (0.0%-99.4%). **CONCLUSION:** Both continuous and discrete analyses capture multi-directional offloading of the ACLR limb. However, the continuous analysis showed the ACLR limb experienced significantly more ML-GRF during the amortization phase. Continuous analyses can identify GRF waveform differences that are not captured by discrete analyses. Future research should utilize multivariate assessment of GRF to better understand biomechanical alterations following ACLR.

Poster #13

THE ACUTE REDUCTION IN VO₂MAX INDUCED BY A MITOCHONDRIAL TARGETING ANTIOXIDANT (MITOQ) IS NOT ASSOCIATED WITH LOWER CARDIAC OUTPUT

Emma Clarke, Hunter Dieter, Ryan Hughes, Mikaela Brown, Bradley Fleenor, and Matthew Harber, FACSM

BACKGROUND: We have previously shown that a mitochondrial targeting antioxidant (MitoQ) acutely blunts aerobic capacity (i.e., VO₂max) in physically inactive individuals. **PURPOSE:** To determine if the acute effects of MitoQ on VO₂max occur in physically active individuals and if this effect is mediated by reductions in cardiac output (Q). **METHODS:** Sixteen (n=16) physically active, apparently healthy adults (age 25.0 ± 3.8 years and BMI 24.6 ± 3.3 kg/m²) performed two trials (Placebo and MitoQ) in a double-blind randomized cross-over design. Participants consumed either a Placebo or MitoQ (80mg) one hour prior to a maximal exercise test on a cycle ergometer. VO₂max was assessed via indirect calorimetry and heart rate, stroke volume and cardiac output were assessed via thoracic cardiac impedance. **RESULTS:** VO₂max was higher ($P=0.05$) during Placebo (2.78 ± 0.65 L/min) compared to MitoQ (2.67 ± 0.67 L/min) while no differences ($P > 0.05$) existed between trials for heart rate

(180.97±8.64 vs 180.82±10.84 bpm, Placebo and MitoQ, respectively, P=0.91), stroke volume (135.24±26.54 vs 134.71±28.04 ml/beat, Placebo and MitoQ, respectively, P=0.87), or Q (23.95±4.41 vs 24.07±5.15 L/min, Placebo and MitoQ, respectively, P=0.83). Peak workload was not different (P=0.46) between Placebo (248±59 W) and MitoQ (249±59 W) but cycling efficiency was higher (P=0.02) in MitoQ (94±6 W/L O₂/min) compared to Placebo (89±4 W/L O₂/min). **CONCLUSION:** The acute reduction in VO₂max after supplementation with MitoQ occurs in physically active adults but is not associated with cardiac function, suggesting the reduced VO₂max was mediated by peripheral factors. Further, peak workload was not reduced suggesting that exercise efficiency was improved after MitoQ. Future research is warranted to explore the mechanisms by which MitoQ acutely alters oxygen utilization during exercise.

Poster #14

ASSOCIATION OF SEDENTARY BEHAVIORS AND PULSE WAVE VELOCITY IN POSTPARTUM WOMEN

Chun-Chen Lin, Annalee Nowak, Marnie K McLean, Thomas Cardaci, Abbi D Lane

BACKGROUND: Sedentary behavior (SB), which is especially prevalent in pregnant women, is linked to higher cardiovascular disease risk. Arterial stiffness, measured by pulse wave velocity (PWV), possibly links SB and cardiovascular disease, but its specific association during pregnancy and postpartum remains poorly understood. **PURPOSE:** To determine associations in sedentary behaviors and PWV in postpartum women. **METHODS:** Adult participants 6 months-3 years post-delivery of a singleton infant were included. Exclusion criteria included current smoking, current use of certain medications, and diabetes outside of pregnancy. Following an overnight (>8 h) fast and abstention from caffeine, alcohol, and exercise, SB (validated Sedentary Behavior Questionnaire; current amount and recall of mid-pregnancy amount) and PWV (carotid and femoral applanation tonometry) were measured. PWV was assessed in m/s using the distances between arterial sites and the time delay between carotid and femoral waveforms. Spearman rank correlation and Pearson correlation were used to test for correlation coefficients between SB scores and PWV. **RESULTS:** Eighty-six women (median age: 33 [30-36] years; 64 White/21 Black/1 Asian; BMI: 26.5 [22.8-34.5] kg/m²) who delivered a singleton infant 6 months-3 years ago were included. SB on a typical weekday was similar between women during pregnancy and postpartum (8.75 [7-11.75] vs 8.5 [6.5-10.5] hours). PWV in postpartum women was within normal range (5.9 [5-6.9] m/s). No significant relation was detected between PWV and SB during pregnancy or postpartum (pregnancy: r=0.1, p=0.41; postpartum: r=0.01, p=0.96). A multiple regression model including age, BMI, and SB on a weekday during postpartum period provides a significant fit for the data, F(3, 61) = 2.87, p=0.04, and explained 12% of the variance in PWV. Within this model, BMI was the only significant positive predictor of PWV (coefficient=0.06, p=0.01). Conversely, a multiple regression model including age, BMI, and SB on a weekday during pregnancy period did not significantly predict PWV, F(3, 56) = 0.67, p=0.57, and only explained 3% of the variance in the PWV. **CONCLUSION:** No association between SB and PWV was found in postpartum women. However, BMI was a significant predictor of PWV. Future research should explore domains of SB at different time points as a predictor of PWV to prevent cardiovascular disease.

Poster #15

THE EFFECTS OF ACUTE RESISTANCE EXERCISE ON SUBSEQUENT CYCLING PERFORMANCE AND SKELETAL MUSCLE OXYGENATION

Arturo Sosa III, Larissa M. Barreto, Julieta R. Sanchez, Ivan J. Leon, Monica Alcantara, Emily Percino, Jennifer T. Lin, Mekhii R. Morris-Heron, Carlos A. Estrada, Michael D. Belbis

BACKGROUND: Post-activation performance enhancement (PAPE) occurs when a high-intensity conditioning contraction leads to improved muscle performance in a subsequent trial. This effect is often used by sports professionals to enhance muscle power output and exercise performance. While the effects of PAPE on muscle power and anaerobic performance are well-documented, its impact on cardiovascular outcomes and endurance performance is less understood. Specifically, the influence of PAPE on skeletal muscle oxygenation during exercise, a key determinant of exercise tolerance, remains unclear. **PURPOSE:** This study aimed to assess the effects of acute hex bar deadlifts (HBD), used as a PAPE stimulus, on subsequent cycling exercise tolerance and skeletal muscle

microvascular oxygen delivery-utilization matching in humans. METHODS: Fourteen healthy participants (23±1 years, 10M/4F) were involved in a randomized crossover trial, performing cycling exercise following either HBD or dynamic stretching (DYN) interventions. Participants completed moderate- and severe-intensity cycling tests with measurements of heart rate, arterial blood pressure, pulmonary oxygen uptake, and vastus lateralis muscle oxygenation (SmO₂; near-infrared spectroscopy. RESULTS: No significant difference was observed in the primary outcome of time-to-exhaustion during severe-intensity cycling between the HBD and DYN conditions (HBD: 452±46 s, DYN: 397±45 s; p>0.05). Resting SmO₂ before both moderate- and severe-intensity cycling was not significantly different between conditions (moderate: HBD: 85.6±1.8%, DYN: 86.4±2.3%; severe: HBD: 87.3±2.4%, DYN: 87.8±2.4%; p>0.05). During moderate-intensity cycling, SmO₂ was not significantly different between conditions, as assessed by the area under the curve (HBD: 27,785±1,348 %·s, DYN: 26,842±1,821 %·s; p>0.05). However, during severe-intensity cycling, SmO₂ was significantly higher in the HBD condition compared to DYN, as assessed by the area under the curve (HBD: 23,737±3,930 %·s, DYN: 18,688±2,365 %·s; p<0.05). No differences were found in heart rate, arterial blood pressure, or pulmonary oxygen uptake during exercise across conditions. CONCLUSIONS: Consistent with our hypothesis, these findings suggest that HBD prior to cycling elevates SmO₂ during severe-intensity cycling but does not translate to improved exercise tolerance in healthy adults. HBD does not affect SmO₂ during moderate-intensity cycling in the conditions evaluated herein.

Poster #16

MANAGING POSTPARTUM BLOOD PRESSURE: THE RELATIONSHIP OF PERINATAL EXERCISE AND RENIN-ALDOSTERONE CONCENTRATIONS

Igor Trifunovic, Nicholas Merritt, Marnie McLean, Thomas Cardaci, & Abbi Lane

BACKGROUND: Approximately ten percent of women with normotensive pregnancies experience new hypertension within one year following delivery. Limited data exists describing its root causes and proper management. High concentrations of renin and aldosterone are implicated in hypertension via the renin-angiotensin-aldosterone system (RAAS). Regular exercise during pregnancy and postpartum helps to reduce maternal blood pressure (BP) in observational studies, but whether perinatal exercise is related to RAAS biomarkers is inconclusive. PURPOSE: To determine (1) if prenatal or postpartum exercise levels are associated with BP or (2) plasma renin and aldosterone concentrations. METHODS: Fifty-eight women (mean age=33.81±0.72; mean BMI=28.47±1.03; 44 White/13 Black/1 Asian) who delivered a singleton infant between 6 months and 3 years prior were included. Exclusion criteria included smoking, diabetes, use of protease inhibitors, and pregnancy length <20 wk. Pregnancy and postpartum leisure-time exercise were measured using the Godin-Shepard questionnaire. Plasma renin and aldosterone were assessed using ELISA blood assays. Spearman correlations tested for variable dependence; regression analyses evaluated associations adjusted for age and body mass index. RESULTS: There was no correlation between brachial systolic/diastolic BP and exercise in pregnancy (sys: $\rho=0.04$, $p=0.71$ | dia: $\rho=-0.03$, $p=0.81$) or postpartum (sys: $\rho=-0.07$, $p=0.55$ | dia: $\rho=-0.15$, $p=0.17$). In adjusted regression analyses, no association was found between renin and aldosterone concentrations and exercise in pregnancy (ren: $p=0.77$ | ald: $p=0.99$) or postpartum (ren: $p=0.88$ | ald: $p=0.68$). CONCLUSION: Pregnancy and postpartum leisure-time exercise were not associated with BP or RAAS system biomarkers. Future studies should include a larger sample size and evaluate BP, renin, and aldosterone at multiple time points before and after delivery. This research was funded by American Heart Association Career Development Award 18CDA34110038 (to Abbi Lane).

Student Presentations – Poster #2 (10:00 am – 11:00 am; Kendall Room)

Poster #1

SEX DIFFERENCES IN ABDOMINAL SUBCUTANEOUS ADIPOSE TISSUE AFTER A SINGLE BOUT OF EXERCISE AT THREE DIFFERENT INTENSITIES

Olivia Chugh, Cheehoon Ahn, Tao Zhang, and Jeffrey F Horowitz, FACSM

Endurance exercise training is known to induce several metabolic adaptations that aid in combating and preventing lifestyle-related diseases. Clear differences have been found between males and females in the regulation of fat metabolism during exercise, but there may be other exercise-related adaptations that differ between the sexes that are still unknown. The primary aim of this study was to investigate changes in gene expression and post-translational modifications in abdominal subcutaneous adipose tissue (aSAT) before exercise and ~1.5 hours after a single session of low-, moderate-, or high-intensity exercise in both male and female subjects. A total of 45 recreationally active males (n=22) and females (n=23), performed a single session of exercise at either low-intensity (LOW; 60min continuous exercise at 30% VO₂peak; 7 males & 8 females), moderate-intensity (MOD; 45min continuous exercise at 65% VO₂peak; 8 males & 7 females), or high-intensity (HIGH; 10x1min intervals at 90% VO₂peak interspersed with 1min active recovery; 7 males & 8 females). Adipose tissue biopsy samples were collected before exercise and ~1.5 hours after exercise and processed for RNA sequencing and targeted protein immunoassays. Circulating cytokines were measured from blood samples collected before and after exercise. After exercise, the phosphorylation of a key inhibitory site on the lipolytic enzyme, hormone sensitive lipase (pHSLser565), was found to be lower in females vs. males (p<0.05), which may help maintain fatty acids after exercise for enhanced intramyocellular lipid resynthesis. Transcriptomic analysis revealed that ATP1A2 was significantly upregulated in adipose tissue in females in the LOW group after a session of exercise (adjusted p=0.0015). ATP1A2 codes for the protein Na⁺/K⁺ ATPase, which has been found to enhance lipid metabolism pathways. In agreement, our pathway analysis also revealed an upregulation of fatty acid metabolism and oxidative phosphorylation pathways in female adipose tissue after exercise compared with males. Plasma concentrations of the cytokines: IL-10, IL-1β, IL-6, and TNFα all increased transiently after exercise with no differences between sexes, indicating that acute inflammatory response to aerobic exercise is similar between males and females. Findings of this study identify some interesting changes in adipose tissue that occur very shortly after a session of exercise, as well as some compelling differences between the sexes.

Poster #2

AIR-CONDITIONED COOLING DURING CONSECUTIVE WORK-REST CYCLES IN THE HEAT

Christiana Donkor, Rowan Fitzpatrick, Sarah Daniel, Marian Avila, Michael Platt, and Micah Zuhl

BACKGROUND: Individuals who work in hot environments are at increased risk for heat-related illnesses. A key prevention strategy is cycling work in the heat with passive rest to prevent a rise in core body temperature. Limited research suggests that spending passive rest in an air-conditioned cooled environment will enhance cooling rate. **PURPOSE:** This study aimed at assessing body temperature changes during three, 45-minute work cycles in the heat followed by 15 minutes of rest in an air-conditioned cooled environment. **METHODS:** Ten (6 male, 4 female) participants (23±8 years) completed baseline testing and two work-rest heat trials (separated by 4 weeks) following NIOSH guidelines. Work-rest trials consisted of 45 minutes of treadmill walking at 425 W (moderate intensity) in the heat (36°C, 40% RH, 29°C WBGT) followed by 15 minutes of passive rest. The rest was either completed in a hot environment (Hot cooling) or an air-conditioned space (Cold cooling). The work-rest cycle was repeated three times (180 minutes total). Rectal temperature (Tre), mean skin temperature (mTsk), mean body temperature (mTb), heart rate, physiological strain index (PSI), and subjective thermal sensation were all recorded every five to ten minutes during the work (45 minutes) and rest (15 minutes) cycles. Peak temperature values along with the rate of heating during work and the rate of cooling during rest (°C/min) were evaluated. **RESULTS:** No difference for peak Tre, peak mTsk, or peak mTb were observed between trials. The rate of mTb cooling during rest was faster in the Cold cooling trial vs. Hot cooling trial during all three cycles (cycle one: -0.054 ± 0.009 vs. -0.013 ± 0.006 °C/min; cycle two: -0.054 ± 0.008 vs. -0.019 ± 0.006 °C/min; cycle three: -0.054 ± 0.007 vs. -0.018 ± 0.008 °C/min, p<0.0001). Similarly, the rate of mTsk cooling was faster during rest in the Cold cooling vs. Hot cooling trial (rest cycle one: -0.22 ± 0.03 vs. -0.02 ± 0.01 °C/min; rest cycle two: -0.22 ± 0.03 vs. -0.02 ± 0.01 °C/min; rest cycle three: -0.21 ± 0.03 vs. -0.02 ± 0.01 °C/min, p<0.0001). No differences were detected between trials for the rate of Tre cooling during rest. **CONCLUSION:** Passive rest in an air-conditioned space was effective at lowering mean body temperature. The effect was regulated through skin temperature cooling as rectal temperature cooling was not different.

Poster #3

THE IMPACT OF PATIENT-SPECIFIC ADAPTIVE DYNAMIC CYCLING ON HEART RATE, EFFORT AND RATING OF

PERCEIVED EXERTION IN PEOPLE WITH PARKINSON'S DISEASE

Chen Li, Brittany Smith, Lara Shigo, Younguk Kim, Angela L. Ridgel, FACSM

BACKGROUND: High-cadence dynamic cycling is an effective therapy for improving motor symptoms in individuals with Parkinson's Disease (PD). 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 changes in heart rate (HR), effort (power output above zero during the exercise session) and rating of perceived exertion (RPE) over 12 sessions of high-cadence dynamic cycling in individuals with PD. **METHODS:** Twenty-two individuals with idiopathic PD (were randomized into two groups: PSADC (n=12) or active control (n=10). All individuals completed 12 sessions (3 sessions per week for 4 weeks) of cycling on a custom motorized stationary cycle. Individuals in the PSADC group followed an adaptive exercise prescription in which resistance level was optimized, using entropy of cadence and cycling effort, on a weekly basis. Individuals in the active control group remained at a constant resistance level. Heart rate, effort and RPE was analyzed with paired sample t-tests and independent sample t-tests to determine differences between different sessions and groups. Pearson's correlation was used to test associations among HR, effort and RPE. **RESULTS:** The average HR of the active control group (Mean = 78.31, SD = 7.39) is significantly lower ($p = 0.009$) than PSADC group (Mean = 86.95, SD = 6.55). There was a significant decrease in HR from Session 1 to Session 12 for the active control group ($p = 0.019$), while the PSADC group show no significant change ($p = 0.192$). The average effort in control group (Mean = 54.49, SD = 38.97) is significant lower ($p = 0.018$) than PSADC group (Mean = 89.87, SD = 25.1). There were no significant correlations observed between HR, Effort, and RPE in either group. **CONCLUSION:** This study showed that heart rate was higher but stable over 12 sessions of PSADC compared to constant resistance cycling in individuals with PD. However, there was no significant correlation between heart rate, effort and RPE. Additional studies are being done to compare heart rate to changes in motor symptoms.

Poster #4

INTRA-RATER RELIABILITY OF A NOVEL TOOL FOR VIDEO CODING OF MUSCLE STRENGTHENING EXERCISE SESSIONS

Vineetha Bollina, Prapti Patel, Joshua Haworth, Elise Brown

Background: Regular muscle strengthening exercise (MSE) helps prevent type 2 diabetes, heart disease, osteoporosis, depression, anxiety and other diseases. However, qualification and quantification of this type of training remains challenging. Proper assessment would likely contribute to improved guidelines and adherence. Video coding is a method of analyzing and interpreting video data to extract meaningful information. In the context of strength training, video coding can leverage standardized methods of defining when an MSE occurs, as well as naming aspects of the exercise, such as modality and movement pattern. By analyzing video recordings of MSEs, feedback can be generated on aspects such as movement patterns and technique, total exercise time, number of reps. An important aspect of video coding is to ensure that the results are consistent upon repeated coding of the same videos, to ensure effectiveness. **Purpose:** The aim of this study is to evaluate the intra-rater reliability of a novel MSE video coding tool. **Method:** A set of 3 standard videos, ~15 minutes each, were created by an MSE expert to include a variety of different movement patterns, modalities, use of implements, and specific exercise types performed as a typical MSE session. A group of 8 students were trained on the use of a novel video coding tool, used for labeling MSE. This group then coded the three standard videos on two separate occasions, one week apart. Separate intraclass correlation coefficients (ICCs, & 95% CI) were conducted to determine intra-rater reliability. ICC(2,k) represents the relative reliability of the rater scheme, whereas ICC(2,1) represents the relative likelihood of a single rater coding consistent with the group. **Results:** Coding outcomes indicate (15.25±7.8) segments with a total duration of exercise (8.7±4.4) minutes. ICC findings indicate that although the coding is generally consistent across raters, ICC(2,k) is "good" or "moderate" for both count (ICC = 0.82, -1.5-.9) and time (ICC = 0.62, -1.5-.8), any individual rater is not very consistent with the group, ICC(2,1) is "poor" for both count (ICC = 0.37, -.08-.6) and time (ICC = 0.17, -.08-.3). All $p < .05$. **Conclusion:** When used by multiple raters, the coding is relatively accurate for a broad understanding of the MSE behaviors within a given video. Though, findings show that continued development of the video coding tool and training for its use is warranted.

Poster #5

NECK STRENGTH IS LOWER IN FEMALE SOCCER PLAYERS WITH A HISTORY OF CONCUSSION

Caroline Chaulk, Zoe Miller, Abby Baldwin, Melissa Anderson

BACKGROUND: Female soccer players experience significantly higher head accelerations during play compared to their male counterparts. These disparities in impact forces, potentially stemming from differences in neck strength and muscle activation speed, may contribute to an elevated concussion risk for female athletes. Targeted neck strengthening interventions hold promise in mitigating this risk by enhancing head and neck stability during collisions. This study aims to establish pre-intervention strength measurements for a Division I women's soccer team and compare performance between those with and without a concussion history. **METHODS:** Twenty-nine (age=19.86 ± 1.27 years, soccer experience=15.34 ± 2.18 years) athletes underwent testing of peak neck flexion and extension in pounds-force (lbf), peak combined right and left flexion (lbf), and the time to achieve peak flexion in seconds (s) with all values being recorded by a hand-held dynamometer. An independent samples t-test was conducted to compare performance between athletes with a concussion history (CONCHX; n=17, 58.6%) and those without concussion history (CONTROL; n=12; 41.4%). Significance levels were set at 0.05. **RESULTS:** Players who had previously sustained a concussion had significantly lower neck extension peaks (CONCHX= 21.9±12.5 lbf, CONTROL= 29.0± 10.7 lbf), faster neck extension peak times (CONCHX= 1.7± 0.8 s, CONTROL= 2.3± 0.4 s), and faster combined right flexion peak time (CONCHX=1.8±0.7 s, CONTROL=5.6± 1.2 s), than those who hadn't (p-value range =0.016-0.047). **CONCLUSION:** Our preseason testing revealed significant differences in neck strength and time to peak flexion between athletes with and without a concussion history. Upon completion of the neck training, a follow-up assessment is required to determine if both groups received the same benefits. Should differences exist between groups, it could indicate a higher need for preventative measures in post-concussion individuals. Therefore, targeted neck strengthening interventions could be beneficial for all female players, with particular emphasis on those with identified neck weaknesses, to potentially mitigate concussion risk.

Poster #6

THE EFFECT OF TRAINING IN A NOVEL COMPRESSION GARMENT ON LOWER BODY ANAEROBIC PERFORMANCE IN MALE COLLEGIATE ATHLETES

Curtis A. Cornell, Jaye E. Fuller, Joshua T. Mayne, Benjamin S. Minier, Seth C. Stoltz, Zachary S. Bitely, Faith C. Benedict, Rudi A. Marciniak, & James R. Sackett

BACKGROUND: A novel, full-body compression garment (CG) is purported to augment axial load, increase engagement of core musculature, and enhance acute bouts of anaerobic exercise performance. However, the effects of chronic CG use during training on lower body anaerobic exercise performance is unknown. **PURPOSE:** Thus, the purpose of this study was to test the hypothesis that athletes who trained while donning GC throughout a training program would improve lower body anaerobic exercise performance greater than a control group. **METHODS:** Male collegiate soccer athletes were assigned to a control (CT, n=10, age=19.80 ± 1.23yrs, ht=177.77 ± 7.82cm, wt=72.15 ± 6.74kg) or experimental (CG, n=10, age=20.10 ± 1.19yrs, ht=178.90 ± 5.17cm, wt=78.71 ± 6.06kg) group that wore CG during a five-week training program. The training included tempo runs, sprints, and/or resistance training five days weekly. To quantify anaerobic performance as power (Watts, W), each subject completed a maximal, 30-second cycling bout against 7.5% of body weight via the Wingate Anaerobic Bike Test (WAnT) prior to (T1) and after (T2) the training program. Relative peak power (RPP, W/kg), relative mean power (RMP, W/kg), and fatigue index (FI, %) were measured during the WAnT. 2 x 2 repeated measures analyses of variance examined the influence of TIME and GROUP on RPP, RMP, and FI. An alpha of .05 determined statistical significance. **RESULTS:** For RPP, a non-significant interaction was identified (F1,18=1.502, p=0.236), as well as non-significant main effects for TIME (F1,18=0.519, p=0.480, T1 11.41 ± 1.44=T2 11.19 ± 1.23W/kg) and GROUP (F1,18=4.294, p=0.053, CT 10.81 ± 0.11=CG 11.79 ± 0.43W/kg). For RMP, a non-significant interaction was identified (F1,18=0.015, p=0.903), as well as non-significant main effects for TIME (F1,18=0.407, p=0.532, T1 4.74 ± 1.35=T2 4.45 ± 1.27W/kg) and GROUP (F1,18=0.000, p=0.985, CT 4.61 ± 0.21=CG 4.62 ± 0.14W/kg). For FI, a non-significant interaction was identified (F1,18 = 0.531, p=0.476), as well as non-significant main effects for TIME (F1,18=0.578, p=0.457, T1 57.84 ± 13.85=T2 49.26 ± 52.06%) and GROUP (F1,18=1.006, p=0.329, CT 47.09 ±

11.88=CG 60.01 \pm 0.26%). CONCLUSIONS: There were no anaerobic performance differences between CT or CG following five-weeks of training. Thus, training with this novel CG does not appear to alter lower-body power adaptations. Future researchers should examine if results are similar following longer training exposures.

Poster #7

PHYSIOLOGICAL RESPONSES ACROSS TIME TO EXHAUSTION AT THE RUNNING VELOCITY ASSOCIATED WITH VO₂MAX

Matteo De Leon and Clayton L. Camic

vVO₂max refers to the minimum running velocity that results in achieving maximal oxygen uptake (VO₂max) and has been described as an ideal training intensity for increasing maximal aerobic power. There are limited data, however, regarding the physiological responses across time exhaustion at vVO₂max. PURPOSE: To examine the oxygen uptake and heart rate responses during a run to exhaustion at vVO₂max in highly-trained runners. METHODS: Twelve competitive runners (males: n = 9, females, n = 3; mean age \pm SD = 21.8 \pm 1.7 yrs; body mass = 71.2 \pm 9.0 kg; running volume = 76.0 \pm 39.6 km \cdot wk⁻¹) volunteered to complete two laboratory visits separated by 72-96 hours. For the first visit, subjects completed an incremental treadmill test to exhaustion that began at 9.0-10.0 km \cdot h⁻¹ and increased 1.0 km \cdot h⁻¹ every two minutes to determine VO₂max and vVO₂max. VO₂max was defined as the average of the highest VO₂ values achieved in two consecutive 15-second periods with standard criteria met. vVO₂max was defined as the lowest running velocity maintained for at least one minute that elicited VO₂max. During the second visit, subjects completed a run to exhaustion at the constant velocity of their vVO₂max. Gas exchange was measured during both visits with a calibrated metabolic cart and VO₂ values were assessed as 15-s averages. Heart rate (HR) was recorded using a chest strap monitor. Separate one-way analysis of variance (ANOVAs) with repeated measures were used to determine significant (p < 0.05) mean differences in normalized VO₂ (% VO₂max) and heart rate (%HRmax) across normalized time to exhaustion (%TTE). Paired-samples t-tests were used as follow-up analyses. RESULTS: Mean \pm SD values for VO₂max, HRmax, vVO₂max, and TTE at vVO₂max were 65.3 \pm 8.8 mL \cdot kg⁻¹min⁻¹, 191 \pm 8 bpm, 16.5 \pm 1.8 km \cdot h⁻¹, and 5.48 \pm 1.13 minutes, respectively. There were significant increases in %VO₂max (85.5 \pm 3.8% < 94.8 \pm 3.1% < 99.8 \pm 3.2% < 101.7 \pm 3.1% < 103.6 \pm 2.8%) and %HRmax (89.7 \pm 2.3% < 92.6 \pm 2.4% < 94.2 \pm 2.0% < 95.6 \pm 1.7% < 97.2 \pm 1.5%) across 20, 40, 60, 80, and 100%TTE, respectively. In addition, the time limit at VO₂max (during the second visit) was 2.65 \pm 0.99 min (47.4 \pm 11.9% of total TTE). CONCLUSIONS: Our findings indicated that running to exhaustion at vVO₂max elicits continuous increases in VO₂ and HR. Furthermore, VO₂max was achieved and maintained during the run to exhaustion at vVO₂max for approximately 50% of the total TTE, whereas HRmax was never attained.

Poster #8

THE EFFECTS OF A SIMULATED PHYSICAL ALTERCATION ON ANAEROBIC PERFORMANCE IN POLICE OFFICERS

Jeremiah A. Hanisch & James R. Sackett

BACKGROUND: Whether they are in a foot chase or attempting to put somebody into custody, police officers regularly find themselves in physically demanding situations. Thus, it is crucial to understand how the body responds to a physical altercation. PURPOSE: The purpose of this investigation was to test the hypothesis that police officers' ability to perform physical exercise would be negatively impacted following a simulated physical altercation when compared to a control condition that didn't include a simulated physical altercation. METHODS: Eight police officers (age: 30 \pm 8 y, BMI: 25.8 \pm 3.5 kg/m², 1 F) from the Grand Rapids Police Department volunteered to participate in this study. Each participant completed two separate randomized visits to the laboratory: a control test (CT) and an experimental test (ET). Each visit consisted of a maximal 60-second push-up test, a maximal countermovement vertical jump test, a maximal grip strength test, and a 30-second Wingate Anaerobic Test on a leg ergometer (WAnT). The push-ups were counted (repetitions). The best of three vertical jumps were recorded by displacement (cm) and the best of two grip strength attempts were recorded for each hand and summed (kg). Peak power (W), mean power (W), and fatigue index (%) were recorded during the WAnT. The ET included a simulated physical altercation at the beginning and again part way through the visit, while the CT did not. The simulated physical altercation consisted of a minute-long striking sequence to a punching bag, followed by a minute of burpees. Data were analyzed using a paired t-test. RESULTS: Officers performed significantly (p=0.001) more

push-ups during the CT (56 ± 10 reps) when compared to the ET (33 ± 11 reps). There were no statistically significant differences between the CT and ET for countermovement vertical jump height ($p=0.419$), summation of grip strength ($p=0.732$) or peak power during the WAnT ($p=0.573$). However, officers performed significantly better ($p=0.005$) for WAnT average power during the CT (569.8 ± 83.3 W) when compared to the ET (523.2 ± 91.1 W) and for WAnT fatigue index ($p=0.045$) during the CT ($52 \pm 8\%$) when compared to the ET ($60 \pm 9\%$). **CONCLUSION:** The simulated physical altercation significantly affected the officers' ability to perform push-ups, maintain a high average power, and fatigue index throughout the WAnT, but did not have an impact on the officers' vertical jump height, summation of grip strength, or peak power during the WAnT.

Poster #9

ACCURACY OF HARRIS BENEDICT AND MIFFLIN ST JEOR EQUATIONS IN PREDICTING RESTING METABOLIC RATE IN OLDER ADULTS

Elizabeth M Hudak, Erin A Hummel, Kyle L Timmerman FACSM

BACKGROUND: Estimating resting metabolic rate (RMR) is important for assessing the dietary needs of hospitalized patients, and for developing caloric recommendations for weight loss/weight maintenance. The Mifflin-St. Jeor (MSJ) and Harris Benedict (HB) equations are commonly used to estimate RMR. The accuracy of these equations compared to measured RMR has been evaluated in previous studies. However, to date, the accuracy of these equations has not been well evaluated in older adults. **PURPOSE:** To compare the accuracy of the MSJ and HB equations relative to measured RMR in a population of older adults. **METHODS:** This study included 48 adults between the ages of 58 and 78 (Average age= 64). RMR (kilocalories per day, kcal/d) was measured using indirect calorimetry (ParvoMedics TrueOne 2400) following an 8-10 hour overnight fast. Each test was conducted in lasted approximately 30 minutes. The first 5 minutes of analysis were not used to give time for the subject to get acquainted with the testing method. RMR was additionally estimated using MSJ and HB prediction equations. Bivariate correlation and Bland-Altman plots were used to compare the MSJ and HB estimated RMR to measured RMR. **RESULTS:** The average measured RMR measured via indirect calorimetry was 1451 ± 251 kcal/day. The average estimated RMR for HB and MSJ were 1625 ± 252 kcal/d and 1607 ± 262 kcal/d. Correlational analysis revealed that both estimation equations were significantly correlated with measured RMR: MSJ ($r= 0.39$, $p= 0.006$) and HB ($r= 0.445$, $p= 0.002$). **CONCLUSION:** Both equations slightly over-estimated RMR, and in this population of older adults, HB appeared to have a greater degree of correlation with measured RMR than the Mifflin-St, Jeor equation.

Poster #10

EVALUATING THE RELATIONSHIPS AMONG PERCEPTION OF HEALTH AND HEALTH-RELATED FACTORS IN OLDER ADULTS

Erin A Hummel, Elizabeth M Hudak, & Dr. Kyle L Timmerman, FACSM

BACKGROUND: Evaluating the connection among habitual physical activity, body composition, and health-related quality of life is crucial as it helps identify the role of exercise in maintaining physical and mental well-being. Continued research in this area may help reinforce the importance of promoting life-style modification (increased PA, improved body composition) as an important strategy to maintain and/or improve health in older adults. **PURPOSE:** To investigate the correlations among self-reported physical activity level, body composition, and perception of health-related quality of life in older adults. **METHODS:** 42 older adults, 10 males and 32 females (63 ± 5 y, 58 - 76y) participated in this study. Participants' habitual physical activity was assessed using the Community Healthy Activities Model Program for Seniors (CHAMPS). Body composition was assessed via bioelectrical impedance analysis (BIA). Health-related quality of life was assessed using the Short Form 36 (SF36) questionnaire. Partial correlations (controlling for age) and linear regression were used to examine the associations between life-style modifiable factors (PA and body comp) and components of health-related quality of life. **RESULTS:** The strongest associations were among the physical functioning (PF) component of the SF36 and body mass index (BMI, avg: 35 ± 4 kg/m²) and moderate-to-vigorous physical activity (MVPA, avg: $1,156 \pm 1,437$ min/wk). The association between BMI and PF ($r= -0.46$, $p= 0.005$) was stronger than the association between MVPA and PF ($r= 0.36$, $p= 0.03$). This was supported by linear regression analysis which showed that a model

containing BMI and MVPA were significantly predictive of PF, but that BMI explained more of the variance in PF than MVPA (43.7% vs. 33.1%). Additional significant correlations include PA and energy/fatigue levels ($r= 0.327$, $p= 0.049$), PA and social functioning ($r= 0.335$, $p= 0.043$), as well as MVPA and social functioning ($r= 0.371$, $p= 0.024$). **CONCLUSION:** These data show that both BMI and self-reported physical activity level are important to older adults' perception of their physical functioning. Additionally, physical activity level was associated with higher perceptions of energy and social functioning.

Poster #11

EFFECT OF COLD-WATER IMMERSION ON 1.5 MILE RUN TIME

Andrew Marrs, Andrew Kozerski, Isaac Weir, Joshua Sutton, Micah Zuhl, and Rachael Nelson

BACKGROUND: Cold water immersion (CWI) following exercise or athletic performance is currently a popular modality used by exercisers and athletes to decrease muscle stiffness, eliminate fatigue, and facilitate recovery (Xiao et al., 2023). However, the impact of CWI prior to exercise performance remains unclear. Specifically, the effect of CWI on subsequent running performance. **PURPOSE:** The study's purpose is to determine the impact of CWI prior to a 2.4-kilometer treadmill time trial on time to completion, mean heart rate (HR), and mean rating of perceived exertion (RPE). **METHODS:** Using a randomized, cross-over study design, 16 male ($n=9$) and female ($n=7$) adults (23.5 ± 0.8 years) completed two, 2.4 km run time trials (control vs. CWI) separated by one week. The trials included either five minutes of CWI (10°C) or a control (no CWI) prior to a 2.4 km running time trial. Time trial performance was measured after a 10-minute dynamic warm-up. Participants were blinded to both their running time and self-selected treadmill speed. Main outcomes included, (1) time to completion of 2.4-km run, (2) mean HR, and (3) mean RPE. Tympanic temperature and subjective pain levels during CWI were secondarily assessed. **RESULTS:** A paired, two tailed T-test was used to determine statistical significance. This study found no significant difference in average time trial performance time, 12.2 minutes for CWI trial, and 12.12 minutes for the non-CWI trial, HR response, RPE, or pain level between the two trial conditions. Although 7 participants completed the 2.4-km run faster, and 11 had lower heart rates during and after CWI, the results were not statistically significant ($p>0.05$). **CONCLUSION:** Despite the absence of statistically significant findings, these variations suggest potential benefits of CWI. The lack of significant results may be attributed to certain limitations within the study, indicating a need for future research to validate these findings.

Poster #12

EVALUATING INTER-RATER RELIABILITY OF A NOVEL VIDEO CODING TOOL FOR MUSCLE STRENGTHENING EXERCISE SESSIONS

Prapti Patel, Vineetha Bollina, Joshua Haworth, Elise Brown

BACKGROUND: Video coding of muscle strengthening exercise (MSE) sessions is increasingly recognized as a valuable tool in both clinical and fitness settings. Video provides a permanent record of technique, exercise form, and adherence, all highly important for optimizing effectiveness and minimizing injury. Manual coding of videos allows for detailed and in-depth analysis of exercise choice and performance, along aspects such as modality and movement pattern, though it is often time-consuming and can be prone to inconsistencies. Even with these challenges, video coding has been shown to afford an informative evaluation of the outcomes of MSE protocols. Developing video based coding relies on high levels of precision and consistency among those that will use it for uses like research and exercise-based intervention planning. **PURPOSE:** The aim of this study was to test inter-rater reliability of a novel tool for video coding of MSE sessions. **METHODS:** A group of 39 participants, aged 18 to 64 years old (35.2 ± 12.4 years), provided up to 4 videos each for a collective 79 videos of their MSE sessions. A group of 13 university students were trained on the use of a novel video coding tool. This software allowed for labeling the video for segments during which MSE was being performed, as well as additional details including the modality and movement pattern. For each video, coding was completed by two of the trained students, selected randomly. The number of exercise segments and the total duration of these segments were considered for analysis. Inter-rater reliability was established using Intraclass Correlation Coefficients (ICCs, & 95% CI), where $\text{ICC}(2,k)$ estimated the overall reliability of the rater scheme and $\text{ICC}(2,1)$ estimated the consistency of a single rater with the group. **RESULTS:** Coders identified 19.5 ± 10 segments per video, representing 9.8 ± 6.2 minutes of MSE. The $\text{ICC}(2,k)$ for

the count of exercise segments was 0.85(.7-.9), while that for total duration of exercise was 0.84(.7-.9), indicating good overall reliability of the rater scheme. In contrast, ICC(2,1) for the count was 0.74(.6-.8) and that for time was 0.73(.6-.9), reflecting moderate consistency of individual raters with the group. All $p < .05$. CONCLUSION: The results indicated that the novel video coding tool was reliable for use by trained students. This work advances the ability to track a detailed analysis of MSE, which will improve research and exercise-based intervention planning.

Poster #13

DONNING A NOVEL FULL-BODY COMPRESSION
GARMENT DURING TRAINING DOES NOT ENHANCE
VERTICAL JUMP PERFORMANCE IN COLLEGIATE
ATHLETES

Seth C. Stoltz, Jaye E. Fuller, Josh T. Mayne, Benjamin S. Minier,
Curtis A. Cornell, Zach S. Bitely, Faith C. Benedict, & James R.
Sackett

BACKGROUND: Compression garments (CG) are utilized in sport to enhance performance. Specifically, many athletes utilize CG to augment explosive power. Previous research indicates that vertical jump performance is enhanced when acutely wearing CG. Yet, there are limited investigations on the effects of training in CG. **PURPOSE:** We hypothesized that wearing a novel full-body CG during a 5-week training program improves vertical jump performance when compared to not wearing the CG during the training program in collegiate athletes. **METHODS:** 20 collegiate athletes completed a 5-week training program with an emphasis on progressive overload. Each week consisted of two tempo runs, two sprint interval sessions, and one strength training session. Subjects were initially divided into two groups, matched by fitness level, such that 10 subjects (CT: age: 20+1 y, BMI: 22.8+1.4 kg/m²) wore normal exercise attire during training, while 10 subjects (CG: age: 20+1 y, BMI: 24.7+2.4 kg/m²) completed the training in a novel full-body CG. Pre- and post-testing, which included three maximal countermovement jumps, was conducted before and after the training program in normal exercise attire. An accelerometer was worn to obtain peak power (W) and peak velocity (m/s) during each jump. The test was conducted using a vertical jump trainer to measure maximal jump height (cm). A two-way repeated measures ANOVA was used for analysis. Data were analyzed and presented as a change from pre-testing. **RESULTS:** There were no significant differences between conditions ($p=0.81$) or across time ($p=0.50$) for the change from pre-testing for max jump height between Control (0.76±10.58 cm) or CG (1.62±4.44 cm). There were no significant differences between conditions ($p=0.42$) or across time ($p=0.53$) for the change from pre-testing for peak power between Control (772.59±1890.96 W) or CG (-91.99±2807.08 W). There were no significant differences between conditions ($p=0.60$) or across time ($p=0.18$) for the change from pre-testing for peak velocity between Control (0.27±0.55 m/s) or CG (0.12±0.70 m/s). **CONCLUSION:** Wearing this novel full-body CG during a 5-week training program does not improve vertical jump performance when compared to not wearing it during the training program in collegiate athletes. Thus, the utilization of this CG is not advised for athletes with the intent of gaining an advantage in improving their vertical jump performance.

Poster #14

EXPLORING THE IMPACT OF CHILDHOOD OPPORTUNITY
INDEX ON PERCEIVED STRESS IN ADOLESCENTS
FOLLOWING ACL RECONSTRUCTION

Frederick IC, Parmar A, Tolzman JE, Grozier CD, Harkey MS

BACKGROUND: For children and adolescents undergoing anterior cruciate ligament reconstruction (ACLR), psychological outcomes, particularly levels of perceived stress, can be significant predictors of successful recovery. Additionally, the economic environment in which a child or adolescent resides can further influence these psychological and physical outcomes. Economic factors can either mitigate or exacerbate stress levels during recovery. However, there is a lack of understanding regarding the interplay between psychological factors, such as stress, and economic conditions for children and adolescents after ACLR. **PURPOSE:** To investigate how Perceived Stress Scale (PSS) scores differ among patients at varying ranks of the Childhood Opportunity Index (COI) at 4-6 months post ACLR. **METHODS:** Twenty participants (65% female, mean age: 16.5 ± 0.97 years, height: 171.95 ± 8.5 cm, mass: 75.1 ± 21.4 kg, time since surgery: 4.8 ± 1.2 months) from the surrounding healthcare system

completed the PSS during their first in-lab testing session 4-6 months post ACLR. The PSS determines how stressful respondents find their lives through a series of self-reported ranked questions. A total PSS score from 0 to 40 is then presented. As verified through their medical record, COI 3.0 data was collected based on the patient's permanent address. COI is a composite index of children's neighborhood opportunity that contains data for every neighborhood (census tract) in the US from 2012 through 2021. COI 3.0 data consists of five ranks which we used to group patients from "very low" to "very high" COI. A one-way ANOVA compared the outcomes of the PSS across the different COI rank and an alpha value was set to 0.05 prior to analysis. RESULTS: The analysis revealed no significant difference in perceived stress when compared to COI rank ($F = 0.67$; $p = 0.58$). The average PSS score was 19.15 with a standard deviation of 3.23. CONCLUSION: These findings suggest that COI may not be a determining factor in the context of perceived stress. However, an important limitation of this study was the sample size, which may not have been sufficient to detect more subtle relationships or effects. Furthermore, perceived stress may differ when comparing time since surgery. Further investigation into additional variables and methodologies may also be necessary to elucidate any potential interactions between perceived stress and COI-related outcomes.

Poster #15

ASSOCIATIONS BETWEEN MOTOR COMPETENCE AND BODY COMPOSITION VARIABLES IN A DIVERSE SAMPLE OF CHILDREN

Luis A. Torres-Villela, Karin A. Pfeiffer, FACSM, Larissa True, Cailyn A. Van Camp, Cézane Priscila Reuter, Kamila Mohammad Kamal Mansour

Childhood obesity and inadequate physical activity are associated with adverse health problems later in life. Motor competence in children is critical in promoting engagement in physical activity throughout the lifespan. Evidence supports an inverse relationship between weight status and motor competence. However, information concerning the directionality of the motor competence and body composition relationship is lacking, and there is a need to include larger, more diverse samples. PURPOSE: Assess the association of motor competence and measures of body composition in a diverse sample of elementary students, taking age, race, and sex into account. METHODS: Children ($n=305$; 8.1 ± 1.0 years old; 50.5% female; 42% black and mixed race) from areas in and surrounding Flint, Michigan, were participants. Motor competence was assessed using the Test of Gross Motor Development-2. Body composition was measured with height and weight on a bioelectric impedance scale and Gulick tape for waist circumference. Demographic differences were detected using independent samples t-test. Linear regression was used to test if motor competence (locomotor, object control, and total score) was significantly associated with body composition (BMI z-score, percent body fat, and waist circumference). RESULTS: Compared to white children, black and mixed-race children had higher BMI (17.5 ± 3.2 vs 19.5 ± 5.2 kg/m²), BMI z-score (0.41 ± 1.0 vs 0.96 ± 1.1), percent body fat (21.8 ± 7.4 vs $25.5 \pm 10.2\%$), waist circumference (60.3 ± 8.2 vs 63.3 ± 13.2 cm), and lower motor competence (total scores 63.3 ± 14.5 vs 58.4 ± 16.5). Significant associations were found among all three body composition indicators and locomotor and total score (negative associations with β from $-.01$ -.42 and R^2 from $.09$ -.21). Object control scores were only significantly associated with waist circumference ($\beta = -.14$, $R^2 = .13$). In most significant models, age, race, and sex had stronger associations with body composition compared to motor competence. CONCLUSION: Although models showed significant associations between motor competence and body composition variables, demographic variables were more related to outcomes than motor competence variables, similar to previous literature. The proportion of variance accounted for suggests other variables are also related to body composition.

Student Presentations – Oral #1 (11:00 am – 12:00 pm; Heldane Room)

11:00 am – 11:12 am

EVALUATION OF SINGLE-LEG BALANCE PRE AND POST-FATIGUE IN COLLEGIATE ATHLETES WITH AND WITHOUT FUNCTIONAL ANKLE INSTABILITY

Stephanie Born, Anthony Fusco, Celia Johnson, Sydney Guyer

BACKGROUND: Dynamic balance, as an integral component of sport play, is crucial in the prevention of ankle injuries, particularly in individuals with functional ankle instability (FAI). **PURPOSE:** This study aims to investigate the impact of fatigue induced via compliant unilateral stance on dynamic balance in athletes with and without FAI. **METHODS:** 24 NCAA DII collegiate athletes (15 M, 9 F, aged 20.87 ± 1.25 yrs) were divided into a control or FAI group based on the results of the IdFAI questionnaire. Both groups performed 3 trials of the Y-Balance Test (YBT) prior to and immediately after a fatigue protocol involving a 2-min unilateral stance on a foam pad. YBT scores were compared pre and post fatigue via 2 factor ANOVA analyzing normalized average distances. **RESULTS:** The intraclass correlation coefficient value (0.906) for the three normalized pre-fatigue YBT reach directions demonstrates excellent reliability. An ANOVA with Two-Factor Without Replication established that mean reach distances for anterior ($F= 4.330$, $p= 0.0488$) was statistically significant, and that the mean reach distances for posterolateral ($F= 3.566$, $p= 0.0717$) and posteromedial ($F= 2.966$, $p= 0.0985$) were approaching significance. **CONCLUSION:** Two minutes of a single-leg stance on a compliant surface resulted in an increase in dynamic balance, evident by improved mean YBT scores. The presence of FAI did not appear to impair dynamic balance in this study.

11:12 am – 11:24 am

THE EFFECTS OF AEROBIC EXERCISE TRAINING ON CIRCULATING sRAGE IN TYPE 2 DIABETES

Maggie Eisenberg, Corey Mazo, Jacob Haus

BACKGROUND: The receptor for advanced glycation end products (RAGE) is a membrane-bound receptor linked to inflammation. Soluble RAGE (sRAGE) acts as a decoy receptor for AGE and other ligands as it lacks an intracellular domain. Similar to RAGE, TLR4 is a pattern recognition receptor that initiates proinflammatory responses. sTLR4 is TLR4's ligand decoy. High sensitive C-reactive protein (hsCRP) is a principal marker of inflammation. Fructosamine is a measure of non-enzymatic glycation of circulating proteins, present in high concentrations in those with poor blood glucose control. Type 2 Diabetes (T2D) is hallmarked by systemic inflammation linked to low levels of sRAGE/sTLR4 and high levels of hsCRP/fructosamine. We have demonstrated that fat loss decreased RAGE expression while increasing circulating sRAGE. We have also established that acute bouts of aerobic exercise slightly modulate sTLR4 and sRAGE levels in healthy and obese adults. Aerobic exercise training (AET) is known to attenuate systemic inflammation, yet its ability to reduce cardiometabolic risk through its relationship with sRAGE remains unknown. **PURPOSE:** To investigate the influence of AET on sRAGE and cardiometabolic risk factors in T2D. **METHODS:** Individuals with T2D ($n=33$, age: 57 ± 9.5 , BMI: 33.8 ± 5.8) were randomized into control (CON: $n=13$) and AET groups ($n=20$). The AET group completed 12 weeks of supervised aerobic exercise (treadmill) at $\sim 70\%$ VO_{2max} , 5 days/week for 60 min/day. Fasting blood samples were taken before/after the 12-week intervention period under controlled conditions. Plasma sRAGE/sTLR4 levels were determined via ELISA. Plasma fructosamine and serum hsCRP were measured via colorimetric assay. Glucose and insulin were assessed during an OGTT and insulin sensitivity was calculated via Matsuda index. Intervention deltas for CON and AET were determined for sRAGE, sTLR4, hsCRP, fructosamine, and Matsuda index. **RESULTS:** Within AET, sRAGE increased by $25 \pm 31\%$ ($p=0.02$), sTLR4 was unchanged ($p=0.36$), hsCRP decreased by $7 \pm 76\%$ ($p=0.13$), fructosamine decreased by $16 \pm 24\%$ ($p=0.05$), and Matsuda index increased by $78.7 \pm 186\%$ ($p=0.09$). Analyses demonstrated a negative correlation between sRAGE and sTLR4 in all cohorts ($r=-0.45$, $p=0.02$). **CONCLUSION:** AET augmented sRAGE levels similar to healthy individuals while improving glycemic control in T2D. AET improved inflammatory conditions for T2D individuals. The mechanisms by which AET affects these factors in T2D are under further inquiry.

11:24 am – 11:36 am

RESISTANCE TRAINING AS PHYSIOLOGICAL AND PSYCHOLOGICAL PRECONDITIONING FOR EXERCISE-AVERSE PEOPLE AT RISK FOR DIABETES

Mitchell Smith, Dakota Deiwart, Amy DeLeon & 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. **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.

11:36 am – 11:48 am

THE EFFECT OF WEARING A NOVEL COMPRESSION GARMENT ON HEART RATE VARIABILITY FOLLOWING ANAEROBIC EXERCISE IN HEALTHY ADULTS

Faith C. Benedict, Adam M. Coughlin, Jaye E. Fuller, Seth C. Stoltz, Zach S. Bitely, Jesse M. Jansen, Benjamin S. Minier, Curtis A. Cornell, & James R. Sackett

BACKGROUND: Donning a compression garment (CG) after a bout of exercise has been shown to counteract several harmful effects of overtraining in athletes. However, it is unknown whether an enhanced recovery can be attributed to the CG positively impacting heart rate variability (HRV). **PURPOSE:** To examine the effects of wearing CG during recovery from anaerobic exercise on variables related to HRV, including heart rate (HR), mean time between heartbeats (RR), root mean square of successive differences between heartbeats (RMSSD), and high-frequency (HF). **METHODS:** Ten healthy adults (age: 21 ± 2 y; BMI: 24 ± 2 kg/m²; 2 F) completed three randomized visits: one where the CG was not worn (CT), one where the CG was worn during recovery (RC), and one where the CG was worn for the entirety of the visit (CG). Baseline (BL) values were recorded after 10 minutes 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 recovered in the supine position for 15 minutes (R1). At the end of this 15-minute rest, HR, RR, RMSSD, and HF values were recorded. A second WAnT and the same recovery procedure were repeated while each value was recorded a second time (R2). HRV values were gathered using photoplethysmography measurements from a valid smartphone application. Data were analyzed via a two-way repeated measures ANOVA and are presented as change from BL. **RESULTS:** There were no statistical differences for change in HR ($p=0.40$) between CT (R1: 12.9 ± 23.6 , R2: 19.9 ± 23.4 bpm), RC (R1: 20.5 ± 30.8 , R2: 32.7 ± 16.4 bpm), and CG (R1: 25.2 ± 18.8 , R2: 29.4 ± 19.6 bpm). There were no statistical differences for change in RR ($p=0.37$) between CT (R1: -162.8 ± 219.0 , R2: -225.9 ± 203.4 ms), RC (R1: -333.6 ± 278.8 , R2: -299.2 ± 166.4 ms), and CG (R1: -240.8 ± 183.8 , R2: -266.7 ± 183.0 ms). There were no statistical differences for change in RMSSD ($p=0.90$) between CT (R1: -50.0 ± 108.5 , R2: -60.9 ± 70.5 ms), RC (R1: -43.8 ± 30.0 , R2: -44.0 ± 28.6 ms), and CG (R1: -47.6 ± 42.7 , R2: -56.3 ± 65.1 ms). There were no statistical differences for change in HF ($p=0.94$) between CT (R1: -800.9 ± 9439.0 , R2: -2614.7 ± 5300.4 ms²), RC (R1: -1121.3 ± 1162.6 , R2: -1094.4 ± 1180.1 ms²), and CG (R1: -1068.6 ± 2505.1 , R2: -1959.3 ± 2365.2 ms²). **CONCLUSION:** There were no statistical differences between CT, RC, or CG for any HRV variables. It does not appear that wearing CG enhances recovery by impacting HRV following repeated WAnT bouts.



Thursday (10/17) Afternoon Presentations

Keynote Presentation & Lunch

12:00 pm – 2:00 pm

SEX DIFFERENCES IN ATHLETIC PERFORMANCE
Sandra Hunter, PhD, FACSM (Ambassador Ballroom)



Biological sex is a primary determinant of athletic performance because of fundamental differences between males and females in anatomy and physiology dictated by sex chromosomes and sex hormones. Adult males are stronger, more powerful, and faster than females of similar age and training status. Thus, for athletic events and sports relying on aerobic endurance, muscle strength, speed and power, males outperform females by 10-35% depending on the requirements of the event. These sex differences in performance grow markedly with the onset of puberty and coincide with the increase in endogenous sex steroid hormones, in particular testosterone in males, which increases to 15X greater in adult males than females. Historically, however, females have not been provided the same opportunities to participate in sports and athletics as males and they have not been assessed in biomedical science and exercise science research at the same rates as males. This presentation will highlight: (1) the magnitude and mechanisms of the sex differences in motor function and athletic performance revealed from more recent studies, and (2) factors that contribute to low participation of females in sports, athletics, and science. Large opportunities for high-impact studies that aim to understand sex differences in motor function and athletic performance remain.

Professional Presentations

2:30 pm – 3:20 pm

**ACTIVITY, INJURY, AND LIFE COURSE HEALTH IN
WOMEN: INTEGRATED PERSPECTIVES FROM INJURY
EPIDEMIOLOGY AND AGING STUDIES**

Avinash Chandran, FACSM, Adrian Boltz,
Jillian Baker (Grandview)

A substantial fraction of girls and young women in the United States engage in sports, which, while offering numerous benefits, also increases their risk of sustaining injuries. Existing research indicates that female athletes often experience a higher burden of injury as compared with their male counterparts. Emerging evidence indicates that physical activities and injuries experienced during early life can have significant and enduring effects on women's health as they age. Understanding the relationships between early-life activities, injuries, and subsequent health outcomes is imperative for elucidating the etiologies of various pathologies and developing effective strategies to prevent or delay onset of chronic disease and morbidity during aging. This session serves as an introductory guide to the epidemiology of injury in female athlete populations and explores how early-life activity behaviors and injuries can enhance our understanding of later-life health outcomes in women. The symposium will be structured as follows: i. (0-15 mins): Sport participation and sport-related injury in female athlete populations; ii. (15-25 mins): Describing health outcomes in female former athletes; iii. (25-35 mins): Short- and long-term implications of sport-related traumatic brain injuries (TBI) in female athlete populations; iv. (35-45 mins): Overview of early-life activity behaviors and subsequent health outcomes in aging women; v. (45-50 mins): Questions and Answers.

2:30 pm – 3:20 pm

**STUDENT PERCEPTIONS OF COMMUNITY-BASED
SERVICE LEARNING IN AN UNDERGRADUATE EXERCISE
SCIENCE PROGRAM**
Katherine Spillios (Pearl)

Background: Community-based service-learning (CBSL) is a high impact practice which provides students with real-life experience while meeting the needs of the community. Although common in many disciplines, there is little literature examining CBSL in exercise science and even less evaluating students' perceptions of CBSL experiences. **Purpose:** This investigation aimed to examine students' perceptions of a CBSL program required as part of their undergraduate exercise science curriculum. **Methods:** A survey was used to solicit qualitative descriptive feedback from recent graduates regarding their views of a required CBSL program completed as part of their curriculum. **Results:** Survey data from participants (N = 91) revealed multi-faceted favorable views of the CBSL program. Nearly 83% of respondents found the experience complementary to their education. Respondents valued leadership development (94.5%), communication, (97.8%), and confidence in working with others (98.9%). Participants also believed the CBSL program provided reciprocal benefits for students and volunteers (87.9%) and made a difference in community volunteers' lives (91.2%) **Conclusions:** The addition of CBSL to exercise science curricula may positively affect student learning experiences, encourage personal growth, and foster professional preparedness. Although implementation can be time-consuming and arduous, CBSL can encourage student learner autonomy, increase civic engagement, and provide services to others.

3:30 pm – 4:20 pm

**BLOOD LACTATE: FRIEND, FOE, OR FUEL? IMPROVING
OUR UNDERSTANDING OF A MISUNDERSTOOD
SUBSTANCE**
Brian Rider, FACSM, Alexander Montoye, FACSM,
Scott Conger, FACSM (Grandview)

Blood lactate and its role during exercise is one of the most common topics covered in exercise physiology courses but remains a commonly misunderstood concept outside (and inside) of the classroom. We will explore the past, present, and future of this essential product of energy metabolism. Our symposium provides a historical journey of lactate, from its initial discovery and the evolution of its scientific understanding, to debunking persistent myths that continue to obscure lactate's role in human physiology. Attendees will learn how lactate functions as a fuel source, particularly during and after intense physical activity. Technological advancements, from portable lactate analyzers to continuous monitoring systems, are revolutionizing how athletes and coaches track and optimize performance. We will explore these emerging technologies, highlighting their validity, convenience, and potential impact on training. The symposium will offer practical insights into leveraging lactate data to enhance training for performance

and how to interpret lactate levels and design personalized training programs. Whether you're an athlete, coach, or researcher, this symposium will highlight the importance of lactate for peak exercise performance. Finally, we will discuss some non-traditional outlets for publication by which we have published work on lactate and other topics and how these alternative outlets provide important ways to get visibility for work related to exercise science.

3:30 pm – 4:20 pm

**GAINING BACK TRUST: THE ROLE OF SCIENCE
COMMUNICATION**
Kevin Gries (Pearl)

Trust in scientists peaked in April of 2020 (height of the COVID19 pandemic) and has since declined to the lowest levels since June of 2016. As of October 2023, only 23% of United States adults trust scientists a great deal while 27% have not much or no confidence at all. Additionally, only 57% of United States adults say science has a mostly positive effect on society. These alarming statistics suggest that we have work to do to promote high quality science and communicate findings to the public. Dr. Fauci recently highlighted the lack of trust and communication as pivotal issues to fix before the next pandemic. Additionally, most scientific funding comes from governmental sources and therefore are reliant on political support. In order to develop strategies to regain trust, we need to first understand theories of how we got to these low approval numbers. These theories where trust was lost include science hype, miscommunicating scientific results, decreased awareness of the scientific method, misplaced role of science in the global health, and politicizing science. In this session, these theories and corresponding strategies to overcome these obstacles will be discussed. Given communication is such a large role in many of these obstacles, we will also be discussing how best to distribute scientific findings to both the scientific and lay community. This session will be interactive given the complexity of the topic and experiences of the session participants.

4:30 pm – 5:20 pm

APPLYING FOR ACSM FELLOWSHIP
J. Derek Kingsley, FACSM (Grandview)

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 and how the Credentials Committee works to review applications, may benefit many individuals that are considering applying.

4:30 pm – 5:20 pm

**GRAPPLE LIKE A GIRL BUT DON'T MAKE WEIGHT LIKE A
BOY: HEALTH & SAFETY CONCERNS IN FEMALE
WRESTLERS**
Andrew R. Jagim, Jill Moschelli, FACSM,
Lisa M. Woodroffe (Pearl)

Female wrestling has grown exponentially over the past decade. A primary health and safety risk among this cohort pertains to weight-cutting strategies. Intentional dehydration, energy restriction, and decreased body fatness, to make a desired weight class, could create catastrophic risks to participants. Low energy availability and low body fatness are associated with menstrual dysfunction and poor bone health in females. Currently, the minimum body fat percentage, used to establish minimal wrestling weight in females is 12%, which is highly questionable for the health and safety of these athletes, and opens the door for health perturbations. We will present the rationale for setting a minimum threshold for % body fat at 18-20%. Further, we recommend that weight cycling, restrictive eating, and deliberate dehydration be avoided. Research should assess the effects of frequent weight-cutting and prolonged periods of low body fat on the overall health of these athletes.

Student Presentations – Oral #2 (2:30 pm – 3:20 pm; Heldane Room)

2:30 pm – 2:42 pm

**RELIABILITY AND VALIDITY OF THE HEART RATE
MONITOR COMPONENT OF A SPORTS BRA**

Katherine C Curtis, Katharine D Currie, David Ferguson, William P Burghardt, Karin Pfeiffer, FACSM

BACKGROUND: Heart rate (HR) monitors are commonly used in sports with a large aerobic emphasis to monitor exercise intensity and are one example of the wearable technology utilized by practitioners to monitor athlete training characteristics. The combination of global positioning technology and HR monitors has enhanced utility of wearable technology in sport. However, it is important to assess the reliability and validity of wearable technology prior to relying on it for monitoring athlete workload. **PURPOSE:** The purpose of the study was to assess the reliability and validity of a sports bra HR monitor in female athletes. **METHODS:** A total of 27 (n=17 field hockey) (n=10 soccer) division I female athletes were recruited. Participants performed two maximal oxygen consumption tests while wearing the sports bra HR monitor and a single lead EKG to obtain maximum and average HR values for each test stage. Anthropometrics (height, weight) of the participants were collected. The test consisted of four stages that lasted three minutes each. During the first stage the participant was supine for resting conditions. In stage two the participant performed walking at 3.1 mph on the treadmill. Stage three was 6.1 mph, and stage four was 7.8 mph. At the end of stage four the grade of the treadmill increased by 3% every minute until volitional exhaustion. Intra-device reliability was assessed by intraclass correlation coefficient (ICC). Validity was assessed through Pearson correlation and Bland-Altman test. **RESULTS:** Overall, the reliability of the sports bra HR monitor decreased as intensity decreased (Rest Avg HR R=0.783, Stage 1 Avg HR R =0.869, Stage 2 Avg HR R=0.508, Stage 3 Avg HR R= 0.198). The sports bra HR monitor was not valid as intensity increased (Rest Avg HR r=0.846, Stage 1 Avg HR r=0.681, Stage 2 Avg HR r=0.069, Stage 3 Avg HR r=0.016). Bland Altman analysis showed minimal bias for average HR during Rest (bias = -0.40), however there was a large bias for average HR during Stage 3 (bias=22.59). **CONCLUSION:** Overall, the sports bra HR measurements displayed good reliability and accuracy during resting conditions but lost accuracy as intensity increased. The sports bra HR monitors overestimated HR by at least 22 beats during stage three. The findings of this study challenge the usefulness of the sports bra HR monitor for assessing HR in female athletes.

2:42 pm – 2:54 pm

THE EFFECT OF BICARBONATE SUPPLEMENTATION ON RUNNING PERFORMANCE, LACTATE, AND GI DISTRESS SYMPTOMS - PRELIMINARY RESULTS

Keegan Reynolds, Nicholas Hanson, Lilin Lan, Kyle Morrison

BACKGROUND: Sodium Bicarbonate is a well-researched ergogenic aid for increased performance during high intensity exercise. While the ergogenic effects of sodium bicarbonate are clear and significant, a common side effect of gastrointestinal (GI) distress can eliminate any benefit of taking the supplement. A new bicarbonate supplement that utilizes a carbohydrate hydrogel delivery system has been developed to increase supplement loading and decrease the incidence of GI side effects. **PURPOSE:** Our study aims to substantiate and quantify this new bicarbonate delivery system's ability to improve performance and reduce GI distress by comparing it to a control condition and a more standard use sodium bicarbonate tablet. **METHODS:** The first visit consisted of VO₂max and lactate threshold (LT) tests. For each of the following three visits, subjects completed a one mile time trial on the laboratory treadmill in a counterbalanced order: 1) a control (C) condition, 2) a 0.2 g·kg⁻¹ body weight (BW) dose of sodium bicarbonate via vegetarian enteric coated sodium bicarbonate tablets (T), and 3) a 0.2 g·kg⁻¹ BW dose of sodium bicarbonate via carbohydrate hydrogel delivery system (MB). Sodium bicarbonate supplements were taken 2-3 hours before exercise. Duration of the 1-mile time trial, rating of perceived exertion, and blood lactate concentration ([BL]) immediately after, 3 and 8 minutes after the 1-mile time trials, and gastrointestinal symptoms immediately before and during the testing were all recorded. **RESULTS:** Preliminary results are available on four well-trained runners (3 men, 1 woman; mean age was 19.25 ± .95 years; training load >35mi per week; mean VO₂max was 62.4±5.4 ml/kg/min; mean LT2 speed was 9.6±.7 mph). Mean mile times were similar between conditions (C: 296.3±23.0 sec; T: 295.0±21.8 sec; MB: 296.0±18.0 sec), although there was a slight increase on average in peak [BL] post time trial with both supplements (C: 13.65 ± 4.89 mmol/L; T: 15.35 ± 4.38 mmol/L; MB: 14.05 ± 2.89 mmol/L). Thus far, the incidence of GI distress is lower with the hydrogel supplement compared to standard sodium bicarbonate tablets (.25 incidence rate with MB vs. .50 incidence rate with T). **CONCLUSION:** Currently more data is needed to make any inferences about the usefulness of the hydrogel supplement. However, it

seems that both bicarbonate forms may increase glycolytic metabolism, with the hydrogel delivery system having a lower incidence rate of side effects.

2:54 pm – 3:06 pm

MEASURING POSTURE AND MOTION USING A THIGH- AND POCKET-WORN ACCELEROMETER (FIB) AND THIGH-WORN MONITOR (AP) IN A LABORATORY SETTING

William G. Rogers, Nicola Gismondi, Patrick M. Filanowski, Kimberly Clevenger, Alexander H.K Montoye, FACSM, Jeremy A. Steeves

BACKGROUND: It is important to have accurate measurements to better understand the health impacts of time spent in different postures/activities. Inclinometer-based accelerometers, most often worn on the front of the thigh, have the potential to classify activity postures into sitting, standing, walking, and cycling. **PURPOSE:** To determine the validity and reliability of a new monitor (FIB) for classifying posture, in a laboratory setting, compared to an established monitor (AP). **METHODS:** 25 adult participants (12 male; age 40 ± 15 yr) wore one AP (left or right thigh), and four FIB (both thighs and front pants/shorts pockets) while performing 12 activities of daily living for 2 minutes each in a laboratory setting. Laboratory activity postural output (sit, stand, step, or cycle) from all devices was compared to direct observation (percent agreement and weighted kappa), and percentage of time each activity was correctly classified was calculated. For sweeping, walking or standing was counted as a correct posture; for rowing, cycling or walking was counted as a correct posture. **RESULTS:** Average accuracy for the FIB thigh monitors was 86% ($\kappa=0.8$; $p<0.001$) with high accuracy (90%-100%) for detecting lying, sitting, walking, stair climbing, jogging, and sweeping, but lower accuracy for cycling (84%), standing (82%), rowing (79%), and reclined sitting (75%). Average accuracy for the FIB pocket monitors was 75% ($\kappa 0.65$; $p<0.001$) with high accuracy (88%-100%) for detecting lying, sitting, walking, and stair climbing, but lower accuracy for jogging (86%), sweeping (78%), cycling (71%), standing (71%), reclined sitting (57%), and rowing (41%). The thigh-worn AP had overall accuracy of 73.0% ($\kappa 0.61$; $p<0.001$) with high accuracy (88%-100%) for detecting lying, sitting, standing, walking, jogging, and sweeping, but lower accuracy for stair climbing (84%), cycling (72%), rowing (12%), and reclined sitting (0%). AP categorized reclined sitting as 100% standing, and rowing as 86% sitting. **CONCLUSION:** The FIB (thigh and pocket) and AP monitors were comparable for many outcomes, but some differences were observed for certain activities (e.g., standing, reclined sitting, rowing). The FIB monitor shows promise as a tool for measuring sedentary and non-sedentary waking postures.

3:06 pm – 3:18 pm

BALL SPEED AND CARRY DISTANCE WITH A LOB WEDGE ARE INCREASED IN MALE COLLEGIATE GOLFERS WHEN USING A NOVEL GOLF TRAINING DEVICE

Clayton R. Schwiebert, Justin A. O'Dell, James R. Sackett

BACKGROUND: A novel golf training device designed to be worn during practice, which incorporates resistance bands into swinging, is purported to improve golf performance. However, no research has been conducted on this device and therefore, the effects of this device remain unknown. **PURPOSE:** The purpose of this study was to test the hypothesis that warming up with the novel golf training device will improve ball speed, carry distance, and total spin without changing the launch angle, push/pull, or spin axis while swinging a lob wedge when compared to not warming up with the device. **METHODS:** Ten male collegiate golfers (age: 22 ± 3 y, BMI: 25 ± 2 kg/m²) completed three randomized trials: a control visit where the golf training device was not worn (CT), a warmup visit where the golf training device was worn during the warmup only (WU), and a visit where the golf training device was worn the whole time (TP). The subjects warmed up with 10 swings using a lob wedge. After a 5 minute break, subjects completed 10 all out swings with the same lob wedge. Ball speed (km/h), launch angle ($^{\circ}$), push/pull ($^{\circ}$), carry distance (m), total spin (rpm), and spin axis ($^{\circ}$) were measured for all 10 swings via a golf simulator and launch monitor and averaged. Data were analyzed via a one-way repeated measures ANOVA. **RESULTS:** There was a significant difference between conditions for ball speed, such that WU was greater than CT ($p=0.01$) and TP

for additional work in this area to understand the impact of chronic training on mucosal immunity, due to a number of methodological, participant, and training differences between early studies. **PURPOSE:** To investigate the impact of chronic training on absolute SIgA concentrations, salivary flow rate (SFR), and secretion rate (SR) over the course of a 3-month, competitive collegiate outdoor track season. **METHODS:** Unstimulated saliva was collected from 11 (6 males, 5 females) collegiate track distance runners (Age= 19.1±0.8) three times (each separated by 1 month) during their competitive season. Participants refrained from high-intensity exercise 24 hours prior and refrained from consuming caffeine 4 hours prior to collection. Saliva samples were measured for volume to determine SFR (µg/min). Biochemical analyses were performed using an enzyme-linked immunosorbent assay (ELISA) to determine absolute SIgA concentrations (µg/ml). Additionally, SIgA SR (µg/min) was computed from SFR and absolute SIgA concentrations. Repeated measure ANOVAs were conducted to determine if changes in absolute SIgA concentration, SFR, and SR were different over the 3-month season. Significance was set at $p < 0.05$. **RESULTS:** There were significant differences in SFR ($F(2,14) = 3.923, p < .05$) and SR ($F(2,14) = 5.24, p < 0.05$) from month 1 to month 3. Post hoc analyses revealed that SR was significant higher at month 3 compared to month 1 ($p < 0.05$) while SFR was significantly higher at months 2 and 3 compared to month 1 ($p < 0.05$). There was no significant difference in absolute SIgA concentration ($F(2,14) = 0.486, p = 0.625$). **CONCLUSION:** Contrary to previous work in this area, the current findings demonstrate that absolute SIgA concentration levels did not significantly change over 3 months of training. Moreover, SFR and SR increased in months 2 and 3. Therefore, based on the findings from this study in relation to previous work, research is still needed in order to better understand immune response to chronic training.

Poster #3

PREVALENCE OF LOW ENERGY AVAILABILITY AND EATING DISORDER RISK IN RECREATIONAL WOMEN ATHLETES

Rachel Audet, Meghan Magee

BACKGROUND: Low energy availability (LEA) is a result of insufficient energy intake and high training demands. Eating disorders and disordered eating behaviors are underpinnings of LEA. It is possible recreational women athletes suffer from LEA and eating disorders (EDs). **PURPOSE:** To investigate the potential relationship between the risk of LEA and EDs among recreational female athletes. **METHODS:** 43 recreational women athletes participated in this survey study. The survey consisted of the LEA in females questionnaire (LEAF-Q) and the brief eating disorder in athletes questionnaire (BEDA-Q). Each questionnaire was scored according to previously published guidelines. The prevalence of both LEA and eating disorder risk was calculated. The relationship between LEAF-Q and BEDA-Q scores was assessed through Pearson's correlations and alpha was set to $p < 0.05$. **RESULTS:** 60.47% ($n=26$) of the recreational women athletes were at risk of LEA, and 67.44% ($n=29$) of the women were at risk of ED. 62.79% ($n=27$) of the women were at risk of either LEA or ED, while 32.56% ($n=14$) were at risk of both LEA and ED. Only 4.65% ($n=2$) had no risk of LEA and ED. A weak negative relationship between LEAF-Q score and BEDA-Q score ($r=-0.24; p=0.120$) was observed. **CONCLUSION:** LEA and ED risk sometimes co-occur, but there was not a significant correlation between the risk of both; therefore, risk of one does not automatically mean risk of both. Further research with a larger sample size is needed to better understand the relationship between LEA and ED risk and to develop effective interventions.

Poster #4

LOW ENERGY AVAILABILITY IN RECREATIONAL FEMALE ATHLETES: AN OBSERVATIONAL STUDY

Adam Barrett, Meghan K Magee

Background: Low Energy Availability (LEA) is described as inadequate caloric intake to meet the metabolic demands for sport or training. Evidence suggests that LEA has an impact on body composition, sport performance, and menstruation. Recreational athletes have been reported to suffer from LEA due to lack of resources and education. **Purpose:** To evaluate the prevalence of LEA and changes in menstrual cycle in recreational female athletes. **Methods:** 10 women (age: 22.4±2.8 years; height: 164.3±9.2 cm; body mass: 66.6±13.0 kg) participated in this cross-sectional study. Participants arrived at the laboratory and underwent a bioelectrical impedance analysis (BIA). After completing the BIA, participants completed the LEAF-Q. Groups were created based upon responses (yes or no) for the item "do you experience that your menstruation changes when you increase your exercise

intensity, frequency or duration?". Independent samples t-tests were conducted to identify if any significant differences existed between the groups for LEAF-Q score, body fat percentage (BF%), and fat free mass index (FFMI). Additionally, Cohen's d effect sizes were used to determine the magnitude of the difference. Alpha was set to $p < 0.05$ and Cohen's d was interpreted as follows: small = 0.20-0.49; medium = 0.50-0.79; large > 0.80 . Results: 20% of women in this study were at risk for LEA. 50% of women reported that there were changes in menstruation from increases in training resulting in less bleeding and bleeding fewer days. No statistically significant differences were observed for LEAF-Q score ($p > 0.05$), BF% ($p > 0.05$), or FFMI ($p > 0.05$). A large, medium, and small effect size was observed for LEAF-Q score ($d = 0.86$), BF% ($d = 0.51$), and FFMI ($d = 0.21$), respectively. Conclusion: There is a concerning prevalence of changes in menstruation due to the increase in training duration, intensity, and/or frequency. Further, 20% of this sample is at risk for LEA. Education on LEA and its consequences may be beneficial to this population.

Poster #5

THE EFFECTS OF CAFFEINE ON REACTION TIME AND ACCURACY IN LAW ENFORCEMENT

Ashtin McDivitt, Grace Davidson, Kara Hughes, & Melissa Cook

BACKGROUND: Law enforcement officers are an essential part of communities as they play a vital role in providing safety across the world. An important part of a law enforcement officer's duty is being able to draw and shoot their firearms in a safe, smart, and efficient manner. It is important that an officer can maintain a fast reaction time while also accurate with their firearms, especially in high-stress situations. Caffeine is a known stimulant and enhances focus. Both of these effects could improve the reaction time and accuracy of shooting a gun. **PURPOSE:** The purpose and hypothesis of the study was to evaluate if the effects of a common performance enhancer, caffeine, improves the reaction time and accuracy of law enforcement officers while drawing and discharging their firearms. **METHODS:** The research approach was a purposeful sampling technique based on a quasi-experimental study design, in which ratio data was collected and given in numerical value. 29 Officers (Males = 27, Females = 1, mean age = 36 years old) followed the procedures based on signing an informed consent and participating in a pre-caffeinated three-trial test, 200mg of caffeine drink consumption/metabolism period of 45 minutes, and post-caffeinated three-trial test. After the day of research testing, a data analysis was run for accuracy and reaction time. **RESULTS:** Paired samples t-tests were run on both variables using a $p < .05$ level on the data collected during the pre-caffeine and post-caffeine tests. Reaction time pre-caffeine mean = 2.62 +/- 0.51s, post-caffeine = 2.64 +/- 0.52s. Accuracy pre-caffeine mean = 9.95 +/- 0.67, post-caffeine = 10.04 +/- 0.7 score (higher score, closer to bullseye on target). Based on the data analysis, there were no significant improvements on reaction time ($p = .397$) or accuracy ($p = .246$). **CONCLUSION:** Overall, the current research completed did not show the hypothesized improvements in reaction time using caffeine as a stimulant nor an increase in accuracy due to increase focus. However, the accuracy scores did improve on the post-caffeine testing suggesting that caffeine did not impact the officers aim at targets or potentially put the public in harms way. For future research, testing with various forms or amounts of caffeine could produce different findings.

Poster #6

NCAA DIVISION III PERSONNEL: PERSPECTIVES ON IMPROVING ATHLETES' RETIREMENT EXPERIENCES THROUGH EXERCISE PROMOTION

Keegan J. DeKuiper, Madelynn L. Struck, Paula-Marie M. Ferrara

BACKGROUND: Former college athletes (FCAs) are at risk of declining physical and mental health after sports retirement, which may be exacerbated by decreased exercise and physical activity post-sport. Recently, former National Collegiate Athletic Association (NCAA) Division (D) I and III athletes indicated that endorsement and/or intervention by personnel from their college athletics departments would have aided in preserving their exercise behavior and retirement quality. **PURPOSE:** Explore NCAA DIII athletic personnel's perceptions of FCAs' exercise post-college and brainstorm how to improve FCAs' retirement experiences through exercise promotion. **METHODS:** Participants were coaches, athletic trainers, and administrators from an athletics department at an NCAA DIII liberal arts college in the Midwest United States. Five, semi-structured focus groups consisting of 3-5 people were conducted between June-July, 2024. To facilitate conversation in data collections, the interview guide included direct quotes from a previous qualitative study exploring the exercise experiences of FCAs from the same

institution. Data was recorded and transcribed via Google Meet, and transcriptions were hand-corrected by researchers before thematic analysis occurred. RESULTS: Focus groups averaged 101.4 ± 25.1 minutes (range 62-123 minutes) in length and included 20 participants (50% men, 46 ± 11 years, 100% white, 60% coaches). Three themes were conceptualized: "the bubble of college athletics", "phasing athletes out of sport", and "phasing athletic exercisers into life." CONCLUSIONS: Overall, participants believed that some FCAs maintain post-sport exercise better than others based on level of motivation, knowledge of exercise concepts, and a desire to stay competitive in recreational sports. Many believed that the college athletics environment limited FCAs' autonomy while in sport, and that a retirement program should expand to other aspects of health and life (e.g., diet, stress management, handling finances) to give them necessary tools and skills to adjust to post-college life. Personnel were wary of being directly involved in a program due to busy work schedules and responsibilities pertaining to current college athletes. Strategies to involve a multidisciplinary team including alumni athletes and outside experts who engage with retiring athletes in mentor groups, informal meetings, and formal lectures were suggested, which warrant further exploration.

Poster #7

THE EFFECT OF AN 8-WEEK INDIVIDUALIZED EXERCISE PROGRAM ON MENTAL HEALTH

Macy Fleury, Le'char Morgan, Marilyn Skarbek & Rachel Luehrs

BACKGROUND: The correlations between exercise and mental health are constantly being assessed. However, most studies conducted are performed in laboratory conditions that rarely mirror the unique goals and exercise routines of the general public. Studies that examine the effectiveness of individualized programs that are geared towards the person's goals and preferences are needed. This is especially true among individuals who experience mental health challenges due to the lower exercise adherence reported previously in this population. **PURPOSE:** This study was conducted to see how an 8-week, individualized exercise program impacted mental health among participants with or without clinical mental health diagnoses. **METHODS:** Twenty-six participants (38 ± 15 years old), signed up for an individualized 8-week exercise program led by undergraduate Exercise Science students at a liberal arts college in the Midwest. All of the study participants were faculty, staff, and students of the institution. These individuals worked with a student coach that developed their individualized program based on their needs and preferences for those 8 weeks. To collect data for this study, participants completed a self-report questionnaire before and after working with a student coach for those 8 weeks. The questionnaire included surveys to measure stress (Perceived Stress Scale), anxiety (Generalized Anxiety Disorder-7), and depression (Patient Health Questionnaire-9). Paired samples t-tests were used to analyze pre- and post-intervention stress, anxiety, and depression levels. **RESULTS:** At the conclusion of the 8-week individualized exercise program, participants reported lower stress levels (pre 17.0 vs. post 14.1; $t=2.41$; $p=0.02$), anxiety levels (pre: 5.85 vs. post: 4.15; $t=2.50$; $p=0.02$), and depression levels (pre 6.27 vs. post 4.23; $t=2.2$; $p=0.04$). **CONCLUSION:** These findings suggest that the study improved symptoms of stress, anxiety, and depression among the participants that completed the individualized 8-week exercise program.

Poster #8

THE EFFECT OF A PROGRESSIVE INDOOR CLIMBING INTERVENTION ON CARDIOMETABOLIC HEALTH OUTCOMES IN INACTIVE YOUNG ADULTS: A PILOT STUDY

Jordan M. Fleury, Vanessa Steigauf, Diana Dzasezeva, Declan B. Stratford, Laila Heiss, Luke Martin, Lukus Klawitter, Ryan M. Weatherwax, Lanae Joubert, Megan C. Nelson

Background: It is estimated that 41.3% of men and 28.7% of women aged 18-34 years do not meet minimum physical activity (PA) recommendations and often engage in high amounts of sedentary behaviors (SB), increasing their risk of developing cardiometabolic diseases (CMD). An increasingly popular form of PA, indoor climbing, is characterized by intermittent bouts of isometric and dynamic movements in multiple planes and may be exceptionally beneficial to cardiovascular health as it relies on both aerobic and anaerobic energy systems. **Purpose:** We aimed to determine the effects of a progressive, indoor climbing intervention on CMD risk factors, PA and SB

in inactive young adults with no climbing experience. Methods: A pilot sample (n=2; 50% male; age: 21.5±0.7 y; BMI: 22.1±2.8 kg/m²) of young, physically inactive, generally healthy young adults that had no experience climbing were recruited to participate in a 12-week indoor climbing intervention. Participants climbed 2 times per week for 60 min for the first 4 weeks, progressing to 3 times per week for the last 8 weeks. Capillary blood sampling was used to measure lipids, glucose, and hemoglobin A1c. ActivPAL and ActiGraph monitors were used to objectively measure PA and SB variables over 7 days. Measurements were taken pre-, mid-, and post-intervention. Descriptive statistics were used to present preliminary results after 6-weeks of climbing. Results: On average, CMD risk factors changed pre- to mid-intervention as follows: systolic blood pressure decreased (127±16 to 119±19 mmHg), diastolic blood pressure decreased (76±11 to 64±7 mmHg), resting heart rate decreased (70±3 to 63±3 bpm), total cholesterol decreased (144±29 to 130±43 mg/dL), HDL-c decreased (53±23 to 45±27 mg/dL), LDL-c decreased (80±6 to 73±13 mg/dL), and HbA1c increased (5.0±0% to 5.4±0.2%). Objectively measured PA and SB remained relatively unchanged for moderate-to-vigorous PA (pre: 51.9±31.4; mid: 42.5±25.5 min/d), steps per day (pre: 8274±1585; mid: 8220±1704), and SB (pre: 439.4±76.1; mid: 506.8±24.9 min/d). Conclusion: Changes in CMD risk factors indicate a positive trend in overall health throughout the first half of the intervention. Further research with a larger sample size is required to determine if a progressive indoor climbing intervention is beneficial for CMD risk factors and PA behaviors.

Poster #9

THE EFFECTS OF PROLONGED SITTING AND
INTERMITTENT EXERCISE ON FIBRINOLYTIC POTENTIAL
Sandra Fredericks, Morgan Mydloski, & Paul Nagelkirk, FACSM

BACKGROUND: Increased sedentary time is positively associated with numerous cardiovascular risk factors and disease states. Prolonged sitting acutely impacts indices of cardiometabolic health and hemostatic potential. Interrupting bouts of sitting with intermittent exercise appears to mitigate those changes. However, little is known about fibrinolytic responses to prolonged sitting, with and without intermittent bouts of exercise. **PURPOSE:** To investigate and examine the fibrinolytic responses to an acute 2-hour sitting bout, compared to 2 hours of sitting with intermittent bouts of low-intensity treadmill walking. **METHODS:** Nine healthy adults (five males and 4 females) with a mean age of 23.44±0.88 years and an average BMI of 28.1±5.2 kg/m² were studied. Two trials were performed in random order and separated by a minimum of 48 hours. One trial was 2- hours of uninterrupted sitting, during which participants sat upright at a desk, reading, working on a computer, or using a cell phone. The other trial involved 2-hours of sitting, broken up every 30 minutes with 5 minutes of walking at 2 mph. Venous blood was collected via venipuncture at baseline and immediately following the bout of sitting. Plasma concentrations of markers of fibrinolysis (t-PA and PAI-1) antigen were analyzed using ELISA. Statistical analyses were conducted using a 2-factor (time x trial) ANOVA. **RESULTS:** There were no significant effects of time for PAI-1 activity (p>0.05, 54.66±2.76 vs 56.74±1.48 U/mL) and t-PA antigen (p>0.05, 4.45±1.09 vs 3.73±0.82 ng/mL). There was a significant time x trial interaction for PAI-1 activity (p<0.05) and a non-significant trend towards a time x trial interaction for t-PA antigen (p=0.06, $\eta^2=0.374$). **CONCLUSION:** Fibrinolytic potential was diminished with prolonged sitting, but intermittent exercise mitigated this response. The results of this study suggest that prolonged sitting increases the risk of thrombosis, and exercise may reduce that risk. This has important implications for adults who partake in prolonged sitting activities, as a cardiovascular preventative measure.

Poster #10

EFFECTS OF MULTIPLANAR HIGH INTENSITY
RESISTANCE TRAINING ON INCREASING BONE MINERAL
DENSITY ON MIDDLE AGED FEMALES. THE STOP
PROTOCOL
Matthew Herring, Elise Craven, Ethan Darley Rachel Kowal, Peter
Chomentowski, Brandon Male, Clayton Camic

BACKGROUND: Menopause transition (MT) typically occurs between the ages of 47 and 51. During MT, rapid bone mineral density (BMD) loss occurs one year before final menstrual cycle and continues two years post MT. Intervention is imperative to preserve BMD. High-intensity resistance training (HIRT) provides mechanical loading needed for bone formation. Bone formation is site-specific. Mechanical loading should be done at different angles to increase BMD in a balanced fashion. Prior research shows HIRT is safe for older adults but fails to move in different

planes of motion. **PURPOSE:** To examine the effects of HIRT on BMD in the lumbar spine (LS), and the femoral neck (FN), on middle-aged females during a multiplanar exercise protocol for eight-months. **METHODS:** Twenty-two females (mean age \pm SD = 53 \pm 5.1 years; body mass = 86.06 \pm 25.55 kg) visited the laboratory for baseline measurements. Demographics and body composition were assessed with InBody 570. DEXA scans for T-scores at FN and LS (L1-L4) were conducted with a Hologic Horizon Wi. Subjects were randomly assigned to one of three intervention groups: two resistance training and a control group. The LIFTMOR (LM) intervention group is assigned to complete deadlift and back squat at five sets of five repetitions at 85% of 1RM. The STOP (ST) intervention group performed three sets of five repetitions at 85% of 1RM of side lunge, curtsy lunge, deadlift, and back squat. Both groups also performed a standing shoulder press for upper body strength. The control group performed a 30-minute at-home workout prerecorded by investigators consisting of body weight exercises focused on balance and functional movements. All groups exercised twice weekly and were supervised in person or electronically. Repeated measure ANOVA was used to determine differences across time and between groups. **RESULTS:** Preliminary data found no statistical difference for time ($p = .527$) or group ($p = .978$) for FN at four months, yet BMD did improve in the ST group (Pre, -.2333, post -.1778). LS data revealed no statistical difference for time ($p = .874$) or between groups ($p = .755$), but both groups displayed a positive trend in increasing BMD following four months of HIRT (ST, pre -.1000, post -.0667; LM, pre -.0667, post .1125), the controls remained unchanged. **CONCLUSION:** Changes in BMD were not significant between groups, but preliminary pilot data suggests a positive effects of HIRT on BMD in women after four months.

Poster #11

PROGRAM DESIGN WITH ARTIFICIAL INTELLIGENCE: AN EXPLORATORY STUDY

Ethan Keighley & Thomas Cieslak

BACKGROUND: According to McKinsey (2023), 60 percent of organizations regularly use generative artificial intelligence (AI) for at least one operational function and 22 percent of their employees regularly use AI tools to complete their work. Additionally, 40 percent of executives said their companies will increase their investment in AI-related tools by 20 percent annually. Eastwood (2024) reported that AI has been adopted unevenly in the U.S. with use clustered in large companies for business operations and the healthcare industry for customer service. Thus, AI may be the next revolutionary tool to help fitness professionals with time management and program design. **PURPOSE:** For the past 60-years, fitness professionals have utilized new and innovative technologies, from the stopwatch and calculator to wearable performance devices and AI, to develop more efficient methods and effective programs. Thus, the purpose of this project was to investigate the accuracy of an AI designed fitness program (AIPD) by evaluating it and comparing it to a fitness professional designed program (HIPD). **METHODS:** A panel of subject matter experts (SMEs) were recruited to assess the effectiveness of fitness programs designed by a fitness professional and AI tool. SMEs ($n=10$ ACSM-CPT; $n=10$ NSCA-CPT) were selected based upon their professional qualifications and geographical representation across the U.S. The SMEs used a modified version of Capital Pentagon assessment tool (OPPO; 2022) to assess the program design effectiveness in 5-areas on a scale anchored by 0 (ineffective) and 20 (very effective). **RESULTS:** The results indicate that AI tools are equally effective in designing fitness programs with no significant differences in the areas of aerobic fitness, muscular strength and mobility. However, there were significant differences in the areas of program safety (HIPD $19 \pm .4$; AIPD $13 \pm .9$) and program specificity (AIPD $18 \pm .6$; HIPD $12 \pm .8$). **CONCLUSION:** It is recommended that industry leaders empower fitness professionals with AI tools to make the most of their precious time and stay updated on industry trends. The first logical step would be to update formal education programs to instruct fitness professionals on 'how' to use AI tools in addition to their benefits and limitations. However, future studies should continue to examine the accuracy and quality of AI designed fitness programs and impact on client satisfaction and fitness professional retention.

Poster #12

THE EFFECTIVENESS OF A STUDENT-LED CAMPUS EVENT ON IMPROVING STUDENT'S KNOWLEDGE OF THE BENEFITS OF EXERCISE ON THE BRAIN

Marissa Madl, Alison Tasso, & Rachel Luehrs

BACKGROUND: Many college students know the benefits of physical activity on physical health, but few understand its benefits on mental health and cognitive function. Regular exercise can significantly improve mental health and enhance cognitive performance in areas such as attention, memory, and creativity. **PURPOSE:** To examine the effectiveness of a student-led campus event on increasing student's knowledge of the benefits of exercise on the brain. **METHODS:** Sixteen undergraduate students participated in a scavenger hunt event geared towards educating students on the benefits of exercise on the brain. An Exercise Science student presented a fact about the benefits of exercise on the brain at each scavenger hunt station. Twenty-four hours after the event, a survey was sent to the participants that 1) asked true and false questions that were intended to test the participant's knowledge of the benefits of exercise on the brain and 2) inquire about the participant's intentions around exercising for the brain benefits. A similar survey was sent to a control group of 16 undergraduate students that did not attend the scavenger hunt. Chi square tests were used to determine differences in the experimental versus control group's knowledge of the benefits of exercise on the brain and their intention to exercise for the brain benefits. **RESULTS:** There was no difference between groups in the number of students who knew that engaging in exercise can help reduce symptoms of stress, anxiety, and depression (Experimental: 15 true, 0 false vs. Control: 16 true, 0 false; $\chi^2=0.27$, $p=0.61$). A greater number of students in the experimental group correctly stated that exercise has been associated with higher academic achievement (Experimental: 15 true, 0 false vs. Control: 9 true, 6 false; $\chi^2=8.48$, $p=0.01$). There was no difference between groups regarding the number of students who intend to exercise for the mental health benefits (Experimental: 14 already do; 1 intend to vs. Control: 13 already do; 3 intend to; $\chi^2=1.0$, $p=0.31$) or academic performance benefits (Experimental: 12 already do; 3 intend to vs. Control: 10 already do, 4 intend to, and 2 do not plan to; $\chi^2=2.30$; $p=0.32$). **CONCLUSION:** The scavenger hunt was beneficial in educating students about the benefits of exercise on academic performance. However, most students already have an awareness that exercise is beneficial for mental health. Furthermore, most students in the study already exercise for the benefits on the brain.

Poster #13

VALIDITY OF ARTERIAL PALPATION TO MEASURE ARTERIAL OCCLUSION PRESSURE

Declan B. Stratford, Isaac J. Wedig, Eric P. Naugle, Jassius C. Taggs

BACKGROUND: For implementation of exercise with blood flow restriction (BFR) it is recommended that cuff pressures be based on arterial occlusion pressure (AOP). However, clinicians, coaches, and athletes may not have access to the necessary equipment for directly assessing AOP (i.e., Doppler ultrasound, handheld Doppler). Palpation, a method of detecting blood flow by simply feeling the pulse with the fingers, could serve as a practical alternative to measuring AOP that would require no equipment. However, there is no data supporting the validity of this method. **PURPOSE:** The purpose of this study was to investigate the validity of manual palpation to measure AOP in both the upper and lower limbs. **METHODS:** Eight normotensive healthy adults (age 25 ± 5) underwent measures of upper and lower-limb AOP in a supine position by applying a 5 cm and 12 cm wide pneumatic cuff to the upper and lower-limbs, respectively. For both limbs, AOP was assessed simultaneously via handheld Doppler and manual palpation by separate investigators at the radial and posterior tibial arteries. Investigators wore sound-canceling headphones and were visually blinded to one another. The degree of agreement between AOP values measured via Doppler and palpation was assessed using Bland-Altman limits of agreement (LoA). To statistically test the equivalence of values we utilized a two one-sided paired t-test ($\alpha = 0.05$) with an equivalence region equal to 10% of the mean Doppler AOP. **RESULTS:** In the upper-limb, the estimated mean difference between palpation (157 ± 17 mmHg) and Doppler (161 ± 20 mmHg) AOP values was -3.4 mmHg. The upper and lower 95% LoA were 11.3 mmHg and -18.2 mmHg. Values obtained via Doppler and palpation were equivalent ($p < 0.05$). In the lower-limb, the estimated mean difference between palpation (138 ± 12 mmHg) and Doppler (146 ± 15 mmHg) values was -8.8 mmHg. The upper and lower 95% LoA were 13.9 mmHg and -31.7 mmHg. Values obtained via Doppler and palpation were not equivalent ($p=0.13$). **CONCLUSION:** Our results indicate that palpation is a valid way to measure AOP in the upper limbs. Measures in the lower body were not as accurate but were still practically acceptable. Accordingly, arterial palpation allows for a way to implement exercise with BFR without the need for specialized equipment.

Poster #14

ALUMNI ATHLETES' EXPERIENCES OF POST-SPORT EXERCISE: HOW INSTITUTIONS CAN DO BETTER

Samantha M. Vermeesch, Madelynn L. Struck, Keegan J. DeKuiper, Paula-Marie M. Ferrara

BACKGROUND: Research shows that former college athletes (FCAs) may face chronic health conditions, which could be due to declines in exercise post-sport. Exercise promotion and retirement preparation efforts prior to FCAs' retirement has been suggested. It is important to consider FCAs' opinions for intervention development due to their familiarity with training and the sports retirement process. **PURPOSE:** To explore how former National Collegiate Athletic Association (NCAA) Division III (DIII) athletes' perceptions of health and exercise change after sports retirement, and their opinions on what is needed to help maintain their exercise behavior post-sport. **METHODS:** Semi-structured interviews were conducted with FCAs from an NCAA DIII institution in Michigan. Following an initial interview that occurred immediately after their graduation (Jun-Jul 2023), 14 FCAs (29% men, 22±1 years, 86% white) returned for a follow up interview six months later (Nov 2023-Jan 2024). Participants' data from the previous interview was used to allow reflection on their exercise behavior in the past six months, and explore their opinions on how they could have been better prepared for sports retirement. Interviews were conducted, recorded, and transcribed via Zoom, and were hand-corrected by researchers before analysis via Consensual Qualitative Research methods. **RESULTS:** Six domains were constructed from interviews. Two pertained to FCAs experiences with post-sport exercise: "secondary realizations leading into new realizations" and "realizations to reality". Four described ideas for what their institution could do to intervene with future retiring athletes: "support and guidance", "strategies for improving exercise in a program", "strategies encompassing overall health promotion in a program", and "how and when to talk to athletes". **CONCLUSION:** Following retirement, FCAs' initial perceptions of how to maintain exercise post-sport changed over time due to new life transitions. Some FCAs indicated a lack of exercise post-retirement, but all indicated a desire to maintain a healthy, active lifestyle long-term. Participants agreed that a program addressing overall health maintenance through hands-on practice, and fit around retiring student-athletes' final sport seasons would be useful. Such strategies should be further examined before implementation in college athletics programs. This study was funded by the 2023 Association of Applied Sport Psychology Seed Grant.

Poster #15

BUILT: PARTNERING WITH PARENTS AND PARKS TO PROMOTE PHYSICAL LITERACY

Timber Terrell, Mandy Vukits, Jake Leese, Eduardo Bustamante, FACSM

BACKGROUND: In partnership with Chicago Park District (CPD) and Urban Initiatives, the University of Illinois Chicago (UIC) Healthy Kids Lab developed the Be Unstoppable in Life Together (BUILT) Family Lifestyle Program. BUILT empowers families to adopt sustainable sleep, food, and exercise routines. BUILT physical activities are fun, cooperative, and competitive multi-family games designed to give children confidence, competence, motivation, and knowledge to be active for life. **PURPOSE:** This study assessed children's physical literacy perceptions before and after BUILT. **METHODS:** Forty-four children (M=8.57 yrs; SD=1.66; 46% female; 50% African American) participated in BUILT. Families at 6 parks received either an 8-week online version with 21 challenges or a 6-week in-person version with 13 challenges. The Physical Literacy Assessment for Youth Self (PLAYself) was collected on 27 children at baseline/post-test. PLAYself assesses children's perceptions of their physical literacy skills. The survey is divided into four subscales: environment, physical literacy self-description, relative rankings of literacies, and fitness. Pre and post change was assessed using paired samples t-tests and Hedges' g effect sizes. **RESULTS:** Children in the BUILT program significantly improved their physical self-efficacy (M=-64.21; SD=140.15; t=-2.244; p=.035; g=.443) from baseline to post-test. At baseline, 52% of children had very high physical self-efficacy, 41% had high self-efficacy, and 7.4% had low self-efficacy. When asked "I think I can take part in any sport/physical activity that I choose," 77% reported "True" or "Very true." At post-test, 36% of children had very high self-efficacy, 55% had high self-efficacy, and 9% had low self-efficacy. When asked, "I think I can take part in any sport/physical activity that I choose," 94% reported "True" or "Very true." Children were most confident being active on the playground and least confident on the ice, and this did not change throughout the program. Before BUILT, children believed physical literacy with friends was more important than with family or at school; however, after the program children believed physical literacy was more important at school than with family or friends. **CONCLUSIONS:** Results show the BUILT program improved children's physical self-efficacy. This supports the continued pursuit of physical activity behavior change through the BUILT program in communities with high needs and few resources.

Student Presentations – Oral #3 (3:30 pm – 4:20 pm; Heldane Room)

3:30 pm – 3:42 pm

**FRAILTY AND PHYSICAL ACTIVITY AMONG THE
OLDEST OLD: INSIGHTS FROM THE BRAZILIAN
LONGITUDINAL STUDY OF AGING**

Amanda Lee, Jessica Lili Frey, Emerson Sebastiao

BACKGROUND: The global population of the "oldest old" (aged 80+) is expected to more than triple by 2050, posing significant individual, societal and medical challenges due to the increased prevalence age-related conditions such as frailty. Frailty is a clinically recognizable state of increased vulnerability due to age-related decline in physiological and functional reserve. This condition has been associated with adverse outcomes, including falls, disability, hospitalization, and mortality. As a non-pharmacological approach, physical activity is recognized as a key strategy to mitigate frailty-related impairments. **PURPOSE:** This study examined physical activity behavior in individuals aged 80+ as a function of frailty status. **METHODS:** This secondary data analysis utilized the second wave of the Brazilian Longitudinal Study of Aging (2019-2021), focusing on those aged 80+. Frailty was assessed using the Fried Frailty Phenotype, classifying participants as non-frail, pre-frail, or frail based on five criteria: unintentional weight loss, exhaustion, low physical activity, slow gait, and weakness. Non-frail individuals had no positive criteria, pre-frail had one or two, and frail had three or more. Physical activity was assessed through self-reported frequency of engagement in vigorous, moderate, and low-intensity activities. Descriptive statistics and chi-square tests were used to analyze the data, with significance set at $p < .05$. **RESULTS:** The analysis included 1,172 participants (62% females) with a mean age of 84.9 ± 4.6 . Among them, 12.8% were non-frail, 73.2% pre-frail, and 13.9% frail, with more females classified as frail than males (17.1% vs. 8.5%; $p = .01$). A significant association was found between frailty status and all intensities of physical activity ($p < .05$). A higher percentage of pre-frail individuals engaged in physical activity on one or more days per week across all intensities: vigorous (64.4% vs. non-frail: 26.7%, frail: 8.9%), moderate (68.5% vs. non-frail: 25%, frail: 6.5%), and low intensity (68.4% vs. non-frail: 20.6%, frail: 11%) compared to the other groups. **CONCLUSIONS:** These findings suggest that, except for those classified as pre-frail, a significant portion of the oldest old in Brazil do not regularly engage in physical activity across all intensity levels. This is a concern as physical activity has been identified as a potential preventive strategy to slow the development frailty and other conditions later in life.

3:42 pm – 3:54 pm

**COGNITIVE FUNCTION IN OLDER ADULTS WITH
MULTIPLE SCLEROSIS: EXPLORING THE IMPACT OF
FRAILTY**

Jessica Lili Frey, Amanda Lee, Emerson Sebastiao

BACKGROUND: Frailty is characterized by impaired stress tolerance due to age-associated declines in physiological reserve and function across different organs and systems thereby increasing vulnerability for adverse health outcomes. Frailty and its consequences have been vastly studied in older adults for the general population, yet few studies have addressed frailty in the context of multiple sclerosis (MS). **PURPOSE:** The present study explored cognitive function (i.e., processing speed, verbal learning, and visuospatial memory) in a sample of older adults with MS as a function of frailty status. **METHODS:** This secondary data analysis study used baseline data of a previous feasibility randomized controlled trial study of a home-based exercise program in older adults with MS. Frailty was verified using performance scores of the Short Physical Performance Battery (SPPB) and cut-points available in the literature (Frail: SPPB score ≤ 9 ; Non-frail: SPPB score > 9). Cognitive function was assessed using the Brief International Cognitive Assessments for Multiple Sclerosis (BICAMS). Data were analyzed using inferential statistics adopting a significance of level of $p < .05$. **RESULTS:** Data from 26 older adults with MS (Mean \pm SD; Age: 64.3 ± 4.5 years) were analyzed. The majority of the participants were women, and over 85% of the sample had the relapsing-remitting form of MS. Participants reported more than 20 years of disease and a moderate level of disability. Nearly 58% of the sample was classified as frail based on SPPB scores. Univariate analysis demonstrated that frail older adults performed significantly worse on all three cognitive tests from BICAMS: a) cognitive

processing speed (Frail: 41.9 ± 13.5 vs Non-Frail: 54.8 ± 10.8 ; $d = 1.05$; $p = .012$); verbal learning (Frail: 47.9 ± 10.5 vs Non-Frail: 58.4 ± 11.3 ; $d = .95$; $p = .026$); and visuospatial memory (Frail: 20.3 ± 5.5 vs Non-Frail: 26.4 ± 3.4 ; $d = 1.31$; $p = .002$). However, after controlling for age and disability level, only visuospatial memory remained significantly different ($p = .043$) between frailty groups - favorable to the non-frail group. CONCLUSIONS: Our findings suggest a reduced cognitive function in frail older adults with MS compared to their non-frail. This highlights the need to develop interventions aiming at reverting frailty - a reversible clinical state - in older adults with MS and improving cognitive function in this population.

3:54 pm – 4:06 pm

EFFECTS OF KINESIO TAPE ON DELAYED ONSET MUSCLE SORENESS

Dakota Deiwert, John Maibauer, Dakota Tiede, Marcos Keefe, Corinthian Blythe, Monica Hubal, FACSM, Keith Naugle, Kelly Naugle

BACKGROUND: Exercise-induced muscle damage (EIMD), which typically occurs through a bout of unfamiliar exercise (e.g., maximal eccentric contractions), includes marked reductions in strength and delayed onset muscle soreness (DOMS). Peak symptoms of DOMS and loss of strength usually occur up to 72 hours post-EIMD. There is a need for effective therapeutic means of reducing the extent of and DOMS in the days after exercise. Kinesio tape (KT), which is purported to help lift the skin off underlying tissue to enhance blood flow, may serve as an intervention to expedite the EIMD healing process. **PURPOSE:** This study investigated KT's effectiveness at recovering strength loss and improving DOMS in upper body, exercise-naïve individuals following eccentric exercise of the bicep. **METHODS:** 28 participants (male = 9; female = 19) underwent maximal elbow flexor (EF) eccentric exercise (ECC) and were then randomized into one of three groups: KT (n=8), placebo (n=10), or control (n=10). 48 and 72 hours after ECC, maximal voluntary EF contractions (MVCs) were measured via an isokinetic dynamometer and pain pressure thresholds (PPT) were measured via an algometer to assess strength recovery and DOMS changes, respectively. A mixed-model ANOVA was conducted to test group differences amongst days ($p < 0.05$). The Tukey HSD procedure was used for significant main effects and interactions. **RESULTS:** ECC induced significant immediate reductions in MVC in all groups (KT= $-43.0 \pm 10.0\%$; Placebo= $-28.3 \pm 15.6\%$; Control= $-30.8 \pm 22.9\%$) and significant DOMS as measured by reduced PPT 48 hours post-ECC (KT= $-46.6 \pm 18.3\%$; Placebo= $-25.1 \pm 33.7\%$; Control= $-31.8 \pm 36.1\%$). However, there were no group x time interactions for MVC or PPT. Furthermore, no group returned to baseline MVC or PPT after 72 hours post-ECC. **CONCLUSION:** While evidence exists to support KT's usefulness, our study suggests that KT does not improve pain sensitivity or the time in which an individual might recover strength after strenuous exercise. However, more time points may be needed to support this.

Student Presentations – Poster #4 (3:30 pm – 4:30 pm; Kendall Room)

Poster #1

THE RELATIONSHIP BETWEEN CARDIORESPIRATORY FITNESS AND RESTING-STATE CORTICAL ACTIVATION: AN EEG STUDY ON POWER SPECTRUM DENSITY.

Manuela Cortes-Ospina, Nicholas Baumgartner, Kyoungmin Noh, Shih-Chun Kao

BACKGROUND: Regular physical activity is known to positively influence both physical and mental health. Research has increasingly focused on the impact of aerobic exercise and associated improvements in cardiorespiratory fitness (CRF) on cognitive and brain health by assessing cognitive task performance and task-related neurophysiological measures. However, whether these neurocognitive benefits of CRF can be extended to alteration in non-task-related brain activation as reflected in resting-state electroencephalogram (EEG) remains largely unexplored. **PURPOSE:** To determine the relationship between CRF and resting EEG power in different frequency bands-delta, theta, alpha-1, alpha-2, and beta- in both eyes-open and eyes-closed seated resting conditions. We hypothesized that higher CRF, measured by maximal oxygen consumption ($\dot{V}O_{2max}$), would be

associated with increased power in fast frequency bands (alpha-1, alpha-2, beta) and decreased power in slow frequency bands (delta, theta). **METHODS:** A total of 119 healthy adults (female N = 58, age = 22 ± 3 years) underwent a graded exercise test to determine $\dot{V}O_2\text{max}$ and completed resting-state EEG recordings under eyes-open and eyes-closed conditions in counterbalanced order. Hierarchical regression analyses were conducted to assess the relationships between $\dot{V}O_2\text{max}$ and EEG power in delta, theta, alpha-1, alpha-2, and beta frequency bands while controlling for age, sex, and body mass index (BMI). **RESULTS:** $\dot{V}O_2\text{max}$ was positively associated with alpha-2 ($F = 6.742$, $\Delta R^2 = 0.052$, $p=0.01$) and beta power ($F = 6.111$, $\Delta R^2 = 0.049$, $p =0.01$) under the eyes-closed condition but not the eyes-open condition after controlling for age, sex, and BMI. No significant association of $\dot{V}O_2\text{max}$ with delta, theta, and alpha-1 power was found. **CONCLUSION:** The positive associations of $\dot{V}O_2\text{max}$ with increased EEG power selectively in fast frequencies and under the resting condition without vision-related processing suggest that having higher CRF levels may improve oxygen delivery to the brain and in turn enhance the neural efficiency and internal attentional processes when the demand from visual sensory input is minimized. These findings contribute to the literature by extending the cognitive benefits of CRF to non-task-related resting brain functioning, highlighting the importance of CRF to cognitive health and the need for longitudinal research to explore the CRF-EEG relationship in more diverse populations.

Poster #2

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

Dylan Darsidan, Max O'Dell, Maddie Moran, Ashley Aird, Ella Kittelson, Alissa Stiles, & Kelsey Bourbeau

BACKGROUND: In an era marked by increasing psychological burnout, research focused on interventions that reduce stress and burnout is crucial. Burnout impacts individuals' well-being and has significant societal and economic implications. Limited evidence suggests that aerobic exercise may play a role in attenuating burnout across a variety of populations. The use of traditional exercise interventions may not be practical as time constraints are often reported as a barrier to seeking treatment of burnout. Thus, exploring whether novel, time-efficient exercise interventions could effectively address burnout is important. **PURPOSE:** The purpose of this study is to examine whether a 6-week stair "snack" intervention improves burnout in healthy individuals. **METHODS:** In this pilot study, subjects experiencing burnout were randomized into a stair snack (SS, n = 3) group or a non-exercise control group (CG, n = 4). Throughout the 6-week intervention, subjects in the SS group performed 3 bouts of 20-second stair sprints at an 'all out' intensity, 3x/day, 3x/week. Subjects in the CG were asked to continue their current lifestyle habits. Subjects visited the exercise physiology lab pre- and post-intervention, and the following data was collected at each visit: 1) Psychological Burnout (BAT), 2) Depression and Anxiety Levels (BDI-II, STAI), 3) Sleep Quality (SQS) 4) Body fat (BIA), and 5) Aerobic fitness ($\dot{V}O_2\text{max}$). Two-way mixed measures ANOVA was used to examine between and within group changes from pre- to post-intervention. **RESULTS:** No significant between group differences were observed from pre- to post-intervention for any variable. Within group differences were observed for total burnout from pre- to post-intervention in the CG group (pre = 3.64 ± .29 to post = 3.20 ± .28) and SS group (pre = 3.36 ± .25 to post = 2.68 ± .52) with lower values indicated less burnout. These results suggest that both groups experienced a reduction in burnout from pre- to post-intervention. No other within group differences were observed in either group. **CONCLUSION:** Results indicate that both groups exhibited the same change in burnout, suggesting that the SS intervention was not uniquely effective at reducing burnout. This may, in part, be due to the timing of data collection (e.g., start of the semester and end of the semester). Further data collection (to achieve statistical power) is needed to confirm that the exercise snack intervention may not aid in reducing burnout.

Poster #3

PATERNAL SUPPORT OF YOUTH PHYSICAL ACTIVITY: EXPLORING THE RELATIONSHIP AMID AFRICAN AMERICAN FATHERS AND DAUGHTERS

Tony Harris, Maureen R. Weiss, & Daheia J. Barr-Anderson, FACSM

BACKGROUND: Across childhood and adolescence, physical activity (PA) levels decline more frequently for African American (AA) females. Parents are important socializing agents of childhood PA motivation through supportive and encouraging behaviors. However, little information exists on parental influence of AA girls,

especially related to fathers' beliefs and behaviors. **PURPOSE:** To investigate the relationship between AA fathers' social support and daughter's PA self-efficacy, enjoyment, and PA behavior. **METHODS:** Eleven father-daughter dyads participated based on in-person and online recruiting. Daughters responded to survey items related to father-daughter relationship quality, paternal support for PA, PA enjoyment, self-efficacy, and weekly PA levels. Due to the small sample size, descriptive statistics and Pearson correlations were calculated between variables of parental influence and daughters' PA beliefs and behavior. **RESULTS:** Mean age was 43.8 ± 4.6 and 11 ± 0.8 years for fathers and daughters. Fathers' mean BMI was 30.8 ± 4.8 kg/m². Daughters' mean BMI-for-age percentile was 52.5 ± 38.3 with the majority (46%) having healthy weight. Households were >80% dual parent, 73% included both biological parents, and 91% of fathers lived with their daughters full-time. Mean paternal social support was 17.4 ± 2.7 out of 25 indicating moderate to high support. Mean father-daughter relationship quality was strong, 4.03 ± 0.6 out of 5. Daughters reported a mean of 7 ± 3.9 hours/ week of total PA, mean PA enjoyment 27.2 ± 4.05 out of 30 and PA self-efficacy as 33.8 ± 4.6 out of 40, both indicating high levels. Most correlations among perceived parental support and daughters' psychosocial and PA outcomes were low to moderate: father-daughter relationship quality ($r=.54$), daughters' total PA ($r=.31$), PA enjoyment ($r=.39$), and PA self-efficacy ($r=.26$). Father-daughter relationship quality was not correlated with any of the daughters' PA outcomes. **CONCLUSION:** The findings of this study provide preliminary evidence of the relationship among AA paternal support and daughters' psychosocial and PA outcomes. The small sample size is a limitation and suggestions are provided for recruitment strategies with this population.

Poster #4

PERCEIVED STRESS RELATES TO PHYSICAL FUNCTIONING IN INDIVIDUALS WITH PRE-DIABETES

Alison Knapp, Jiyoung Lim, Diane Dungan, Scott Fenstermacher, Erik Hayes, & Bradley Kendall

Purpose: It is estimated that 629 million people will have diabetes by 2045. Currently, approximately 13% of adults have diabetes while 34% have prediabetes. As a result of these numbers, healthcare professionals and programs are aimed at helping individuals lose weight and lower their hemoglobin A1c. However, individuals with prediabetes and diabetes often experience other complications such as low aerobic capacity, poor mobility, and poor psychological health - all of which are related to overall mortality. Moreover, higher perceived stress is associated with failure among diabetics to control blood sugar. Therefore, the purpose of this study was to examine relationships between perceived stress and physical functioning in pre-diabetic adults. **Methods:** Participants were adults ($N=41$, Mean age= 65 ± 15) who volunteered to participate in a diabetes prevention program. Individuals enrolled in the program were referred by their physician and were considered at risk for pre-diabetes or diabetes (mean A1c= 5.7 ± 1.0 , mean BMI= 34.3 ± 5.2). Upon enrollment, participants completed assessments of aerobic capacity (6-minute walk test), mobility (4-square step test and the 8-foot up-n-go test), and muscular endurance (chair stands). Additionally, participants completed the Perceived Stress Scale (PSS). **Results:** As hypothesized, the 6-minute walk test was significantly correlated with the 4-square step test ($r = -.537$, $p < 0.01$), the 8-foot up-n-go test ($r = -.735$, $p < 0.01$), and chair stands ($r = .611$, $p < 0.01$). Additionally, perceived stress was significantly correlated with the 6-minute walk test ($r = -.360$, $p < 0.05$), the 4-square step test ($r = .502$, $p < 0.01$), the 8-foot up-n-go test ($r = .438$, $p < 0.01$). Chair stands were not associated with stress scores. **Conclusion:** These findings highlight various relationships between functional abilities and perceptions of one's stress. Individuals with pre-diabetes with higher self-reported stress levels had lower mobility and aerobic capacity. Finally, similar to previous studies examining glucose control and perceived stress, the Perceived Stress Scale could potentially be a quick assessment for healthcare professionals to somewhat understand the physical abilities of their patients. Future studies should assess how well the Perceived Stress Scale might predict physical limitations in this population.

Poster #5

THE ASSOCIATION BETWEEN RESISTANCE TRAINING, AEROBIC EXERCISE AND SUICIDE RISK AMONG COLLEGE STUDENTS

Carson McCoy & Catherine Gammon

BACKGROUND: Mental health challenges are common among college students and can hinder academic performance. Physical activity (PA) improves mental health. The occurrence of suicidal thoughts/behaviors is an indicator of mental health. Few studies have examined the association between suicidal thoughts/behaviors and PA

among college students, and none have examined different PA modes. Assessing the relationship between different PA modes and suicidal thoughts/behaviors can aid the development of mental health support strategies for college students. **PURPOSE:** Examine the association between aerobic PA, resistance training (RT) and suicide risk among college students. **METHODS:** In Fall 2019, 757 college students completed an online survey which included the Suicide Behaviors Questionnaire-Revised (SBQR). The SBQR is validated for classifying individuals as 'nonsuicidal' (score 3-6) or 'suicide-risk' (score 7-18). Participants self-reported weekly minutes of aerobic PA and days per week of RT. National PA and RT guidelines were used to classify participants as meeting/not meeting recommendations. Independent samples t-tests were used to compare mean SBQR scores for students who did and did not meet PA and RT guidelines. Chi-square tests and relative risk values were used to examine the association between guideline compliance and SBQR classification. Alpha was set at .05. **RESULTS:** Students who met PA guidelines had a lower mean SBQR score (5.22) than those who did not (6.22, $p<0.05$). Students who met RT guidelines had a lower mean SBQR score (5.31) than those who did not (5.90, $p<0.05$). Chi square tests revealed that students who met PA and RT guidelines were more likely to be classified as 'nonsuicidal' ($p<0.05$). Relative risk values indicated that the likelihood of being classified as 'suicide-risk' was 35% higher among students who did not meet PA guidelines, and 25% higher among students who did not meet RT guidelines (compared to those meeting guidelines). **CONCLUSION:** Engaging in recommended levels of PA and RT was associated with fewer suicidal thoughts/behaviors and lower suicide risk among college students. Causal claims cannot be made as the data were cross-sectional, but the results align with previous research and national recommendations endorsing regular activity (aerobic or RT) as supportive of mental health. Future studies using an experimental design should examine the effects of increasing PA and RT on suicidal thoughts/behaviors.

Poster #6

THE EFFECTS OF TRADITIONAL VERSUS VIRTUAL REALITY EXERCISE ON COGNITIVE FUNCTION IN OVERWEIGHT AND OBESE ADULTS: A PILOT STUDY.
Greta Ness, Grayce Bjugan, Emma Kelsey, Darci Wiseman, & Terence Moriarty

PURPOSE: Research has suggested that there is a relationship between overweight/obesity (body mass index (BMI) > 25 kg/m²) and deficits in cognitive function. Although exercise is commonly prescribed to improve physical and cognitive health, many overweight/obese individuals struggle with adhering to an exercise program, putting them at a greater risk for cognitive dysfunction. A new technique that is gaining popularity with its application to exercise is virtual reality (VR). Therefore, the aim of the current study was to investigate the effects of traditional (TRAD) versus VR exercise on cognitive performance, and whether these changes are associated with alterations in prefrontal cortex (PFC) oxygenation (O₂Hb) in overweight and obese adults. **METHODS:** Four participants (M=1, F=3, BMI: 30.4 ± 3.4 kg/m², body fat: $35.5\pm 1.8\%$, VO₂max: 30.0 ± 5.7 ml/kg/min) completed a 15-minute moderate-intensity TRAD cycle ergometer and VR exercise bout followed by administration of a Stroop task (four rounds of 30 trials) on two separate days. A functional near-infrared spectroscopy (fNIRS) device was used to measure PFC O₂Hb during the cognitive evaluation. A one-way repeated measures ANOVA was used to determine differences in cognitive performance in each round of the Stroop task between trials. A paired t-test was also used to determine differences in the average PFC O₂Hb between the TRAD and VR trials. **RESULTS:** All participants completed both trials and there were no significant differences in exercise intensity indicators between trials (TRAD: %HRmax $72\pm 2.7\%$, RPE 12 ± 0.8 , VR: %HRmax 71 ± 3 , RPE 12 ± 1.3). Participants showed no significant improvement in Stroop accuracy in any of the four rounds. That said, response time during the third round of the Stroop was significantly faster following the TRAD cycling exercise bout (TRAD: 0.63 ± 0.13 s, VR: 0.70 ± 0.12 s). All other rounds were not significantly different for response time. The PFC displayed no significant change in O₂Hb during the Stroop task (average PFC O₂Hb TRAD: $1.46\pm 1.04\mu\text{mol}$, VR: $1.68\pm 1.56\mu\text{mol}$). **CONCLUSION:** Our preliminary findings suggest that both VR and TRAD exercise are viable options for improving physical and cognitive health in overweight/obese adults. Further studies with a larger population sample to investigate the effect of TRAD and VR exercise on cognitive health are needed to yield peak benefits for overweight/obese individuals.

Poster #7

COPING STRATEGIES THAT ENABLED A RETURN TO REGULAR EXERCISE IN COLLEGE-AGED INDIVIDUALS
Jessica Smith-Ricketts, Gretchen E Elsey, & Jacob E Barkley

BACKGROUND: Previous research indicates that individuals may experience exercise-related negative affective valence. These negative exercise experiences can then lead to a discontinuation of exercise. Coping strategies that enable an individual to return to their regular exercise are generally understudied. **PURPOSE:** To explore potential coping strategies that enabled a return to exercise in individuals who previously stopped exercising. **METHODS:** 269 college-aged individuals (21 ± 2.6 years, $n = 142$ female) completed a survey in Spring 2024. Individuals were asked two yes/no questions to ascertain whether they stopped exercising for a prolonged period of time and whether they were able to return to their regular exercise routine. Individuals who were able to return to their regular routine were asked what helped them return to their routine. Thematic analysis was utilized to analyze the open-ended question. **RESULTS:** 67% ($n = 180$) of participants stated that they had stopped exercising for a prolonged period of time. Of those that stopped exercising, 72% ($n = 129$) stated that they were able to return to their regular exercise routine following the discontinuation of exercise. Thematic analysis resulted in four main themes. Theme one, 'Social', was composed of two subthemes: positive and negative. Theme two, 'Self-Perceptions', was composed of two subthemes: positive and negative. Theme three, 'Determinants of Exercise', was composed of two subthemes: motivators and barriers. Finally, theme four, 'Health', did not have any subthemes. Theme three was represented by the highest number of responses, totaling 40% of responses. **CONCLUSION:** As supported by previous research, the majority of individuals reported experiencing a prolonged period of time where they discontinued their regular exercise routine. Of those individuals, the majority (72%) were seen as 'copers' because they were able to return to their regular routine. Three of the themes (social support, barriers and motivators to exercise, and exercising to better one's health) have been previously reported within the literature as reasons individual's exercise. Negative perceptions of self (e.g., "I started to get fat") is a novel finding, potentially indicating that negative associations may be a greater driving force behind exercise participation than previously thought.

Poster #8

THE EFFECTS OF SHORT-TERM HIGH-DOSAGE CREATINE SUPPLEMENTATION ON COGNITIVE MEASURES FOLLOWING MENTAL FATIGUE IN HEALTHY YOUNG ADULTS: A PILOT STUDY
Olivia Van Meter & Terence Moriarty

PURPOSE: To examine the effects of high-dosage creatine (CR) supplementation (30 g/day for 10 days) before performing a mentally fatiguing task on measures of cognition in healthy young adults, and whether these changes are associated with alterations in prefrontal cortex (PFC) oxygenation (O₂Hb). **METHODS:** Ten participants ($M=7$, $F=3$, height: 1.76 ± 0.07 m, weight: 76.7 ± 9.6 kg, body mass index (BMI): 24.9 ± 3.2 kg/m²) were evenly randomized to receive supplementation with CR (CR:30g/day) or a placebo (PLA:30g/day) for 10 days. Participants completed a comprehensive 60-minute cognitive test battery (30-minute Computerized Neurocognitive Assessment Vital Signs (CNSVS) & 30-minute Stroop task) on two separate occasions prior to and following supplementation. A functional near-infrared spectroscopy (fNIRS) device was used to measure PFC O₂Hb during the cognitive evaluation. A two-way repeated measures ANOVA was used to determine the differences between the groups and the timepoints for the cognitive performance scores and average PFC O₂Hb. **RESULTS:** CR had no significant effect on accuracy or response time (CR pre vs. post: 0.66 ± 0.02 vs. 0.62 ± 0.02 s, PLA pre vs. post: 0.59 ± 0.02 vs. 0.60 ± 0.02 s) during the Stroop task. Similarly, there were no significant differences in all twelve cognitive domains measured during the CNSVS test following CR supplementation. The PFC displayed no significant change in O₂Hb across the comprehensive cognitive assessment (CR pre vs. post: 3.00 ± 2.49 vs. 2.12 ± 2.24 μ mol, PLA pre vs. post: 2.42 ± 2.39 vs. 2.68 ± 2.51 μ mol). **CONCLUSION:** Our preliminary findings suggest that high-dosage CR supplementation has no significant effect on the measures of cognitive performance. Although not significant, there was a trend for decreased PFC O₂Hb and a quicker response time during the Stroop task in the CR versus the PLA group. Since CR is safe, future studies should include larger sample sizes. It is imperative that CR should be tested on patients with dementias or cognitive impairment.

Poster #9

FIBER-TYPE SPECIFIC EFFECTS OF GLO1 EXPRESSION IN TYPE II DIABETES FOLLOWING AEROBIC EXERCISE TRAINING INTERVENTION
Meelap Patel, Isabelle Merem, Corey Mazo, and Jacob Haus

Introduction: Glyoxalase-1 (GLO1) is a highly conserved myocellular protein involved in the detoxification of methylglyoxal, a toxic dicarbonyl byproduct that is spontaneously produced in glycolysis. We have previously shown elevated levels of dicarbonyl stress and reduced GLO1 protein expression in skeletal muscle tissue of individuals with obesity and Type 2 diabetes (T2D) that correlate with the degree of insulin resistance. However, there is little evidence concerning the role of aerobic exercise training (AET) on inducing skeletal muscle GLO1 protein expression. Our study aimed to identify whether aerobic exercise training upregulates GLO1 expression, specific to fiber-type, in human skeletal muscle. Methods: Individuals with T2D (n=33, age: 57±9.5, BMI: 33.8±5.8) were randomized to control (CON; n=13) and AET (n=20) groups. The AET group completed 12 weeks of supervised aerobic exercise (treadmill) at ~70% VO₂max, 5 days/week for 60min/day. Skeletal muscle biopsies samples were obtained before and after the 12 week intervention period (in the fasted condition). Total GLO1 protein expression was quantified by Western blot from muscle tissue homogenates and via immunofluorescence in skeletal muscle histological preparations concomitant with myosin heavy chain fiber type profiling. Results: Baseline GLO1 expression was lowest in Type IIX fibers compared to Type IIA (p = 0.002) and Type I (p = 0.26). All fiber types had an increase in GLO1 expression post AET (Type I (9.6% ± 14.6), Type IIA (3.7% ± 16.6), and Type IIX (5.6% ± 21.6)) however, no changes were statistically significant when compared to CON. In skeletal muscle homogenates, GLO1 protein expression was unchanged with AET. Conclusion: We and others have previously reported increased GLO1 expression with AET in older adults and adults with obesity and pre-diabetes. However, this is the first reporting of GLO1 protein expression with AET in obese adults with T2D. Our findings suggest that individuals with T2D are not responsive to GLO1 exercise adaptation. Numerous factors can affect GLO1 protein expression. Including, but not limited to NAMPT, SIRT 1, SIRT2, and NRF2. Future direction should focus on possible dysregulation amongst these pathways affecting the inductive effects of AET on GLO1 protein expression.

Poster #10

COMPARING VASTUS LATERALIS PENNATION ANGLE DURING GAIT IN ADOLESCENTS AND ADULTS POST ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION
Jessica Tolzman, Arjun Parmar, Corey Grozier, Ian Fredrick, Matthew Harkery

Background: Advancements in wireless ultrasound allows for real-time assessment of muscle characteristics during dynamic tasks like walking. Quadriceps function, specifically pennation angle excursion, is vital following an anterior cruciate ligament reconstruction (ACLR) as it serves as a force-generating tool within the muscle. Following an ACLR muscle alterations are common; however, it is unknown how adolescents and adults differ in dynamic muscle characteristics. Purpose: Utilize wireless ultrasound to compare pennation angle excursion during gait between adolescent and adult patients post ACLR. Methods: A cross-sectional study was performed on 24 total participants (adolescents [14-17.9 years]; adults [18-36 years]) who were 4-9 months post-ACLR. The ultrasound probe was affixed to the thigh of the ACLR limb, positioned over the vastus lateralis, 50% of the femur. The probe was oriented longitudinally, parallel to the muscle fibers of the vastus lateralis, allowing clear visualization of the muscle fascicles. While walking on a treadmill at their habitual walking speed, 2x10 second videos were captured with a wireless ultrasound. Force sensing insoles were placed in participants preferred walking shoes and time-synced to the ultrasound videos. Pennation angle was measured from the fascicle to aponeurosis from keyframes that corresponded to initial contact and peak vertical ground reaction force (vGRF) in all steps of the gait cycle. An independent t-test was used to compare pennation angle excursion between groups ($\alpha \leq 0.05$). Results: Participants included 12 adolescents (33% females, age: 16.0±1.4 years, bmi:20.6±3.3kg/m², time since surgery: 5.2±1.4 months) and 12 adults (50% females, age: 24.4±7.4 years, bmi: 22.7±4.0kg/m², weight: 79.0±14.4kg, time since surgery: 6.2±1.5 months). There were no significant differences (t₂₂ = 0.41, p = 0.68, d = 0.17) in pennation angle excursion between adolescents (4.0±2.1°) and adults (3.6±1.6°). Conclusion: Adolescents and adults show similar pennation angle excursion after ACLR, however, it is important to note that a control group was not utilized within this study. Post-surgery adults and adolescents may have a similar pennation angle to each other, but when compared to a healthy individual they may be experiencing decreased muscular function. While no differences were found, further research should explore longitudinal muscle changes in these groups to improve post-surgery treatment and rehabilitation.

PLANTAR FLEXOR MYOFIBER CROSS-SECTIONAL AREA
ACROSS A RANGE OF PHYSICAL INACTIVITY IN EARLY
POSTNATAL MICE

Olivia Waits, Lauren Lefkowitz, Anthony Kachulkin, Katie Richards, Austin Smith, Rachael Binion, Ben Jevnikar, Alexandra Bagg, Ty Schaab, Maddie Sisler, Jackson Yeager, Paul Reidy

BACKGROUND: Physical activity is known to have a positive impact on health while physical inactivity is known to do the opposite. Less is known about how different levels of physical activity during early life periods can affect myofibers. **PURPOSE:** This study examines how early life periods of varying activity and inactivity affect myofiber size immediately after treatment and after a short controlled post-treatment period. **METHODS:** 102 mice were separated into 2 cohorts: All completed 14 days of treatment voluntary wheel-running (VWR), standard cage sedentary (SED), small mouse cage (SMC), or hindlimb unloading (HU). The level of activity was as follows (VWR>SED>SMC>HU). One of the cohorts completed an additional 7 days of post-treatment standard cage control. After completing the experiment, mice were euthanized, and the gastrocnemius (GAS) and plantaris muscles were mounted frozen and sectioned in ten-micron thick sections placed on slides. Slides were incubated in antibodies specific to Myosin Heavy Chain I, IIa, IIx, and IIb with appropriate fluorescent secondary antibodies and imaged on a wide-field fluorescence microscope. Sample images were then processed with ImageJ and analyzed through semi-automatic muscle analysis using segmentation of histology (SMASH) for analysis of myofiber cross-sectional area (CSA) in microns². **RESULTS:** We found that the mean CSA of the GAS after 14-day treatment was 983 209, 827 154, and 529 92, for SED, SMC, and HU mice, respectively. The mean CSA of the GAS after a 14-day treatment was 1095 119 and 888 174, VWR and SED mice, respectively. After a 7-day post-treatment control, we found the mean CSA of the GAS to be 916 247, 930 325, and 1015 285, respectively for SED, SMC, and HU. Following a 7-day post-treatment control, we found the mean CSA of the GAS to be 897 195 and 916 247 for VWR and SED, respectively. **CONCLUSION:** HU and VWR significantly differed in muscle size and fiber type distribution. Recovery was noted in treatment groups 7 days post-treatment. Our findings can help guide future studies on different muscles to understand how varying activity and inactivity levels affect skeletal muscle. Funding was provided by the Committee on Faculty Research Grant, EHS Seed Grant; EHS Interdisciplinary Seed Grant to P.T. Reidy; 2022 Undergraduate Summer Scholars Award to K.E. Richards; 2022 Undergraduate Summer Scholars Award to A.A. Kachulkin.



Friday (10/18) Morning Presentations

Professional Presentations

8:00 am – 8:50 am METABOLIC COST OF HUMAN LOCOMOTION: A
HISTORICAL REVIEW AND FUTURE CONSIDERATIONS
Kyle Wehmanen, Steven Elmer (Grandview)

In comparison to other primates, humans have an enhanced capacity to move long distances and by some metrics they perform on par with other mammals specialized for endurance running. Human endurance capabilities have been further enhanced through the use of passive tools (e.g., bicycles, skis, ice-skates) which ultimately enable them to travel more efficiently over diverse terrain. The process by which humans expend metabolic energy to move a given distance (cost of transport - COT) has been studied for more than a century. However, to this day there remains discussion about how to best calculate COT and to make comparisons between different groups (e.g., trained vs. untrained individuals; cyclists vs. runners). Additionally, most of the research on COT in humans has occurred in laboratory settings with much less investigation under real-world conditions. The relatively recent development of portable metabolic measurement systems has expanded the ability to calculate COT in the field. In this session, we will provide a historical review of the research on COT in humans and discuss how the use of passive tools can improve COT and enhance human performance. We will also advocate for expanded research in this area with special consideration for future applications of human powered locomotion across diverse terrain including desert and arctic travel and space exploration. Supported by the National Aeronautics and Space Administration and Michigan Space Grant Consortium.

8:00 am – 8:50 am SPORTS NUTRITION KNOWLEDGE IN DIII ATHLETES
Kerrie Berends, Michael Wierenga, Madeline Frens (Pearl)

Over 400 Midwest NCAA DIII athletes were surveyed using the Sports Nutrition Knowledge Questionnaire - abridged version (ASNKQ). Participants represented over 16 varsity sports with both men and women's teams represented in 10 sports. Higher scores on the ASNKQ correlated with upper-class students, students who had participated in a nutrition course or seminar, endurance athletes, and individuals who were responsible for cooking their own meals. Students reported getting nutrition information mostly from coaches, parents, and social media yet indicated that nutrition education should be provided by a registered/certified dietician, a strength and conditioning coach, and a medical professional (doctor, nurse, physician's assistant). Findings were similar to previously published research using the SNKQ and ASNKQ (48% score) and indicate the need for sports nutrition education in DIII athletes, particularly freshman, sophomores, and students who eat primarily at campus dining halls. Additional research is suggested to examine the utilization of dieticians and medical personnel in sports nutrition education of athletes. Additional education and certification in sports nutrition for strength and conditioning professionals should be considered.

9:00 am – 9:50 am

**USING BIOMECHANICS IN THE CLINICAL SETTING FOR
GORILLAS, CHIMPANZEES, MONKEYS**
Antony George (Grandview)

This presentation is to demonstrate the importance of biomechanical measurements in the clinical setting of athletes before or after injury, and before or after symptoms occur. The treatment approach to patient injury or symptoms usually driven by the diagnosis. Physical therapy has its "protocols" to follow. But there are muscle and joint injuries and imbalances that occur from the injury beyond the site of pain not part of the diagnosis protocol. If these areas in the biokinetic chain are not addressed, then the athlete may not be able to recover without the strength and functional support, acutely or chronically. For example hip ROM or strength data is not part of a Knee injury. ACSM reports 15-25% limb muscle mass loss by removal, of a cast. Some problems may have existed prior to the injury and contributed to it. Even after protocols and surgery, muscle imbalances persist and delay or prevent recovery. Muscle imbalance problems are undetected in usual preseason physicals because of no technical measurements of strength along with range of motion following the biokinetic chain of the whole extremity. Data needs to be collected technically of the ROM and strength of large, medium, and small muscles to compare ratios of power. Hence the measurable strength contribution of "Gorillas-large, Chimpanzees-medium, and Monkeys-small" muscle data needs to be collected as a part of evaluation, treatment and progress in recovery outcomes.

9:00 am – 9:50 am

THE FUTURE OF FITNESS: A GIG ECONOMY CAREER
Thomas Cieslak (Pearl)

According to Hannaham (2016), fitness professionals are frequently overworked, undertrained and underpaid by their gyms. Most fitness professionals work variable, exhaustive schedules while 31% work multiple jobs. The industry consists of 330,000 fitness professionals with an annual median income of \$46,480 (U.S. Department of Labor, 2024) and there are more part-time employees (41%) than full-time employees (33%) and independent contractors (26%; IDEA-ACSM, 2023). As a result, the fitness professional's future is the gig economy, which is an activity where people earn income providing on-demand services on their terms via a digital platform (IRS, 2024). A total of 522 participants (age = 38 ± 9 years; 250 males, 272 females) completed a 32-item questionnaire online to 1) determine the participant's current physical activity stage (Gawwad, 2008), 2) measure participants' outcome expectations of the peer-to-peer fitness platform (Wójcicki, White & McAuley, 2009) and 3) examine buyer behavior related to gig economy services. The results indicate consumers are interested in, and willing to purchase, a peer-to-peer fitness service. Sixty percent of respondents said they would use a monthly subscription-based service and 74% would recommend the peer-to-peer fitness service to a friend. It is recommended that industry leaders rethink the industry best practices related to formal education and certification programs to prepare fitness professionals for a career in the gig economy.

Student Presentations – Oral #4 (8:00 am – 8:50 am; Heldane Room)

8:00 am – 8:12 am

**CAN A NOVEL WRESTLING HEADGEAR REDUCE HEAD
AND NECK IMPACT? A CONTROLLED LABORATORY
STUDY.**

Caitlyn Picard, Michael Baria, Jaclyn Caccese, Yun Seok Kang,
Pasindu Wanigarathne, Ibrahim Abuzer, Timothy Wensink, John
Bolte

BACKGROUND: Head and neck injuries are a growing concern in collegiate wrestling, with high rates of concussions and cervical disc herniations. To date, no significant rule modifications have been introduced to reduce the risks of these injuries, other than ear guards, which mainly prevent cauliflower ear. **PURPOSE:** The objective of this study was to assess a novel headgear design that has been approved for competitive use, which pads the forehead, crown of the head, and the rear of the skull. **METHODS:** A total of 21 laboratory-controlled head impact test conditions were conducted on a Hybrid III (HIII) 50th percentile male head and neck complex. The HIII was

impacted with a pneumatic ram to target common wrestling impact locations, frontal, rear, and side, each at three different velocities, 1 m/s, 2 m/s, and 3 m/s. Each location and velocity were impacted with and without headgears. The HIII was instrumented with the following sensors: six single axis linear accelerometers, three angular rate sensors, and a six-axis upper-neck load cell. These sensors produced primary outcome measures including peak rotational velocities (PRV) and peak linear accelerations (PLA) from each impact, which were filtered and processed in MATLAB. The following relevant injury criteria calculations were evaluated in MATLAB: head injury criteria (HIC15), brain injury criteria (BrIC), neck injury criteria (Nij), and combined probability of concussion risk (CPoC). The relative change for with and without headgears were calculated for each outcome measure. RESULTS: PLA, HIC, CPoC, and ram forces in all three impact types (i.e., frontal, rear, lateral) all experienced greater than a 50 percent decrease when LDR headgear was used compared to when it was not. Some change (between 20 and 30 percent change) was seen in the main axis neck force (frontal and rear impacts) and the vertical axis neck forces (frontal and rear impacts). Little to no change (less than 20 percent change) was observed in the following measures: PRV, BrIC, Nij, main impact axis neck forces in lateral impacts, and neck moments in the lateral impacts. CONCLUSION: The reductions seen in the PLA, HIC, and CPoC, are critical because they are all independent predictors of severe head injuries, and indicates the potential for a reduction in concussions experienced during these scenarios. These results present important preliminary findings for a protective headgear specific to reducing wrestling head and neck injuries.

8:12 am – 8:24 am

FREE-LIVING COMPARABILITY OF THIGH (AP), AND THIGH-AND POCKET-WORN (FIB) MONITORS, AND RELIABILITY OF THIGH-AND POCKET-WORN (FIB) MONITORS

Nicola Gismondi, William Rogers, Patrick M. Filanowski, Kimberly Clevenger, Alexander H.K. Montoye, FACSM, & Jeremy A. Steeves

BACKGROUND: Thigh-worn, inclinometer-based accelerometers classify activity into postures including sitting, standing, walking and cycling. The thigh-worn (AP) (used since 2001) and the thigh- or pocket-worn (FIB) monitor (released in 2022) are two such monitors used for classifying posture. PURPOSE: To determine the reliability of the FIB thigh- and pocket- monitors worn on the left (L) and right (R) side for classifying posture, in a free-living setting, and to compare outcomes to the AP. METHODS: 24 adult participants (11 male; age 41 ± 15 yr) wore 4 FIB (both thighs and pockets), and one AP (thigh) monitors for three days during normal activities and in waking hours. Minute-by-minute sitting, standing, stepping, and cycling outputs from the L and R FIB monitors (thigh and pocket) were compared to each other (percent agreement and weighted kappa). Paired-samples t tests evaluated statistical differences between L and R FIB monitors for daily time spent in activity type (sitting, standing, slow walk, fast walk, cycling, high-intensity activity), and activity intensity (light, moderate, vigorous). Repeated measures ANOVA compared daily sitting, standing, stepping, and cycling among FIB and AP monitors. RESULTS: Across 63,775 total minutes, FIB L and R thigh had 85.6% agreement ($\kappa=0.73$), and L and R pocket had 76.1% agreement ($\kappa=0.57$; both $p<0.001$). Daily L and R (thigh and pocket) output demonstrated excellent reliability; L and R thigh ($r=0.88-0.99$) and pocket ($r=0.73-0.98$) variables had high correlations except for thigh: light intensity ($r=0.57$) and; pocket: standing ($r=0.65$), and cycling ($r=0.04$). There were no significant differences between FIB L and R pocket outcomes, and only 3 outcomes (stepping, cycling, and moderate intensity) were significantly higher on FIB R thigh than L thigh. When comparing all five monitors, sitting was significantly less for FIB pocket (500 min, $p<0.05$) than AP and FIB thigh (550 min). Standing was significantly less for FIB thigh (182 min, $p<0.05$) than AP and FIB pocket (220 min). Stepping was significantly more for FIB thigh (158 min, $p<0.05$) than FIB pocket (150 min), and AP (133 min) was significantly less than all. There were no differences in cycling. CONCLUSION: FIB thigh and pocket monitors have similar and high intermonitor reliability. However, FIB thigh, pocket, and AP estimates of sitting, standing and stepping were dissimilar.

8:24 am – 8:36 am

EFFECTIVENESS OF A 20-WEEK FIREFIGHTER RECRUIT TRAINING PROGRAM

Jakob Oldendick, Maria Weizman, Jeromy Alt, Kayla Baker, and Daniel L. Carl FACSM

BACKGROUND: The demands of being a firefighter (FF) require a high level of physical fitness. Often FF recruits participate in a preparatory physical training program prior to placement for active duty. These training programs are void of national standard requirements and as a result may vary in program design, length, and oversight. **PURPOSE:** To evaluate the effectiveness of a local fire departments, 20-week physical training program on measurements of cardiovascular endurance, strength, mobility, and body composition. **METHODS:** Forty-Five FF recruits (38M; 27.5 + 5.7 yr.) consented. Participant measurements were collected at weeks 1, 10 & 20*. Measurements included body composition, a functional movement screen (FMS), a multistage shuttle test for VO₂max prediction, max repetitions in 60 seconds for body weight squats, push-ups, pull-ups, and sit-ups, and a 7-story tower run. A paired t-test was used to determine differences between pre and 10-week measurements. Recruits were then grouped within each area of measurement (VO₂, strength, FMS, and body composition) based off their pre-screening values into top, middle and lower tiers for additional analysis. **RESULTS:** Percent body fat significantly decreased across all participants at the 10-week measurement ($p < 0.001$); however, when separating the highest scoring 1/3, significance was not detected ($p = 0.080$). FMS composite scores were likewise significantly enhanced across all participants ($p < 0.001$); however, when separating the highest scoring top 1/3, there was no significant improvement noted ($p = 0.240$). Measurements of VO₂max were not significantly enhanced in the top 1/3 performers ($p = 0.180$) but were significantly enhanced in the lower two groups ($p < 0.009$; $p < 0.002$). Measurements of strength were significantly improved across all variables measured and for each group (Squats $p < 0.001$; Sit-ups $p < 0.001$; Push-ups $p < 0.001$; Pull-ups $p < 0.001$). **CONCLUSION:** The general effectiveness of a local fire departments physical training program prior to active duty appears to provide benefits of enhanced strength, endurance, agility, and body composition.

Student Presentations – Poster #5 (8:00 am – 9:00 am; Kendall Room)

Poster #1

A COMPARISON OF CO-CONTRACTION RATIOS OF COLLEGE ATHLETES AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION (ACLR) DURING A SINGLE LEG DROP LANDING

Melissa Cook, Spencer Upton, Laine Anthony & Courtney Cockrum

BACKGROUND: An ACL injury has a significant impact on an individual's biomechanics resulting from neuromuscular adaptations, thus increasing their susceptibility to a secondary injury. **PURPOSE:** To determine if there are differences in the muscle co-contraction ratio between the quadriceps and hamstrings of collegiate athletes with and without a history of prior anterior cruciate ligament reconstruction (ACLR) during a single leg box drop landing. **METHODS:** Fifteen collegiate athletes with prior ACLR (10 female, 5 male, 20 ± 1.05 years) and fifteen control collegiate athletes (10 female, 5 male, 20 ± 1.05 years) were included. Four 4-slot sensor adhesive interface electrodes were placed on the subject's vastus lateralis, vastus medialis, semitendinosus, and biceps femoris muscles. Subjects then performed three trials of a single leg drop landing on each leg after researcher demonstration. During the single leg drop landing test, the participants began the testing by standing on their 'non-testing' leg on top of a 40.5 cm wooden box and rolling off and landing on their opposite leg onto the force plate while maintaining a stable landing. The 'non-testing' foot was placed 1.5 foot-lengths away from the edge of the box to ensure the drop did not include any vertical motion. The participants kept their hands on their hips for the entirety of each trial. The average amplitude of the root mean square (RMS) was calculated over the first 50ms upon initial contact. The average of the three trials was inserted into a co-contraction ratio equation ($CCR = AEMGA / (AEMGB + AEMGA)$; agonist muscle group = AEMGB, antagonist = AEMGA). **RESULTS:** There was no statistically significant difference found in any of the three comparisons made: non-dominant leg of control group vs injured leg of injured group (injured mean ratio=0.469 +/- 0.179, control mean ratio=0.369 +/- .179, $p=0.068$), dominant leg of male vs female (mean +/- SD - male = 0.480 +/- 0.150 mV, female = 0.497 +/- 0.093mV, $p=0.859$), and injured vs un-injured leg of injured group (mean +/-SD - un-injured = 0.477 +/- 0.097 mV, injured = 0.469 +/- 0.178 mV, $p=1.00$). **CONCLUSION:**

The present findings indicate that an ACLR does not create significant muscular imbalances in the quadriceps and hamstrings. Other factors may contribute more significantly to high rates of secondary ACL injuries.

Poster #2

EXAMINING ASSOCIATIONS BETWEEN HEALTHY BEHAVIORS, MENTAL HEALTH, AND DEMOGRAPHIC CHARACTERISTICS AMONG COLLEGE STUDENTS

Nicholas Chittum, Catherin Gammon, Andrew Cornett

BACKGROUND: Many college students engage in unhealthy behaviors - insufficient physical activity (PA), inadequate sleep, poor dietary habits - which tend to co-occur. Health promotion efforts need to target students who engage in multiple unhealthy behaviors. Few studies have examined the demographic and psychological characteristics of students who engage in multiple unhealthy behaviors. Understanding these characteristics can help develop health promotion programs and direct them to those who need them most. **PURPOSE:** (1) Quantify the prevalence of co-occurring unhealthy behaviors among college students; (2) compare demographic and mental health characteristics of students who engage in more vs fewer unhealthy behaviors. **METHODS:** 757 college students (71.4% female, 75.6% White, 76.7% undergraduate) completed an online survey and reported weekly minutes of moderate- and vigorous-intensity PA, hours of sleep per night, daily fruit and vegetable (F+V) intake and demographic characteristics. National guidelines (GL) were used to classify students as 'meeting' or 'not meeting' recommendations for (1) PA, (2) sleep and (3) F+V intake. Participants completed validated surveys for four mental health indicators including psychological wellbeing and distress. Frequencies were used to quantify the prevalence of students meeting 0, 1, 2 and 3 of the health behavior GL. Chi square tests were used to examine the association between demographic characteristics and the number of GL met. A one-way ANOVA was used to compare mental health scores between students meeting 0, 1, 2 and 3 GL. Alpha was set at .05. **RESULTS:** 11%, 34.4%, 38% and 15.9% of participants met 3, 2, 1 and 0 GL, respectively. Chi-square tests revealed that a lower GPA, higher BMI, identifying as Black/African American and not identifying as White were associated with meeting fewer GL ($p < .05$). Psychological wellbeing scores were lower ($p < .05$) for students meeting 0 GL (Mean=42.1) than those meeting 1, 2 and 3 GL (Means=44.8, 47.3 and 48.1, respectively). **CONCLUSION:** Poor compliance with health behavior GL indicates a pressing need to promote PA, sleep and F+V intake among college students. Demographic groups that should be key targets of health promotion programs include students with a lower GPA, with a higher BMI, who are not White and who are Black. Poorer mental health was concurrent with fewer health behaviors, so incorporating mental health resources into collegiate health promotion is imperative.

Poster #3

THE ASSOCIATION BETWEEN ACUTE AND CHRONIC HEALTH CONDITIONS AND ENGAGEMENT IN PHYSICAL ACTIVITY AMONG COLLEGE STUDENTS

Ellie Petersen, Catherine Gammon, & Andrew Cornett

BACKGROUND: Regular physical activity (PA) has health benefits yet 72.2% of college students are insufficiently active. Identifying causes of insufficient PA among college students is important. In the general adult population causes of insufficient PA include recent/existing health conditions, but it is not known if the same association is observed among college students. Understanding the relationship between PA and health conditions among college students can inform the development of PA promotion programs. **PURPOSE:** Examine the association between PA and acute and chronic health conditions among college students. **METHODS:** In 2019, 757 college students (71.4% female, 75.6% White, 76.7% undergraduate) completed an online survey and reported their engagement in moderate-intensity PA (MPA; minutes/week), vigorous-intensity PA (VPA; minutes/week) and strength training (ST; days/week). Participants also reported whether they had received a diagnosis for an acute health condition (eg, flu, bronchitis) in the last year, and whether they had attended a healthcare appointment for a chronic health condition (eg, depression, insomnia) in the last year. Independent-samples t tests were used to compare average values for MPA, VPA and ST between students who had and had not received an acute health condition diagnosis in the last year, and between students who had and had not attended an appointment for a chronic health condition in the last year. Alpha was set at 0.05. **RESULTS:** All comparisons indicated non-significant differences in MPA, VPA and ST between students who did, and did not, report a recent acute condition or appointment for a chronic condition. For example, students who did, and did not, attend an appointment for a chronic condition reported 195.3

and 203.0 minutes of MPA per week, respectively ($p=.704$), and 1.6 and 1.8 days of ST per week, respectively ($p=.111$). One comparison approached statistical significance - there was a 19.6-minute difference in VPA between students who attended an appointment for a chronic condition (56.4 minutes) and those who did not (76.0 minutes; $p=.051$). **CONCLUSION:** College students' engagement in MPA, VPA and ST does not appear to be associated with acute or chronic health conditions in the last 12 months. These findings differ from those observed among adults and suggest that recent health conditions don't deter students from engaging in PA. Further research is needed to explore causes of low PA among college students.

Poster #4

**DO THEY COUNT? ASSESSING THE STEP COUNT
ACCURACY OF FOUR COMMERCIAL SMART WATCHES**
Samuel Aylward, Jolie LaBarge, Kirk Brumels, Adam M.
Coughlin FACSM, Alex HK Montoye, FACSM Brian C. Rider
FACSM

BACKGROUND: Physical inactivity is a public health concern, with only 22.7% of Americans currently meeting the physical activity (PA) guidelines. Transitioning the PA recommendations from a duration-based metric (minutes of activity) to steps per day is an intriguing strategy to increase adherence to PA recommendations. Thus, it is important that devices used to track steps do so accurately. **PURPOSE:** To determine the step counting accuracy of four commercial smartwatches in laboratory and outdoor trail settings. **METHODS:** Twelve adults (mean age \pm SD, 24.8 ± 8.4 years) completed this two-trial study. Trial 1 (T1) occurred in a laboratory setting and Trial 2 (T2) took place on an outdoor trail. During T1 participants wore four smartwatches, two on each arm (Apple Watch Ultra, Coros Vertex 2, Garmin Fenix 6, Polar Grit X), and completed treadmill walking/jogging and activities of daily living (ADL) with criterion steps determined by hand tally counting. During T2 participants completed a self-paced 3.2 kilometer trail run. To determine criterion steps in T2, participants wore a chest-mounted GoPro camera pointed at their feet. The GoPro continuously recorded video of all steps taken throughout the run, and the GoPro videos were reviewed after testing to determine steps taken. A repeated measures analysis of variance (ANOVA) identified significant differences ($p<0.05$) across watches. A post hoc Bonferroni adjustment was employed to compare the mean step data, which were analyzed using SPSS version 29.01.1. Data are reported as means and standard deviations. **RESULTS:** The Garmin (1037.1 ± 92.2 steps) and Polar (1012.3 ± 92.2 steps) devices were significantly different ($p < 0.01$) from the criterion measure (1220.3 ± 77.7 steps) when treadmill and ADL lab activities were combined in T1. There were no differences in device accuracy during T2. **CONCLUSION:** Though Garmin and Polar devices were least accurate when examining total steps, users should exercise caution when relying on any of these devices for total steps per day or any "strain" or "recovery" scores these watches provide that incorporate total step counts as part of their algorithm.

Poster #5

**THE RELATIONSHIP OF THE BILATERAL LIMB DEFICIT
ON LINEAR SPRINT AND AGILITY PERFORMANCE IN
NCAA MALE COLLEGIATE SOCCER PLAYERS: A PILOT
STUDY**
Giuseppe Capello Real, Isaac Wedig, Megan C. Nelson, Lukus
Klawitter

BACKGROUND: Soccer is a demanding sport that relies on endurance, strength, power, and repeated sprints, with lower limb force generation critical for actions like acceleration, deceleration, directional changes, and linear sprints (LS). LS is crucial for goal scoring and defender separation, while a change of direction (COD) requires rapid acceleration and deceleration, bringing attention to multidimensional movements. The countermovement jump (CMJ) reliably assesses force production in athletes, with the bilateral limb deficit (BLD) indicating the ratio between the vertical force-generating capacity of both limbs in a CMJ compared to the combined force generated by each limb individually. A higher BLD may predict COD and LS performance in soccer players. **PURPOSE:** This study investigated the relationship between BLD on COD and LS performance in Division II collegiate male soccer players. **METHODS:** A pilot sample of NCAA Division II male soccer players ($n=20$; 20.8 ± 1.51 years; 179.68 ± 7.36 cm; 75.2 ± 6.30 kg) were included. After a dynamic warm-up, participants performed BLD measurements via

unilateral right CMJ, unilateral left CMJ, and bilateral CMJ, with one-minute rests, and peak propulsive Fz was recorded. They then completed the 505 Agility Test with both right and left leg in a turf field, followed by 10m and 30m LS. Times were recorded in seconds. RESULTS: No significant relationships were found in this pilot sample. LS 10m (1.75 ± 0.05 s) had a negligible correlation ($r = 0.01$) with BLD ($37.68 \pm 5.26\%$). The correlations between LS 30m (4.21 ± 0.08 s) and 505 right (2.52 ± 0.78 s) with BLD were insignificant ($r=0.04$), and the 505 left (2.53 ± 0.06 s) showed a weak correlation with BLD ($r=0.27$). CONCLUSION: The LS 10m and 30m, along with the 505 agility test, are predictors of soccer performance; however, BLD was not a predictor of LS or COD performance in collegiate-level male soccer players. Further research is warranted on female NCAA soccer players.

Poster #6

PHYSICAL ACTIVITY, FITNESS, AND EMOTIONAL HEALTH IN COLLEGE STUDENTS: PRELIMINARY RESULTS

Emmalyse Mason, Christopher Dondzila

BACKGROUND: College students encounter numerous challenges (academic difficulties, financial struggles, sense of belonging, adjusting to independence) that can impair academic performance and career preparation. Mental factors (cognition and emotional health) are influential, and have been independently linked with physical activity (PA), physical fitness (PF), and health. Yet it remains unclear how all these variables are related to one another during the college years. **PURPOSE:** The purpose of this study is to examine the relationships between PA, PF, and physical health with mental and emotional health in college students. **METHODS:** PA (steps/day and time spent in moderate-vigorous physical activity) was monitored with wrist-worn activity trackers over a 7 day period. PF was assessed by predicted VO₂max (1.5 mile run), maximal hand grip strength, and push up test. Physical health was measured by body mass index, and resting heart rate and blood pressure. The Perceived Stress Scale and Brief Resilience Scale were used to assess students' self-reported stress and resilience, respectively. Visual reaction time (a marker of mental cognition) was assessed via a large screen-based technology that presented visual stimuli to touch. Pearson correlation coefficients were used to assess the relationships between the study variables. **RESULTS:** The participants ($n=8$, 20.4 ± 0.5 years) had a body mass index of 23.8 ± 5.4 kg/m², resting heart rate of 70.1 ± 7.4 beats/min, and a resting blood pressure of $117.7/77 \pm 3.9/6.8$ mm/Hg. Based on ACSM's normative data, PF ranked below the 50th percentile for predicted VO₂max (36.3 ± 8.7 ml/kg/min), maximal handgrip strength (33.1 ± 10.0 kg), and completed push ups (17.3 ± 8.7). The average steps/day were 6934.7 ± 2680.7 and time spent in moderate-vigorous activities was 15.0 ± 11.1 minutes. All but two participants reported "moderate" stress and "normal" resilience outcomes. The average reaction time was 917.3 ± 231.8 ms. Perceived stress was positively associated with body mass index ($r=.743$, $p<.05$) and predicted VO₂max ($r=.799$, $p<.05$). Resilience was inversely correlated with predicted VO₂max ($r=.496$, $p<.05$). **CONCLUSION:** PA quantity and quality, and PF, were low; yet mental and emotional health were favorable. Future efforts should continually examine PA efforts to promote PF and mental and emotional health in college students.

Poster #7

BARBELL VELOCITY COMPARISON BETWEEN TWO NOVEL LINEAR POSITION TRANSDUCERS DURING SNATCH AND CLEAN HIGH PULLS

Emily Percino, Mekhii R. Morris-Heron, Jennifer T. Lin, Julieta R. Sanchez, Ivan J. Leon, Monica Alcantara, Larissa M. Barreto, Arturo Sosa III, Ernesto Ramirez Jr., Tanner A. Rowe, Jenee M. Rago, Carlos A. Estrada, Michael D. Belbis

BACKGROUND: Linear position transducers (LPTs) are well-established for traditional exercises like squats and bench presses, but weightlifting movements such as snatch high pulls (SHP) and clean high pulls (CHP) may offer greater performance benefits. The Vitruve (VT) LPT is more cost-effective compared to the established TENDO (TN) LPT, making its validation for barbell velocity assessment crucial. **PURPOSE:** This study aimed to assess the validity of the VT LPT compared to the TN LPT during SHPs and CHPs at various submaximal loads in collegiate athletes, potentially supporting the use of the VT LPT as a cost-effective tool for barbell velocity measurement. **METHODS:** Eighteen collegiate hockey and basketball athletes (21 ± 0 years, 7M/11F) performed submaximal SHPs

and CHPs on separate days. VT and TN LPTs measured peak velocity (PV) and mean velocity (MV) during each repetition. Twelve sets (50%, 60%, 70%, and 80% of 1RM; 3 sets per load) were performed for each exercise. Paired t-tests were used to compare measurements between devices. RESULTS: Significant differences were observed in SHP PV at 50% and 60% 1RM (50%, VT: 2.56±0.06 m/s, TN: 2.63±0.06 m/s; 60%, VT: 2.34±0.06 m/s, TN: 2.39±0.06 m/s; p<0.05), but not at higher loads (70%, VT: 2.17±0.05 m/s, TN: 2.21±0.05 m/s; 80%, VT: 2.01±0.04 m/s, TN: 2.04±0.05 m/s; p>0.05). SHP MV showed no significant differences across all loads (50%, VT: 1.64±0.05 m/s, TN: 1.64±0.04 m/s; 60%, VT: 1.49±0.05 m/s, TN: 1.50±0.05 m/s; 70%, VT: 1.39±0.04 m/s, TN: 1.40±0.03 m/s; 80%, VT: 1.26±0.03 m/s, TN: 1.27±0.03 m/s; p>0.05). CHP PV showed no significant differences (50%, VT: 2.56±0.06 m/s, TN: 2.60±0.06 m/s; 60%, VT: 2.35±0.06 m/s, TN: 2.38±0.06 m/s; 70%, VT: 2.17±0.05 m/s, TN: 2.20±0.04 m/s; 80%, VT: 2.03±0.04 m/s, TN: 2.04±0.04 m/s; p>0.05). CHP MV also showed no significant differences (50%, VT: 1.71±0.06 m/s, TN: 1.67±0.05 m/s; 60%, VT: 1.57±0.05 m/s, TN: 1.54±0.05 m/s; 70%, VT: 1.45±0.04 m/s, TN: 1.43±0.04 m/s; 80%, VT: 1.31±0.04 m/s, TN: 1.32±0.04 m/s; p>0.05). CONCLUSIONS: The VT LPT showed comparable results to the TN LPT in measuring MV during SHPs and CHPs across all loads and PV during CHPs at all intensities and SHPs at higher intensities. The VT LPT recorded lower PVs than the TN LPT at lower intensities during SHPs. Overall, VT is a valid and cost-effective tool for assessing barbell velocity and mean velocity in weightlifting movements, offering practical benefits for strength and conditioning.

Poster #8

EFFECTS OF RIDING AN ELECTRIC BIKE FOR 6 MONTHS ON MEASURES OF CARDIOMETABOLIC HEALTH: A CASE STUDY FOR ONE PRE-DIABETIC PATIENT

Alexandra Bagg, Helaine Alessio, FACSM, Lindsay Stein, Kevin Ballard, FACSM, Eric Slattery Brandon Grosfiler, & Amritesh Bali

BACKGROUND: The prevalence of prediabetes is projected to exceed 470 million people in 2030 (Tabák et al. 2012). Physical activity (PA) can prevent diabetes but persons with diabetes have poor adherence to consistent PA (Poitras et al. 2018). E-bikes may be an appealing type of PA that improves blood glucose regulation and insulin resistance in persons with prediabetes, without the burden of pharmaceuticals. PURPOSE: To determine the effects of riding an electric bike (e-bike; EB) for 6 months on blood glucose regulation, insulin resistance, and cardiovascular risk factors in one pre-diabetic adult. METHODS: Baseline values were obtained for pulse wave velocity (PWV), resting blood pressure, VO₂max, body composition, resting blood lipids, glucose, HbA1c and insulin (age=70, sex=female, HbA1c=6.1%, VO₂max=21.5 ml•kg•min⁻¹). PA was measured via an accelerometer, and continuous glucose using a continuous glucose monitor (CGM). Following receiving the EB all values measured were repeated at month 3 and month 6. Food intake was tracked through the Automated Self Administered 24 Hour Dietary Assessment Tool (ASA) for 6 days over 2 wks and repeated at month 3 and 6. RESULTS: At the 3 month mark there was an improvement in HbA1c (No e-bike (NB)=6.1% vs. EB=5.7%) and resting blood glucose (NB=90 mg/dL vs. EB=65 mg/dL) indicating promising results that glucose levels improved. Additionally improvements in PWV (NB=7.6 m/sec vs. 6.9 m/sec), percent body fat (NB=32.2% vs. EB=31.6%) and resting blood pressure (NB=126/76 vs. EB=114/62). Upon receiving the EB average total number of steps per day increased (8066±1124 vs. 8326±1161). No differences were found for activity score (NB=34.4±0.4 vs. EB=34.4±0.5 Met.h). The percentage of time points where blood glucose was above the normal healthy range (70 - 120 mg•dL⁻¹) decreased (NB=26% vs. EB=24%) indicating better glucose regulation. CONCLUSION: Preliminary data from the first 3 months shows promising results that riding an EB does improve glucose regulation. We expect to see continued improvement in the individual's cardiometabolic profile. This will include a) healthier glucose regulation, b) HbA1c levels in a normal/healthy range < 5.7, c) healthier insulin levels, d) regular physical activity levels that meet the criteria established by the American Heart Association and American College of Sports Medicine, and e) improved cardiovascular function as indicated by PWV and maximum oxygen consumption.

Poster #9

EFFECTS OF PILATES-BASED TRAINING INTERVENTIONS ON FALL RISK, FEAR OF FALLING, AND FUNCTIONAL MOBILITY OUTCOMES IN OLDER ADULTS, A PILOT STUDY.

Hannah Beidelman & Scott Fenstermacher

BACKGROUND: Falls are the leading cause of injury and injury-related deaths among older adults. Estimates of fear of falling in older adults range from 20-39% overall and 40-73% in those who have fallen. Poor physical function is strongly related to fall risk. Research on Pilates training in older adults is limited and has shown varied results, indicating the need for further research to examine the effects that Pilates provides and its comparison to other fall prevention interventions. **PURPOSE:** The purpose of this pilot study was to assess the feasibility and effectiveness of a Pilates-based training (PBT) intervention on outcomes of fall risk, fear of falling, and functional mobility in older adults. **METHODS:** Six participants (71±6 yrs) with an average of 2±2 falls in the last year completed 4 weeks of PBT, consisting of two 60-minute sessions/week. Participants were assessed pre- and post-intervention on measures of fall risk (Timed Up and Go (TUG) and 4-Square Step test (4SST)), fear of falling (Activities-specific Balance Confidence scale (ABC)), and functional mobility (10-Meter Walk Test (10MWT) and 5x Sit to Stand test (5xSTS)). Paired sample T-tests and Cohen's d were used to analyze differences and effect size between pre- and post-intervention. **RESULTS:** There was a 100% retention rate and a 79% participation rate in the PBT intervention. No significant differences were found between pre- and post-intervention. PBT had small effects on preferred 10MWT (d=0.25, pre: 1.2±0.2 vs. post: 1.3±0.2 m/s, p=0.59) and 4SST (d=-0.43, pre: 10.2±1.5 vs. post: 9.6±1.4 sec, p=0.24), and moderate effects on ABC (d=-0.71, pre: 90.1±5.6 vs. post: 86.1±9.6%, p=0.17) and fast 10MWT (d=0.55, pre: 1.6±0.1 vs. post: 1.7±0.1 m/s, p=0.13). No effect was evident on TUG (d=0.08, pre: 7.6±1.3 vs. post: 7.7±0.9 sec, p=0.71) and 5xSTS (d=0.11, pre: 10.4±1.7 vs. post: 10.6±1.7 sec, p=0.73). **CONCLUSION:** This pilot study demonstrates a small to moderate effect of PBT on fall risk and functional outcomes even given the limitation of a small sample size and an already high functioning population, which supports our hypothesis that PBT should be explored more thoroughly as a viable means to increase function, reduce fall risk and fear of falling in a clinical population. This research was supported through funding from the Faculty Mentored Student Undergraduate Scholarship program at Taylor University.

Poster #10

INVESTIGATING THE EFFECTS OF BODY DYSMORPHIA ON PHYSICAL ACTIVITY PATTERNS, MENTAL HEALTH PARAMETERS, AND GYM AVOIDANCE

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

BACKGROUND: Body dysmorphic disorder (BDD) is a mental health condition characterized by an obsessive focus on perceived flaws or imperfections in one's appearance. These perceived flaws are often minor or not noticeable to others, however, they can cause a significant amount of distress. Individuals with BDD may engage in behaviors such as repetitive mirror checking, excessive grooming, extreme exercise habits, seeking reassurance, avoiding social situations, and are overall more anxious due to their appearance concerns. **PURPOSE:** This study investigated the relationship between BDD and potential predictor variables in college-aged individuals. **METHODS:** In April 2024, 192 (Mean ± SD: 20.9 ± 2.9 yrs) college-aged participants completed a survey in which they self-reported BDD (via the Body Dysmorphic Disorder Symptom Scale), total anxiety (via the Beck Anxiety Inventory), and gym avoidance (via the Social Exercise and Anxiety Measure). Objectively assessed physical activity (average daily steps) was also recorded via the iPhone Health app. A standard multiple regression analysis was performed to test the relationships between BDD and total anxiety, gym avoidance, and physical activity. **RESULTS:** There was a significant relationship between BDD (Mean ± SD: 1.3 ± 0.4) and the model of predictors (R = 0.36, R² = 0.13, p = 0.001) with the model accounting for 13% of the variance in BDD scores. When examining individual relationships, only total anxiety (Mean ± SD: 16.6 ± 15.4, β = 0.32, p < 0.001) was a significant and positive predictor of BDD. Gym avoidance (Mean ± SD: 3.2 ± 2.0, β = 0.08, p = 0.26) and physical activity (Mean ± SD: 7006.6 ± 3957.5 steps/day, β = -0.01, p = 0.86) were not significantly associated with BDD. **CONCLUSIONS:** Individuals with higher BDD scores displayed increased overall total anxiety levels, yet their engagement in physical activity and tendency to avoid the gym did not differ from those with lower BDD scores. Despite their heightened anxiety, these individuals reported a comparable level of physical activity and may be just as likely to visit a gym. The present sample of participants with BDD might have been inclined to confront their anxiety, potentially viewing exercise as an approach to counteract their obsessive occupation with perceived flaws or imperfections in their appearance.

Poster #11

ASSOCIATION BETWEEN WAIST CIRCUMFERENCE AND MOTOR COMPETENCE IN LOW-INCOME CHILDREN

Grayson Hagenbuch, Ryan Hulteen, Larissa True, Cailyn Van Camp, Karin Pfeiffer, FACSM

BACKGROUND: Motor competence in children is a predictor of lifelong physical activity. Research has shown that different components of body composition are associated with motor competence, particularly waist circumference. Additionally, demographic factors such as sex, race, and socioeconomic disparities affect the development of motor competence. **PURPOSE:** Examine the association between waist circumference and motor competence, accounting for sex and race, in a low-income population. Participants (n=232, 50.4% Female; 33% Black) were recruited from four public schools in and around Flint, Michigan. **METHODS:** Motor competence was assessed via the Test of Gross Motor Development-2, and product scores were determined for four variables (kick, throw, run velocity (m/sec) and jump distance (cm)). Velocities were determined using Dartfish software, and distance was measured with a tape measure. Height (cm) and weight (kg) were measured via a stadiometer and bioelectric impedance scale. Waist circumference measurements were taken with Gulick tape. Independent samples t-tests were used to examine demographic differences, and linear regression was performed to determine if motor competence (kick, throw, run velocity, and jump distance) was significantly associated with waist circumference, while controlling for demographic factors. **RESULTS:** All models showed statistical significance, but only two models showed waist circumference as significantly related to motor competence (kick velocity: $R^2 = 0.22$, $F(3, 228) = 21.9$, $p < .001$ (positive association) and jump distance $R^2 = 0.34$, $F(3, 228) = 39.1$, $p < .001$ (negative association)). Race was significantly related to jump distance and run velocity, while sex differences existed for all skills. **CONCLUSION:** Results are similar to previous research that showed sex differences in motor competence and associations of waist circumference and motor competence. However, since waist circumference was not a significant factor for all skills, it remains unknown how important its role may be in this sample. Future research should compare differences in higher versus lower socioeconomic samples.

Poster #12

THE EFFECTS OF 8-WEEK GYMNASTICS PROGRAMS WITH HIGH VERSUS LOW COGNITIVE LOAD ON SPATIAL WORKING MEMORY AND PREFRONTAL CORTEX OXYGENATION IN CHILDREN: A RANDOMIZED CONTROLLED TRIAL

Chih-Chien Lin, Shih-Chun Kao, Chiao-Ling Hung, Chia-Liang Tsai, Chung-Ju Huang, Yu-Kai Chang & Tsung-Min Hung

BACKGROUND: Evidence suggests that exercise enhances children's working memory (WM), but whether such a benefit depends on the level of cognitive load involved in exercise is unclear. **PURPOSE:** This study used functional near-infrared spectroscopy (fNIRS) to investigate the effects of gymnastics programs with high versus low cognitive load on children's performance and prefrontal cortex oxygenation (PFCOxy) level during a WM task. **METHODS:** Eighty-one children (7.88 ± 0.96 , 38 female) were randomly assigned to high cognitive load (HG), low cognitive load (LG), and control (SC) groups. The HG and LG groups underwent an 8-week gymnastics program with different levels of cognitive load, while the SC group participated in a static course. WM performance and simultaneous monitoring of PFCOxy were assessed before and after the program. A 3 (Group: HG, LG, SC) \times 2 (Time: pretest, posttest) repeated measures ANOVA was conducted to analyze WM performance (response time [RT], response accuracy [ACC], d-prime [d']) and PFCOxy, while Pearson's correlation was used to assess the relationship between intervention-induced changes (posttest minus pretest) in WM performance and PFCOxy. **RESULTS:** Analyses showed a significant Group \times Time interaction on ACC ($F = 10.06$, $p < 0.001$, $\eta^2p = 0.205$) and d' ($F = 7.81$, $p = 0.001$, $\eta^2p = 0.167$). Post-hoc analysis showed improvements from pretest to posttest in ACC and d' for the HG (pretest: ACC = $87.1 \pm 9.1\%$, $d' = 3 \pm 0.8$; posttest: ACC = $92 \pm 8.6\%$, $d' = 3.4 \pm 0.8$; $ps < 0.001$) and LG (pretest: ACC = $86 \pm 10.9\%$, $d' = 2.9 \pm 0.9$; posttest: ACC = $90.6 \pm 9.9\%$, $d' = 3.3 \pm 0.8$; $ps < 0.001$) groups but not the SC group (pretest: ACC = $86.9 \pm 9.6\%$, $d' = 3 \pm 0.8$; posttest: ACC = $88.3 \pm 11.2\%$, $d' = 3.1 \pm 0.9$, $ps > 0.063$). Further, the HG group showed higher ACC and d' compared with the SC group at the posttest ($ps < 0.005$). No significant effect involving Group \times Time interactions on RT and PFCOxy was observed ($Fs < 1.34$, $ps > 0.268$).

$\eta^2p < 0.033$). Correlation analysis showed positive associations of intervention-related changes in PFCOxy with ACC ($r = 0.341$, $p = 0.002$) and d' ($r = 0.303$, $p = 0.006$). CONCLUSION: An 8-week gymnastics program improved children's WM performance and this beneficial effect may be maximized by incorporating higher cognitive load into the intervention. Although PFCOxy may play a role in WM performance, the gymnastics intervention did not affect PFCOxy, indicating that the improved WM performance following intervention may not solely rely on changes in PFCOxy.

Poster #13

PHYSICAL FITNESS AND NUTRITION IN COLLEGIATE MUSICAL THEATER PROGRAMS

Alexis Ochi, Mary-Jon Ludy, Amy Morgan, FACSM

BACKGROUND: Athleticism and physical fitness are often not the first characteristics one identifies when visualizing someone in musical theater. Watching just one performance can make it clear that dancing, acting, running, all while singing and keeping near perfect pitch requires a theater actor to be extremely fit. As well as fitness, nutrition considerations and injury prevention should also be considered due to the high physiological demand placed on these performers. Minimal research was found regarding the fitness and nutritional habits of musical theater performers. **PURPOSE:** To investigate the prevalence of discussions about fitness and nutrition in collegiate musical theater programs and assess how students in these programs prepare themselves for the physiological demand of performance. **METHODS:** Eleven musical theater majors at Bowling Green State University (BGSU) agreed to participate in this study. A questionnaire was sent to all musical theater students at BGSU by the musical theater department head, upon obtaining permission. The survey contains questions about physical fitness, injury prevention, and nutrition, such as if/where they learn about these topics (e.g. formal curriculum, parents, peers). The questionnaire contained questions from the International Physical Activity Questionnaire (IPAQ) and the Starting the Conversation (STC) nutritional survey. **RESULTS:** Based on the IPAQ, students were found to be in the Health Enhancing Physical Activity (HEPA) active category. Seven (78%) respondents reported engaging in vigorous physical activity (PA) ≥ 3 days/week; six (67%) reported moderate PA ≥ 3 days/week. On the STC, the average score of the students was eight, which is neutral on the scale of healthiest habits to those with the most room for improvement (Scale 0-16). Students reported that much of the class discussion of fitness and nutrition is informal and that they learned about these topics from friends (fitness: $n=6$, nutrition: $n=4$), parents (fitness: $n=5$, nutrition $n=4$), and other sources (Informal class discussion, staff). Four (50%) respondents reported that they had experienced an injury while preparing for or participating in performance. **CONCLUSION:** Respondents have high levels of activity and appropriate nutrition habits despite minimal formal discussion on these topics in their curriculum. Addition of fitness and nutrition into the curriculum would ensure that all students are receiving consistent and reliable information.

Poster #14

THE EFFECTS OF SMARTPHONE USE DURING RESISTANCE TRAINING

Morgan Rekstis, Emily Beach, Taylor Cornell, Mallory Kobak, & Michael Rebold

BACKGROUND: Smartphone use is associated with sedentary behavior, which increases the risk of chronic diseases such as cardiovascular disease, metabolic disorders, and type 2 diabetes. Resistance training (RT) is beneficial in reducing these risks; however, most adults fail to meet RT guidelines. Previous research suggests that smartphone use negatively impacts exercise performance, but the specific effects during RT remain unclear. **PURPOSE:** The purpose of this study was to determine whether full smartphone access during RT reduces volume-load, intensity, liking, and productivity. **METHODS:** Twenty, recreationally active college-age students ($n = 10$ males, 10 females) participated in two, separate 30-minute RT conditions (smartphone ALL, smartphone MUSIC). The order of the two conditions were counterbalanced to ensure that an equal number of participants completed upper and lower body RT sessions during each condition. During the smartphone ALL condition, participants used their smartphone for any function (e.g., texting, talking, etc.). During the smartphone MUSIC condition, participants were only allowed to use their smartphone for music purposes. At the conclusion of each condition, participants were asked to rate their intensity using an OMNI scale, liking and productivity using a visual analog scale, and volume-load was calculated by multiplying weight by sets by repetitions. **RESULTS:** A repeated

measures ANOVA was used to examine differences in volume-load, intensity, liking, and productivity. There was no significant differences for volume-load between smartphone ALL upper and lower body RT exercises and smartphone MUSIC upper and lower body RT exercises ($p < 0.69$). There was no significant differences for exercise intensity between smartphone ALL upper and lower body RT exercises and smartphone MUSIC upper and lower body RT exercises ($p < 0.96$). There was a significant difference for liking between smartphone ALL upper and lower body RT exercises and smartphone MUSIC upper and lower body RT exercises ($p = 0.01$). There was a significant difference for productivity between smartphone ALL upper and lower body RT exercises and smartphone MUSIC upper and lower body RT exercises ($p < 0.001$). CONCLUSION: In conclusion, using your smartphone for all functions has the potential to interfere with RT exercise, resulting in significantly decreasing the liking (i.e., enjoyment) and perceived productivity.

Poster #15

EFFECTS OF THE BUILT FAMILY LIFESTYLE PROGRAM ON HOME STRUCTURE AND ROUTINES

Amanda J. Vukits, Timber Terrell, Eduardo E. Bustamante, FACSM

BACKGROUND: The Be Unstoppable in Life (BUILT) Family Lifestyle Program was developed by the University of Illinois Chicago (UIC) Healthy Kids Lab in partnership with Chicago Park District (CPD). BUILT is designed to empower families to adopt and sustain healthy food, sleep, and exercise routines that optimize child focus and attention. **PURPOSE:** This analysis tested the effects of BUILT on family routines. **METHODS:** A total of 44 children ($M=8.57$ yrs., $SD=1.66$; 46% female) and 26 parents ($M=39.56$ yrs., $SD=7.65$, 86% female) participated in the program from 08/2022 to 05/2024. Participants were enrolled in CPD programming across 6 parks. Families participated in either an 8-week online version consisting of 21 food, sleep, and exercise challenges or a 6-week in-person version with 15 challenges. Families received access to brief educational videos, activity trackers, and health coaching by UIC students and CPD staff. A subset of parents ($N=15$) completed the Family Routines Inventory (FRI) at baseline and posttest. The FRI measures family cohesion, solidarity, order, and satisfaction. The measure yields a frequency score reflecting the extent to which there is structure and routine in the home (e.g., consistent bedtime) and an importance score reflecting the perceived importance of home routines. Pre and post change was assessed using paired samples t-tests and Hedges' g effect sizes; frequency data were log transformed to achieve normality. **RESULTS:** At baseline, families were in the 64th percentile for home routine frequency ($M=53.6$, $SD=11.86$) and in the 84th percentile for home routine importance ($M=72.21$, $SD=9.41$). At posttest, routine frequency and importance increased slightly to the 66th percentile ($M = 55.60$, $SD = 8.84$) and 88th percentile ($M=74.00$, $SD=6.69$), respectively. Paired samples t-tests indicated that there was no significant change in routines ($M=2.0$, $SD=8.63$); [$t(14)=1.152$, $p=.269$; $g=0.281$]. However, a trend was observed for perceived importance of routines ($M=3.53$, $SD=6.46$; $t(14) = 2.119$, $p=.052$; $g=0.517$). **CONCLUSION:** Preliminary results suggest that BUILT needs to more explicitly pursue home routine changes to affect these outcomes. Given the small sample size, the trend on perceived importance is encouraging and suggests potential to influence parent perspectives. The next iteration of BUILT will combine the strongest parts of the in-person and online implementation to generate changes in home environment.

Poster #16

NOT GIVING UP: A MIXED METHODS STUDY OF MINDFULNESS FOR STROKE SURVIVORS

Taryn Jones, Erin Wagner, Meriden McGraw, Chalee Engelhard, Emily Zawadzki, Barbara Walker, Kari Dunning

BACKGROUND: Stroke survivors often experience physical and mental side effects such as depression, anxiety, and stress that limit recovery and return to life. Finding acceptance and self-compassion after stroke may reduce these side effects as research has suggested that mindfulness may help stroke survivors cope with stress and reach rehabilitation goals. **PURPOSE:** To investigate the effect of a mindfulness program for stroke survivors on acceptance, stress, and self-compassion. **METHODS:** Eight participants (6 females, 2 males, 41-66 years, 7-94 months post-stroke) completed an 8-week (1.5 hours per week) virtual mindfulness course led by a certified mindfulness practitioner. The Illness Cognition Questionnaire (ICQ) Helpless subscale, Neff Self Compassion Scale (SCS), and the Perceived Stress Scale (PSS) were measured before (PRE) after the program (POST), and two

months later (POST2). A POST interview was completed with each participant to understand their experience in the program. RESULTS: Paired t-tests were used to compare PRE to POST and PRE to POST2. ICQ Helplessness decreased from PRE (mean (M) = 14.6) to POST (M = 13.4, $p = 0.047$, $t(7) = 1.9$). PSS decreased from PRE (M = 16.9) to POST (M = 12.3, $p = 0.025$, $t(7) = 2.4$) and POST2 (M = 12.3 $p = 0.005$, $t(7) = 3.6$). SCS decreased from PRE (M = 67.9) to POST (M = 82.4, $p = 0.003$, $t(7) = -3.9$) and POST2 (M = 90.4, $p = 0.005$, $t(7) = -3.4$). During POST interviews, participant statements provided insight into their experience. One participant stated "Prior to the program, I thought acceptance was giving up. The program definition of acceptance included not giving up but accepting where you are now...I felt that I've been able to...move on instead of being ashamed of who I am and regretful of what I am...just be more accepting." Another participant stated "The idea of loving kindness was that I could forgive myself. It was very profound. It has allowed me to move forward through the pain and guilt." CONCLUSION: From an 8-week mindfulness program, stroke survivors increased acceptance, decreased stress, and increased self-compassion. Changes from PRE to POST were maintained or further improved at POST2. Mindfulness may provide a way for stroke survivors to move forward with life. Understanding how mindfulness benefits stroke survivors may help understand the journey post-stroke. Integrating mindfulness strategies into practice may allow clinicians to better support their clients and offer holistic care.

Student Presentations – Oral #5 (9:00 am – 9:50 am; Heldane Room)

9:00 am – 9:12 am Examining the Accuracy of PPG Technology Across Varying Skin Tones
Harlee Scholten, Casey Flammini, Halle McGuire, Scott A. Conger
FACSM & Brian C. Rider FACSM

BACKGROUND: Heart rate (HR) monitors that employ optical technology are increasing in popularity. However, previous research has shown discrepancies in the accuracy of HR readings across skin tones. PURPOSE: To investigate the accuracy of two new HR monitors, the Coros Heart Rate Monitor (CM) and the Polar Verity Sense (PM) during rest and exercise.

METHODS: Twenty-four participants (males $n=9$, females $n=15$) between the ages of 18 and 40 years completed testing. Participants were outfitted with the CM and PM on each arm and a Polar H10 chest strap which served as the criterion measure across a range of resting and exercise conditions. Skin type was categorized using the Fitzpatrick scale. Participants completed a rest protocol (two-minute periods of lying supine, sitting, and standing), a treadmill protocol (two minute periods of walking at 1.6 kilometer per hour (km/h), walking at 4.8 km/h, and jogging at 8.0 km/h), and a metronome-paced, Airdyne cycle protocol (two minute periods of arms only cycling at a rate of 92 beats/min, arm and leg cycling at 100 beats/min, and leg- only cycling at 100 beats/min). A repeated measures analysis of variance (ANOVA) identified significant differences ($p<0.05$) across devices. A post hoc Bonferroni adjustment was employed to compare the mean step data, which were analyzed using SPSS version 29.01.1. Data are reported as means and standard deviations. RESULTS: The CM (139.0 ± 15.5 bpm) and PM (137.2 ± 16.0) were significantly different from the criterion measure when jogging at 8.0km/h (140.2 ± 15.2 bpm, $p<0.01$). The PM was significantly different during the arm-only cycling (113.2 ± 14.9 vs 116.8 ± 14.5 bpm, $p=0.003$). When controlling for skin tone, there were no differences between devices in the light and moderately dark skin tone groups. However, in the darkest skin tone group, the PM was significantly different from the criterion during the Arm (104.0 ± 10.3 vs 109.8 ± 8.7 bpm, $p=0.043$) and Leg (125.7 ± 11.8 vs 124.9 ± 11.4 bpm, $p=0.030$) cycling conditions. CONCLUSION: While the CM performed better than the PM across activities and skin tone it should be noted that total beats between devices, while often statistically significant, may not be practically significant for users. Both could be considered viable tools to use for measuring HR during various exercise activities

9:12 am – 9:24 am COMPARING PHYSICAL ACTIVITY BARRIERS & FACILITATORS IN UNDERREPRESENTED MINORITIES: PRELIMINARY QUANTITATIVE OUTCOMES FROM A MIXED METHODS STUDY

Rafael A. Alamilla, Navin Kaushal, FACSM, & NiCole R. Keith, FACSM

BACKGROUND: Physical activity (PA) is crucial for preventing chronic illness, yet many adults fail to meet PA guidelines. This is particularly demonstrated for underrepresented racial minority (URM) adults, who face serious social inequities that prevent participation. To understand the factors that influence PA, it is valuable to explore barriers & facilitators to PA. **PURPOSE:** To document the barriers & facilitators to PA among urban Midwestern URMs using a theory-driven, mixed methods study. **METHODS:** A cross-sectional study framed on the socio-ecological model was conducted to identify barriers & facilitators to PA among URMs completing low (LLPA) & high (HLP) amounts of leisure-time PA. Participants completed an online survey assessing weekly PA, barriers, & facilitators. Surveys used included the International PA Questionnaire-Long Form, PA Barrier Questionnaire (PABQ), Exercise Identity Scale (EIS), Self-Report Behavioral Automaticity Index (SRBAI), & PA Social Support Scale. MANOVA was used to test the primary outcome measures with follow-up ANOVAs. Between-subject effect sizes were also used to detect differences. **RESULTS:** Twenty-nine URMs (LLPA, n = 11; HLP, n = 18; 44.83% Black, 41.37% Latino) completed the survey. HLP group reported higher total (HLP = 1,642.39 ± 1,073.98 min/wk., LLPA = 735.00 ± 521.94 min/wk.; p = 0.02, d = 1.00) & leisure-time (HLP = 448.89 ± 227.43 min/wk., LLPA = 44.55 ± 48.40 min/wk.; p = 0.001, d = 2.21) PA. MANOVA achieved a nonsignificant, practical effect size difference (F(1,27) = 1.18, p = 0.37; Wilk's λ = 0.61, partial η^2 = 0.40). PABQ revealed the LLPA group had more personal barriers (HLP = 27.61 ± 7.88, LLPA = 36.64 ± 12.53; p = 0.02, d = -0.92). Nonsignificant, effect size differences favoring the HLP group were detected for EIS (HLP = 32.00 ± 6.61, LLPA = 27.45 ± 7.90; p = 0.11, d = 0.64), SRBAI (HLP = 13.44 ± 4.60, LLPA = 10.18 ± 5.06; p = 0.09, d = 0.68), informational support (HLP = 15.44 ± 6.16, LLPA = 13.18 ± 4.19; p = 0.29, d = 0.41) & instrumental support (HLP = 13.00 ± 8.33, LLPA = 7.18 ± 6.82; p = 0.06, d = 0.75) composite scores. **CONCLUSION:** Both the HLP and LLPA groups reported achieving PA guidelines, but through different PA domains. LLPA group participants faced several personal barriers to PA participation. Facilitators such as increasing social support & lowering PA costs could increase PA. Addressing barriers & leveraging facilitators are crucial for increasing PA participation.

9:24 am – 9:36 am

HATE TO SWEAT WHEN YOU EXERCISE? FOR ENJOYMENT, YOU MAY NOT HAVE TO!
Kimberly A. Campbell & Kathryn M. Rougeau

BACKGROUND: Exercise prescription is effective for addressing various mental and emotional health concerns. However, many individuals avoid engaging in physical activity (PA) due to discomfort or physical strain, which can overshadow the psychological benefits. Passive PA may provide a more tolerable alternative to active PA, catering to individual preference (Pref) and tolerance (Tol) levels. **PURPOSE:** This study aimed to examine the relationship between an individual's Pref and Tol for PA and their enjoyment of both intensities, through active (AC) and passive (PC), motor-driven cycling. It also sought to determine if different PA types and intensity levels can be effectively prescribed to improve psychological health, particularly through enhanced enjoyment. **METHODS:** 35 participants (22 females, 13 males, Mage: 21.20 ± 2.93 years) completed 35-minute sessions of both PC and AC. Each session included a warm-up (2.5-min@35 r·min⁻¹), a 30-minute exercise bout (@65 r·min⁻¹), and a cool-down (2.5-min@35 r·min⁻¹), performed at a self-selected intensity rated as "hard" (15 RPE). Pref and Tol for PA were assessed using the Preference for and Tolerance of the Intensity of Exercise Questionnaire (PRETIE-Q) at least 24 hours before any condition, and the Physical Activity Enjoyment Scale (PACES) was administered following the randomized, counterbalanced PA bouts. **RESULTS:** Males had a significantly higher Tol for PA (29.07 ± 4.66) compared to females (23.41 ± 4.79; p = 0.010), though no significant difference was found in Pref for PA between males (27.08 ± 4.57) and females (23.55 ± 6.87; p = 0.204). While AC (94.13 ± 15.89) was rated as more enjoyable than PC (88.81 ± 21.94), this difference was not statistically significant (p = 0.109). **CONCLUSION:** While males demonstrated a higher Tol for PA compared to females, Pref for PA did not differ significantly between sexes. Although AC was rated as slightly more enjoyable than PC, this difference was not statistically significant. These results indicate that passive, motor-driven cycling may be an alternative to AC, providing comparable levels of enjoyment. Exercise prescriptions incorporating both AC and PC may enhance psychological health accommodating for Pref and Tol of PA, and potentially increasing adherence to PA. Future research should investigate the impact of varying intensities and explore other factors that may influence PA enjoyment and psychological outcomes. **FUNDING:** SHS Faculty Seed & OUWB Embark Grants.

Student Presentations – Poster #6 (9:00 am – 10:00 am; Kendall Room)

Poster #1

**THE ASSOCIATION OF BONE MINERAL DENSITY AND
ULTRASOUND ASSESSED SUBCHONDRAL BONE IN
FEMALE ATHLETES**

Natalie L. Blake, Corey D. Grozier, Matthew S. Harkey

BACKGROUND: Bone mineral density (BMD) is a critical metric for assessing bone quality, with deviations often indicating compromised bone integrity and elevated fracture risk. Prior research suggests that short, intense, multidirectional loading, typical in athletic endeavors, has a significant influence on BMD. Dual-energy X-ray absorptiometry (DXA) is precise in assessing BMD within athletic populations but lacks feasibility due to high cost and limited availability. Ultrasound imaging presents an affordable and accessible alternative for BMD assessment. **PURPOSE:** To assess ultrasound imaging as a more practicable option for BMD measurement compared to DXA in Division I female athletes. **METHODS:** Forty-nine Division I female athletes (Age: 20.0 ± 1.5 years; Height: $170.5 \text{ cm} \pm 9.5 \text{ cm}$; Mass: $68.6 \pm 10.6 \text{ kg}$; Sport: FH=12; VB=11; BB=5; SC=21) underwent full-body DXA scans, with raw DXA scores collected for right and left leg BMD analysis. Subsequently, three suprapatellar ultrasound images encompassing the femoral condyles and sulcus angle were taken bilaterally. Using an image processing software, subchondral bone was segmented at the midpoint between the sulcus and medial condyle peak to assess the echo-intensity of the bone. A 25x25 pixel box was placed at the bone-cartilage border at the most superficial aspect of the femur. The box was segmented into five evenly distributed horizontal subsections, from superficial to deep. The average color or mean echo-intensity was assessed for each box. A Pearson's r was used to evaluate the relationship between raw DXA scores for the lower extremity and the ultrasound echo-intensity for each of the six boxes. **RESULTS:** For the right limb, a moderate negative correlation was observed between BMD and echo-intensity of the first three segments (one: $p=0.019$, $r=-0.334$; two: $p=0.011$, $r=-0.359$; three: $p=0.003$, $r=-0.414$), the fifth segment ($p=0.037$, $r=-0.298$), and overall ($p=0.005$, $r=-0.396$). Similarly, on the left limb, moderate negative correlations were found for the first three segments (one: $p=0.022$, $r=-0.326$; two: $p=0.004$, $r=-0.400$; three: $p=0.003$, $r=-0.417$) and overall ($p=0.005$, $r=-0.398$). **CONCLUSION:** These findings underscore the potential of ultrasound as a viable alternative to DXA in the assessment of bone quality within athletic populations. The feasibility of ultrasound could facilitate long-term imaging to monitor changes in BMD, allowing for the detection of compromised bone integrity before an athletic injury develops.

Poster #2

**THE EFFECT OF ARCH-SUPPORT ORTHOSES ON THE
BIOMECHANICS OF DOWNHILL DISTANCE RUNNING**

Aidan Harmer & Henry Wang

BACKGROUND AND SIGNIFICANCE: Running training mechanisms are built on consistently applying and adapting to the physical demands of the activity. Time spent on feet or the amount of mileage a runner covers brings an increased variation of terrain and gradient. Running mechanics and footwear contribute to the risk of running-related injuries. In order to combat the resultant kinetic and kinematic variables, runners often turn to foot orthoses to mitigate potential risks. Foot orthoses, referring to a plantar contouring insole, are often used in footwear to provide stability, redistribute plantar loading, and minimize the local plantar pressure. Downhill running increases ground reaction force compared to level or uphill running. Prolonged eccentric muscle actions and changes to foot strike patterns may lead to a higher risk of running-related injuries. There is limited research available regarding the effects of foot orthosis on uphill running, and there is no research available on the biomechanical effects of foot orthosis during downhill running or on the biomechanics of steep hill running. The purpose of this study is to quantify the biomechanical effects of downhill running using different foot orthosis conditions at different gradients in male distance runners and to determine the potential benefits when running with foot orthoses downhill. **RESEARCH QUESTION:** Does over-the-counter foot orthosis reduce potential injury risk when running downhill? **PROPOSED METHODS:** Fifteen healthy male distance runners between the ages of 18 and 35 who ran a minimum of 15 miles per week with no lower extremity injuries participated in this study. Participants ran on a force-instrumented treadmill at 4.0 m/s for 1-3 minutes at 0%, -10%, and -20% grades, with 3-5 minutes of rest between

each condition. Motion capture camera systems and force plates embedded within the treadmills will capture data to be analyzed with repeated measures of one-way ANOVA. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the proposed number and variability of participants, a broader sample may be needed to detect significant effects. Running on a force-instrumented treadmill in a controlled environment does not replicate outdoor running, where downhill running is most common. Foot orthoses used within the study would not represent all variations of foot orthoses.

Poster #3

**THE RELATIONSHIP BETWEEN THE
COUNTERMOVEMENT JUMP, ISOMETRIC MID-THIGH
PULL, AND DYNAMIC STRENGTH INDEX WITH EXIT
VELOCITY IN COLLEGE BASEBALL PLAYERS**

Clark Bennett, Chad Odaffer

BACKGROUND AND SIGNIFICANCE: The power of a baseball swing can be quantified by the use of a measurement called exit velocity (EV). EV is a great predictor of success on the baseball field, and higher EV values have repeatedly been shown to improve performance outcomes on the field. This study looks to determine how concentric and isometric force production relate to exit velocity among collegiate baseball players. By understanding how these methods of force production translate to the power behind a swing, strength and conditioning professionals can better design baseball athlete training programs to maximize physical capabilities and improve on field performance. **RESEARCH QUESTION:** The purpose of this study is to determine if a relationship exists between EV and concentric or isometric force production or a combination of these two independent variables. **PROPOSED METHODS:** 15 position players on the University of Indianapolis baseball team will perform 10 swings to find their peak EV values. These values will be compared to the force that these players can create in an isometric mid-thigh pull (IMTP) and a countermovement jump (CMJ). The athletes are to perform 3 trials of each movement with adequate rest and recovery to allow for an accurate representation of maximal force production. The IMTP will measure the peak isometric force an athlete can create, and the CMJ will measure the peak concentric force an athlete can create. A statistical analysis will be done to reveal any relationship between EV and peak force as well as the dynamic strength index, a ratio of CMJ/ImTP peak forces. **PROJECTED LIMITATIONS AND OBSTACLES:** The most significant limitation in this study is going to be the final sample size. Because this study will be conducted with athletes of the highest level, it is challenging to recruit a large sample size of participants. As a result of this, the sample size will likely not be large enough to show a true statistically significant difference in the results.

Poster #4

**THE EFFECT OF EXERCISE MODALITY ON ESPORTS
PERFORMANCE**

Lilin Lan, Amanda Cunningham, Keegan Reynolds, Simran Kamboj, Nicholas Hanson

BACKGROUND AND SIGNIFICANCE: With the rapid growth of the video gaming industry and concerns about the potential negative impacts of sedentary gaming habits, there is a need to explore how exercise can influence gamers' cognitive abilities and gaming performance. This study aims to investigate the acute impacts of three different exercise modalities (resistance training, circuit training & high intensity interval training [HIIT]) on cognitive function and video gaming performance. By comparing the effects of these exercise modalities on gaming performance, the study seeks to provide evidence-based recommendations to encourage video gamers to incorporate regular physical exercise into their routines. **RESEARCH QUESTION:** What are the immediate impacts of exercise on cognitive function and gaming performance, and is one modality more effective than the others? **PROPOSED METHODS:** We will use a repeated-measures within-subjects experimental design to investigate the acute impacts of exercise on video game performance. Approximately 25 experienced gamers will complete four sessions: one familiarization visit and three experimental visits, separated by at least 24 hours. The experimental visits will consist of 1) 20 min of resistance training, 2) 20 min of circuit training, or 3) 20 min of HIIT training, in a counterbalanced order. Cognitive function will be assessed using critical flicker fusion threshold and a reaction time test before and after exercise, while gaming performance will be evaluated through a custom in-game task where participants will control a character to eliminate computer-controlled enemies, testing their reaction time and precision within the

game environment. **PROJECTED LIMITATIONS AND OBSTACLES:** The relatively small sample size of 25 participants and potential challenges in recruiting individuals representing a full spectrum of gaming habits and exercise levels may limit generalizability. Additionally, the acute nature of the study does not address chronic long-term effects of exercise on gaming performance.

Poster #5

MULTIPLE AXIS ANALYSIS OF FORCE IN RELATION TO SWIMMING SPEED

Jonny Simoes, Mike Bottom, & Joshua Haworth

BACKGROUND AND SIGNIFICANCE: In the sport of swimming, champions are determined by hundredths of seconds. With a margin of victory this small, tiny adjustments to swimming stroke technique can be the deciding factor in a race. Previous research has addressed this by using sensor technology on the palms of swimmers to determine the force each hand exerts on the water. The idea behind this technology is that if a swimmer can increase the force exerted on the water, they would swim faster. However, existing research has only been able to measure resultant force, not total effective propulsive force. Recent developments in swimming sensor technology allows measurement of separate force vectors in 3 axes: propulsive, lateral, and vertical. Utilizing this technology, swimmers and coaches can better understand how to produce optimal stroke patterns to maximize effective propulsive force. This work is significant because coaches can quickly identify flaws in swimmers' stroke patterns in more detail than previously possible. **RESEARCH QUESTIONS:** Does an increase in vertical or lateral force correlate with increased freestyle swimming time? Does one affect swimming time more than the other? **PROPOSED METHODS:** In this study, fifty swimmers will perform a maximal effort 50-yard freestyle swim from an in-water start. Swimmers will be fitted with a coordinated dual omni-directional pressure sensing device on each palm. 3-axis swim stroke force data will be collected throughout the trial through an online software. Pearson correlation coefficient tests will be used to evaluate the separate relationships between vertical and lateral stroke force and 50-yard swim test. Larger correlation will be understood to represent a larger impact on swim time. **PROJECTED LIMITATIONS AND OBSTACLES:** While there have been pilot studies of validity and reliability conducted of the coordinated dual omni-directional pressure sensing device, there are currently no large scale studies verifying the validity and reliability of the technology.

Poster #6

COMPARING CARDIORESPIRATORY FITNESS LEVELS BETWEEN FIRST GENERATION AND CONTINUING GENERATION COLLEGE STUDENTS

Francesca Whalen, Rachel Luehrs

BACKGROUND AND SIGNIFICANCE: Individuals of low socioeconomic status (SES) have lower physical activity levels compared to individuals of middle- and higher-SES. The lower engagement in PA among individuals of low SES has been attributed to factors such as a lower access to free PA spaces, and greater danger in the activity spaces that are available, such as unattended dogs and unfixed sidewalks. The decreased access to PA resources experienced by low SES individuals is associated with lower cardiorespiratory fitness than their peers of higher SES. First-generation (FG) college students are more likely to be low SES. Given the link between low SES and lower reported PA levels, it is plausible that FG students have lower cardiorespiratory fitness levels compared with continuing generation students (CG). However, this remains to be elucidated. This information is important because it may help the field of Exercise Science determine if first generation students should be targeted for exercise interventions. **RESEARCH QUESTION:** Do FG students have lower levels of cardiorespiratory fitness than CG students, and what are the barriers correlated with this possible disparity? **PROPOSED METHODS:** This cross-sectional study will recruit 50 college students (25 FG, 25 CG). Height and weight will be recorded at baseline. Cardiorespiratory fitness will be measured via a one mile walk test (Rockport Walking Test). During the test, participants will wear a chest strap heart rate monitor. Estimated maximal oxygen consumption will be determined using the validated Rockport walking test equation. Following the walking test, participants will complete a questionnaire that will ask background and demographic information (e.g. first-generation status and socioeconomic status classification). The questionnaire will also inquire about any barriers to PA that the participants experience. Independent samples t-tests will be used to compare cardiorespiratory fitness levels between FG and CG students. Descriptive data and chi-square tests will be used to compare barriers of PA among FG and CG students.

PROJECTED LIMITATIONS AND OBSTACLES: Participants will be recruited from one liberal arts institution in the Midwest. Although we intend to recruit students from a wide variety of academic disciplines, the participants included in this study may not be representative of all students at various higher education institutions across the country.

Poster #7

RELATIONSHIP BETWEEN PERCEIVED STRESS, SLEEP QUALITY, AND BODY COMPOSITION CHANGES DURING THE OFF-SEASON IN DIVISION I FEMALE ATHLETES
Jagger Wraalstad, Arjun Parmar, Jessica Tolzman, Matthew Harkey

BACKGROUND AND SIGNIFICANCE: The Mental Health Model supports an inverse relationship between psychopathology and sports performance. Therefore, it is vital to explore the relationship between athletes' perceived stress and physiology related to sports performance. Inadequate lean mass (LM), fat mass (FM), and bone mineral density (BMD) have been associated with increased injury risk and compromised performance in athletes. LM is associated with force generation and attenuation which is necessary for performance and injury mitigation. FM is necessary as athletes have an increased metabolic expenditure, potentially leading to relative energy deficiency. Sufficient BMD helps decrease risk for fractures and injuries as well as bone diseases later in life. Typically, athletes utilize the off-season to recover and prepare for the upcoming season, by increasing LM and FM energy stores. However, poor perceived stress has been shown to negatively impact body composition in athletes. Furthermore, sleep quality and stress have both been observed to be related to athlete body composition, which may make them ideal predictors of body composition changes. **RESEARCH QUESTION:** Are perceived stress and sleep quality related to off-season body composition changes in Division I female athletes? **PROPOSED METHODS:** Body composition measurements of the athletes will be evaluated via dual-energy X-ray absorptiometry (DXA) at post-season testing and repeated the following pre-season testing. The Perceived Stress Scale (PSS) and the Athlete Sleep Screening Questionnaire (ASSQ) will be administered at the post-season testing session. The fixed effect relationship between post-season psychometric scores and body composition changes in each athlete will be assessed using a mixed models for repeated measures. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the number of survey questions and research population, we also anticipate possible survey fatigue and a ceiling effect. Furthermore, the population is specific, so the results may not be applicable to all athletes. Lastly, there are likely other confounding variables in play that aren't measurable, as the off-season is not standardized for all athletes.

Poster #8

DISORDERED EATING BEHAVIOR IN COLLEGIATE ATHLETES

Paige Eacker, Andrew Johnson, Kelley Borton, Madison Wyatt, Emily Van Wasshenova

BACKGROUND: The eating behaviors of collegiate athletes impact the athletes' athletic performance, current well-being, and future wellness. Disordered eating (DE) include irregular eating behaviors that may or may not warrant a diagnosis of a specific eating disorder. While more research has been conducted on eating disorders in collegiate athletes, DE is more prevalent with an estimated 84% of collegiate athletes engaging in maladaptive eating and weight control behaviors impacting athletic performance and psychosocial health after leaving sport. The type of sport (lean or non-lean based on importance for performance) may be an important factor in DE risk for collegiate athletes. While some studies have linked lean-sport athletes to increased risk for DE, other studies report no relationship between sport type and DE. More evidence is needed on the relationship between DE, sport type, and gender to best identify teams at increased risk for DE. **RESEARCH QUESTION:** Is DE in collegiate athletes influenced by sport type and gender? **PROPOSED METHODS:** **PROPOSED METHODS:** This will be a cross-sectional study of Oakland University student-athletes (n=310) with no diagnosis of an eating disorder. Data collection will occur via an 87-item voluntary survey. The survey will not collect any identifying information, allowing for anonymous results. Participants will be given a \$10 Amazon gift card upon completing the survey. The survey will ask students to report demographic information including height, weight, gender, primary sport type, college class standing, and years competing at collegiate level. Sport type will be grouped into two categories: 1)

lean (dance, cross country, swimming and diving, volleyball) and non-lean sports (golf, basketball, baseball, softball, soccer, tennis, e-sports). Track and field includes lean and non-lean events, so an additional question will assess event type. Disordered eating behavior will be assessed using the 6-item measure Eating Disorders Screen for Athletes (EDSA). All analyses will be conducted using SPSS version 28.0. A two-way ANOVA will be conducted to assess differences in DE based on sport type and gender. The statistical significance level will be set at $p < 0.05$ for all analyses. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the cross-sectional research design, we will not assess how behaviors change or evolve over time. Since participation in the study is voluntary, this study may be subject to selection bias.

Poster #9

ASSOCIATION BETWEEN PHYSICAL ACTIVITY TIME AND BALANCE PERFORMANCE IN THE THIRD TRIMESTER OF PREGNANCY

Israa Anwar, Joshua Haworth, Melissa Jones

BACKGROUND AND SIGNIFICANCE: Balance function refers to the ability to maintain or restore the center of gravity within the base of support under the influence of gravity. Pregnancy is a unique period in which rapid and short-term physiological and anatomical changes occur which may impact balance and stability. These changes may include an increase in lumbar lordosis, greater stress on the lower back, shifting center of mass, and modified gait patterns. With a potential decline in both static and dynamic balance and increased risk associated with a fall, it is critical to understand factors associated with poorer balance in pregnancy and potential fall prevention methods. One behavior that may impact balance in pregnancy is physical activity. Evidence in non-pregnant individuals demonstrates those who participate in regular moderate to vigorous intensity physical activity (MVPA) have improved static and dynamic balance. However, limited evidence is available on the associations between physical activity during the third trimester of pregnancy and its effects on maternal balance and stability. **RESEARCH QUESTION:** Are accelerometer-measured MVPA and sedentary time (ST) associated with balance performance in the third trimester of pregnancy? **PROPOSED METHODS:** This proposed cross-sectional study will include 15 participants between 28-35 weeks pregnant. MVPA and ST will be measured over a period of one week (with a minimum requirement of 5 days and 10 hours of wear time per day) using a thigh-mounted accelerometer. The balance will be assessed using a balance-tracking portable force plate system. The balance test protocol (BBT) will measure static postural sway, while the limits of stability (LOS) will measure the extent of stability within the functional base of support. Linear regression models will test for associations between LOS and BBT scores with percent of wear time in MVPA and ST. Models will adjust for gestational age and MVPA or ST when appropriate. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the study's cross-sectional nature, we are unable to establish temporality between activity habits and balance outcomes. Further, small sample sizes and recruitment obstacles may limit the ability to adjust for confounding variables and the generalizability of findings.

Poster #10

THE INFLUENCE OF CARBON FIBER INSOLES ON WALKING ECONOMY AND HEART RATE IN OLDER ADULTS

Rafia Shamsi, Lukus Klawitter

BACKGROUND AND SIGNIFICANCE: As humans age, biological changes gradually affect walking mechanics, resulting in increased cost of walking, fatigue, and diminished mobility. With joints becoming less elastic, walking economy declines, posing challenges to the quality of life in older adults. Walking economy, defined as the oxygen uptake during movement, is a crucial factor in sustaining ambulatory activities. In addition to reduced walking speed, aging is associated with decreased walking economy, meaning an increased cost of walking. Apart from being a marker of poorer health, any changes in walking speeds can be exorbitant for navigation of everyday environments as well as partaking in social activities and hence also impact the individual's activities of daily living (ADL) and instrumental activities of daily living (IADL). Carbon fiber insoles (CFIs) have emerged as a potential intervention to optimize walking mechanics, yet existing research predominantly focuses on athletes and young adults, leaving a critical gap in knowledge regarding their impact on older adults. **RESEARCH QUESTION:** Does the placement of CFI's in a standard walking shoe increase the walking economy by decreasing aerobic output and heart rate at self-selected walking speeds in adults 55-75 years of age. **PROPOSED METHODS:** In this cross-

sectional block randomization study, walking economy as a measure of aerobic uptake and heart rate as well as RPE will be measured in (n=40, 55-75 years) adults. Participants will self-select preferred walking speed (3.1, 3.5, 3.9, and 4.4 mph) and aerobic uptake will be measured via ParvoMedics TrueOne 2400 metabolic cart in two different walking conditions (no CFI, CFI's). Block randomization will be used to determine which condition is performed first. Participant will walk for six-minutes and aerobic uptake, heart rate, and RPE will be recorded over a plateau of two-minutes. Participants will rest for 15-minutes and perform the six-minute walk in the second condition. PROJECTED LIMITATIONS: Due to feasibility preferred walking speed will be self-selected, which may not directly reflect the individuals actual steady state velocity.

Poster #11

DEVELOPING A CULTURALLY RELEVANT INSTRUMENT TO ASSESS DETERMINANTS OF PHYSICAL ACTIVITY IN AFRICAN AMERICAN WOMEN

Jennifer Turpin Stanfield, Rick Petosa

BACKGROUND & SIGNIFICANCE: African American Women (AAW) report the lowest levels of physical activity of any racial-gender group in the United States. An emerging body of research suggests that culturally relevant physical activity programs may be more efficacious than traditional programs at increasing physical activity participation in AAW (Joseph et al., 2017). However, to date, there are no known valid and reliable instruments used to measure culturally relevant determinants of physical activity in AAW. Based on a review of the literature and a small focus group study (N = 16) a culturally relevant questionnaire - the Barriers to Physical Activity Questionnaire (B-PAQ) - was developed to assess factors that may influence physical activity in AAW. Following instrument construction, an expert panel review was conducted to establish content validity for the B-PAQ. The primary purpose of the proposed study is to estimate reliability for the B-PAQ. A secondary purpose of this study is to test the B-PAQ for predictive validity. **RESEARCH QUESTIONS:** 1). Is the B-PAQ a reliable instrument to assess factors that influence physical activity in African American women? 2. How well does the B-PAQ predict physical activity participation in a sample of African American women living in the Midwest? **PROPOSED METHODS:** The proposed study will be conducted in two phases. Phase 1: A sample of adult AAW will be recruited to complete the B-PAQ. Cronbach's alpha testing will be conducted to estimate preliminary reliability for the instrument. Phase 2: A second sample of AAW will complete the B-PAQ and will also complete the International Physical Activity Questionnaire (IPAQ). Factor analysis will be conducted on the B-PAQ to determine reliability and to identify instrument variables that maybe strongly correlated. Simple linear regression will be used to test the B-PAQ for predictive validity. The IPAQ has demonstrated acceptable levels of reliability (Spearman's $\rho = 0.8$) and criterion validity (median $\rho = 0.30$) in diverse adult (18-65 yrs.) populations and will be used as the criterion. **PROJECTED LIMITATIONS & OBSTACLES:** Both phases of this study will employ a cross-sectional design and thus cannot detect potential fluctuations to psychometric variables assessed by the B-PAQ that may occur over time.

Poster #12

COMPARISON OF FEAR AVOIDANCE SCORES IN COLLEGIATE ATHLETES DURING LOWER LIMB REHABILITATION

Grace Cusimano, Trent E. Cayot, Brian Gerlach, Stacey L. Gaven, Mindy Hartman Mayol

BACKGROUND AND SIGNIFICANCE: Past studies have examined fear avoidance in athletes undergoing lower limb rehabilitation when returning to their sport. Returning to sport post-rehabilitation following lower limb injuries is known to be strenuous and anxiety-driven. Research shows athletes struggle with fear of reinjury in return to sport as well as psychological readiness leading athletes to either not return or return at a skill level less than prior to injury. Previous studies found a relationship between an athletes' fear avoidance level and their rehabilitation after a major injury. A decrease in psychosocial state elongates the rehabilitation stage. A better understanding of the levels of fear avoidance at different times in rehabilitation will assist sports medicine professionals in providing intervention strategies to lower fear avoidance scores. **RESEARCH QUESTION:** Are there differences in fear avoidance scores over the duration of the rehabilitation stage? It is hypothesized that fear avoidance scores will increase when athletes near the end phase of rehabilitation and prepare to return to their sport. **PROPOSED METHODS:** Thirty college athletes who have sustained lower limb injuries involving the knee and hamstring will

be recruited to complete an online demographic questionnaire and 10-item Athletic Fear Avoidance Questionnaire (Dover and Amar, 2015) used to measure the athletes' level of fear avoidance when engaging in the return to sport process. One-way, repeated measures Analyses of Variance with Bonferroni post hoc tests will be used to analyze fear avoidance scores over five time points during the rehabilitation timeline. An alpha level of $p \leq 0.05$ will be set for statistical significance. **PROJECTED LIMITATIONS AND OBSTACLES:** This research design will not align recruitment or measure if the injured athletes and their respective sport is within the pre-season, in-season or off-season.

Poster #13

DIFFERENCES IN MOTIVATION SOURCES OVER TIME IN COLLEGIATE ATHLETES UNDERGOING REHABILITATION

Julia F. Johnson, Trent E. Cayot, Brian Gerlach, Stacey L. Gaven, Mindy Hartman Mayol, FACSM

BACKGROUND AND SIGNIFICANCE: Motivation sources of athletes in accordance with the Self-Determination Theory (SDT) have been extensively researched. However, little research has been done on how injured athletes' motivation sources change over time. What is known is that athletes who set rehabilitation goals have higher levels of competence (a psychological need of the SDT) see increases in intrinsic motivation. Additionally, athletes whose competence, autonomy, and relatedness needs are met have more positive return to sport outcomes than those whose needs are not met. However, intrinsic motivation sources have been demonstrated a decrease in injured athletes as time progresses. An understanding of the evolution of motivation sources may lead sport and rehabilitation professionals to tailor their interventions to produce sustainable motivation sources. **RESEARCH QUESTION:** Does the motivation source of an injured athlete change over time, from intrinsic to extrinsic or vice versa, as the athlete progresses through rehabilitation? It is hypothesized that intrinsic-based motivation sources will decrease over time in athletes undergoing rehabilitation. **PROPOSED METHODS:** Thirty college collegiate athletes who have sustained lower limb injuries involving the knee and hamstring will be recruited to complete an online demographic questionnaire and 18-item Sport Motivation Scale II (Pelletier et al., 2013) used to measure six motivation/regulation sources per the SDT: intrinsic, integrated, identified, introjected, external, and amotivation regulation. Six, one-way, repeated measures Analyses of Variance with Bonferroni post hoc tests will be used to analyze these motivation sources over five time points during the rehabilitation timeline. An alpha level of $p \leq 0.05$ will be set for statistical significance. **PROJECTED LIMITATIONS AND OBSTACLES:** This research design will not align recruitment or measure if the injured SA and their respective sport is within the pre-season, in-season or off-season.

Poster #14

PEDALING PERSPECTIVES: UNVEILING THE IMPACT OF ACTIVE VS. PASSIVE CYCLING ON SALIVARY CORTISOL AND TESTOSTERONE LEVELS IN HEALTHY ADULTS

Claire Wang, Kathryn Rougeau

BACKGROUND AND SIGNIFICANCE: Cortisol, a strong stress indicator, and testosterone have been shown to increase in both acute and chronic stress-inducing situations such as during physical activity. Limited research exists on how active and passive, motor-driven, cycling affects salivary cortisol and testosterone in a healthy population. As new evidence has shown that an increase in cortisol and testosterone levels is associated with increased cardiovascular risk, our findings may provide valuable evidence to help validate the benefits of passive cycling as a therapeutic measure. If passive cycling reduces cortisol levels post-exercise, then clinicians may prescribe passive/low-intensity exercise for individuals who can not physically perform moderate/high-intensity exercise, such as stroke survivors and those with spinal cord injuries. **RESEARCH QUESTION:** Does passive cycling have similar effects on salivary testosterone and cortisol levels compared to active cycling in able-bodied adults? **PROPOSED METHODS:** This within-subject study will recruit (N=50) individuals (aged 18-25) to undergo acute bouts of active and passive cycling, randomized & counter-balanced, each lasting for 30 minutes. Participants will pedal a custom-built cycle ergometer at a predetermined resistance of 15 on rating of perceived exertion (RPE) on the 6-20 scale. Pedaling cadence will be maintained around 65 revolutions per minute and water will be provided up to 10 minutes before each saliva sample is collected. Salivary samples will be collected immediately before, immediately after,

and 30 minutes post-cycling. Participants must naturally cycle and not be on any hormone-influencing medications or be pregnant. The protocol will include a 35-minute cycling session comprising a 2.5-minute warm-up, a 30-minute cycling bout at a predetermined resistance, and a 2.5-minute cooldown. Participant heart rate, rate of perceived exertion, and affective feelings (energy, tension, tiredness, calmness, and state anxiety) will also be collected and measured. **PROJECTED LIMITATIONS AND OBSTACLES:** This pilot study is performed by a small, single institution in Michigan, which is less generalizable to the larger population.

Poster #15

INVESTIGATING THE SENSITIVITY OF PHASE ANGLE TO ECCENTRIC EXERCISE

Lily Arledge, Angela Hillman

BACKGROUND AND SIGNIFICANCE: Phase Angle (PhA) is a tool typically collected during bioelectrical impedance analysis (BIA) scans and is commonly used in clinical practices to assess disease prognosis and cellular health. PhA is sensitive to inflammation and fluid shifts which may occur after muscle damaging exercise. However, the role that PhA may have in evaluating muscular recovery or in sports performance-related practices is still being determined and needs to be thoroughly investigated. **RESEARCH QUESTION:** Is segmental PhA sensitive to muscular damage, and what is the relationship between PhA, muscular strength, and soreness? **PROPOSED METHODS:** Participants will undergo an eccentric bicep curl exercise protocol on a HUMAC NORM isokinetic dynamometer. Participants will complete a maximal voluntary isometric contraction (MVIC) for both arms and then will complete sets of 10 eccentric bicep curls at $45^{\circ} \cdot s^{-1}$ using the non-dominant arm. After each set, MVIC will be evaluated; once MVIC values are reduced to 60% or less of the original measurement, participants will be given 2 minutes of rest. Following the 2-minute rest, MVIC will be retested; if values are still below 60% of the original, the exercise will be concluded. If values are above 60% of the original, participants will be asked to continue with the exercise protocol until MVIC values remain below 60% of the original. BIA scans will be conducted before and after the protocol, to measure segmental PhA in the arm before and after exercise. A Wagner pressure algometer will be used to evaluate soreness in the active arm pre and post exercise; a pressure-pain threshold test and a pain tolerance test will be conducted. To evaluate the pressure-pain threshold, the algometer will be pressed into the belly of the biceps brachii, and the researcher will add pressure until the participant indicates they feel pain. A visual analog scale will be presented for the participant to assign a value to their pain. Participants will then be asked to return to the lab for the next three days, at the same time. During these visits MVIC values will be collected on both arms, soreness measures will be conducted on the arm used in the exercise protocol, and BIA scans will be conducted to investigate the segmental PhA of the active limb. **PROJECTED LIMITATIONS AND OBSTACLES:** Due to the anticipated soreness and side effects of eccentric exercise, as well as 5 total lab visits, the research team anticipates issues of retention.

Keynote Presentation, Brunch, & Business/Award Meeting

10:00 am – 12:00 pm

PERFORMANCE ENGINEERING: FROM BENCH SCIENCE
TO BREAKING 2

Philip Friere Skiba, DO, PhD, FACSM (Ambassador Ballroom)



There are a variety of tools available to help optimize human performance. One of the most neglected is the use of physiological models. Dr. Skiba will discuss the development and use of peer-reviewed mathematical tools to improve athlete performance everywhere from local fun runs to the Olympic Games and beyond.