2017 Program of Events

45th Annual Meeting

Midwest Chapter of the American College of Sports Medicine

November 9-11, 2017

Amway Grand Plaza

Grand Rapids, Michigan

Contents

Past-President's Welcome Letter

Dear friends, colleagues, students:

Welcome to Grand Rapids, MI and the Midwest Chapter of the American College of Sports Medicine. This is the first time we have been back in Michigan since 2002 (Dearborn, MI) and the first time back in Grand Rapids since 2000, which was my very first regional chapter meeting as a graduate student. My wish is that you enjoy both the meeting and the city.

Hopefully you share in my excitement for the two keynotes that are scheduled for the 45th Annual Meeting of the Midwest Chapter of the American College of Sports Medicine. In addition to the two keynotes there is a full CEPA schedule on Friday, almost 150 submissions for poster and slide presentations, and nearly two dozen symposia abstracts. To say that we have a full schedule is an understatement. In fact, what was a single room for the conference at the 2000 meeting has now grown into three rooms for 2017.

Friday's keynote will be delivered by Tami Hew-Butler, DPM, PhD on "What Do We Really Know About Hydration". This will be science at its finest, using science to advance our knowledge and understanding. What a terrific example of better understanding through science. Saturday's keynote will be delivered by none other than one of ACSM's finest, Barry Franklin, PhD. This presentation has been strategically scheduled for Saturday from 10:30a until noon. This way, once Dr. Franklin concludes his "GPS for Success: 10 Behavioral Skills of Highly Successful People" you can take the "run through a brick wall" inspiration and leave the conference being ready to change the world, or at least a life…even if it's yours.

While this conference is highlighted by such great keynotes and incredible people, the other conference "happenings" are intended to educate, inform, and inspire. Please enjoy the conference, make the most of this time and opportunity. I would like to thank the entire MWACSM Board of Directors and volunteers for their time well spent on this year's Chapter business and particularly this conference. Specifically, I would like to thank Executive Director Jodee Schaben (the glue that holds this chapter together) as well as Heather Betz and Dan Carl for their Presidential powers that have helped guide me to bring this conference forward. Lastly, I would like to thank CEPA, specifically Ken Ecker, for taking part in this conference.

Enjoy,

Adam M. Coughlin

Adam M. Coughlin, Ph.D.
2017 Past-President and Program Committee Chair, Midwest ACSM

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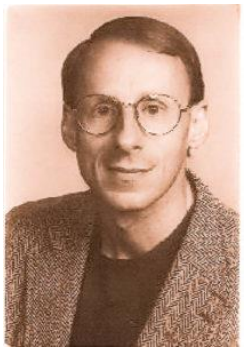

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Chapter and Conference Information

The FIRST ACSM regional chapter

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

Purpose and Objectives:

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

ACSM Continuing Education Credit (CEC)

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

Name Badge

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

Annual Business Meeting and Saturday Keynote Session

The annual business meeting is scheduled for Saturday, November 11, from 10:00-10:30am in the Ambassador Ballroom, brunch will be served following the business meeting. The annual business meeting is your opportunity to participate in the activities of the Midwest Chapter of ACSM. During this meeting, we will announce the award winners, newly elected officers, an update from the MWACSM Chapter Office and other, new items. Please plan to attend.

Awards

Awards that will be presented include the Student and Clinical Presentation Awards, the Founder's Award, and the MWACSM ActiveU Competition Award. For more information on all our student and professional awards, to include eligibility requirements, criteria, application forms, and submission deadlines, please go to: http://www.mwacsm.org/wordpress/about-mwacsm/awards/.

Continuing Education (CEC)

ACSM CEC Certificate

Participant Name

Midwest Regional Chapter of the American College of Sports Medicine

Provider Organization

2017 Midwest ACSM Annual Meeting, Grand Rapids, MI

Course Title

#650390	**12.0**
Approved Provider Number	CECs Awarded

Adam M. Coughlin, PhD

Lead Program Administrator Signature

Sponsors

ParvoMedics TrueOne® 2400 system is accurate, reliable and easy-to-use for exercise VO2max and resting RMR measurement. Used by NASA, U.S. Olympic Training Centers, and NIH.

http://www.parvo.com/

Exhibitors

The Midwest ACSM also thanks our 2016 Exhibitors, and encourages all meeting attendees to take a few moments to visit with representatives from the following companies:

CEPA Clinical Exercise Physiology Association
ACSM Affiliate Society

Cincinnati Children's Heart Institute

Tekscan™

COSMED
The Metabolic Company
Creative Design in Cardiopulmonary Diagnostics since 1980

NSCA
NATIONAL STRENGTH AND CONDITIONING ASSOCIATION

AtCor Medical
SphygmoCor
Essential for hypertension management.

CREATIVE HEALTH PRODUCTS

AtCor Medical develops SphygmoCor® for central arterial pressure waveform analysis and arterial stiffness assessment, better informing treatment decisions. SphygmoCor provides information that is not available from brachial blood pressure. Visit atcormedical.com or email info@atcormedical.com for more information.

Graduate Fair

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

Ohio University

St. Ambrose

Northern Illinois University

Eastern Michigan University

Southern Illinois Univesity

Liberty University

Carroll University

Bowling Green State

University

Michigan State University

Meeting Agenda

Thursday, Nov 9

Time	Event	Location
2:00-5:00pm	MWACSM Board of Directors Meeting	Emerald Room
7:00-8:00pm	Meeting check-in/registration	Center Concourse
8:00-10:00pm	Welcome Reception – hosted by Past-President, Adam Coughlin, PhD	Center Concourse

Friday, Nov 10

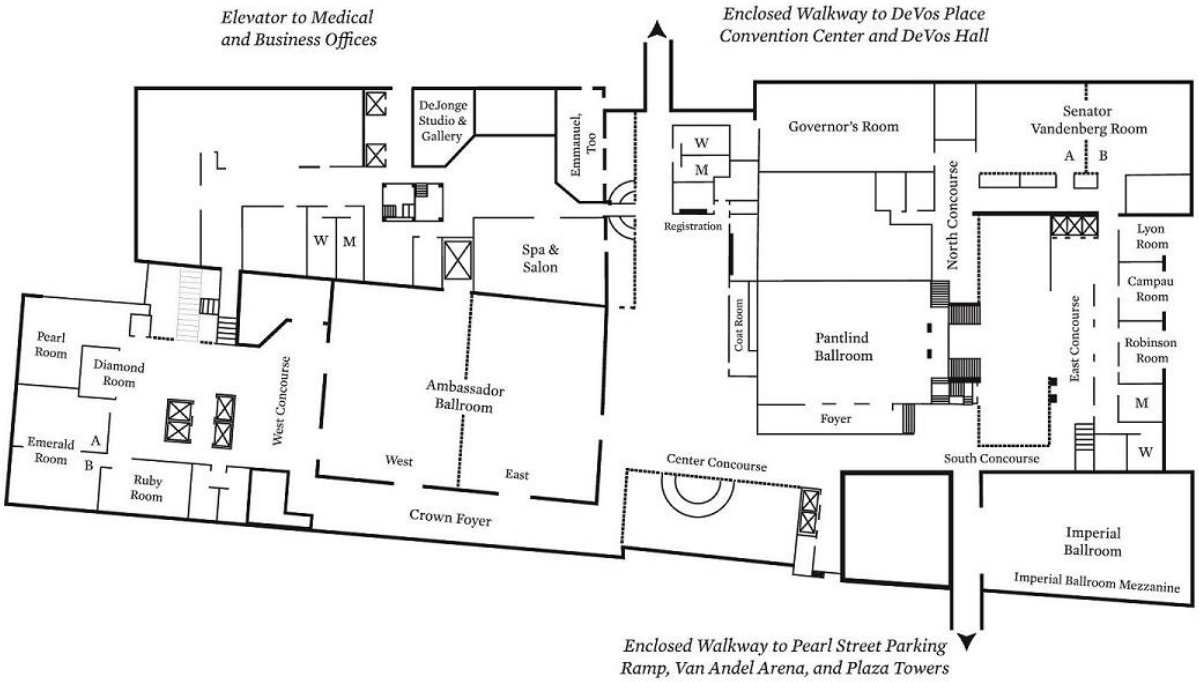
Time	Center Concourse	Gerald R. Ford Room	Pantlind Ballroom	Ambassador Ballroom	Crown Foyer	Imperial Ballroom
8:00am	7:00-9:00am Breakfast	Symposium #1	Symposium #2		Poster Session #1 9:00-10:25am	7:30-8:20am Symposium #3
9:00am		Free Comm/Slides #1	Symposium #4			
10:00am	7:00-5:00pm Conference Registration/ Exhibitors	Free Comm/Slides #2	Symposium #5		Poster Session #2 10:30-11:55am	8:30-11:45am CEPA schedule
11:00am		Free Comm/Slides #3	Symposium #6			
12:00pm		Keynote and Luncheon Dr. Tamara Hew-Butler				
1:00pm						
2:00pm	Grad Fair 10:00-noon, 2:00-4:00pm	EIM Ambassador	Symposium #7		Poster Session #3 2:00-3:25pm Poster Session #4 3:30-4:55pm Poster Session #5 5:00-6:25pm	2:00-3:40pm CEPA schedule
3:00pm		Free Comm/Slides #4	Symposium #8			
4:00pm		Free Comm/Slides #5	Symposium #9			Symposium #10
5:00pm		Free Comm/Slides #6	Symposium #11			Symposium #12
6:00pm						
6:30pm		Dinner on your own				
8:00pm		Student Quiz Bowl 8:00-9:30pm Reception to Follow				

Saturday, Nov 11

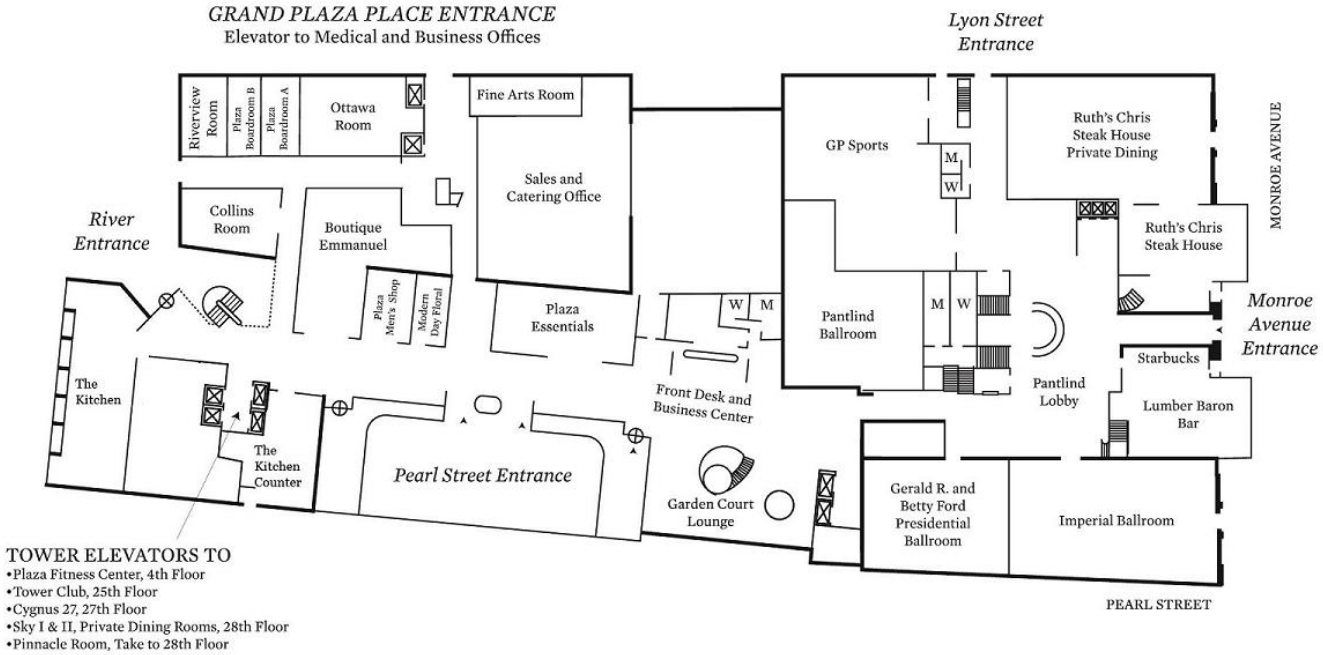
Time	Center Concourse	Gerald R. Ford Room	Pantlind Ballroom	Ambassador Ballroom	Crown Foyer	Imperial Ballroom
8:00am	Registration/ Exhibitors	Symposium #13	Symposium #14		Poster Session #6 8:00-9:25am	Symposium #15
9:00am		Symposium #16	Symposium #17			Symposium #18
10:00am		Business Meeting 10:00-10:30am Keynote and Brunch – Dr. Barry Franklin – 10:30-noon				

Conference Center Floor Plan

CONCOURSE LEVEL – 2ND FLOOR



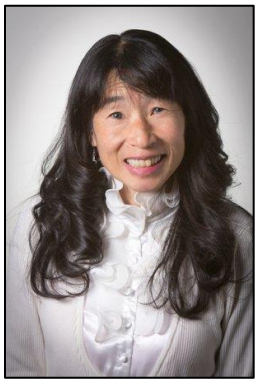
LOBBY LEVEL – 1ST FLOOR



Keynote Speakers

What Do We Really Know about Hydration

Friday, November 10th – Noon to 2pm, Ambassador Ballroom



Dr. Tamara Hew-Butler is a podiatric physician and associate professor of Exercise Science at Oakland University in Rochester, Michigan. She obtained her BS in Kinesiology at the University of California at Los Angeles, CA; Doctor of Podiatric Medicine (DPM) at Temple University in Philadelphia, PA; and Philosophy Doctor (PhD) at the University of Cape Town, South Africa. Dr. Hew-Butler is a Fellow of the American College of Sports Medicine (FACSM) with expertise in exercise-associated hyponatremia and the endocrine regulation of water and sodium balance. She trained under Timothy D. Noakes MD, DSc and Joseph G. Verbalis MD and has published over 60 papers on the topic. Her scientific work has been highlighted on radio shows (Science Friday, National Public Radio), podcasts (CJSM), newspapers (New York Times, Washington Post), a comic strip (xkcd) and reality television show (Adam Ruins Everything).

Our fear of becoming dehydrated is deeply rooted within our commercialized culture. The clinical definition of "dehydration" (i.e. intracellular dehydration, based upon blood measures) conflicts with the definitions widely utilized by sporting organizations and epidemiologists (i.e. body weight and urine concentration). Our misguided fear of dehydration has sparked an increase in the number of reported cases of overhydration (dilutional hyponatremia). This lecture serves to dispel our fears of the debilitating consequences of both dehydration and overhydration by highlighting the robust and redundant fluid homeostatic mechanisms conserved within our DNA. The pros and cons of using indirect (body weight; urine indices, etc.) versus direct (plasma osmolality, electrolyte and volume) hydration measures will also be discussed along with a unifying theme of when thirst is (and is not) an appropriate rehydration strategy.

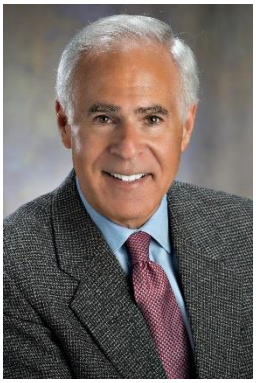
The purpose of this talk is to clarify the physiological underpinnings for the competing definitions of (de)hydration from the perspective of a wide variety of measurement techniques utilized to promote "fluid balance".

The primary learning objectives are to:

1. Identify the two physiologically protected variables of fluid homeostasis (plasma osmolality and volume) and subsequent regulation (by arginine vasopressin and thirst) in mammals.
2. Recognize the role of marketing in our evolving understanding of the term "dehydration" and subsequent advice regarding "how much should we drink?"
3. Reflect upon why we need someone or something to tell us how much we should drink.

GPS for Success: 10 Behavioral Skills of Highly Successful People

Saturday, November 11th – 10:30am to Noon, Ambassador Ballroom



Barry A. Franklin, PhD, FACSM, MAACVPR, FAHA, is the Director of Preventive Cardiology and Cardiac Rehabilitation at William Beaumont Hospital in Royal Oak, Michigan. He also serves as Professor of Internal Medicine, Oakland University William Beaumont School of Medicine. Dr. Franklin is a past editor-in-chief of the Journal of Cardiopulmonary Rehabilitation and Prevention, as well as a past president of the AACVPR (1989) and ACSM (2000). Currently, Dr. Franklin serves on the editorial boards of 15 scientific and clinical journals. He has written or edited more than 600 publications, including 27 books. His latest book is "The Heart-Healthy Handbook" (2017) (www.healthylearning.com). In 2015, he was listed by Thomson Reuters among the World's Most Influential Scientific Minds (Clinical Medicine).

Nearly four decades ago, I became fascinated with a simple question: "Why do some people and organizations thrive while others seem to 'tread water' and merely survive?" After years of formal education, it seemed somewhat paradoxical to me that virtually no college course had prepared me for the "real life" career challenges I'd begun to experience. To find out, I began reading everything I could on success strategies, and carefully studied the "stars" in their respective fields. Were there common behaviors they exhibited on a daily basis? You bet there were! **THE PURPOSE OF THIS PRESENTATION WILL BE TO COVER THE 10 KEY BEHAVIORAL STRATEGIES OF HIGHLY SUCCESSFUL PEOPLE IN ALL WALKS OF LIFE**. The "take home message" in a nutshell? "Opportunities don't happen. You create them." If time permits, we'll also share 2 inspirational videos – guaranteed to have attendees laughing one minute, and crying the next.

Learning Objectives:

1. To provide "words of wisdom" and inspiration that students and young professionals (e.g., instructor or assistant professor level) need to achieve their dreams, by offering "sports-related" motivational stories and uplifting experiences that we can all relate to.
2. To share the 10 common behavioral skills of highly successful people – leaders in all walks of life.
3. To clarify the significance of Malcolm Gladwell's 10,000 hour rule (outliers) – which invariably underlies "success" in virtually every field (i.e., PREPARE, and pay the price).

CEPA Schedule – Friday 8:30am – 3:40pm

Expanding Opportunities for the Clinical Exercise Physiologist

8:30 a.m.
Welcome- Overview and Scope of Practice for the CEP
Kenneth Ecker, Ph.D., FACSM, ACSM CEP/EP-C

8:45 a.m.
What You Need to Know about ACSM Clinical Certifications
Bill Simpson, Ph.D., FACSM, ACSM CEP

9:15 a.m.
How to Get Hired as a CEP. Perspectives from a Cardiac Rehab Director
Hanna Claeys, M.S.

9:30 a.m.
CEP's Working in Cardiovascular Testing
Kelsey Bryant, M.S. ACSM RCEP

9:45 a.m.
Cardiopulmonary Exercise Testing in Patients with Heart Failure – Looking Beyond Peak VO_2
Cemal Ozemek, Ph.D., ACSM CEP

10:00 a.m.
Exercise and PAD
Melissa Cook, M.S., ACSM RCEP

10:15 a.m.
Clinical Exercise Physiology 2022…the broadening role of the clinical exercise physiologist
Steven Keteylan, Ph.D., FAACVPR

11:00 a.m.
Panel Discussion
Kelsey Bryant, M.S., ACSM RCEP
Hannah Claeys, M.S.
Melissa Cook, M.S., ACSM RCEP
Steven Keteylan, Ph.D., FAACVPR
Cemal Ozemek,, Ph.D.
Laura A. Richardson, Ph.D., ACSM RCEP
Bill Simpson, Ph.D., FACSM, ACSM CEP

12:00 p.m.
Lunch

2:00 p.m.
Exercise for the Bariatric Population
Laura A. Richardson, Ph.D., ACSM RCEP

2:20 p.m.
The Effects of Gait Training on Physical Activity, Balance, Confidence, and Self-Efficacy in Individuals with Parkinson's Disease
Amanda Penko, Ph.D. Candidate, ACSM EP-C

2:40 p.m.
Cardio-oncology, Preliminary Results from the HF-PROACTIVE Trial
Dennis Kerrigan, Ph.D., FACSM, ACSM CEP

3:00 p.m.
Exercise Testing in Special Populations Part I - Down Syndrome, Diabetes, Multiple Sclerosis
Garrett Griffith, M.S., MPH, ACSM RCEP

3:20 p.m.
Exercise Testing in Special Populations Part II - Cancer and Pulmonary Disease
Matthew Thomas, M.S., ACSM RCEP, EIM3

***Clinical symposia to follow at MWACSM Annual Meeting**

CEPA members can register for the annual meeting at a discounted rate. To register, please visit the MWACSM website at http://www.mwacsm.org/wordpress/ and click on the Annual Meeting tab.

CEPA Clinical Exercise Physiology Association
ACSM Affiliate Society

CEPA Annual Meeting at MWACSM Annual Meeting
November 10th, 2017
Grand Rapids, MI

CEPA Schedule – Friday 8:30am – 3:40pm (continued)

Bridging the Gap: Translation to Application

Colloquium

CEPA: Updates & Resources for the Clinical Exercise Physiologist

Samuel Headley, Ph.D., FACSM

Peter Ronai, M.S., FACSM

Tutorial

The Relevance of Sedentary Behavior Reduction to the Clinical Exercise Physiologist

Samuel Headley, Ph.D., FACSM

CEPA members can register for the annual meeting at a discounted rate. To register, please visit the NEACSM website at http://www.neacsm.org and click on the Register Here tab.

CEPA Clinical Exercise Physiology Association

NEACSM New England Chapter of the American College of Sports Medicine

NEACSM Fall Meeting
October 19-20, 2017
Providence, RI

CEPA Schedule – Friday 8:30am – 3:40pm (continued)

Obesity and Fitness

Physical Activity and Exercise for Treating Overweight and Obesity
Michael Bruneau Jr., Ph.D., ACSM EP-C, NASM CPT

Endocrine Disruption and Cardiovascular Fitness in Obesity
Peter Hasick, Ph.D.

Physical Activity Interventions in Obese Youth
Jaci Van Heest, Ph.D., FACM

Resistance Training for Special Populations

Peter Ronai, M.S., FACSM, ACSM RCEP, CSCS-D

Gregory Dwyer, Ph.D., FACSM, ACSM RCEP, PD, ETT, CES

*Doug Lentz, M.S., CSCS, RSCC*E*

CEPA members can register for the annual meeting at a discounted rate. To register, please visit the MARCACSM website at http://www.marcacsm.org and click on the Annual Meeting tab.

CEPA Clinical Exercise Physiology Association
ACSM Affiliate Society

MARC ACSM

MARCACSM Annual Meeting
November 3-4, 2017
Harrisburg, PA

Schedule – Friday Morning: Symposia

Symposium #1: Gerald R Ford Room – 8:00-8:50am

Perceptions of Physical Activity of Middle-aged and Older Latinos

Session Moderator: David X. Marquez, PhD, FACSM University of Illinois at Chicago
Presenters: Guilherme M. Balbim[1], Isabela G. Marques[1], Susan Aguiñaga[2]
[1]University of Illinois at Chicago
[2]University of Illinois at Urbana-Champaign

David X. Marquez, PhD, is an Associate Professor in the Department of Kinesiology and Nutrition, and Director of the Exercise Psychology Laboratory in the UIC College of Applied Health Sciences. He earned a doctoral degree and a master's degree in Kinesiology from the University of Illinois at Urbana-Champaign and a bachelor's degree in Psychology from Loyola University Chicago. His research has focused on reducing health disparities and developing physical activity interventions for vulnerable populations. Marquez spends a majority of his time working with the Latino community, older adults and individuals at risk for Alzheimer's disease. In 2016, Marquez was appointed to the 2018 Physical Activity Guidelines Advisory Committee to review scientific research and submit evidence-based recommendations to the U.S Department of Health and Human Services for updates to the guidelines for all Americans. He is a fellow of the American College of Sports Medicine, Society of Behavioral Medicine, and the Gerontological Society of America.

Isabela G. Marques is a PhD Candidate in the Department of Kinesiology and Nutrition at the University of Illinois at Chicago. She received her Post-baccalaureate degree in Adapted Physical Activity and Health from Estacio de Sa University, Brazil, and she earned her Bachelor of Science degree in Kinesiology and her Bachelor of Education in Physical Education from the Maringa State University, Brazil. She had worked as a research assistant in the UIC Exercise Psychology Laboratory in Dr. Marquez's research since 2014. She is the Principal Investigator in a qualitative study aiming to understand older Latinos' perceptions and usage of technology, and she is the PI in a feasibility study that combines a mobile health dance intervention for older Latinos using wearable device and text messaging.

Guilherme earned his Bachelor of Science and Master's degree in Kinesiology from the Maringa State University – Brazil. He held a temporary faculty position at West Parana State University - Brazil. Currently, is pursuing a doctoral degree in Kinesiology with a concentration in Exercise and Health Psychology at the University of Illinois at Chicago. His research interests include the effects of exercise on cognition and brain structure, as well as physical activity promotion among older Latinos and African-American women with asthma. Moreover, also is interested in factors involving the experience of Latino caregivers of people with Alzheimer's disease and related dementia. He is currently assisting Dr. Marquez in data analysis from his R01 funded BAILA dance intervention study with older Latino adults, in the iBAILA (Investigating Brains & Activity to Improve Latino Aging), and assisting Dr. Sharmilee Nyenhuis in the ACTION study, which promotes physical activity among African-American women with asthma.

Susan Aguiñaga, PhD, is a postdoctoral research associate at the University of Illinois at Urbana-Champaign. She earned a doctoral degree, master's degree, and bachelor's degree in Kinesiology from the University of Illinois at Chicago. Susan's research interests include the design and implementation of community-based physical activity and sedentary behavior interventions in older adults, specifically older Latinos.

Purpose: This symposium will present data from cutting edge qualitative studies investigating Latinos' perceptions of physical activity. This work is critical for intervention design and adaptation among a fast growing and inactive demographic group.
Learning objectives
The Latino population has grown faster than other ethnic groups over the last decades in the United States.

Studies have shown that Latinos engage in less leisure time physical activity than non-Latinos. Therefore, it is important to understand the perceptions of physical activity among Latinos, specifically, middle-aged and older Latinos since it is expected that they will account for 22% of the U.S. population by 2060. Thus, the learning objectives of the proposed session are: (1) provide information about past, current, and desired physical activity engagement of Latino caregivers, (2) inform the attendees about middle-aged and older Latinos' perceptions of technology and physical activity, and (3) describe behavioral strategies (e.g., physical activity and sedentary behavior) used and suggested by older Latinos to improve brain health.

Title: Introduction
Speaker: David X. Marquez, PhD, FACSM
Description: Dr. Marquez will introduce the speakers and format of the session and provide a brief overview of the rationale for intervening in Latino populations.

1. Title: Past, present, and desired physical activity engagement by middle-aged and older Latino caregivers
Speaker: Guilherme M. Balbim, MS
Purpose: Mr. Balbim will present data on past, present and desired physical activity (PA) described by middle-aged and older Latino caregivers caring for a relative with Alzheimer Disease or related dementia (ADRD). Caring for a person with ADRD is considered a chronic stressor, given the challenging responsibilities, experiences of enduring stress and frustration. Benefits of regular PA can significantly offset the negative effects of stress with a positive impact on well-being and quality of life for the caregivers. The data is derived from semi-structured interviews conducted with 16 participants aged 50 years and older (60 ± 8.5 years old), who had been caring for a relative with ADRD for at least 4 hours per day for the last 6 months. The interviews were conducted in English and Spanish and covered topics such as caregiver role, family, and social support, coping strategies and PA. Results suggest that
middle-aged and older Latino caregivers are aware of the PA importance to their health and as a strategy to cope with caregiver strains. Moreover, increasing leisure time PA in the future was mentioned as a desired healthy behavior. Guilherme M. Balbim received his Master's degree in 2013 at the Maringa State University (Brazil), and held a temporary faculty position at the West Parana State University (Brazil) from 2014 to 2016. Mr. Balbim is currently a Doctoral Student with Dr. David X. Marquez at the University of Illinois at Chicago.

2. Title: Older Latinos' Perceptions of Technology and Physical Activity
Speaker: Isabela G. Marques, BS
Purpose: Ms. Marques will present data on perceptions of technology and physical activity by middle-aged and older Latinos. Mobile health is being increasingly used in behavioral interventions; however, more research is needed about older Latinos' perceptions and use of technology. Data presented are results of six focus groups conducted with 27 community-dwelling, Spanish speaking middle-aged and older Latinos, who had a cell phone. Discussions involved barriers and motivators to engage in technology use, daily technology usage, and perceptions of a physical activity wearable tracker. Focus groups were audio recorded, transcribed, translated, and directed content analysis was conducted. Participants also completed demographic questionnaire and a technology survey. Most participants reported engaging in regular physical activity, mainly dancing and walking, and stated that using technology, such as physical activity wearable trackers, can increase physical activity participation. Isabela G. Marques is a Doctoral Candidate with Dr. David X. Marquez at the University of Illinois at Chicago where she served as a research assistant since 2014.

3. Title: Perceptions of Physical activity and Sedentary behavior on Brain Health among older Latinos with Mild Cognitive Impairment
Speaker: Susan Aguiñaga, PhD

Purpose: Dr. Aguiñaga will present data on the perceptions of physical activity and sedentary behavior among a group of older Latinos who participated in a Latin dance intervention. Although, older Latinos experience Alzheimer's disease symptoms 6.8 years earlier and are 1.5 times more likely to have Alzheimer's disease compared to non-Latino whites, gaps remain on the perceptions of health behaviors on brain health. Two focus groups (n=7, n= 6) were conducted among older, Spanish speaking Latinos (75.4 ± 6.3 years old; 22.4± 2.8 MMSE score). Focus groups were audio-recorded, transcribed verbatim in Spanish and translated to English; a directed content analysis was used to analyze the data. Results from the focus groups suggest that older Latinos have memory loss concerns. Participants suggested strategies (e.g., walking, social networks, listening to music, and limiting TV watching) to prevent and improve cognitive decline. Understanding multicultural views of physical activity and sedentary behavior may help inform interventions that seek to improve brain health among underserved populations. Dr. Susan Aguiñaga is a Postdoctoral Research Associate at the University of Illinois at Urbana-Champaign.

Symposium #2: Pantlind Ballroom – 8:00-8:50am

HOW TO FIND AND COMPETE FOR MAINSTREAM, UNIQUE, AND ATYPICAL EXERCISE AND SPORT SCIENCE CAREERS

Session Moderator:
Presenters: Andy Bosak

Andy Bosak, Ph.D., EP-C, CSCS, *D is the director and professor of the Graduate Exercise Science Program in the Department of Health Professions at Liberty University. Dr. Bosak earned BS and MS degrees in Physical Education (Emphasis: Exercise Science) from Western Kentucky University and completed a Ph.D. in Human Performance/Kinesiology (Emphasis: Exercise Physiology) at the University of Alabama. Dr. Bosak has presented his research and related works at various conferences with over 100 primary presentations. Dr. Bosak is an occupational performance specialist with the Lynchburg City Fire Department Cadets/Recruits and was previously a sports scientist for the Professional Referee Organization.

With graduation nearing, students often worry what their immediate future may hold specifically regarding new employment. To reduce the fears and stress of a new career, it is crucial that students begin their search very early to determine the right career for them. But, with so many careers to pick from, with many being unique and atypical, how does a student decide what job might be right for them?

This symposium's purpose is to acquaint students with the nuances of competing for mainstream, unique, and/or atypical careers in human performance, exercise and sport science, and related fields. This presentation will 1) outline various tasks that students should accomplish in order to be competitive for today's careers and 2) serve as a "help-session" to assist students with where to look for mainstream, unique, and atypical careers, how to apply, and how to obtain their desired job/career.

The main learning objective for this symposium is that session attendees, specifically students, will understand how they can maximize their efforts in areas such as academics, internships, certifications, volunteer service, research/scholarship, and awards in order to enhance their portfolios, resumes, and CVs so that they can be more competitive in the present and future job markets.

This presentation is intended for current graduate and undergraduate students as well as recently graduated young professionals who are looking for employment or who are new assistant professors and are seeking

ways to advise their current students for future careers.

<u>Symposium #3:</u> Imperial Ballroom – 7:30-8:20am

Setting Students up for Success: Advancement in Exercise Science Curriculum

Session Moderator:
Presenters: Cassandra Ledman, ACSM and Lane Yahiro of Purdue University

Cassandra Ledman, MS, ACSM CEP, ACSM EIM is a Clinical Assistant Professor in the Department of Health and Kinesiology at Purdue University and an ACSM Certified Clinical Exercise Physiologist. She has over 10 years of experience in the clinical exercise physiology field where she has worked for Lutheran Hospital, Cleveland Clinic and IU Health. During her time in the field she specialized in diagnostic stress testing and cardiopulmonary rehab. Cassandra received her undergraduate degree from Purdue University in Health and Fitness and her master's degree in Clinical Exercise Physiology from Ball State University. Cassandra has been with Purdue since July 2016 and is honored to be in the educator role where she can help prepare students to become leading young professionals in the field by providing optimal education, skill building and experiential learning opportunities.

Lane Yahiro, MS, ACSM, is a Clinical Associate Professor and Director of the Ismail Center at Purdue University. He has over 30 years of experience in the areas of fitness, health and wellness. His specialty is in cardiopulmonary rehabilitation where he has worked at both Rush-Presbyterian St. Lukes Medical Center in Chicago and Franciscan Alliance in Lafayette, Indiana. Lane earned his undergraduate degrees in Biology and Psychology from the University of Illinois – Chicago and his Master's degree from George Williams College in Exercise Physiology. He is a member of the American College of Sports Medicine and the Medical Fitness Association. Lane is honored to have the privilege to give back to the community as he prepares students to enter the fitness, health and wellness fields. He lives in West Lafayette with his wife Sarah and has 3 children.

The Department of Health and Kinesiology at Purdue University has established a unique program for their students, and would like to share these advancements with others. The College of Health & Human Sciences and the Department of Health & Kinesiology at Purdue University have been working on adapting curriculum and coursework to set students up for success.
Individuals with strong clinical and academic backgrounds developed the program. Cassandra Ledman, MS, ACSMP CEP and Lane Yahiro, MS worked in the clinical exercise physiology setting as clinicians for many years, while Tim Gavin, PhD, FACSM has developed and coordinated multiple exercise physiology and health and kinesiology programs. Together they have used their understanding of the demands of the exercise physiology profession and the academic world requirements to make these curriculum changes.

Two unique changes that the program has undergone include:

1. The merging of two degrees into one: Movement and Sport Sciences & Applied Exercise and Health become Kinesiology.
2. Creation of an applied concentration in Clinical Exercise Physiology that incorporates a wealth of experiential learning and instructional opportunities.

Primary Purposes and Learning Objectives:

- Evaluate current & past exercise science curriculum
- Share Purdue's approach to improving curriculum and 'setting students up for success'
  - Value of a Clinical Exercise Physiology degree concentration
  - Importance of experiential learning and service in coursework
- Discuss other approaches achieving positive outcomes and brainstorm potential future opportunities for

continued growth within the exercise science curriculum.

- Apply presented concepts involving succinct degree paths and experiential learning to set students up for success in their future professions.

Purdue's approach to setting students up for success:
The Kinesiology Degree: An All-Encompassing Degree Path:

Starting in Fall of 2017 Purdue's Movement and Sport Sciences and Applied Exercise and Health degrees will merge into one degree, Kinesiology, to create a more succinct path with more course possibilities. The students in Kinesiology will have the option of selecting a concentration in Clinical Exercise Physiology (CEXP), where students will take 35 credits of clinically oriented exercise physiology course work in preparation for ACSM Certified Clinical Exercise Physiologist (CEP) credentialing (see below).

Purdue's previous degree pathways, which are typical of many universities, were very specific and did not provide students with much flexibility to modify degree paths, even within their general field. For example, our degree in Movement and Sport Sciences was research oriented and provided a solid coursework that would enable students to apply for Graduate/Professional School. The Movement and Sport Sciences degree, however, had little applied/hands-on coursework and left students with little option of employment with just their B.S. degree. Our Applied Exercise and Health degree had an abundance of applied/hands-on coursework and prepared students for professions in fitness and wellness, but limited students' ability to apply for Graduate/Professional School due to not having the required courses in their curriculum. The Kinesiology degree curriculum is designed to include courses typically required
to apply for professional school, such as Physical Therapy (PT), Occupational Therapy (OT), Physicians Assistant (PA), and Medical School. The inclusion of the optional concentration in Clinical Exercise Physiology provides the applied clinical coursework to not only make students better prepared for professional school, but also provide students employment options with their B.S. degree.

CXEP Concentration prepares for ACSM CEP certification exam
Students completing the concentration in Exercise Physiology are ensured of having all the KSA's and clinical hours required to successfully take and pass the ACSM CEP certification exam.
The course work is highlighted here: Clinical Exercise Physiology Concentration (35 Credits)
_____(2) HK 22100 Foundations for the Fitness Professional
_____(3) HK26100 Applied Anatomy & Kinesiology
_____(1) HK26900 Career Development & Preparation for the Health and Fitness Fields
_____(2) HK 31800 Strength and Conditioning and Exercise Instruction across the Lifespan
_____(1) HK41100 Clinical Applications of Health/Fitness Concepts III
_____(3) HK42100 Health Screening & Fitness Evaluation
_____(3) HK42200 Basic Concepts in Exercise Program Design
_____(3) HK48500 ECG, CVD & Exercise
_____(3) HK46900 Exercise Testing & Prescription in Special Populations
_____(9) HK49201 Professional Practicum Cumulative Internship
_____(3) NUTR30300 Essentials of Nutrition

Experiential learning Dominates Coursework

As one can see, students are involved in a wealth of experiential learning. They are working directly with clients that are not their classmates, in multiple classes. In HK 31800 and HK 41100 students apply the skill sets learned in previous classes by creating and implementing exercise programs/classes for: strength and conditioning clients, group personal training sessions, and older adult group and individual exercise sessions. The students have the advantage of working with multiple populations by instructing college age students

taking elective fitness classes and older adults at our AH-Ismail Center for Health, Exercise and Nutrition. Students receive a very strong foundation in exercise prescription and testing for healthy and special populations in HK 42100, HK 42200 and HK 46900. The ECG, CVD & Exercise class provides the students with additional skill sets in ECG interpretation and diagnostic exercise testing. The concentration is finalized with the completion of a cumulative Internship of the students' choice, where they fulfill 400 additional hours in a clinical/professional setting and obtain more real-life experiences.

Cross-linked Courses Provide Service & Instructional Opportunity and Physical Activity Promotion & Education in One Setting:

The HK Students completing the concentration in CXEP will take a course, HK 31800, in which they instruct a variety of different exercise sessions and setting with other students and older adults. The students they are instructing are enrolled in PES 11400, Exercise and Fitness; and the older adults are members of the Ismail center, an adult fitness center on Purdue's campus. These classes meet at the same time, and serve as the HK students' lab/clinical days. Cross-linking the courses has enabled the HK students to enhance their exercise programming and instructional skills with 'real clients' while also promoting physical activity and wellness to the PES 11400 students and Ismail participants.

Curriculum Advancements for the Future of Young Professionals in Exercise Science

Our previous degree model, locked students into distinct career paths early in their academic career. We have developed a single degree in Kinesiology that provides greater flexibility to our students wishing to pursue clinical exercise science and be prepared for professional school. In addition, our optional concentration in Clinical Exercise Physiology utilizes a unique model of experiential/service-learning that provides students with valuable clinical skill across a range of populations. We believe this model increases the potential for success of our students and produces graduates fluent in both basic and applied kinesiology.

Symposium #4: Pantlind Ballroom – 9:00-9:50am

Adapting Alternative Pedagogies Fostering Student Engagement: A Response to Stepping Out of Your Comfort Zone

Session Moderator:
Presenters: Katherine E. Clark, Judith A. Juvancic Heltzel, and Laura A. Richardson

Katherine E. Clark, Ph.D. is an associate professor of Exercise Science in the Department of Human Performance and Sport Business at the University of Mount Union. Her previous research interests have included the effects of sleep deprivation on thermoregulation and the effects of caffeine on anaerobic performance. She is a Certified Exercise Physiologist and has collaborated with multiple community partners to establish nearly a dozen exercise programs for various populations.

Judith A. Juvancic Heltzel, PhD is an associate professor in the Exercise Science department at The University of Akron. Her research efforts are focused on behavior modification and how to empower individuals to take control of their personal health and wellness. She also has over 30 years clinical experience as a registered medical technologist and managed a cardiac rehabilitation program. And is a Certified Exercise Physiologist. Additionally, she mentors interprofessional students with numerous ongoing community wellness programs.

Laura A. Richardson, PhD is a professor of instruction at The University of Akron in the Exercise Science program and

an American College of Sports Medicine Registered Clinical Exercise Physiologist. Her research interests are obesity stigmatization and fat bias with emphasis on students' perceptions of weightism. As an educator, Dr. Richardson is dedicated to innovative pedagogy, fostering online teaching and learning initiatives, digital course materials and interprofessional collaboration. In addition to academia, she has over 20 years of clinical experience in healthcare as an RCEP practitioner working with patients diagnosed with: immunological, metabolic, pulmonary, neuromuscular, cardiovascular and orthopedic disorders using exercise as a mode of therapeutic intervention. Laura's expertise with is working with Bariatric patients utilizing behavior modification strategies for lifelong weight management success.

Learning objectives:

1. Review technology and innovative pedagogical strategies commonly implemented in the Exercise Science educational setting(s).
2. Provide an overview of survey data collected denoting faculty and student perceptions and perspectives related to technology and innovative pedagogical strategies.
3. Discuss what this means for faculty and students in the Exercise Science educational setting(s).
    a. Identify benefits
    b. Identify barriers
    c. Identify successful implementation strategies
    d. Identify possible alternative implementations

Narrative: This presentation provides an interactive panel discussion regarding student and faculty perceptions of implementing technology, digital literacy, and/or experiential learning inside and outside of the classroom.

Selecting appropriate pedagogies for the meaningful engagement of today's college students can be challenging. Employers of the 21st century are seeking employees who possess more than just field specific knowledge and skills to be successful in achieving long-term success and career advancement (Hart, 2013); skills such as critical thinking, complex problem solving, and communication and collaboration. Traditional classrooms may not always expose students and therefore, additional pedagogical strategies may need to be employed. Adequate preparation to meet the advances and challenges in our rapidly evolving profession requires mutual collaboration and open mindedness by both faculty and students alike.

While a wealth of research exists examining the implementation of technology, digital literacy, and/or experiential learning pedagogies within higher education settings, limited data are available specifically exploring the implementation and perceptions of these pedagogies in the Exercise Science classroom. Respondents (N=51) were surveyed to capture perceptions related to these pedagogical technologies and strategies. Faculty (N=22) and students (N=29) provided insight on the use of technology and experiential learning pedagogies in and out of the Exercise Science educational setting to identify their effectiveness and potential barriers to learning and retention of knowledge.

Symposium #5: Pantlind Ballroom – 10:00-10:50am

PROFESSIONAL DEVELOPMENT THROUGH PRACTICUM EXPERIENCES IN FITNESS: EXPLORING CAREER OPTIONS FOR KINESIOLOGY MAJORS IN THE PERSONAL TRAINING FIELD

Session Moderator:
Presenters: Robyn Becker[1], Garett Griffith[2]
[1]Malcolm X Community College, Chicago, IL; [2]Integrative Physiology Laboratory, Chicago, IL

Robyn L Kretschy Becker is the Program Director for Personal Fitness Training program at Malcolm X City Colleges of Chicago (MXC), adjunct professor with Loyola University in the exercise science program, and has worked as owner and lead personal trainer in her business Healthy Results for over 15 years. Robyn has worked with a diverse population and receives referrals from physicians, showcasing the Exercise is Medicine model. At MXC, Robyn has piloted and expanded an on-site practicum for students to learn to be personal fitness trainers and bridged with all the program's partners, including Garett Griffith from the Integrative Physiology Laboratory, to ensure a well-rounded education.

Garett Griffith has worked in several Indianapolis-area fitness centers as a Personal Trainer, and obtained his first master's degree from Ball State in Clinical Exercise Physiology. He is currently the Laboratory Manager and Senior Research Specialist for the Integrative Physiology Laboratory at the University of Illinois at Chicago, where he directs practicum and experiential learning opportunities in primary prevention, health and fitness assessment, and health consultations.

LEARNING OBJECTIVES: 1) To describe ways in which MXC has designed an innovative student experience for students pursuing a certificate in Personal Fitness Training; 2) To highlight some unique career paths within the health and fitness industry; 3) To inform students attending the 2017 MWACSM how they can best prepare for a career in this field.

INTRODUCTION: The constantly evolving healthcare landscape continues to put more and more emphasis on prevention as a primary area of focus. This is happening at a time when rates of chronic diseases such as obesity, hypertension, and diabetes are on the rise. These two factors, in addition to other forces in the marketplace, are creating an increase in demand for personal fitness trainers. In order to successfully secure a job after graduation from a formal academic program, students must have a thorough knowledge of what opportunities are available. This creates a need for academic administrators and industry partners to work together to provide hands-on, practicum-based learning opportunities so the next generation's fitness-industry workforce is well-equipped to meet the health- and fitness-related needs of the public.

PURPOSE: To expose exercise science/kinesiology majors, personal fitness training students, and other health- and fitness-based program attendees to the wide variety of career paths available to them after graduation.

COLLABORATION: MXC has developed mutually beneficial partnerships with local industry-leaders in the health and fitness industry. Through an innovative field-based practicum structure, students enrolled in the Personal Fitness Trainer program at MXC are able to refine their skills, build their knowledge, and explore career opportunities outside of the traditional classroom.

METHODS: MXC offers a one semester, 17 credit personal fitness training basic certification preparation program. The program is designed to provide the most comprehensive and practical program in one term, driven by the needs and definitions of "fitness trainer" in the labor market. Traditional coursework includes English, Health and Fitness, Assessment, and Anatomy & Physiology classes. While enrolled in these courses, students are required to obtain 80 hours of practicum-based field experience, directly supervised by program members or industry partners in unique health and fitness settings around the city. Students become eligible for the recently developed on-site practicum opportunity after week 4 of the semester, and after successful demonstration of standardized fitness assessment protocols per national certifying bodies' standards.

Students are required to complete 80 hours of practical experience before the semester ends, attend several

required seminars which include sales and business practices, populations with special considerations, aerobic capacity testing, nutrition, functional training and mock interviews at the very end of the semester.

One unique focus of the on-site practicum is providing the student interns, with the opportunity, under supervision, to work independently with real clients, rather than with their classmates or mock personal fitness training sessions. By encouraging students to perform the duties as interns providing "real" clients such as faculty, staff and students with professional personal training services, the interns are presented with a variety of clientele with many special considerations, including diabetes, obesity, hypertension, joint issues, and self-efficacy building.

These seminars are presented by members of the Program Advisory Committee (PAC). Members include individuals from partners such as University of Illinois Integrative Physiology Laboratory as well as Nutrition program, Chicago Athletic Clubs, Fitness Formula Clubs and boutique studio owners such as The Space. This gives students exposure to other areas of the field, potential employers, and a variety of instructional methods to apply back to the classroom material. At the end of the semester, student interns submit a portfolio that showcases their performance and experience in the practicum and sit for the certification exam.

Measurements of progress that have been used are certification exam pass rate, reported knowledge base of students moving into next program based on faculty feedback, and breakdown of certification performance per domain for students who did not pass.

RESULTS: Pass rate of accredited personal certification exam improvement by 47%, exceeding the national average in 1 semester. Placement dropped 7%, reported as of June 14, 2017, which includes matriculation into the Physical Therapist Assistant and Massage Therapy programs, as well as employment placement into the field with partners such as Fitness Formula Clubs and Chicago Park District. This measurement is monitored on a continuous basis through outreach to program completers through the Career Services department and surveys from the Personal Fitness Training department.

IMPACT: The impact of the on-site practical experience for students seeking to either become personal fitness trainers or build a knowledge base into other programs such as Physical Therapist Assistant and Massage Therapy, is to provide the following: Hands on learning experience, service the college's community in awareness and gaining health through fitness, building relationships with PAC, exposing students to a variety of careers through earning the Basic Certificate and providing students with credentials and experience to gain employment in the fitness field upon completion of a one semester program. Ultimately, the long-term impact of this innovative program structure is to elevate the quality of education provided to personal fitness trainers and to improve the job awareness, industry-specific skill set, and professional aptitude for those enrolled in this program. Through these collaborative practicum experiences in diverse and unique fitness settings, these students are learning to think critically and independently, and are given opportunities to thrive in their current roles as well as future endeavors. Students and young professionals in this field should seek out similar opportunities both inside and outside of the traditional classroom in order to find their niche in the health and fitness community.

<u>Symposium #6:</u> Pantlind Ballroom – 11:00-11:50am

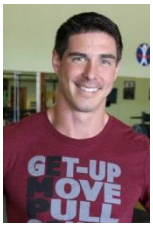
Student Colloquium: Exploring Career Options - What's the Right Path for You?

Session Moderator: Kerri Vasold
Presenters: James R. Sackett, Justin Grinnell, Tamara Duby-Sheahan, Meghan Baruth, Lucie Silver, and Alexander HK Montoye

Undergraduate Student Panelists

James R. Sackett, M.S, Center for Research and Education in Special Environments, University at Buffalo, New York is a doctoral candidate at the University at Buffalo in Buffalo, New York. James received a Bachelor's degree from Adrian College in Exercise Science in 2013 and a Master's degree from Ball State University in Exercise Physiology in 2015. James currently works in the Human Integrative Physiology Laboratory in the Center for Research and Education in Special Environments under Dr. Blair Johnson where his primary research focus is on ventilatory control and carbon dioxide retention during water immersion in humans. Other research interests of James' include concussion physiology, thermal physiology, and diving physiology.

John Zubek, PT, MS, DPT, Michigan State University, East Lansing, Michigan, is an Assistant Professor of Physiology at Michigan State University serving as the Course Director for an undergraduate physiology lab for pre-healthcare professionals. He has been teaching anatomy and physiology related courses for over 17 years, and has been a licensed physical therapist for almost 10 years. He continues to work with patients in both an inpatient and outpatient clinical setting. Due to the variety of positions he has held in higher education, philanthropy and healthcare, John enjoys working with students to help them find their most practical path to reach their own career goals.



Justin Grinnell, Owner, State of Fitness, East Lansing, Michigan, is the founder of two businesses: State of Fitness, an East Lansing personal training facility and Jackson State of Fitness, a corporate wellness personal training facility serving over 2,600 employees. He is a featured writer for Muscle & Fitness Magazine, and has authored multiple e-books related to health and personal training. He serves on the Personal Training Advisory Board for Retro Fitness and KokoFit Clubs, and has over 30,000 hours of personal training experience. Additionally, as an alumni of Michigan State University's Kinesiology program, Justin has mentored over 300 students in his internship program.

Graduate Student Panelists

Meghan Baruth, PhD, Saginaw Valley State University, University Center, Michigan is an Assistant Professor of Health Science at Saginaw Valley State University. Dr. Baruth earned her PhD in Exercise Science at the University of South Carolina and completed a post doc at the University of South Carolina. Her research interests lie in the area of community-based, behavioral, physical activity interventions. She has worked with diverse populations, with the most recent projects focusing on pregnant women. During her time at SVSU, Dr. Baruth has secured both internal and external funding and has continued to publish in peer-reviewed journals.

Lucie Silver, MS, RCEP, Exercise Physiologist/Clinical Specialist at Helen DeVos Children's Hospital Healthy Weight Center, Grand Rapids, Michigan, received her bachelor's degree from Adrian College in Exercise Science. As an undergraduate, she assisted with exercise laboratory testing, participated in Kinesiology Club and attended both Michigan and Midwest chapters of ACSM. She then earned her Master's Degree in Kinesiology from Michigan State University. As a graduate student, she helped with Girls on the Move, an afterschool program for middle school girls in the Lansing area public schools. For the past 5 years, she has worked at the HDVCH Healthy Weight Center, providing daily healthy lifestyle counseling and exercise prescription, and leading an exercise program at the local YMCA.

Alexander HK Montoye, PhD, Alma College, Alma, Michigan, received his undergraduate degree in Exercise and Health Science and Mathematics from Alma College in 2010 and his PhD in Kinesiology from Michigan State University in 2014. His first faculty position was at Ball State University, where he taught in the Clinical Exercise Physiology master's program for two years before returning to Alma College as faculty in 2016. He is currently an Assistant Professor in the Integrative Physiology and Health Science department. Dr. Montoye's research focus is validating and using wearable activity monitors to monitor and improve health and sport performance.

Narrative:
The student colloquium will be split into two different tracks - one for graduate students and one for undergraduate students. Panels for each track will consist of 3 professionals from various aspects of the field, and each panelist will address the students individually as well as contribute to questions asked at the end of the sessions.

Purpose: To introduce undergraduate and graduate students to various career options in the field, and provide an opportunity for students to get feedback and suggestions from professionals in various positions.

Learning Objectives:

1. To introduce undergraduate students to career options following completion of their degree, including applying to graduate schools, corporate wellness, and starting your own fitness business.
2. To introduce graduate students to different career options inside and outside of academia, including exploring different types of universities, post-doctoral studies, and careers outside of academia.
3. To allow all students a chance to ask questions and network with professionals in various fields.

Schedule – Friday Morning: Free Communication/Slides

Free Communication/Slides #1: Gerald Ford Room – 9-10:00am

9:00-9:15am

ASSOCIATIONS AMONG AGE, PHYSICAL ACTIVITY, AND SERUM RESISTIN AND ADIPONECTIN LEVELS

Caitlyn A. Thomas (Miami University), Keenan R. Herman (Miami University), Kaitlin M. Frindt (Miami University), Jennifer L. Shine (Miami University), Victoria E. Warren (Miami University), Kevin Ballard (Miami University), Kyle L. Timmerman (Miami University)

Abstract Adipose tissue was once considered a passive reservoir for energy storage, but now it is viewed as an active endocrine organ secreting adipokines such as resistin and adiponectin. Resistin tends to be inflammatory in nature, while adiponectin tends to be anti-inflammatory, with both being related to insulin resistance. Few researchers have examined the impact of age and physical activity level on serum resistin and adiponectin within the same study. Thus, the Purpose of this study was to assess the relationships among age, physical activity level, and resistin and adiponectin levels in healthy young and older adults. Methods: A convenience sample was used consisting of 20 young (10 M/10 F; age: 21.0±1.2y; BMI: 24.3±4.5 kg·m-2) and 20 older (6 M/14 F; Age: 68.4±4.0y; BMI: 25.5±3.1 kg·m-2) adults. Physical activity frequency and intensity were determined in young and older subjects using the International Physical Acitivty Questionnaire (IPAQ) and the Community Healthy Activities Model Plan for Seniors (CHAMPS), respectively. Enzyme-linked immunosorbent assays were used for the detection and quantification of serum resistin and adiponectin. Results: Young and older subjects had average resistin levels of 3.49 ± 0.97 ng·mL-1 and 2.97 ± 0.69 ng·mL-1; and adiponectin levels of 101.40 ± 61.65 ng·mL-1 and 106.03 ± 59.39 ng·mL-1, respectively. Physical activity level was not correlated with either resistin or adiponectin. Resistin tended to be lower in older compared to young subjects (p= 0.056). There was no significant difference in adiponectin levels between young and old subjects (p= 0.57). Adiponectin was correlated with BMI within both groups (old: r = -0.45, p = 0.034; young: r = -0.46, p = 0.043) and when old and young subject data were combined (r = -0.45, p = 0.004). Conclusions: Body composition appears to be more predictive of serum levels of the anti-inflammatory adipokine, adiponectin, than either age or physical activity level. Surprisingly, resistin, a pro-inflammatory adipokine, was lower in older compared to young adults. Future studies with larger sample sizes and objective measures of physical activity level are warranted to better understand the relationships among age, physical activity level, and the expression of these adipokines.

Keywords: inflammation, adipokines

9:15-9:30am

EVALUATING THE CONTRIBUTION OF LOWER EXTREMITY KINETICS TO WHOLE BODY POWER OUTPUT DURING THE POWER SNATCH

Kyle D. DeRosia (Western Michigan University), Landon Lamie (Western Michigan University), Timothy J. Michael (Western Michigan University), Nicholas J. Hanson (Western Michigan University), Carol A. Weideman (Western Michigan University), Sangwoo Lee (Western Michigan University)

Abstract PURPOSE: The purpose of this study was to investigate the relationship of lower extremity (hip, knee, and ankle) net joint torques (NJT) to whole body power output (WBP) during the power snatch (PS). Information gathered from this study could be used by strength and conditioning and/or weightlifting coaches to gain a better understanding of the PS biomechanics. This improved understanding could lead to better coaching of athletes and, in turn, increased performance by the athletes in competition or sport. METHODS: Ten experienced weightlifters (five male and five female) were recruited for the data collection. Each weightlifter performed five trials of the PS with 60% of his/her self-reported one repetition maximum. Lower extremity NJT and WBP were gathered via a three-dimensional motion analysis and were used to evaluate the data. Pearson correlation coefficients were obtained to investigate the relationship of NJT to WBP. A stepwise multiple-regression analysis was used to assess the contribution of lower extremity NJT to WBP, with the independent variables being the hip, knee, and ankle NJT. RESULTS: A significant positive correlation existed between hip NJT and WBP ($r = 0.47$, $p < 0.01$). Knee NJT had a significant negative correlation with WBP ($r = -0.34$, $p < 0.05$). A significant inter-correlation between hip NJT and knee NJT ($r = -0.66$, $p < 0.01$) was also observed. CONCLUSION: Hip NJT was identified as a significant contributor to WBP during the PS. This study suggests that, to improve WBP during the PS, athletes should strengthen the hip extensor muscles as well as train skills to effectively utilise the hip extensors.

Keywords: power snatch, joint torque, power, ground reaction force

9:30-9:45am

THE ASSOCIATION OF BODY COMPOSITION WITH CARDIOMETABOLIC RISK FACTORS IN APPARENTLY HEALTHY YOUNG ADULT FEMALES

Samantha C. Orr (Oakland University), Elise C. Brown (Oakland University), Ryan T. Tyler (Oakland University), Timothy Rengers (Oakland University), Mary A. Elsesser (Oakland University), Tamara Hew-Butler (Oakland University), Charles R.C. Marks (Oakland University)

Abstract Although risk factors associated with cardiometabolic diseases (CMD) are oftentimes detected in young adults, most of the research examining these relationships has focused on middle-aged and older adults and those “at-risk” for chronic diseases. Given the U.S. trend of increased obesity prevalence with age and the high prevalence of metabolic abnormalities in normal-weight young adult females, understanding the link between body composition and CMD risk in healthy young females is important for developing intervention strategies for prevention of obesity and CMD diseases. PURPOSE: Therefore, the purpose of this study was to examine the associations of body composition with CMD risk factors in apparently healthy young adult females. METHODS: Twenty-five non-obese [body mass index (BMI) < 30 kg/m2] apparently healthy females (22.6 ± 4.2 years) participated in this cross-sectional study. All participants had height, weight, waist circumference (WC), body composition using Dual-energy X-ray Absorptiometry, resting heart rate (HR), blood pressure, and fasting biomarkers assessed. Bivariate correlations using Spearman’s rho were used examining the relationships of CMD risk factors with anthropometric obesity indices and body composition. Significance was set a priori at $P \leq 0.05$. RESULTS: Significant associations were found between waist-to-height ratio (WHtR) and resting HR (Spearman’s $\rho = 0.436$, $P = 0.03$), cholesterol ($\rho = 0.404$, $P = 0.04$), low-density lipoprotein cholesterol (LDL-C) ($\rho = 0.475$, $P = 0.02$), and glucose ($\rho = 0.485$, $P = 0.01$); BMI and resting HR ($\rho = 0.41$, $P = 0.04$), cholesterol ($\rho = 0.437$, $P = 0.03$), and LDL-C ($\rho = 0.477$, $P = 0.02$); total body fat percentage and resting HR ($\rho = 0.636$, $P = 0.001$); bone mineral content and glucose ($\rho = -0.536$, $P = 0.007$); and lean mass and glucose ($\rho = -0.461$, $P = 0.02$). WC was not significantly associated with any of the CMD risk factors. CONCLUSION:

While WHtR was correlated with more CMD risk factors than other measures of body composition, the strongest correlation was found between total body fat percentage and resting heart rate. This data suggests that body composition may play an important role in CMD health in young adult females even when classified as apparently healthy and non-obese.

Keywords: Waist-to-height ratio, biomarkers, DXA, total body fat

9:45-10:00am

CARDIOVASCULAR FITNESS, BODY COMPOSITION, AND ADHD DIAGNOSIS AMOUNT YOUTH IN NHANES 2001-2004

Lundon C. Burton (University of Illinois at Chicago), Thessa Hildenkamp (University of Illinois at Chicago), Eduardo E. Bustamante (University of Illinois at Chicago),

Abstract Purpose: The study investigated the relationship between cardiovascular fitness, body composition, and ADHD diagnosis. Obesity and ADHD are highly comorbid—ADHD children are twice as likely to become obese adults than typically developing peers. However, the role of physical fitness in this relationship remains unexplored. Methods: Youth age 12-19 years old (N=4,790) participating in the National Health and Nutrition Examinations Survey (NHANES) 2001-2004 were included. Parents reported demographics and whether their child had ever been diagnosed with ADHD. Children underwent examinations of body fat percentage via bioelectrical impedance and estimated VO2 max via a submaximal treadmill test. Chi-square analyses and t-tests assessed differences between ADHD and typically developing (TD) youth on fitness and composition. Significantly different variables entered a logistic regression analysis with ADHD diagnosis as the dependent variable and estimated VO2 max, percent body fat, age, race/ethnicity, gender, and household income as predictors. Results: Males were 3 times more likely to be diagnosed with ADHD than females (12% vs. 4%) (β=1.109, Exp(B)=3.03, $p < .001$). Non-Hispanic Whites were more likely to have been diagnosed with ADHD (13%) compared to Mexican Americans (4%) and Non-Hispanic Blacks (7%); they were also more likely to have seen a mental health professional in the last year (13%), compared to Blacks (8%) and Mexican Americans (6%). Children diagnosed with ADHD evidenced significantly higher VO2 max than typically developing peers (45.3 ml/kg/min vs. 42.0 ml/kg/min; t= -5.00, p<.001) and lower % body fat (26% vs. 29%; t=4.83, p<.001). In regression analyses age, gender, and estimated VO2 Max were related to ADHD, while body fat %, race/ethnicity, and household income were not. For each 1ml/kg/min increase in VO2 max odds of ADHD diagnosis increased by 2% (β=.017, Exp(B)=1.02, p< .01). Conclusion: The associations between ADHD, physical fitness and percent body fat were in the opposite direction of hypotheses and previous literature. This may be a function of ADHD diagnosis as the outcome, rather than symptoms. The unfortunate reality, is that low-income and racial/ethnic minority children are less likely to be diagnosed and more likely to be obese and unfit. Future studies should directly assess ADHD.

Keywords: Childhood, Obesity, physical activity, Mental Health

Free Communication/Slides #2: Gerald Ford Room – 10-11:00am

10:00-10:15am

CORRELATIONS AMONG SUBJECTIVE VS. OBJECTIVE PHYSICAL ACTIVITY, DIET, AND MEDICATION USE IN

OLDER ADULTS

Victoria E. Warren (Miami University), Kelsey D. Loss (Miami University), Alexis N. Heldt (Miami University), Kyle L. Timmerman (Miami University),

Abstract Due to the increased burden of chronic disease, prescription medication use in older adults is high. This rise in the use of multiple medications (polypharmacy) is concerning due to its relationship with adverse drug related events (ADEs), drug-drug interactions, and increasing healthcare costs. Level of physical activity (PA) and habitual dietary nutrient intake are lifestyle factors that may influence prescription medication use and associated complications. The PURPOSE: of this study was to identify correlates among physical activity level measured subjectively and objectively, habitual nutrient intake, and prescription medication use in older adults. METHODS: In 96 older adults (58F, 38M, 77±7.7 years) prescription medication use (Rx), subjective physical activity level (Community Healthy Activities Model Program for Seniors, CHAMPS), and objective physical activity level (Accelerometer, Actical, Phillips Respironics) were measured. In a subset of 73 subjects, habitual dietary intake of macro-and micronutrients was assessed (3-Day Diet Log). Partial correlations were run between variables while controlling for age, sex, and body mass index (BMI). Significance was set to $p < 0.05$. RESULTS: Mean values±standard error (SE) for the variables include: moderate-to-vigorous subjective PA (MVPA-S): 1353±120 kcal·wk-1, moderate-to-vigorous objective PA (MVPA-O): 51.2±5.1 cts·day-1; Rx number: 3.4±0.3; total caloric intake: 2107±64 kcal·d-1; and percent polyunsaturated fatty acid (PUFA) intake: 10.4±7.0 g·kcal·d-1. Rx was inversely correlated MVPA-S ($r = -0.24$, $p < 0.05$) and with MVPA-O ($r = -0.31$, $p < 0.05$). MVPA-S and MVPA-O were positively correlated ($r = 0.64$, $p < 0.01$). Rx number was inversely correlated with percent dietary intake of PUFA ($r = -0.31$, $p < 0.01$). There were no significant correlations between Rx and other macro-or micronutrients. CONCLUSION: Preliminary data show that Rx use in older adults is inversely associated with subjectively and objectively measured physical activity level. These data also show a strong correlation between the subjective and objective measures of PA, which could be important when looking at measurement possibilities in clinical settings and for future studies. Additionally, these data show an inverse correlation with Rx number and PUFA. These preliminary data suggest that lifestyle factors may significantly influence Rx use and associated complications.

Keywords: age, prescription medications, accelerometer, polyunsaturated fatty acids

10:15-10:30am

THE EFFECT OF BODY-WEIGHT CIRCUIT TRAINING ON THE PERCEPTION OF PAIN

Cody L. Diehl (Western Michigan University)

Abstract Exercise-induced hypoalgesia (EIH) is a phenomenon that often occurs following exercise. It is believed to be related to the endogenous opioids that are released during physical exercise that affect pain perception. Many of the studies investigating EIH have used either aerobic, isometric or resistance training protocols. It is not currently known if circuit training, using bodyweight exercises, can lead to EIH. Therefore, the purpose of this study was to determine if EIH can be elicited through bodyweight exercise circuit training. Methods: Thirty (11 men, 19 women; age 22.8±3.3 years, height 169.71±10.44 cm, mass 75.74±21.56 kg) healthy recreationally active individuals volunteered for this study. Subjects were asked to come to the laboratory, in a randomly assigned order, for two visits: once for a control condition and once for a circuit training condition. In the control condition, subjects were asked to simply rest quietly for 20 minutes. In the experimental condition, they were guided through a series of bodyweight exercises such as squats, lunges,

push-ups and chair dips. Pre/post, and at various points during recovery, pain pressure threshold (PPT) was assessed with a strain algometer. Four sites were tested: upper trapezius, index finger, patellar tendon and the dorsal foot. A repeated-measures 2 (condition) by 7 (time: pre/post, and 10, 15, 20, 25 and 30 min post) ANOVA was performed for each site. Results: There was only a significant main effect of condition seen in the upper trapezius ($p<.05$). A significant increase was seen in PPT for the index finger immediately after exercise (2.87±0.15 kg/cm2 at pre and 3.24±0.19 post; (mean±SD)) and the dorsal foot (2.63±0.14 pre and 2.94±0.15 post). While the index finger PPT returned to baseline quickly, the patellar tendon PPT reached significance at the 10 min post exercise point, and remained elevated. Conclusion: Three out of the four sites showed increased PPT following exercise, suggesting that EIH can be elicited through circuit training implementing bodyweight exercises. Further research is needed but there is a possibility for certain populations such as the elderly or individuals with chronic pain that could benefit from EIH, especially those that cannot perform traditional training methods.

Keywords: PPT, EIH, body-weight, exercise

10:30-10:45am

PATTERNS OF SEDENTARY BEHAVIOR IN PREGNANT WOMEN

Anya Odabasic (Saginaw Valley State University), Meghan Baruth (Saginaw Valley State University), Samantah Deere (Saginaw Valley State University), Rebecca Schlaff (Saginaw Valley State University)

Abstract Previous research indicates that women become more sedentary during pregnancy. However, very few studies have objectively measured sedentary behaviors in this population. PURPOSE: To quantify objectively measured sedentary behaviors, including patterns of sedentary behaviors, in a sample of pregnant women. METHODS: Participants included pregnant women enrolled in a behavioral nutrition and physical activity intervention. Participants wore an Actigraph accelerometer during all waking hours for seven consecutive days. The total volume of sedentary behaviors was quantified (% of day), as was the amount of time spent sedentary according to time of day (morning [6am-12pm], afternoon [12pm-6pm], evening [6pm-12am]) and type of day (weekday, weekend). Surveys were administered to assess demographic characteristics. Descriptive statistics calculated the percentage of time spent sedentary, in addition to the percentage of type and time of day spent sedentary. RESULTS: On average, the participants (n=41) were mean(SD)=28.0(4.4) years of age, mean(SD)=17.8 (2.3) weeks gestation, and had a pre-pregnancy body mass index (BMI) of mean(SD)=27.0 (7.5). The majority of the sample were Caucasian (82.5%), married (68.3%), and had some college education (72.3%). Overall, participants spent 59.1% of waking hours sedentary. When looking at type of day, participants were sedentary 60.2% of the day on weekdays, and 55.6% of the day on weekend days. When looking at time of day, participants were sedentary 57.7% of time during morning hours, 58.6% during afternoon hours, and 61.3% during evening hours. CONCLUSION: Results indicate that pregnant women spend a majority of their day engaged in sedentary behaviors. When looking at type and time of day, the data indicate that our sample was more sedentary on weekdays and during evening hours. Given the benefits of regular physical activity during pregnancy for both the mother and baby, and the high rates of sedentary behaviors, interventions aimed at decreasing sedentary time during pregnancy are needed. Replacing sedentary behaviors with even light activity may be a first step in successfully decreasing the total volume of sedentary behavior.

Keywords: accelerometry, physical inactivity, behavioral intervention, prenatal

10:45-11:00am

CHANGES IN CORTICAL NEURAL AROUSAL AFTER A SELF-PACED VO2MAX (SPV) TEST

Rachel M. Maceri (Western Michigan University), Taylor Lee (Western Michigan University), Timothy Michael (Western Michigan University), Michael Miller (Western Michigan University), Sangwoo Lee (Western Michigan University)

Abstract Arousal of the CNS can be affected by intense physical activity. Previous research shows that after a traditional GXT to exhaustion, neural arousal increases. What is not known, is if the same results are shown with a self-paced maximal exercise test. Purpose: To investigate the change in neural arousal after a self-paced VO2max (SPV) test. Methods: This study included 22 recreational runners, mean age 25.1±6.2 years. The SPV test was exactly ten minutes in length, with five 2-minute stages. Each stage was perceptually regulated using the 6-20 RPE scale: 11, 13, 15, 17 and 20. Subjects were blind to treadmill control panels but allowed to adjust speed to maintain each prescribed RPE. Prior to and immediately after each SPV, neural arousal was assessed using the critical flicker frequency (CFF) threshold test; this implements discrimination of visual stimuli. A flashing light increases in frequency, beginning at 12 Hz, and subjects are asked to determine when it appears as though it has fused/stopped flickering (ascending trial) or when a fused light, at 50 Hz, breaks apart and flickers (descending trial). Three ascending trials and three descending trials were performed. Mtot was calculated as the average of trials. Mdi was calculated as the difference between ascending and descending trials. Results: There was not a significant difference in Mtot values before/after SPV (p=.071). There was, however, a significant difference in Mdi as these values changed from -3.5±4.9 before to -1.5±4.6 after (p=.005). Conclusion: The effect of exhaustive exercise has been shown to create two different effects: CNS fatigue, resulting in decreased stimuli sensitivity, or an increased arousal of cortical processes, resulting in an increased stimuli sensitivity. This study supports the existence of CNS fatigue, frequently linked to the central governor theory (CGM) which proposes that the CNS regulates physical activity through muscle fiber recruitment. If physical exertion reaches an unsafe level, decreased muscle fibers are recruited, leading to a "fatigued" sensation. Additionally, the interaction between physiological and cognitive processes could explain why cortical arousal and increased sensitivity to stimuli did not occur after SPV protocol.

Keywords: Critical Flicker Frequency, Central Governor Theory

Free Communication/Slides #3: Gerald Ford Room – 11-12:00pm

11:00-11:15am

SELF-REPORTED WELLNESS BENEFITS OF RECREATIONAL SPORTS USE IN COLLEGE FRESHMEN

Kerri Vasold (Michigan State University), Samantha J. Deere (Saginaw Valley State University), James M. Pivarnik (Michigan State University)

Abstract Previous research has shown a positive relationship between academic success and recreational sports participation. However, few studies have investigated the relationships between recreational sports participation and psychosocial/physical health indicators. PURPOSE: To investigate the impact of recreational sports on psychosocial and physical health indicators in college freshmen, and determine differences in impact between high and low recreational sports users. METHODS: Participants included freshmen students who

participated in an online survey and consented to recreational sports usage tracking. Usage was collected via ID card swipe each time the student utilized the University fitness centers, group fitness classes, and participated in intramural sports games. Users were categorized as high or low (median split) based on total usage during their 1st year. The survey was administered during the 2nd semester of participants' 1st year. Participants reported the impact (1=very negatively to 5=very positively) of their usage on psychosocial and physical health variables. Responses were categorized into negative/no impact (1-3) and positive impact (4,5). Frequencies and percentages were calculated for variables of interest. Logistic regression was utilized to investigate the impact of recreational sports use on psychosocial and physical health variables. RESULTS: The sample (N=131) was 51.1 percent male and primarily Caucasian (82.4%). On average, high users had 48.1 ID card swipes per year; low users had 6.1. Most participants reported that recreational sports participation had a positive impact on psychosocial and physical health: overall well-being (86.3%); sense of belonging (83.2%); stress management (77.9%); self-confidence (77.9%); time management (68.7%); overall health (90.8%); fitness level (89.3%); weight control (64.9%); balance and coordination (74.8%); and sleep (61.8%). High users were more likely than low users to report recreational sports participation had a positive impact on overall well-being (OR: 3.2; 95%CI: 1.1-9.5), fitness level (OR: 4.4; 95%CI: 1.2-16.7), and self-confidence (OR: 3.0; 95%CI: 1.2-7.1). CONCLUSION: Overall, recreational sports participation had a positive impact on self-reported psychosocial and physical health in college freshmen. Frequency of participation played a role in some of these relationships. Future research should investigate the role of different recreational sports options (i.e., fitness center versus intramural sports) in health.

Keywords: Campus recreation; student health

11:15-11:30am

THE INFLUENCE OF TECHNOLOGY ON SEDENTARY BEHAVIOR: OLDER LATINOS' PERCEPTIONSTHE INFLUENCE OF TECHNOLOGY ON SEDENTARY BEHAVIOR: OLDER LATINOS' PERCEPTIONS

Isabela G. Marques (University of Illinois at Chicago), Jackelyn Cantoral (University of Illinois at Chicago), David X. Marquez (University of Illinois at Chicago),

Abstract The older Latino population will increase rapidly, and technology is advancing exponentially. New devices and features can contribute to increase or decrease physical activity. Older Latinos on average spend 8 hours per day of their waking hours in sedentary time. PURPOSE: To examine older Latinos' perceptions of the influence of technology on sedentary behavior. METHODS: Twenty-seven Latinos participated in six focus groups where technology and physical activity were discussed. Eligibility criteria was to be 55 years and older, to be self-identified as Latinos, to own a smartphone, and to pass a cognitive screening questionnaire. Discussions were held in Spanish and conducted by a bilingual and bicultural moderator. Discussions were recorded, transcribed in Spanish, translated to English, and directed content analysis was conducted. RESULTS: Sedentary behavior as a theme was only mentioned in three focus groups. Older Latinos mentioned that technology can contribute to sedentary behavior in regards to reduction on daily activities that used to require physical effort: 1) lack of walking for transportation, as walking is the most common form of transportation to run errands in many Latin American countries that has been replaced by driving; 2) less activity within the household, for example the use of a remote control to change the TV station; and 3) reduction in activity within daily activities as participants mentioned not walking to banks to pay their bills. CONCLUSION Older Latinos might not be aware of their sedentary behavior as this topic only emerged in three of the six focus groups, or they might not engage in much sedentary time as sedentary participants might not sign up for

research that discusses physical activity. More research focusing specifically on older Latinos' perceptions of sedentary behavior is needed to provide insight on how much older Latinos engage in sedentary behavior and how cultural differences influence their sedentary time.

Keywords: Focus group, qualitative, physical activity, Hispanic

11:30-11:45am

THE IMPACT OF STAND-BIASED DESKS ON AFTER-SCHOOL PHYSICAL ACTIVITY BEHAVIORS IN CHILDREN

Nathan R. Tokarek (University of Wisconsin-Milwaukee), Chi C. Cho (Center for Aging and Translational Research), Scott J. Strath (University of Wisconsin-Milwaukee), Nora E. Miller (University of Wisconsin-Milwaukee), Ann M. Swartz (University of Wisconsin-Milwaukee),

Abstract The extent which stand-biased desk use during school impacts the physical activity (PA) and sedentary (SB) behaviors of children during the after-school period remains unexplored. PURPOSE: To assess changes in after-school time spent performing SB, light-intensity physical activity (LPA), and moderate- to vigorous-intensity physical activity (MVPA) among elementary school children in response to the introduction of stand-biased desks in the classroom. METHODS: Thirty-one 6th grade participants were assigned by their teacher to either a traditional (TD) (n=16) or stand-biased (SBD) (n=15) desk. After-school PA and SB were measured using accelerometry on four consecutive weekdays at baseline, prior to introduction of the stand-biased desks, and again following 9-weeks of exposure to either a traditional or stand-biased desk in the classroom. After-school weather and sport participation were recorded during both measurement periods using NOAA data and the Youth Activity Profile Questionnaire, respectively. Wilcoxon Rank Sum Tests were used to detect significant differences ($p<0.10$) in changes in the proportion of after-school wear time performing SB and PA between groups. RESULTS: No significant differences between groups were found in pre-post changes in time spent performing SB ($p=0.770$), LPA ($p=0.740$), vigorous-intensity PA (VPA) ($p=0.599$), or MVPA ($p=0.470$). Significant differences in the median change in the proportion of time spent performing moderate-intensity PA (MPA) (SBD: -1.4%; TD: -0.2%, $p=0.093$) were detected, with the SBD group experiencing a decrease of 4.3 minutes/after-school period, relative to a 0.1 minute increase among TD participants. Average after-school temperature was 60.0 and 11.4 oF at pre- and post, respectively, coinciding with an 81 minute decrease in daylight during the after-school period. After-school sport participation also decreased from pre-post, with eight participants from the SBD group, and one participant from the TD group not participating in after-school sport at post. CONCLUSION: Stand-biased desks did not have a meaningful negative impact on children's after-school PA and SB. Instead, after-school activity appears to be highly associated with distinct factors, including sport participation and weather conditions. Seasonal variation and children's after-school schedule may have a greater influence on after-school activity than a mild intervention stimulus in the classroom such as that provided by stand-biased desks.

Keywords: Classroom, Elementary School, Intervention, Sedentary

11:45-12:00pm

VALIDATION OF THE ELEMENTARY SCHOOL WELLNESS ENVIRONMENT PROFILE TOOL

Joey A. Lee (Iowa State University), Andra M. Luth (Iowa State University), Greg J. Welk (Iowa State University)

Abstract There is a need to develop valid tools for assessing school physical activity (PA) and nutrition environments to understand the impact on student behaviors and health. PURPOSE: The study is designed to evaluate the validity of school wellness leaders' reported ratings of school wellness environments against directly observed ratings. METHODS: Ten Iowa elementary schools completed an evaluation of their school using the newly developed School Wellness Environment Profile (SWEP) tool. The SWEP includes 35 observable items that span six areas of the school (Physical Education, 4; recess, 4; classroom, 4; before/after school, 6; school wellness policies, 6; school food environment, 11). After school reporters/wellness leaders completed the SWEP, a trained researcher conducted a full-day observation in each school using direct observation to complete the SWEP. School and school reporter characteristics were used to provide information about the types of schools and reporters that participated in the project. Percent agreement was used to provide a baseline understanding of the general agreement. Cohen's Kappa statistic was used to assess the agreement between the reporters. Where necessary, Prevalence-Adjusted Bias-Adjusted Kappa (PABAK) was used to assess agreement between reporters on items. RESULTS: The overall mean percent agreement between reporters was 75.4%. There was variation in the percent agreement within each of the six categories (Physical Education = 75.0%; recess = 80.0%; classroom = 65.0%; before/after school = 76.7%; school wellness policies = 91.7%; school food environment = 67.3%). Overall, 22 out of 35 (62.9%) items demonstrated fair to almost perfect agreement. The PA items had a higher prevalence of fair to strong agreement (18 out of 24 or 75.0%) compared to the school food environment items (4 out of 11 or 36.4%). CONCLUSION: Overall, the results provide preliminary support for the validity of the SWEP to assess elementary school PA and nutrition environments. Additional work is needed to refine specific items and to enhance the utility of the SWEP for use in school wellness programming. Efforts to facilitate independent use by school leaders will facilitate broader applications for school wellness programming.

Keywords: Physical Activity, Nutrition, CSPAP, Whole School

Schedule – Friday Morning: Poster Session

Poster Session #1: Crown Foyer – 9-10:25am

Board 1

THE INFLUENCE OF LACROSSE HEAD STRINGING PATTERNS ON OVERHEAD LACROSSE SHOT PERFORMANCE

Nathan T. Greenberg (DePauw University), Brian Wright (DePauw University), James Babington (DePauw University)

Abstract: INTRODUCTION In Men's lacrosse, players have the ability to manipulate head stringing patterns. Common explanations for different string patterns include player skill level, position and personal preference. Little empirical data have been collected to examine head string pattern and the effect on shot performance. PURPOSE The purpose of this study was to examine whether or not lacrosse ball resultant velocities and angles are influenced by head stringing patterns during the overhead lacrosse shot. METHODS Eighteen different stringing patterns were tested using an offensive lacrosse head. Independent variables included, pocket depth (low, mid, high), mesh type (soft, hard, wax) and number of shooting strings (1 or 2). Thirty shots were performed for each condition using a custom built spring-loaded device. All trials were captured on video at 120 fps. Positions on the stick, head, and ball were digitized using Simi Motion Reality Systems software to quantify velocities and angle of release. A Three-Way ANOVA was used to compare dependent variables between lacrosse head string patterns. RESULTS Comparison of velocity revealed a significant main effect for pocket depth ($F(2, 17) = 103.70$; $p < 0.01$, $\eta 2 = 0.284$), mesh type ($F(2, 17) = 13.38$; $p < 0.01$, $\eta 2 = 0.049$), and shooting string ($F(1, 17) = 14.07$; $p < 0.01$, $\eta 2 = 0.026$). Comparison of release angle revealed a significant main effect for pocket depth ($F(2, 17) = 984.43$; $p < 0.01$, $\eta 2 = 0.790$), mesh type ($F(2, 17) = 308.21$; $p < 0.01$, $\eta 2 = 0.541$), and shooting string ($F(1, 17) = 487.61$; $p < 0.01$, $\eta 2 = 0.483$). CONCLUSION Lacrosse head mesh type, pocket depth, and shooting string number appear to influence the velocity and angle with which the ball exits the lacrosse head upon execution of the overhead lacrosse shot.

Keywords: Kinematics, Release Angle, Ball Velocity

Board 2

USING THE VERTICAL SHOULDER PRESS TO COMPARE BILATERAL AND UNILATERAL MUSCULAR STRENGTH IN THE UPPER BODY

A. Justin Burley (Eastern Michigan University), Rebecca Moore (Eastern Michigan University), James L. Ramsey (Eastern Michigan University), Shel Levine (Eastern Michigan University), John M. Carbone (Eastern Michigan University)

Abstract Bilateral deficit (BLD) is an occurrence where the unilateral sum in force output is higher than the bilateral force output in the upper or lower limbs. Bilateral facilitation (BLF) occurs when the unilateral sum in force output is lower than the bilateral force output. Maximal bilateral and unilateral lifts can be used to determine if a BLD or BLF is present. Purpose: To determine if there was a difference between a maximal unilateral lift (MUL) and a maximal bilateral lift (MBL) for vertical shoulder press (VSP) in recreationally trained

participants. Methods: Thirty participants (19 male, 11 female; age: 22.96 ± 3.72; height: 170.1 ± 9.3 cm; weight: 73.7 ± 11.50 kg) were recruited for this study. Participants engaged in three separate visits which were each 72 hours apart. The first visit consisted of a movement screening that assessed biomechanical functionality when performing the VSP. This was accomplished by observing efficiency in a set of 8 to 10 repetitions at 30% of their one repetition maximum (1RM) for the VSP. Participants were then randomly assigned for visit 2 to either a MUL or MBL testing condition and completed the other condition during visit 3. In each testing condition, participants performed 6 to 8 repetitions at 50% 1RM. Participants then proceeded to lift one repetition at 70% 1RM, which was increased by 10% after a successful lift. This pattern was followed until volitional fatigue was present. Unilateral values for the left and right limbs were combined (MUL). A paired samples t-test was used to determine if there was a difference between MUL and MBL ($p<0.05$).
Results: A significant difference was not observed between the MBL (99.0 lbs ± 36.4) and MUL (98.3 lbs ± 32.3). However, 15 participants presented a BLD, 14 presented a BLF, and one presented no difference.
Conclusions: Previous studies have shown that bilateral resistance training reduces the occurrence of BLD, while unilateral resistance training has the opposite effect. Current participant's training history was not controlled, however, and could have influenced the results.

Keywords: asymmetry performance deficit facilitation

Board 3

ACUTE EFFECTS OF PREWORKOUT SUPPLEMENTATION ON 5-KM RACE TIME IN RECREATIONALLY-TRAINED INDIVIDUALS

Davoncie M. Granderson (Northern Illinois University), Michael D. Belbis (Northern Illinois University), Peter J. Chomentowski (Northern Illinois University), Clayton L. Camic (Northern Illinois University),

Abstract PURPOSE: The purpose of the present study was to examine the effects of an acute dose of a multi-ingredient, thermogenic, pre-workout supplement on 5-km running performance and subjective measures of fatigue. METHODS: Twenty aerobically-trained, college-aged males (n = 10, mean ± SD = 80.8 ± 6.1 kg) and females (n = 10, 64.5 ± 6.6 kg) were recruited to complete two 5-km running races for time. During the first session, the subjects were randomly assigned to ingest one dose of the pre-workout supplement or placebo 30 minutes prior to running a 5-km race as fast as possible. The supplement contained multiple ingredients including caffeine anhydrous (150 mg), beta alanine (1600 mg), arginine AKG (1000 mg), as well as tyrosine, L-carnitine, green coffee bean extract, and velvet bean extract at unspecified quantities. The placebo was a non-caloric mix that was matched for flavor and consistency. Subjects also completed a 5-point Likert scale questionnaire to determine feelings of fatigue, alertness, energy, and focus immediately prior to ingesting the substance (baseline), 30 minutes post-ingestion (immediately pre-race), and 5 minutes post-race. For the second session, subjects ingested the opposite substance (supplement or placebo) and underwent the same testing procedures (including time of day) as the first session. Race times were compared between the supplement and placebo conditions using a paired-samples t-test. In addition, four separate two-way ANOVAs with repeated measures were used to compare the feelings of fatigue, alertness, energy, and focus among the conditions (supplement vs. placebo) at the common time points (baseline, pre-race, post-race). RESULTS: The results indicated there was no significant difference in 5-km race time between the supplement (23.62 ± 2.08 min) and placebo (23.51 ± 1.97 min) conditions. For the subjective variables (energy, fatigue, alertness, and focus), there were no significant condition x time interactions or main effects for condition, but there were main effects for time. CONCLUSIONS: The findings of the present investigation indicated that the pre-workout

supplement provided no ergogenic effects on 5-km race time or subjective feelings of energy, fatigue, alertness, or focus when administered on an acute basis in recreationally-active males and females.

Keywords: nutritional supplement; caffeine; running; performance

Board 4

THE ERGONOMICS AND ENERGY HARNESSING POTENTIAL OF BACKPACK SYSTEMS DURING GAIT

Ryan A. Queen (University of Findlay)

Abstract Backpack carriage is a commonly integrated practice in today's society. According to Wang et. al, 40 million students in the United States use backpacks on a regular basis. With the prevalence of this practice in mind, precautions should be taken to examine the biomechanical load that we are placing on the youth of our society. PURPOSE: The objectives of this study were to (i) evaluate the influence of backpack design on biomechanical load and to (ii) estimate the amount of energy that may be harnessed for various purposes from the displacement of the various backpack systems during gait. METHODS: Six subjects each participated in each of 3 trial conditions – control, standard, and ergonomic backpack use. Subjects proceeded with natural gait across an in-ground force plate while 6 infrared cameras recorded kinematic data. Data deemed relevant for assessing biomechanical load include average sagittal plane trunk angle, average sagittal plane and frontal plane hip moments, and peak ground reaction forces (in the X, Y, and Z directions). Center of mass data for both the subjects and the backpacks were collected. RESULTS: Only normalized average trunk forward lean demonstrated a significant difference between control and each backpack condition. In the control condition, the value of normalized average trunk forward lean was 0.04 mmx/ht. Both backpack conditions of standard and ergonomic design displayed a value of 0.07 mmx/ht. The average amount of "available" power in the backpack's motion was 29.6 watts for the standard design and 34.6 watts for the ergonomic design. DISCUSSION: The significant difference in normalized average trunk forward lean indicates that backpack carriage results in trunk flexion, as seen in similar literature. Further research is advisable to determine the plausibility of the fraction of the available energy that could be used for beneficial purposes.

Keywords: biomechanics, design, power

Board 5

A COMPARISON OF MAXIMAL MUSCULAR STRENGTH BETWEEN THE BILATERAL AND UNILATERAL LEG PRESS EXERCISE

James L. Ramsey (Eastern Michigan University), John W. Carbone (Eastern Michigan University), Rebecca W. Moore (Eastern Michigan University)

Abstract The bilateral deficit (BLD) is a phenomenon in which the maximal strength of both limbs contracting simultaneously is less than the sum of the weight lifted by each limb contracting in isolation. It is unknown if this phenomenon is typical for trained participants. Purpose: To determine if the BLD is present during a dynamic leg press in trained participants. Methods: Thirty volunteers (19 male, 11 female; 19-37 years old) reported to the EMU Running Science Laboratory on three separate occasions 72 hours apart. On day 1, participants performed a movement screening consisting of 8-10 repetitions at 30% of one repetition maximum (1RM) for both the bilateral and unilateral dynamic leg press training conditions to ensure that all

exercises were safely performed. On day 2, participants were randomly assigned to either the maximal bilateral or maximal unilateral condition. For both conditions, participants performed 6-8 repetitions at 50% of 1RM, followed by a single repetition at 70% of 1RM. Afterwards, the amount of weight lifted was increased by 10% between each successful lift to ensure standardization. This process continued until participants could no longer increase weight for either testing condition. On day 3, participants completed whichever condition, maximal bilateral or maximal unilateral, that was not completed on day 2 following the same procedures. A paired samples t-test was conducted to determine if there was a significant difference between the bilateral contractions and the sum of the left and right unilateral conditions ($p<0.05$). Results: The 30 participants were 22.96 ± 3.72 years old, had a height of 170.1 ± 9.3 cm, and weighed 73.7 ± 11.50 kg. A significant difference was observed and the maximal strength was greater for the bilateral condition (495 ± 209 lbs) compared to the unilateral condition (387.7 ± 208 lbs). Conclusion: A BLD was not observed in this study. Research suggests that the BLD is associated with unilateral training while bilateral training reduces the phenomenon. The participants in this study reported the consistent use of bilateral training, which may explain the results. Future investigations are necessary to determine how various resistance training protocols influence the BLD.

Keywords: Bilateral deficit, bilateral facilitation

Board 6

ATTENTIONAL INVOLVEMENT AND RESPIRATORY COMPLEXITY DURING STANDING BALANCE IN PARKINSON'S PATIENTS

Luis R. Hernandez (Northern Illinois University), John Manning (Northern Illinois University), Christina Odeh (Northern Illinois University), Shuqi Zhang (Northern Illinois University)

Abstract PURPOSE: Regulation of balance requires attentional involvement inversely proportional to the efficiency of postural control system. Sample entropy of center of pressure (CoP), a non-linear measure, reflects the complexity of postural control system indicating attentional involvement. Parkinson's patients (OAP) may require a higher degree of attentional involvement during balance. Due to internal perturbances during standing, respiration may relate to balance among individuals with deteriorated postural control systems. The purpose of this study is to investigate 1) differences in attentional involvement between OAP and healthy controls (OAH); 2) relationships between complexity of breathing activity and balance performance. METHODS: Twelve participants were recruited and instructed to stand on a force plate with feet oriented at 15 degrees apart and look at a 5cm-diameter spot on the wall. They were asked to maintain balance for 2 minutes with eyes open and eyes closed. Meanwhile, thoracic and abdominal breathing activities were record through Biocapture system. All equipment was synced. Non-linear measures were calculated in Matlab for CoP in the anteroposterior (SampEnCoPx) and mediolateral (SampEnCoPY) directions and for thoracic (SampEnTh) and abdominal (SampEnAb) breathing activities. CoP-related measures were calculated in Bioanalysis software for 95% sway area (SA), average velocity ($\bar{v}$), and average displacement in anteroposterior (Dx) and mediolateral (Dy) directions. RESULTS: Group and visual effects were examined on non-linear and CoP-related measures via Two-Way MANOVA with subsequent application of ANOVAs when needed. Pearson's correlation tests examined the relationships among non-linear and CoP-related measures. Significant group effects were observed among the CoP-related measures (Wilks' Lambda =.004). Specifically, OAP exhibited greater Dx (.4822 ± .2163 vs .2493 ± .1643), SA (7.7021± 6.3551 vs. 3.4585 ± 3.7771), and $\bar{v}$ (3.1912 ± 1.3198 vs. 2.1321 ± 1.2171) than OAH ($p<.05$). In addition, significant correlations were observed between SampEnTh and SampEnAb (r = .422), SampEnTh and SA (r = -.441), SampEnAb and Dx (r = -.431), SampEnAb and SA (r = -.545), SampEnCoPx and $\bar{v}$ (r = .499), and SampEnCoPY and $\bar{v}$ (r = .590). CONCLUSION:

OAPs displayed similar attentional involvement with OAH during standing balance. As the complexity of respiration decreased, balance worsened.

Keywords: Older adults, Postural control, Sample entropy

Board 7

PLASMA NITRARE AND NITRITE FOLLOWING EXERCISE TRAINING IN A RAT MODEL OF PULMONARY HYPERTENSION

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Abstract PURPOSE: Impairment of the L-arginine-nitric oxide (NO) pathway has been reported in animal models and patients with pulmonary hypertension (PH). Plasma nitrate (NO3) levels are higher in endurance trained humans, reflecting upregulation of this pathway. We investigated the effect of exercise training using two different training approaches, high intensity interval training (HIIT) and continuous exercise training (CET), on plasma NO2 and NO3 levels and their relationship to experimentally-induced PH disease severity. METHODS: Male Sprague-Dawley rats (~315g, male) received a single injection of vascular endothelial growth factor inhibitor Sugen5416 (20mg/kg) + 3 wks hypoxia (Patm=362 mmHg) followed by 4 wks room air (SuHx, n=25). Control rats (CON, n=18) received an injection of saline and remained in room air. A subgroup of SuHx and CON then underwent 6 wks of treadmill training performed as HIIT (2 min at ~80-90%VO2reserve [VO2R] + 3 min at 30%VO2R, for 4-5 cycles, n=14), or CET (60 min 50%VO2R, n=15) with the remainder untrained (SED, n=14). RESULTS: SuHx induced elevation in right ventricular systolic pressure (RVSP in mmHg, mean±SE) as expected vs. CON (28±3, $p<0.05$), and was not different for HIIT- (61±7), or CET- (60±8) trained vs. SED SuHx (55±8, $p>0.05$). Plasma NO3 and NO2 (µmol/L) was also not different ($p>0.05$) between trained vs. untrained for SuHx (HIIT: NO3 17±2, NO2 0.22±0.08; CET: NO3 14±2, NO2 0.22±0.04; SED: NO3 17±4, NO2 0.30±0.08, $p>0.05$); or for CON (HIIT: NO3 18±4, NO2 0.23±0.03; CET: NO3 16±6, NO2 0.23±0.02; SED: NO3 10±1, NO2 0.22±0.01), nor was it significantly different by SuHx vs. CON ($p>0.05$). However, a positive correlation was observed for both NO3 ($r=0.49$, $p=0.001$) and NO2 ($r=0.41$, $p=0.007$) with RVSP when examined for the entire group; as well as for just SuHx rats ($r=0.42$, $p=0.037$ NO3; $r=0.54$, $p=0.006$ NO2). CONCLUSION: Plasma NO3 and NO2 were not affected by training in a rat model of PH. However, greater levels of plasma NO3 and NO2 were associated with increased disease severity which may suggest compensatory upregulation of the NO3-NO2-NO pathway in the presence of eNOS-arginine-NO pathway impairment.

Keywords: Nitric Oxide, High Intensity Interval Training, Continuous Training

Board 8

EVALUATING THE VALIDITY OF THE ACT24 ONLINE PHYSICAL ACTIVITY ASSESSMENT INSTRUMENT

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Abstract The Act24 is a prominent online assessment tool designed to capture detailed information about physical activity (PA) behavior in adults. The tool is freely available through the National Institutes of Health and provides an effective way to capture detailed information about PA behaviors in an efficient way. PURPOSE: The study evaluates the agreement between estimates of PA and sedentary behavior from the Act24 compared with data from an objective activity monitor. METHODS: Fifty-seven participants wore the Sensewear Core activity monitor on their right arm for a full 24-hour period. On the day following the monitoring period, participants completed the online ACT24 assessment instrument which guided them through steps to help recall the activities they performed during the monitoring period. Correlations, mean percent error (MPE), and mean absolute percent error (MAPE) were calculated to evaluate agreement between the Sensewear monitor and ACT24 for estimating sleep time, sedentary time, light PA, and moderate-to-vigorous physical activity (MVPA). RESULTS: Correlational analysis revealed moderate agreement between the two measures for sleep time (r = 0.61), sedentary time (r = 0.50), and MVPA (r = 0.66). Calculation of MPE indicated that participants consistently overestimated sleep (error = -20.67%) and sedentary time (error = -21.76%) but underestimated light PA (error = 15.25%) and MVPA (error = 32.83%). Calculation of MAPE revealed actual error rates of 24.90%, 29.42%, 52.36%, and 53.16% for sleep time, sedentary time, light activity, and MVPA, respectively.
CONCLUSION: The results revealed moderate associations between estimates from the Act24 and objective estimates from the SWA. However, there is considerable error when estimating time spent in specific intensities of PA. The results suggest the need to employ calibration methods to adjust for the systematic error in estimation of SB and PA. The results also highlights the importance of using MAPE as method of assessing error, as MPE allows for overestimation and underestimation to cancel each other out.

Keywords: accelerometer, error, online, calibration

Board 9

COGNITION, VAGAL MODULATION, PULSE WAVE REFLECTION AND ARTERIAL STIFFNESS IN WOMEN WITH FIBROMYALGIA

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Abstract Fibromyalgia (FM) is an idiopathic disease that is characterized by chronic pain and a myriad of symptoms, including cognitive dysfunction. Cognitive dysfunction in women with FM is partly manifested as impaired facial emotion recognition which may be a result of cerebrovascular impairment mediated by reduced vagal tone, increased pulse wave reflection characteristics and increased arterial stiffness. PURPOSE: To evaluate facial emotion recognition in women with FM, and to determine if measures of facial emotion recognition are associated with decrements in vagal tone, pulse wave reflection characteristics or arterial stiffness. METHODS: Eight sedentary women (47±12 yrs; 1.65±0.05cm; 101.2±25.1kg; 37.3±9.5kg/m2) that met the 2010 American College of Rheumatology criteria for FM volunteered to participate in the study. Facial emotion recognition was measured using an online cognitive test, with data reported as z-scores. Vagal tone, measured via heart rate complexity [Sample Entropy (SampEn)], pulse wave reflection [augmentation index (AIx)], as well as arterial stiffness, measured via pulse wave velocity, were collected after a 10min supine rest period. Pearson-moment correlations were used to examine the relationships between domains and

independent tests of facial emotion recognition, vagal tone, pulse wave reflection, and arterial stiffness. RESULTS: SampEn was positively correlated with the cognitive domain of emotional bias (r=0.934, p=0.002). There were significant positive correlations between accuracy for emotional identification of disgust and AIx (r=0.824, p=0.012)], AIx normalized at 75bpm [AIx@75 (r=0.833, p=0.01)], and wasted left ventricular energy [Ew (r=0.766, p=0.036)]. Arterial stiffness significantly negatively correlated with reaction time of emotional identification of happiness (-0.849, p=0.008), and accuracy of emotional bias of neutrality (r=-0.722, p=0.043). CONCLUSION: Based on our data, increases in vagal modulation, pulse wave reflection characteristics, and arterial stiffness appear to strongly correlate with the accuracy, and reaction time, of facial emotion recognition in women with FM. More data are needed to ascertain the influence of these variables on facial emotion recognition in women with FM.

Keywords: Facial emotion recognition, sample entropy, augmentation index, pulse wave velocity

Board 10

EFFECTS OF DIFFERENT EXERCISE MODALITIES ON POSTPRANDIAL HYPERGLYCEMIA IN OVERWEIGHT AND OBESE ADULTS

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Abstract Postprandial hyperglycemia (PPH), the exaggerated and prolonged elevation in blood glucose after a high carbohydrate meal, is directly associated with cardiovascular disease (CVD) risk. A single bout of aerobic or resistance exercise lowers PPH the following morning in healthy adults. No studies have examined the extent to which prior exercise regulates PPH in overweight and obese adults, and whether differences exist between exercise modalities. PURPOSE: The purpose of this ongoing investigation is to determine the effects of different exercise modalities (aerobic vs. resistance) on PPH responses to an oral glucose tolerance test (OGTT) in overweight and obese adults. We hypothesize that a single bout of exercise performed 14-16 hours prior will mitigate increases in plasma glucose induced by an OGTT, independent of exercise modality. METHODS: Recruitment for the current study is ongoing. In a randomized, cross-over design, participants [n=4 (3 women); age=21.3±2.1 y; BMI=30.6±4.2 kg/m2] completed three trials. For each trial, an OGTT (1 g/kg body weight) was preceded (14-16 hours prior) by seated rest (control), a single bout of aerobic exercise, or a single bout of resistance exercise. The aerobic exercise bout consisted of 30 min of continuous moderate-intensity (50-60% VO2max) treadmill exercise. The whole-body resistance exercise bout consisted of 3 sets of 10 repetitions of the following exercises: leg press, chest press, seated leg extension, lat pulldown, shoulder press, and seated row. The weight used for each set was determined from the participant's previously determined 10-RM. Blood was obtained prior to and at 30 min intervals for 3 hours following glucose ingestion. Repeated-measures ANOVA and LSD post-hoc tests were used to evaluate differences within and between trials. RESULTS: Plasma glucose did not differ between trials at baseline. A main effect due to time ($P<0.001$) was observed for plasma glucose. Relative to baseline, plasma glucose increased ($P<0.05$) by 35-59%, 23-56%, and 30-49% at 30-120 min post-ingestion in the control, aerobic exercise, and resistance exercise trial, respectively. CONCLUSION: Preliminary findings from our ongoing study suggest that acute aerobic or resistance exercise performed 14-16 hours prior to an OGTT does not affect postprandial glucose responses in overweight and obese adults.

Keywords: glucose; resistance exercise; aerobic exercise

Board 11

THE EFFECTS OF POSTACTIVATION POTENTIATION ON SUBSEQUENT 40-YARD SPRINT PERFORMANCE IN 16- TO 23-YEAR-OLD MALE ATHLETES

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Abstract Postactivation potentiation (PAP) is a physiological adaptation which enables the muscles' contractile properties to optimally perform. PAP is engendered through pre-performance conditioning activities, such as parallel back squats performed prior to a vertical jump test. PURPOSE: The purpose of this study was to determine the effects of postactivation potentiation on subsequent 40-yard sprint performance in 16- to 23-year-old male athletes, specifically, the effects of hexagonal bar deadlifts (HBD) and weighted sled sprints (WSS) as PAP-loading protocols. METHODS: Thirty-one male subjects (age, 16.9 ± 1.4 years; height, 180.2 ± 6.2 cm; weight 83.4 ± 19.2 kg) participated in this study. Testing sessions included two different visits, a control trial and a PAP-loading protocol trial separated by ~48-hours, counterbalanced, allowing each subject to act as his own control. The HBD (n = 8) group performed four sets of HBD as the PAP-loading protocol, using body weight (BW) to calculate estimated one repetition max (1RM). The WSS (n = 23) group performed four sets of WSS for 15-yards, using WSS loads of 25%, and 50% BW. Both PAP-loading protocols were followed by a 6-minute rest period and concluded with two laser-timed 40-yard sprint performances. Control trials for both groups consisted of identical time intervals as the PAP trial, with active movement utilized instead of the PAP-loading protocol. RESULTS: The PAP trials had faster average 40-yard sprint times (5.35 ± 0.44 s) compared to the control trials (5.39 ± 0.39 s) for all subjects. The average difference for the PAP trials (-0.04 ± 0.10) was statistically significant (p = 0.029). However, there was statistical significance (p = 0.035) between PAP-loading groups, with WSS being the only group to improve in sprint time for the PAP trial. The WSS group improved in 40-yard sprint time for the PAP trial (5.33 ± 0.45 s) compared to the control trial (5.40 ± 0.41 s) with a PAP difference of -0.06 ± 0.10 s for 40-yard sprint time. CONCLUSION: The use of a PAP-loading protocol enhances 40-yard sprint performance, with the use of WSS proving to generate faster sprint times compared to the HBD.

Keywords: postactivation potentiation, sprint, deadlift, weighted sled sprint

Board 12

THE EFFECT OF HYPERTHERMIC WHOLE BODY HEAT STIMULUST (SAUNA) ON HEAT SHOCK PROTEIN 70 AND SKELETAL MUSCLE HYPERTROPHY IN YOUNG MALES DRUING WEIGHT TRAINING

Brandon C. Jones (Northern Michigan University), Scott Drum (Northern Michigan University)

Abstract The Finnish steam sauna is theorized to aid skeletal muscle hypertrophy by stimulating Heat Shock Protein 70 (HSP70), which acts as a molecular chaperone to the folding of skeletal muscle. PURPOSE: To investigate if stimulating HSP70 by using a sauna (45 – 50° C, 80% Humidity) post workout could aid skeletal muscle hypertrophy during heavy resistance training (HRT) in a young (21.38 ± 1.9 yrs.), moderately trained male population. METHODS: Thirteen subjects were randomly distributed into 3 groups [resistance training + sauna (RT+S, n=5), RT + relaxation (RT+R, n=5), and complete control (CON, n=3) or no training]. Primary

dependent variables, observed in a pre- and post-test format during a 6-wk intervention, 3 x wk HRT protocol followed by 15-min sauna (i.e., RT+S) or relaxation (i.e., RT+R), included: lean body mass (LBM) via dual energy x-ray absorptiometry (DEXA), HSP70 concentration from a ELISA assay, and a 5 repetition maximum (5RM) back squat. A repeated measures ANOVA was used to determine difference between groups and across time. RESULTS. RT+S and RT+R increased LBM by 0.99 ± 2.0 kg and 0.30 ± 1.0 kg, respectively while CON decreased LBM by 0.46 ± 0.8 kg. RT+S, RT+R, and CON, respectively, changed HSP70 concentration, 0.40 ± 0.5 ng/ml, 0.09 ± 0.1 ng/ml, 0.04 ± 0.4 ng/ml. 5RM increased for RT+S and RT+R, respectively, by 23.15 ± 5.7 kg and 31.33 ± 8.2 kg. No significant main effects or interactions were observed ($p > 0.05$) for LBM ($p = 0.169$), HSP70 ($p = 0.096$), and 5RM ($p = 0.105$). The hypothesis that HSP70 would be upregulated to a greater extent with concurrently larger LBM and 5RM improvements in RT+S vs. the other trained group(s) was not supported. CONCLUSION: Although HSP70 and LBM changes were highest in RT+S after 6-wks of heavy resistance training, RT+R improved most on 5RM. Sauna use in combination with resistance training does not appear to augment muscle hypertrophy or strength enhancements in this small sample. However, it appears using sauna post RT does not hinder muscle growth and may be a viable strategy for maintaining muscle mass.

Keywords: Sauna, Heat Shock Protein, Skeletal Muscle Hypertrophy, Hyperthermia

Board 13

IMPACT OF SITTING ON DIFFERENT TYPES OF STABILITY BALLS ON EMGs DURING ARM ERGOMETRY

Michelle Nguyen (Oakland University), Hayley MacDonald (Oakland University), Charles R. C. Marks (Oakland University)

Abstract Past studies have demonstrated that sitting on a stability ball (SB) elevates oxygen consumption (VO2) and leg electromyography (EMG) activity during arm ergometry when compared to chair sitting. In addition, our laboratory has reported that a SB made of stiff material had lower VO2s when compared to a more elastic SB but had not indicated if there was an impact on muscle activity. PURPOSE: To determine if the characteristics of a SB also affects muscle activity during arm ergometry. METHODS: Twenty apparently healthy young adults underwent rest and two stages of submaximal arm ergometry under three different conditions (order randomized): sitting on a stiff material SB (SMB), same size but elastic material SB (SEB), and a smaller SEB (SSEB). Anterior Deltoid (AD), External Oblique (EO), and Rectus Femoris (RF) EMGs were recorded during the last 10 seconds of each stage. Repeated Measures ANOVA was used to determine SB type effect (alpha= .05) for peak rectified EMG levels. RESULTS: There were no significant SB type effects for AD ($P = 0.553$) and EO ($P = 0.963$) EMGs. However, RF had significant ($P = 0.002$) SB type effect. The SMB (Stage 1: 283 +/- 229 mv; Stage 2: 370 +/- 248 mv) had 19% to 37% lower EMG levels than the SEB (Stage 1: 337 +/- 256 mv; Stage 2: 461 +/- 305 mv) or SSEB (Stage 1: 361 +/- 300 mv; Stage 2: 508 +/- 371 mv) EMGs. CONCLUSION: A SB made of more elastic material requires more leg muscle activity during arm ergometry and may account for the higher VO2 response.

Keywords: Muscle Activity, Swiss Ball, Aerobic Arm Exercise

Board 14

RELATIONSHIPS AMONG FATIGUE THRESHOLDS DERIVED FROM NEUROMUSCULAR, METABOLIC, AND VENTILATORY PARAMETERS

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Abstract A number of fatigue thresholds have been developed to describe fatigue-induced changes in various physiological factors including muscle activation, blood lactate, and gas exchange. These fatigue thresholds, however, may correspond to different exercise intensities depending on the variable from which they were derived as well as their underlying mechanisms. PURPOSE: The purpose of the present study was to examine the relationships and compare power outputs among fatigue thresholds derived from neuromuscular, metabolic, and ventilatory parameters. METHODS: Fifteen college-aged males (mean age ± SD = 22.1 ± 1.7 years, 78.0 ± 9.4 kg, 176.5 ± 5.6 cm) volunteered to perform an incremental test to exhaustion on an electronically-braked cycle ergometer for determination of their physical working capacity at the fatigue threshold (PWCFT), lactate threshold (LT), ventilatory threshold (VT), and gas exchange threshold (GET). The incremental test involved recording electromyographic (EMG) signals from the vastus lateralis as well as measurements of blood lactate from the fingertip and gas exchange using open circuit spirometry. RESULTS: The results of the one-way ANOVA with repeated measures and follow-up paired samples t-tests indicated that the LT (132 ± 14 W) occurred at a significantly ($P < 0.05$) lower power output than the PWCFT (153 ± 33 W), GET (155 ± 33 W), and VT (177 ± 27 W). In addition, the VT occurred at a higher output than the LT, PWCFT, and GET, whereas there was no difference in power outputs between the PWCFT and GET. Furthermore, there were no significant inter-correlations among any of the fatigue thresholds ($r = -0.03$ – 0.35), except between the GET and VT ($r = 0.70$). CONCLUSION: Based on the significant mean differences in power outputs and non-significant correlations, the findings of the present study indicated there were no relationships among indicators of fatigue identified through changes in muscle activation (PWCFT), blood lactate (LT), and measurements of gas exchange (VT and GET). These findings suggested there is a dissociation among the exercise intensities associated with the PWCFT, LT, VT, and GET, and thus, each originate from separate physiological mechanisms.

Keywords: muscle activation; lactate; gas exchange; PWCFT

Board 15

THE EFFECTS OF SIMULATED HYPOXIA BOUTS ON RESTING BLOOD GLUCOSE LEVELS AND HEMODYNAMICS OF A TYPE 1 DIABETIC: A CASE STUDY

Devin J. Rettke (Northern Michigan University), Scott Drum (Northern Michigan University)

Abstract Individuals diagnosed with diabetes may choose adventure travel vacations at higher altitudes, thereby perturbing formerly controlled sea level (SL) blood sugar (BG) levels. Purpose: We sought to describe change in resting BG concentration, heart rate (HR), and mean arterial pressure (MAP) during repeat acute exposure to simulated altitude bouts in a type 1 diabetic (T1D) vs a non-diabetic (ND). We hypothesized T1D would encounter less stable readings on all variables. Methods: Two male participants (n=2), a T1D and ND, 22 and 23 years old, respectively, completed this case study. Participants, simultaneously, visited a lab on six different days [i.e., three days in a row one week (M, T, W) and the same three days the following week (M, T, W)]. They ingested the same meals the night before and day of (1.5-hrs before chamber use). At each visit, BG (Contour Next Link; Parsippany, NJ), HR (Polar, Lake Success, NY), and MAP (Briggs Healthcare, Waukegan, IL) were assessed at rest at SL and during 2-hr/bouts at 10-min intervals using a hypoxic chamber (Hypoxico Inc., New York, NY) set randomly to varying altitudes: SL; 915 m; 1,829 m; 2,743m; 3,658m; and 4,572m. Results: For each variable, magnitude of change (Δ) was averaged over the 6 lab visits and compared at SL and across

altitude levels. SL ΔBG (mg/dL), ΔHR (bpm), and ΔMAP (mmHg) for T1D and ND, respectively, were: 19, 16, 18; and 34, 18, 12. T1D maintained a more stable BG at SL over 6 days. When averaging the five altitude levels over 6 days, ΔBG (mg/dL), ΔHR (bpm), and ΔMAP (mmHg) for T1D and ND, respectively, were: 58, 9, 10; and 47, 9, 10. Notably, T1D had a less stable BG during hypoxic exposure. Conclusion: Simulated hypoxia perturbed BG to a greater extent in T1D. This could have practical application for when a T1D travels to higher, natural elevations, at which point they should more closely monitor their BG levels with normal food and fluid intake.

Keywords: heart rate, mean arterial pressure, altitude, diabetes

Board 16

EFFECTS OF AN ACUTE BOUT OF RESISTANCE EXERCISE ON COGNITIVE PERFORMANCE IN YOUNG ADULTS

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Abstract The effect of acute exercise on cognition has been studied extensively. There is overwhelming support for enhanced cognitive performance as a result of longitudinal and cross-sectional studies of aerobic exercise, along with the positive effects of an acute bout of aerobic exercise on cognitive performance. However, less research has been reported and the research is much less clear regarding the effects of an acute bout of resistance exercise on cognitive performance. PURPOSE: To investigate the effect that an acute bout of high-intensity resistance exercise (RE) has on reaction time (RT), working memory (WM), memory vision (MVI), memory verbal (MVE) and inhibition (IN). METHODS: Ten healthy males and females (18-25 yrs) volunteered. Visit 1: body composition (Bodpod) and VO2 max were assessed. Visits 2, 3 & 4 were separated by 1 week. Visit 2: Subjects completed a computerized cognitive performance test (imPACT) and then completed 1-repitition maximums (1-RM) for each of 7 resistance exercises. Visits 3 & 4: Subjects underwent either 30 minutes of semi-reclined Rest (R) or the RE routine. RE consisted of 2 sets (12 reps) at 75% of 1-RM for each exercise. Sets were separated by 1min of sitting rest. R and RE were counter-balanced. Prior to and following R and RE subjects performed the imPACT test. RESULTS: Reaction Time decreased from 0.541sec pre-exercise to 0.524sec post-exercise but not at a significant level (p-value .145) as compared to pre-rest RT of 0.533sec increasing post-rest to 0.535sec (p-value .884). There was also no significant difference between pre-exercise RT 0.541sec and pre-rest RT 0.533sec (p-value .558). CONCLUSION: These findings show no statistically significant changes post exercise, though RT does seem to trend to decreasing post-exercise. This preliminary data does not show any statistically significant effect caused by RE. More subjects should be tested to develop a better understanding on how cognitive performance is affected by an acute bout of resistance exercise.

Keywords: Reaction time, High-Intensity, Cognitive Function,

Board 17

BLOOD FLOW RESTRICTED WALK TRAINING ON BODY COMPOSITION AND VO2MAX

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Abstract Blood flow restricted (BFR) resistance exercise has gained a lot of attention due to its ability to increase muscle mass and strength during low-to-moderate intensity as compared to traditional high intensity exercise. Less information is available on the effects of BFR when applied to walking. PURPOSE determine the

effects of chronic moderate intensity BFR walking on aerobic fitness and body composition in healthy, college aged men with average to above average aerobic fitness. METHODS nine men were recruited for this investigation – five for the no-BFR (CON) walk-training group (age 22±1 yrs old) and four in the BFR walk-training group (age 20±1 yrs old). Aerobic capacity (VO2max performed without BFR) and body composition (% body fat) were determined pre- and post- 10 sessions of CON or BFR walk-training sessions. Each session was at least 2 days, but no more than 4 days apart, and performed at approximately the same time of day (±2 hrs). Walk-training consisted of 20 minutes sessions with (BFR) or without (CON) BFR at 50% of each participants' pre-determined VO2max. Data are reported as means±standard deviations. A 2x2 repeated measures ANOVA was used to compare variables of interest between groups, pre- and post-walk training. Significance accepted as $\alpha < 0.05$. RESULTS There were no differences between groups in age or VO2max, while pre- % body fat was significantly lower in the CON group. Following the 10 sessions of training, there were no changes in the CON group's VO2max (48.80±1.63 vs 47.32±0.67 ml/kg/min, pre- vs post- trainng, respectively) or body fat (14.00±1.58 vs 14.22±2.55%). However, the BFR walking group did significantly increase their VO2max (46.07±1.55 vs 51.50±4.77ml/kg/min), but did not alter their body fat (20.93±1.08 vs 20.03±2.62%) after training. CONCLUSION In this group of health young men, 10 sessions of 20 minutes of walking at a moderate intensity was not sufficient to increase VO2max, but with the application of BFR to this training did provide a sufficient stress to increase VO2max.

Keywords: KAATSU, Blood Flow Restriction

Board 18

PREDICTABILITY OF VO2MAX FROM THREE COMMERCIALLY AVAILABLE DEVICES

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Abstract Submaximal testing is often used to determine VO2max. Recently, sports watches have been developed with a feature that predicts VO2max from a submaximal effort. It is unknown if three commercially available sports watches accurately predict VO2max. Purpose: To examine the predictability of VO2max from two heart rate monitors (Device A and V) and a global positioning system (GPS) watch compared to measured VO2max. Methods: Thirteen participants, 7 males and 6 females ages 18 to 55, volunteered for this study. Participants came to the Running Science Laboratory at Eastern Michigan University (EMU) on two occasions. During the initial visit, participants arrived in a semi-fasted state (without caffeine or caloric consumption for 3 hours) and completed a maximal graded exercise test (GTX) to determine VO2max. The participant determined a self-selected speed. This speed remained constant throughout the test whilst only grade increased by 2% every 2 minutes until volitional exhaustion and VO2max (ml/kg/min) was recorded. During the second visit, participants first wore two heart rate monitors simultaneously (Device A and V) and were instructed to lie still for 6 minutes to allow for the devices to estimate VO2max. After these values were obtained, these two devices were replaced by a GPS watch. Participants then completed a 15-minute submaximal outdoor run and the GPS watch estimated VO2max. Pearson correlations and paired samples t-tests were utilized to compare estimated VO2max values from the three devices to measured VO2max from the GTX ($p<0.05$).
Results: One participant was excluded due to having a VO2max less than 35ml/kg/min. Device A ($r=0.83$; $p<0.01$), Device V ($r=0.87$; $p<0.01$), and the GPS watch ($r=0.67$; $p<0.05$) were associated with measured VO2max. However, a significant difference was found between measured VO2max (55.5±8.9 ml/kg/min) compared to Device A (44.75±5.59), Device V (47.08±5.56), and the GPS watch (47.73±6.19).

Conclusion: Previous research has shown that the GPS watch underestimates VO2max when participants have a measured VO2max greater than 50ml/kg/min. In this study, even though there were moderate to strong relationships, all three watches underestimated VO2max compared to measured VO2max. These watches may not be an accurate measure of VO2max for individuals with a high VO2max.

Keywords: Cardiorespiratory fitness, fitness testing, sports watches, running

Board 19

EXAMINATION OF PERSONALITY RELATED TO INDIVIDUALS' REPORTED PRIMARY MODE OF EXERCISE

Allyson G. Box (University of Illinois Urbana-Champaign), Yuri Feito (Kennesaw State University), Chris Brown (Kennesaw State University), Steven J. Petruzzello (University of Illinois Urbana-Champaign

Abstract Introduction: Various personality traits have been linked to exercise behavior. It is possible that these personality dimensions are associated with the type of exercise one chooses to engage in. Purpose: To examine the relationship between personality dimensions, based on the Five Factor Model (FFM), and primary exercise modalities. Methods: 576 adults (34.5±11.4 years; 46.7% male), currently participating in any form of exercise on a regular basis, completed an online survey. The survey included questions related to their primary mode of exercise (PME) and items for the Big Five Inventory (BFI). The BFI assesses the FFM dimensions of Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. PMEs were divided into 5 main groups: CrossFit® Training (n=90), Group Exercise (n=59), Aerobic Training (n=116), Resistance Training (n=142), and Sport (n=142), with 2 other categories concurrently assessed: High-Intensity Training (n=13) and Other (n=14). Results: A multivariate ANOVA (with df=5, 569) revealed significant differences (all Ps<0.001) between PME and Conscientiousness (F=45.2, η2p=0.323), Agreeableness (F=18.7, η2p=0.165), Neuroticism (F=14.1, η2p=0.129), Openness (F=7.5, η2p=0.073), and Extraversion (F=6.3, η2p=0.062). Discussion: These findings support the notion that aspects of an individual's personality are linked to their preference to participate in a particular exercise mode. With this type of information, it may be possible to prescribe exercise modalities that could lead to greater adherence, thereby reducing the likelihood of physical inactivity and addressing a prominent public health concern.

Keywords: Big Five, CrossFit, Physical Activity Preference

Board 20

DIFFERENCE IN NONLINEAR MEASURES OF ATTENTIONAL INVOLVEMENT IN BALANCE BETWEEN YOUNG AND OLDER ADULTS

Jack Manning (Northern Illinois University), Luis Hernandez, Shuqi Zhang, Paul Wright, David Brenner

Abstract Balance is a multi-faceted dynamic system that requires different bodily systems working in conjunction to maintain balance. Sample entropy, as an indicator of attentional involvement in balance, measures the complexity of time-series-data, with higher values indicating higher complexity. Balance has been documented as deteriorating as aging progresses. Due to this we hypothesized that attentional investment on balance is higher among older adults(OA), leading to lower Sample entropy. Purpose: this study was to compare the center of pressure(CoP) complexity between OA and young adults(YA). Methods: Participants were recruited and placed into two groups, OA(n=6) and YA(n=6). Participants were asked to

stand on a force plate for 2 minutes (Accusway, AMTI, Watertown, MA) with two feet apart at 15º and one fist apart at heels. Balance tests were conducted under two visual conditions, eyes open(EO) and eyes closed(EC). In the EO condition, participants focused on a 5cm-diameter spot placed at eye level on a wall. CoP-related measures were calculated for 95% sway area (A95%) and average velocity of CoP($\bar{v}$). Raw data of CoP were filtered by a 4th order low-pass Butterworth filter with cutoff-frequency at 10Hz in R (R software, The R Foundation, Austria) using "Signal" package. Sample entropy of CoP was calculated in mediolateral-direction (SampEnCoPx) and anteroposterior-direction (SampEnCoPy) using "nonlinear-Tseries" package in R. Two-way MANOVA was used to test the effects of group and visual condition (independent variables) on SampEnCoPx, SampEnCoPy, A95%, and $\bar{v}$ (dependent variables). ANOVA test was used when needed. Results: MANOVA showed there was significant difference between groups (Wilks' Lambda=.002), while ANOVA showed that OA exhibited significantly larger means in SampEnCoPx (OA:0.1552 ± 0.0650; YA: 0.1073 ± 0.0240) and SampEnCoPy (OA: 0.3145 ± 0.1332; YA: 0.1377 ± 0.0493) as well as CoP-related measures A95% (OA:3.458 ± 3.777cm2; YA: 0.5624 ± 0.6024cm2) and $\bar{v}$ (OA: 2.132 ± 1.217m/s; YA: 0.4980 ± 0.1313m/s)($p<.05$). Conclusion: Complexity of CoP in both directions was shown to be higher in OA, accompanying larger A95% and $\bar{v}$. Prior studies have suggested that interpretation of SampEn on physiological time-series warrants further investigation, which should be the focus of future research.

Keywords: Sample Entropy, Complexity, Postural Sway

Board 21

WOMEN'S PSYCHOSOCIAL HEALTH, PHYSICAL ACTIVITY, AND PERCEPTIONS OF PLUS-SIZE EXERCISE APPAREL

Gabriel Serafin (University of Wisconsin-Milwaukee), Christy Greenleaf (University of Wisconsin-Milwaukee), Caitlyn Hauff (University of South Alabama), Lori Klos (University of Wisconsin-Milwaukee), Amy Kauffung (University of Wisconsin-Milwaukee)

Abstract INTRODUCTION: Individuals with overweight and obesity face many barriers to physical activity. Limited availability and poor quality of plus size-exercise apparel may act as an additional barrier for some women. Furthermore, psychosocial factors associated with body size, such as exercise motivation and body surveillance, may be exacerbated by plus-sized exercise apparel and influence women's physical activity. PURPOSE: To explore differences in psychosocial health and physical activity among women who believe that plus-size exercise apparel may facilitate, prohibit, or bear no influence on their physical activity. METHODS: Women (Mage=39.83, SD=10.63) who identified wearing size 14 or larger completed an online survey including: demographic items, Body Surveillance Scale (BSURV), Social Physique Anxiety Scale (SPAS), Exercise Avoidance Motivation Scale (EXMOT), International Physical Activity Questionnaire (IPAQ), and an item on perceived influence of exercise apparel on physical activity (1=facilitates, 2=no influence, 3=barrier). Multivariate analysis of covariance included perceived influence of exercise apparel as the independent variable; SPAS, BSURV, EXMOT, and IPAQ as dependent variables; and age and race as covariates. Additionally, responses to two open-ended items on perceived influence of exercise apparel on activity were analyzed for themes. RESULTS: Most women (53.6%) reported that exercise apparel facilitated physical activity, while some felt it either did not influence (31.4%) or was a barrier to physical activity engagement (15%). A significant multivariate effect was found (Wilks' Lambda=.95, $F(8, 230)$, $p<.05$). Follow-up univariate analyses indicated that women who felt apparel positively influenced activity scored lower on SPAS than women who had neutral ($p<.05$) or negative feelings ($p<.05$); women who viewed exercise apparel as a barrier to activity had higher EXMOT compared to women who had positive ($p<.001$) or neutral feelings ($p<.05$). Responses to open-ended item responses revealed that feelings of apparel-related comfort and confidence positively

influenced activity, while self-consciousness negatively influenced activity. CONCLUSION: Our results indicate negative psychosocial experiences are associated with perceiving apparel as a barrier to activity. Additional research is needed to further elucidate these relationships and determine how apparel can contribute to people of all shapes and sizes feeling comfortable and confident while being physically active.

Keywords: Weight Bias, Body Image, Motivation

Poster Session #2: Crown Foyer – 10:30-11:55am

Board 1

MOVEMENT DEFICIENCIES IN DIVISION II MALE FOOTBALL ATHLETES AS IT RELATES TO CLASS AND POSITION

Taylor A. Taraski (Saginaw Valley State University)

Abstract The NCAA Division II Student-Athlete population may be subject to numerous mobility and stability deficiencies as it relates to sport and training requirements. Deficiencies must first be identified prior to prescription of sport performance training modalities. PURPOSE: Identify movement deficiencies in Division II male football athletes and investigate differences among specified groups. METHODS: Forty-three athletes (weight 103.1 ± 19.9 kg, height 183.3 ± 6.6 cm) underwent 11 screening exercises assessing deficiencies in 15 evaluation areas. Data was collected by trained evaluators who scored athletes on a pass/fail system with failure defined as compromised mobility or stability during exercises. Scores were compiled into evaluation areas determining deficiencies. For analysis, athletes were dichotomized into Upperclassmen (UC) n = 22 and Lowerclassmen (LC) n = 21 and stratified into position groups: Skill (n = 15), Big Skill (n = 15), and Bigs (n = 13). Descriptive statistics and comparative analysis, T-Test and ANOVA, were performed using SPSS (version 22.0) with significance set at $p \leq 0.05$. RESULTS: All athletes displayed deficiencies, but comparative analysis identified significant differences between UC and LC in lower body strength (UC = 1.9 ± 1.4, LC = 3.1 ± 0.9; F = 11.9, p = 0.001) and single leg strength (UC = 3.8 ± 1.9, LC = 5.1 ± 1.2; F = 6.5, p = 0.02). Within position groups, Bigs (6.9 ± 1.7; 13.2 ± 2.8; 2.6 ± 0.5, 1.9 ± 0.9) presented greater deficiencies in posterior chain (F = 6.4, p = 0.004), core stability (F = 5.4, p = 0.01), hip girdle strength (F = 3.6, p = 0.04) and posterior shoulder girdle strength (F = 3.6, p = 0.04) compared to Skill (3.7 ± 2.7, p = 0.001; 9.9 ± 3.3, p = 0.01; 1.8 ± 0.9, p = 0.01; 1.3 ± 0.9, p = 0.06) and Big Skill (4.3 ± 2.9, p = 0.01; 10.0 ± 2.8, p = 0.01; 1.8 ± 0.9, p = 0.37; 1.1 ± 0.8, p = 0.01). CONCLUSION: Identification of individual and group deficiencies allows for utilization of targeted training protocols with the goal of enhancing overall performance.

Keywords: Sport Performance, Testing, Screening

Board 2

A DESCRIPTIVE ANALYSIS OF THE OVERHEAD LACROSSE SHOT IN A MECHANICAL SET-UP

Alexander J. Randall (DePauw University), Nathan T. Greenberg (DePauw University), James P. Babington (DePauw University), Brian V. Wright (DePauw University),

Abstract: INTRODUCTION Previous literature has investigated the influence of lacrosse stick models on ball velocity during the overhead lacrosse shot in lacrosse players (Crisco, 2008). However, to our knowledge no

studies have examined the lacrosse shot using a standardized mechanical set-up to control for variation in shot performance due to interindividual differences in player shot mechanics. PURPOSE The purpose of this study was to develop a mechanical device that performed a standardized overhead lacrosse shot to further explore lacrosse shot kinematics. More specifically to compare predicted (i.e. based on the stick being a passive extension of the player) and actual ball velocities achieved at points located on the shaft, head, and ball during this motion. METHODS To perform consistent lacrosse shots a custom spring loaded device (much like a catapult) that permitted a lacrosse stick to rotate through a constant plane was developed. Each shot it required manual placement of the ball in the lacrosse head mesh, pulling of the shaft back against the spring loaded resistance to a standard distance, then releasing the shaft of the lacrosse stick. The force generated by the spring was measured during each shot using a commercial crane scale. Thirty shots of digital video were captured at 120 fps. Points located at the proximal shaft, distal shaft, lacrosse head, and ball were digitized throughout movement of the standardized overhead lacrosse shot using Simi Motion Reality Systems software. Instantaneous velocities were quantified at each point to describe the relationship between stick, head, and ball velocity throughout the range of movement for each shot using an offensive lacrosse head and a low pocket position. A independent samples t-test was used to compare ball and lacrosse head tip linear velocities at the release of the ball. RESULTS Results revealed that instantaneous linear ball velocity was significantly greater than linear head tip velocity at release of the ball from the lacrosse head (32.4 ± 1.2 m·s-1 vs 27.3 ± 0.6 m·s-1 respectively; $p < 0.001$). CONCLUSION This study demonstrated that a men's lacrosse stick offensive head was capable of shooting the ball at velocities higher than predicted when the stick is considered to be a rigid-body using a standardized mechanical set-up.

Keywords: Rigid Body Mechanics, ball velocity

Board 3

ACUTE EFFECTS OF AEROBIC EXERCISE ON PLASMA ENDOTHELIN-1 LEVELS IN HEALTHY MEN

Kristina B. Arslain (Miami University), Caitlin M. Gatts (Miami University), Robert M. Duguid (Miami University), Craig W. Berry (Miami University), Kevin Ballard (Miami University)

Abstract Endothelin-1 (ET-1) is a vasoconstrictor molecule that is inversely associated with vascular endothelial function (VEF). Aerobic exercise training improves VEF and decreases systemic ET-1 levels. A single bout of aerobic exercise transiently improves VEF. However, it is currently unknown if an acute bout of aerobic exercise influences systemic ET-1 levels. PURPOSE: In the present study, we examined the effect of acute aerobic exercise on plasma ET-1 in healthy men. We hypothesized that a single bout of aerobic exercise would decrease plasma ET-1 levels for up to 3-hrs post-exercise. METHODS: Healthy, recreationally active men [n = 11; 21.2 ± 0.6 y; BMI = 24.7 ± 1.0 kg/m2; VO2max = 49.9 ± 5.1 ml/kg/min (mean ± SE)] participated in two randomized trials separated by 1-wk. Participants performed a single bout of moderate-to-vigorous treadmill exercise (45 min at 65% VO2max) (EX) or 45 min of quiet rest (REST) as a control condition. Plasma ET-1 concentrations were assessed after an overnight fast, 1-hr following EX (or REST), and at 1-hr intervals for 3-hrs. Plasma ET-1 was measured using an ELISA kit. Two-way repeated-measures ANOVA and Fisher's LSD post-hoc tests were used to detect differences within and between trials. RESULTS: Participants completed the 45 min of treadmill exercise at 65.6 ± 1.2% VO2max (range = 60.9-72.6%). Plasma ET-1 did not differ between trials at baseline (1.72 ± 0.20 versus 1.78 ± 0.16 pg/mL for EX and REST, respectively). A significant main effect for time ($P<0.01$) was found for plasma ET-1. However, no significant pairwise differences were detected (all $P\geq0.09$). Change from baseline was calculated for plasma ET-1 but findings did not differ from absolute values. CONCLUSION: A single bout of moderate-to-vigorous intensity aerobic exercise did not affect plasma ET-1

concentrations in healthy men. Future studies are warranted to examine differences due to sex, age, disease status, and exercise modality on ET-1 and VEF responses to acute exercise.

Keywords: vascular function; endothelial; exercise

Board 4

FOOTSTRIKE PATTERNS AT VELOCITIES RELATIVE TO VELOCITY AT MAXIMAL OXYGEN CONSUMPTION

Megan Montgomery (DePauw University), Brian Wright (DePauw University), Patrick Babinbgton (DePauw University)

Abstract: INTRODUCTION: Previous research suggests that faster runners tend to use a more midfoot/ forefoot strike pattern during competition. In addition, at increasing running velocities, reports suggest that runners transition to a midfoot/forefoot strike pattern between 5 and 6 m·s-1. Footstrike patterns have not been reported at velocities relative to a running velocity that elicits VO2 max. PURPOSE: To determine if footstrike pattern, as measured by footstrike angle, changes at running velocities relative to velocity at VO2 max in active college-age individuals on a level treadmill. METHODS: VO2 max was measured in ten college age subjects (7 males, 3 females; age 18 ± 0 years, height 175.0 ± 8.6 cm, body mass 73.2 ± 13.5 kg and VO2 max 50.7 ± 12.0 ml·kg-1·min-1). During the test, subjects ran at 3 submaximal velocities before treadmill incline was increased until VO2 max was attained. Velocity at VO2 max was estimated from the VO2-submaximal running velocity relationship for each subject. Subjects then performed a treadmill run at 60, 70, 80, 90, and 100 percent of their velocity at VO2 max. Video was captured (120 fps) in the sagittal plane during the last 10 seconds of the 1-minute run at each velocity. Footstrike angle was determined by the methods of Altman and Davis (2012). A repeated measures Oneway ANOVA was used to determine changes in footstrike angle across the running velocities. RESULTS: Mean running velocity at VO2 max was 4.2 ± 0.8 m·s-1. Mean footstrike angle at relative velocities of 60, 70, 80, 90 and 100 percent of velocity at VO2 max were 15.9 ± 8.9˚, 16.1 ± 8.4˚, 14.1 ± 9.4˚, 13.8 ± 9.4˚ and 13.7 ± 8.8˚, respectively. There were no differences in footstrike angle across the relative running velocities. Conclusions: In this sample, it appears that runners do not alter their footstrike pattern as running velocity approaches the velocity at VO2 max. For most individuals, the velocity that elicits VO2 max may be below the transition velocity to a more midfoot/forefoot strike pattern.

Keywords: RUNNING, MIDFOOT STRIKE, FOREFOOT STRIKE

Board 5

THE FEASIBILITY OF BLOOD FLOW RESTRICTION EXERCISE IN INCOMPLETE SPINAL CORD INJURED PATIENTS

Lisa Stout (Kent State University, Louis Stokes Cleveland VA Medical Center), Jon Stavres (Kent State University, Louis Stokes Cleveland VA Medical Center), Tyler Singer (Kent State University), Amber Brochetti (Louis Strokes Cleveland VA Medical Center), Martin Kilbane (Louis Strokes Cleveland VA Medical Center), Steven Brose (Louis Strokes Cleveland VA Medical Center), John McDaniel (Kent State University, Louis Stokes Cleveland VA Medical Center)

Abstract Individuals with incomplete spinal cord injuries (iSCIs) suffer from significant functional limitations, and improvements with traditional physical therapy are limited by exercise intensity. Therefore, an exercise modality that maximizes adaptations to low intensity exercise would be ideal in this population. PURPOSE: To

determine the safety and feasibility of blood flow restriction (BFR) exercise in a sample of individuals with iSCIs, and to compare physiological responses between BFR and non-BFR exercises. METHODS: Nine subjects with iSCIs completed a trial of unilateral BFR knee extension (3x10 reps) at a self-selected intensity with, and without, BFR (125% of venous occlusion pressure) in a counterbalanced order. Pain, perceived difficulty, muscle activation (iEMG), hemodynamics, and tissue oxygenation characteristics were compared between conditions. Each subject was screened for a DVT before participation, and returned for a quantitative D-dimer assessment within a week following the protocol. RESULTS: Subjects were able to complete each BFR trial without any adverse events (including acute autonomic dysreflexia or DVT formation). No differences were observed for pain, perceived effort, muscular activation, and lactate between BFR and control exercise. Mean arterial pressure and systolic pressure both increased with exercise (18.8% and 17.6% in BFR, and 19.4% and 19.6% in control, respectively; $p<0.05$), however, were not different between conditions. There was an increase in oxygenated hemoglobin during exercise in the BFR condition and a simultaneous decrease during exercise in the control condition (+12.3±96.7 NU in BFR and –56.2±82.37 NU in control, $p<0.04$). There was a significant increase in Doxy during exercise compared to baseline in the BFR condition (+105.4±76.7 NU), and a significantly higher Doxy during BFR compared to control exercise (105.4±76.7 NU and 6.1±28.8 NU in BFR and control respectively, all $p<0.01$). CONCLUSIONS: In conclusion, the physiological responses to BFR exercise in individuals with incomplete spinal cord injuries are similar to those in previously reported healthy control subjects. This preliminary study indicates BFR exercise can be safely performed by individuals who have incomplete spinal cord injuries without added cardiovascular strain or heightened pain. Thus, BFR training may serve as an optimal exercise modality for this population to maximize muscular strength and endurance.

Keywords: Functional, limitations, physical therapy, physiological

Board 6

INFLUENCE OF REACH HEIGHT ON QUANTIFYING VERTICAL JUMP HEIGHT

Staisy Cardenas (DePauw University), Emily N. Blankenberger (DePauw University), Brian V. Wright (DePauw University)

Abstract: INTRODUCTION The vertical jump is a common tool used to measure lower body power and performance. Several tools in the field are used to quantify jump height (e.g. Vertec, force plates, jump mats, and tethered mechanisms). Some of these methods require measuring a person's reach height prior to executing the test to control for reach distance and capture the vertical jump distance. However, little empirical data exist to describe whether or not variation in reach height measurements influence the final calculation of jump height. PURPOSE The purpose of this study was to examine whether or not different procedural measures of reach height influence the quantification of vertical jump height. METHODS Four variations of reach height were measured on a group of seven college students to begin testing. These four measurements included a standard reach height (i.e. standing flat foot with arm rotated to vertical position 180° from anatomical position; R1), standing reach height with an additional elevation at the scapula (R2), standing reach height while standing on toes (plantar flexion; R3), and standard reach height with both standing on toes and additional elevation at the scapula (R4). Following measures of reach height each subject performed a series of vertical jumps (i.e. 7-10) using the Vertec device to determine maximal jump height. Four variations of jump height were then calculated from each of the reach heights measured. A one-way repeated measures ANOVA was used to test for differences between each of the quantified jumps heights. RESULTS Results of the analyses displayed a significant difference between all quantified values of vertical jump ($F(1, 6) = 48.45$; $p < 0.01$, $\eta 2 = 0.890$). Pairwise comparisons revealed R1 > R2 > R3 > R4 (34.4 ±

3.9 cm, 28.8 ± 4.6 cm, 26.1 ± 3.4 cm, 20.5 ± 4.0 cm respectively). CONCLUSION This study demonstrated that procedural steps executed during measures of reach height can influence the quantified outcome of the vertical jump test.

Keywords: testing protocol, lower-body power

Board 7

THE RELATIONSHIP BETWEEN MUSCLE SIZE AND ANAEROBIC PERFORMANCE

Sara Gulczynski (Elmhurst College), Emily Marszalek, Raymond Kraus, Bridget Lester

Abstract The Wingate Anaerobic Test (WAnT) is a traditional way anaerobic performance is assessed to determine an individual's fitness and readiness for certain athletic activities. One of the limitations to using the WAnT is that there is no single accepted way to express anaerobic power to make the most meaningful comparisons across people. Most commonly anaerobic power is normalized to body weight, but it is unclear if this is the most optimal method. PURPOSE: To determine the most effective way to normalize WAnT performance, the relationships between anaerobic power and the following variables were explored: 1) size of skeletal muscle recruited for the exercise, 2) total lean mass, and 3) total body mass. It was hypothesized that anaerobic power would have the strongest relationship with muscle size. METHODS: Six healthy individuals (3=males, 3=females) were assessed during one day of testing at Elmhurst College's Department of Kinesiology's Laboratory. Upon arrival to the laboratory, body weight was collected and body composition was measured using bioelectric impedance analysis. Next, size of the vastus lateralis muscle of the quadriceps femoris was determined using panoramic ultrasound. After body measurements were collected, each subject performed one 30-second WAnT at a maximal effort with resistance set to 7.5% of body weight. Mean and peak power values were determined using computer software integrated with the cycle ergometer (Velotron). Pearson's product-moment correlation analyses were performed to determine relationships between anaerobic power and the 1) size of muscle, 2) total lean mass, and 3) total body mass. RESULTS: There was no relationship between muscle size and anaerobic power ($P>0.05$). There was a strong positive relationship between total lean mass and mean power ($r=.96$, $P<0.05$) and total lean mass and peak power ($r=.93$, $P<0.05$). In addition, there was a strong positive relationship between total body mass and peak power ($r=.90$, $P<0.05$), but no relationship between total body mass and mean power ($P>0.05$). CONCLUSIONS: Our hypothesis was refuted; muscle size did not have the strongest relationship with anaerobic power and is likely not the optimal measurement to use for anaerobic power normalization.

Keywords: WAnT, Normalization

Board 8

GLYCEMIC AND INSULINEMIC RESPONSES TO A SINGLE BOUT OF EXERCISE WHEN ACUTELY OVERFED

Andrea Smith (Ohio University), Kerry Detienne (Ohio University), Larry Osborne (Ohio University), Erica Custer (Ohio University), Michael R. Kushnick (Ohio University, Briar Cliff University)

Abstract A single bout of aerobic exercise has been demonstrated to reduce insulin concentrations. Moreover, while chronic overeating and obesity have a profound effects on blood glucose and insulin, much less is known about the short term effects of overeating on blood glucose and insulin. PURPOSE compare the effects of a single day of overfeeding in combination with a single bout of exercise on blood glucose and insulin in healthy

men. METHODS Five healthy men (age 23±1years) with average body fat (16.6±4.5%) and VO2max (48.6±3.5ml/kg/min) participated in this investigation. Four trials were performed in random order. Participants ate 45 kcals/kgFFM for energy balance (CON and CONX) and 65 kcal/kgFFM for overfed (OF and OFX). On the controlled feeding day of exercise trials (CONX and OFX) participants walked at 60% VO2max to expend 500 kcals. Fasted blood was collected at baseline, 12 and 36 hours after exercise (or similar time in CON and OF). Means±stdev are reported. 2x2x3 repeated-measures-ANOVAs were performed on insulin and glucose between fed states, exercise/non-exercise trials and across time. One-way-ANOVAs and LSD post-hoc tests were performed as necessary. Significance was $\alpha<0.05$. RESULTS There was significant interaction among trials. While glucose and insulin were not different at baseline among the four trials, nor did they change over CON, insulin was lower at 12 and 36 hours in CONX (4.3±2.1 and 6.6±3.6 as compared to 8.3±4.5mU/L). During OF both glucose and insulin were higher (glucose 112.5±14.5 and 107.9±7.2/insulin 17.7±5.4 and 14.9±8.2 for 12 and 36 hours as compared to 91.6±11.3mg/dL/7.8mU/L). However, during OFX, insulin was only higher at 12 (18.3±5.7mU/L) but not different at 36 hours (10.1±8.8 as compared to baseline 7.5±5.2mU/L), while no differences were observed in glucose (96.2±10.4 and 94.8±9.9mg/dL). CONCLUSION In this group of healthy men, acute overfeeding significantly increased blood glucose and insulin. Moreover, a bout of moderate intensity aerobic exercise to expend 500 kcals during a day in energy balance resulted in a reduction in insulin 12 and 36 hours post exercise. However, this exercise didn't negate the detrimental effects of one day of overfeeding on insulin at 12 hours after the exercise bout.

Keywords: KAATSU, Blood Flow Restriction

Board 9

THE EFFETS OF VIRTUAL REALITY GAMING VERSUS TREADMILL EXERCISE ON PERCIEVED ENJOYMENT AND HEART RATE RESERVE

Hannah A. Bennett (Franklin College), Brayton J. Allen (Franklin College), Jacob N. Leachman (Franklin College), Levi Spaniolo (Franklin College), Adam M. Heavrin (Franklin College), Max W. Adophs (Franklin College)

Abstract Interactive video gaming has been shown to acutely increase physical activity while being perceived as enjoyable. The effects of virtual reality (VR) gaming, a new and increasingly popular mode of interactive video gaming, on these variables is currently unclear and not well explored. PURPOSE: This study examined the effects of VR gaming versus self-selected moderate intensity treadmill exercise on heart rate reserve (HRR) and exercise enjoyment in college students. METHODS: Seventeen healthy college students (9 males, age = 20.22 ± 1.30 years, weight = 88.78 ± 18.58 kg; 8 females, age = 20.5 ± 0.93 years, weight = 68.45 ± 6.48 kg) completed the study. All participants completed two separate experimental trials in a random order. The trials consisted of a treadmill trial and a VR gaming trial. The treadmill trial consisted of a self-selected 5-minute warm up on a treadmill followed by 5 minutes of self-selected moderate intensity exercise on a treadmill with the grade set at 1%. Subjects were asked to maintain a 3 out of 10 on the modified Borg scale to ensure moderate intensity. The VR gaming trial consisted of a 5-minute familiarization with an archery game followed by 5 minutes of collection while playing the same game. During all trials, resting and exercise heart rate data was collected and averaged by a chest worn heart rate monitor. Directly following all trials, exercise enjoyment measures were determined by each participant completing the modified Physical Activity Enjoyment Scale (PACES). HRR and exercise enjoyment measures were statically analyzed across groups using repeated measures ANOVA. RESULTS: A significant ($F = 33.98$, $P < .001$) difference in HRR (VR gaming trial = 75.24 ± 15.02%, treadmill trial = 57.47 ± 12.89%) and a significant ($F = 18.35$, $P < .001$) difference in exercise enjoyment measures (VR gaming trial = 31.29 ± 3.55, treadmill trial = 22.76 ± 8.49) were seen across groups.

CONCLUSION: Because VR gaming elicited a greater intensity of exercise and was perceived as more enjoyable than self-selected moderate intensity treadmill exercise, it may be a unique strategy for improving health and fitness.

Keywords: Interactive Gaming, Physical Activity, Health Promotion

Board 10

PHYSICAL FITNESS TRENDS IN COLLEGE-AGED STUDENTS ENROLLED IN A HEALTH PROMOTION PROGRAM

Vanessa M. DeLeo (Grand Valley State University)

Abstract BACKGROUND: Consistent physical activity and sustained physical fitness are essential pieces of maintaining a healthy lifestyle throughout the lifespan. There is an alarming drop in physical activity during college years, with nearly half of college students not participating in regular physical activity. The UFit program at Grand Valley State University offers free health evaluations and exercise programming, yet it remains unknown which components of physical fitness are most impacted during the college years, specifically between genders. PURPOSE: To examine male and female physical fitness in Grand Valley State University students enrolled in the UFit program. METHODS: Data was collected from participants (aged 18-22) upon enrollment in the UFit program for baseline testing. Physical fitness was measured by predicted VO2max (YMCA cycle test; cardiorespiratory endurance), handgrip strength (muscular strength), YMCA bench press test, push up test; muscular endurance), sit and reach (flexibility), and body fat percentage (body composition). A one way ANOVA was performed to compare the mean values for all components of physical fitness. RESULTS: There were no significant differences in any of the physical fitness variables between the individual age groups, even when examining across genders. Not surprisingly, most of the physical fitness variables were very poor (i.e. VO2max 35.2±9.8 ml/kg/min and grip strength 65.4±23.2 lbs). CONCLUSION: Understandably, students seeking assistance in a fitness program do so likely to improve deteriorating physical fitness. However, these individuals demonstrated the ability to maintain fitness through the college years (as opposed to typical students), which may be attributable to accountability and motivation offered through the UFit program. Future research is warranted to identify and engage with inactive students to enhance physical fitness.

Keywords: Students, UFit, Exercise

Board 11

THE INFLUENCE OF PRACTICE AND INSTRUCTIONAL METHODS ON VERTICAL JUMP PERFORMANCE

Emily N. Blankenberger (DePauw University), Staisy Cardenas (DePauw University), Brian V. Wright (DePauw University),

Abstract: INTRODUCTION A common measurement utilized to assess lower body power and performance is the vertical jump. Most individuals know what a jump is, yet an often overlooked procedural step includes the role of the administrator. More specifically, how the administrator "instructs" the subject on how to perform the highest possible vertical jump. PURPOSE The purpose of this study is to examine whether or not "uninstructed practice" and "instructional" methods influence performance of the vertical jump test. METHODS Five college students (non-athletes) participated in four separate testing trials. During the first

three trials participants were simply instructed to “jump as high as possible while reaching for vanes on a Vertec” with no additional instruction. On the fourth visit, they were instructed to perform a countermovement jump using both verbal description and a physical demonstration. Each session the participant performed 5-10 jumps where jump height was recorded using both a Vertec and a force plate simultaneously. A repeated measures One-Way ANOVA for jump height was used to compare testing trials. RESULTS Thus far following the analyses of five completed subjects no significant differences ($p > 0.05$) for vertical jump were detected between testing trials (Trial-1 = 38.1 ± 14.9 cm= , Trial-2 = 34.4 ± 14.4 cm, Trial-3 = 36.6 ± 17.1 cm, Trial-4 = 40.5 ± 17.9 cm). Upon further examination of the data analyses a power analyses revealed a power of (β-1) 0.358 and an effect size (ω2) 0.313. Therefore, it appears at initial evaluation the independent variable has an influence upon jump height, yet statistical power remains low at this point. CONCLUSION This study to point in time has revealed that the number of separate vertical jump testing trials (i.e. day to day) and instructional methods may have the ability to influence vertical jump performance.

Keywords: learning effect, lower-body power

Board 12

EXERCISE IS MEDICINE AT GVSU-BRINING AWARENESS AND ENGAGEING STUDENTS ACROSS CAMPUS

Victoria Warren (Grand Valley State University), Vanessa DeLeo (Grand Valley State University), Chris Dondzila (Grand Valley State University), Amy Campbell (Grand Valley State University), Lindsey DesArmo (Grand Valley State University), Amy Gyorkos (Grand Valley State University)

Abstract The Exercise is Medicine-on Campus (EIM-OC) initiative is growing across the nation, requiring a need to share programming and implementation outcomes to grow the limited body of empirical evidence. PURPOSE: The purpose of this study was to provide descriptive data on the EIM-OC programming and associated promotional efforts at a Midwestern Masters Comprehensive University. METHODS: During October (official EIM-OC month), a number of events were planned to bring awareness and engage students, faculty and staff across campus in exercise. RESULTS: Grand Valley State University has been recognized for two consecutive years as a EIM-OC “Silver” status institution. GVSU has 22,081 undergraduates, 3,046 graduate students, and 2,500 faculty/staff. The total student participants for the EIM events in 2016 included; Walk with the President event (210), Zumba Party (109 total), Discovery Scuba (8), Wheelchair Basketball (33), Faculty/Staff Pedometer Challenge (460; 133,454,370 total steps), and Celebrating EIM at GVSU (116). Compared to the previous month, October increased EIM-OC website page views 144% and increased return visits by 192%. In addition, the Student Recreation Center increased usage by 23.2% from Aug-Oct when compared to the same months in the previous year. Facebook garnered 170 “Likes,” reaching 1,115 people and engaged 357, while Twitter amassed 90 followers. DISCUSSION: In an effort to move to “Gold” status in 2017, the committee has taken strides to strengthen the exercise referral plan across campus. Also, to continue to bring more awareness and engage more students, the committee has implemented a campus-wide Wellness Summit, a campus activity challenge and a second annual Walk with the President event to kick-start the month of October. In addition and based on 2016 data, efforts to engage more lower-classmen include collaborating with Housing and Residence Life and resident assistants to promote lower-classman participation in the EIM-OC events. CONCLUSION: A large, diverse sample of students and faculty were reached via various marketing outlets. Such descriptive data is warranted to share evidence of successful implementation and marketing of EIM-OC programming and to increase EIM engagement and awareness at Colleges/Universities across the country.

Keywords: EIM-OC, Programming, Marketing

Board 13

EFFECTS OF BACKPACK LOAD AND LOAD HEIGHT ON ARM REACHING ABILITY IN SEVERAL DIRECTIONS

Patrick O'Malley (DePauw University), Matthew D. Beekley (DePauw University)

Abstract: PURPOSE: The ability to reach with the arm has not been examined during load carriage with a backpack, or with the load distributed high or low in the backpack. METHODS: Arm reach was tested using the Functional Reach Test (Forward), Multi-directional Reach Test (Backward, Right, Left), Upward Reach Test (Upward) at a 50° angle, and Forward Reach to the Floor Test (Low). Subjects were healthy males (n=7) and females (n=2), 19-21 years, who wore a hiking backpack and performed using the dominant arm. Subjects were tested with no backpack, and then (in random order on different days) with the backpack empty, or load (weight) equivalent to 10, 30, and 50% of bodyweight in the bottom of the backpack. Trials were repeated with the load high in the backpack using a custom designed box. Three trials were completed for each reach. Mean values were analyzed with repeated measures ANOVA and Tukey's post-hoc test with significance level $p < 0.05$. RESULTS: (Data are presented as reach in cm normalized for arm length, mean ± SD). When compared to no backpack, load high (30, 50% BW) in the backpack resulted in significant reductions in arm reach (all directions; Low = 140.5±13.8 vs 124.3±6.7, 115.5±7.7; Upward = 165.1±10.7 vs 159.9±9.3, 155.3±12.9; Left = 196.2±8.5 vs 181.6±7.3, 173.4±4.5; Right = 194.0±8.9 vs 181.7±8.0, 175.5±8.4; Backward = 180.2±9.1 vs 160.9±5.7, 153.5±7.9; Forward = 218.2±10.8 vs 208.9±8.1, 200.9±10.1) and load low (all loads) in the backpack resulted in significant reductions in arm reach for backward reach only (180.2±9.1 vs 176.8±8.1, 169.5±9.5, 164.5±1.3). When compared to empty backpack, load high (30, 50% BW) in the backpack resulted in significant reductions in arm reach (all directions; Low = 137.1±1.1 vs 124.3±6.7, 115.5±7.7; Up = 163.9±10.6 vs 159.9±9.3, 155.3±12.9; Left = 194.3±8.6 vs 181.6±7.3, 173.4±4.5; Right = 194.7±8.7 vs 181.7±8.0, 175.5±8.4; Backward = 177.9±7.4 vs 160.9±5.7, 153.5±7.9; Forward = 215.1±11.3 vs 208.9±8.1, 200.9±10.1) and load low (50% BW) in the backpack resulted in significant reductions in backward reach only (177.9±7.4 vs 164.5±1.3). CONCLUSIONS: Backpack load weight and height differentially affects arm reach.

Keywords: load carriage

Board 14

THE ACCURACY OF CALORIC EXPENDITURE IN FITNESS TRACKING TECHNOLOGY

Elaine Shimmons (Indiana Wesleyan University), Aly Williams (Indiana Wesleyan University), Bekah Forbes (University of South Carolina), Hannah Hayden (Southwest Baptist University), Michaela Coffey (Indiana Wesleyan University)

Abstract Wearable technology is trending in today's society as it allows consumers to obtain instantaneous information about their health and fitness level. Studies show that people enjoy the convenience of these devices but the overall accuracy of the devices measurement of caloric expenditure is relatively unknown. PURPOSE: To determine the accuracy of fitness tracking devices in their calculations of caloric expenditure. METHODS: Thirty-two participants (20-22 yrs) completed three 10-minute exercise bouts, walking, jogging, and step-ups, while wearing two different fitness tracking devices (one with and one without heart rate capabilities) and connected to a metabolic cart. Participants resting for 10-minutes between each exercise

bout. The two devices and smart phone fitness application measured caloric expenditure and were compared to the "gold standard" metabolic cart. Pearson correlation coefficient and a paired samples t-test were calculated to assess the caloric expenditure of the devices and smart phone app in comparison to the metabolic cart. RESULTS: The smart phone application showed the strongest correlation to the metabolic cart ($r(21) = .833$, $p < .01$) indicating caloric expenditure measurement increases at relatively the same rate. Meanwhile the device measuring heart rate exhibited a moderate correlation for jogging ($r(19) = .691$, $p < .01$). Despite relatively strong correlations, results of t-tests suggest statistically significant differences of caloric expenditure of devices compared to the metabolic carts for walking (Mean = 46.26 calories (metabolic cart); 77.83 calories (device 2)), and jogging (Mean = 89.33 calories (metabolic cart); 115 calories (device 1). DISCUSSION: In most cases the devices and app measured increases in caloric expenditure at a rate similar to the metabolic cart. However the fitness devices and the smart phone application calculated a greater caloric expenditure for walking, jogging and stepping when compared to the metabolic cart. The greater estimation of calorie burn during exercise could mislead consumers as they count calories or work to balance their nutritional intake with energy expenditure. Further research is needed to compare a wider variety of devices over a longer period of exercise so that health professionals can make accurate recommendations regarding the use of these devices.

Keywords: wearable technology, energy burn, exercise tracker

Board 15

EFFECT OF SCHOOL WELLNESS POLICIES ON SCHOOL PHYSICAL ACTIVITY BEHAVIOR

Andra M. Luth (Iowa State University), Joey Lee (Iowa State University), Greg Welk (Iowa State University)

Abstract The recent passing of the USDA Final Rule on School Wellness Policies requires schools to update their local school wellness policies. In addition to strengthening requirements on public involvement, transparency, implementation, evaluation, and nutrition education and promotion, the Final Rule requires that schools have policies to support physical activity (PA). PURPOSE: The study is designed to evaluate if the presence of policies to support PA in schools was associated with students' school-based PA behavior. METHODS: Ten Iowa elementary schools participated in the study. A school wellness leader at each school completed an evaluation of their school wellness environment using the School Wellness Environment Profile tool which collects information about six school PA policies. Two classes of 4th and 5th grade students at each school completed the Youth Activity Profile (YAP), an online survey designed to assess students PA habits at school and at home. Descriptive information about school PA policies were used to understand the status of policies to support student PA in schools. Regression analysis were used to explore if there was an association between a school wellness policy score focused on PA and student-reported school-based PA. RESULTS: Descriptive analyses revealed that approximately 50% of schools had a Physical Education policy, 60% reported having recess policies, 10% reported having active transportation policies, 70% reported having a policy including physical activity during school, 90% reported having staff wellness policies and 50% reported having policies for parent communication. Descriptive analyses with the YAP yielded a mean score for school PA of 2.9 on a 5 point scale. Regression results revealed that the number of policies in place to support student PA was not predictive of school level PA outcomes ($b=0.09$, $t(9) = -1.12$, $p = 0.51$). CONCLUSION: Our results show that differences exists in the types of wellness policies in place to support student PA in schools. In addition, we found that the presence of school PA policies was not associated with better student PA at school. Future work is needed to better understand the influence of school PA policies on student PA at school.

Keywords: physical activity, school wellness, policies

Board 16

CELLULAR TELEPHONE USE PREDICTS THE LIKELIHOOD OF BEING CATEGORIZED AS AN "ACTIVE COUCH POTATO"

Hannah Altsman (Kent State University), Andrew Lepp (Kent State University), Jacob E. Barkley (Kent State University),

Abstract Physical activity and sedentary behavior are independent predictors of cardio-metabolic disease. While these behaviors are typically inversely related to one another, the term "active couch potato" was developed to describe individuals who participate in regular, planned physical activity yet are also highly sedentary. These individuals are of interest as participation in excessive amounts of sedentary behavior, even in individuals which are regularly physically active, increases the risk for cardio-metabolic disease. Our group has demonstrated that cellular telephone (cell phone) use is positively associated with sedentary behavior, but not related to physical activity. Therefore, it is possible that individuals who use their cell phone heavily may participate in large amounts of sedentary behavior while also regularly participating in physical activity. In other words, cell phone use may predict the likelihood of being an "active couch potato." The purpose of this study was to assess this hypothesis.
Methods: A sample of 228 college students completed validated survey items to assess their daily cell phone use, physical activity, and sedentary behavior. Tertile splits were performed and participants were categorized into low, moderate or high groups for each of these three variables. Participants were then categorized as "active couch potatoes" if they were a) in the high physical activity group and also in a high or moderate sitting group, or b) in the moderate physical activity group and also in the high sitting group. A binary logistic regression was then used to test if cell phone use group predicted being an "active couch potato."
Results: According to the binary logistic regression the likelihood of being an "active couch potato" was significantly ($\chi 2 = 11.0$, $p = 0.01$) associated with cell phone use. Specifically, individuals in the moderate and high cell phone use groups were 2.3 and 3.5 times more likely (Wald ≥ 3.9, $p < 0.05$), respectively, to be an active couch potato than low users.
Conclusion: Among a sample of college students, moderate and high cell phone users were significantly more likely to being categorized as "active couch potatoes" than their low use peers.

Keywords: Physical activity, sedentary behavior

Board 17

RELATIONSHIOPS OF MIDNFULNESS MEASURES WITH PHYSICAL ACTIVITY

Amari Ellsworth (Michigan State University), Jeanette Ricci (Michigan State University), Kim Clevenger (Michigan State University), B Grace Bullock, Sarah Sullivan (Crim Fitness Foundation), Karin A. Pfeiffer (Michigan State University)

Abstract Mindfulness refers to paying attention on purpose, in the present moment, without judgment. Mindfulness may be related to health behaviors such as physical activity, but this has not been studied thoroughly in children (Greco, 2011; Roberts, 2010). PURPOSE: To examine the interrelationship between

mindfulness and its correlates (stress, self-regulation and affect), and two physical activity indexes. METHODS: Fourth, fifth and sixth grade students (N=703, 51.0% female, 49.5% Black) in 11 Flint MI elementary schools completed a survey in their classrooms that included the Cognitive and Affective Mindfulness Scale Revised (CAMS-R; 10 items), Perceived Stress Scale (PSS: 10 items), Child Behavior Questionnaire-Self Regulation (CBQ-SR; 20 items), and the Positive and Negative Affect Schedule (PANAS; 20 items). Physical activity was assessed using a single question from the Youth Risk Surveillance System Survey (YRBSS); "How many of the last 7 days did you obtain ≥7 days of moderate-to-vigorous physical activity (MVPA)?", and the Physical Activity Questionnaire for Children (PAQ-C; 9 items, max 5). Interrelationships between these items and/or scales were analyzed using Pearson correlations. RESULTS: The CAMS-R (r=.183, p<.01), CBQ-SR (r=-.106, p<.05), and positive affect scale of the PANAS (r=.214, p<.01) were significantly related to the YRBSS question (mean 4.0, sd=2.4). The CAMS-R (r=.220, p<.01) and positive affect scale of the PANAS (r=.378, p<.01) were related to the PAQ-C (mean=3.2, sd=0.8). No other correlations were statistically significant. DISCUSSION: The fact that the CAMS-R and PANAS were both related to two different PA measures suggests that mindfulness and positive emotion are associated with health-related (PA) outcomes. In a previous study, our team showed that another mindfulness measure, the Child and Adolescent Mindfulness Measure, was not related to physical activity. Further investigations that account for race, sex, and grade level are needed to further validate these relationships.

Keywords: health behaviors, stress, self-regulation, youth

Board 18

CONCURRENT VALIDITY OF A GAIT APPLICATION VS. SLOW MOTION VIDEO FOR THE ASSESSMENT OF A 400 M WALK TEST

Alexandra Colacino (University of Mount Union), Meghan Hess (University of Mount Union), Brianna Gassman (University of Mount Union), Christal Schumacher (University of Mount Union), Megan D. Salvatore (University of Mount Union), Nathan W. Saunders (University of Mount Union)

Abstract Our lab developed a cell phone application to assess gait parameters during a 400 m Walk Test. It has the potential to improve the feasibility and effectiveness of allied healthcare professionals. PURPOSE: To test the concurrent validity of a cell phone gait assessment application by comparing results to those found through slow motion video analysis of participants completing a 400 m walk test. The hypothesis is that there will be agreement between the application and video for gait speed, cadence, and turn duration. METHODS: Seven female and six male apparently healthy adults (Age = 40.7 ± 7.5 years) participated in this study. Participants completed a single trial of a 400 m walk test at a self-selected pace on a 25-meter, linear course. Ends of the course were marked with a cone, and dashed lines were positioned 2.5 meters inward from each cone. Two investigators were present at each test session. One video recorded the participant with a cell phone camera at 30 fps, which was later analyzed for steady-state gait speed, cadence, and turn duration. A second investigator used the gait application to assess the same parameters in real time. Paired t-tests were used to test for significant differences between the two assessment methods. Significance was established a priori at alpha = 0.05. RESULTS: There were no significant difference between the gait application and video for gait speed (1.694 ± 0.352 vs. 1.693 ± 0.347 m/s, respectively) or turn duration (4.165 ± 0.761 vs. 4.171 ± 0.762 s, respectively). There was, however, a small but significant difference between the gait application and video for cadence (129.9 ± 14.0 vs. 129.1 ± 13.6 steps/min , respectively). CONCLUSION: For middle aged adults across a broad spectrum of gait speeds, the gait application is a valid method to evaluate steady-state gait speed and turn duration of a 400 m walk test. Although there was a significant difference between the

gait application and video for cadence, the one step per minute difference is not likely to be clinically meaningful.

Keywords: aerobic fitness assessment, cadence, turn duration, gait speed

Board 19

A CROSS-TRAINING INTERVENTION IMPROVES THE CARDIORESPIRATORY FITNESS OF MALE INMATES

Alyssa N. Morrison (Taylor University), Gabrielle Trudeau (Taylor University), Matt Renfrow (Taylor University), Ariana Gibula (Taylor University)

Abstract Those in prison have reported poor physical and mental health as well as a reduction in physical activity upon entering prison. Given the relationships between exercise, fitness, and overall health, an understanding of the impact of an exercise intervention on physical fitness is warranted. To date, literature on the effectiveness of exercise interventions in this population is sparse. PURPOSE: The purpose of this study was to examine the effects of an 8-week exercise intervention on obesity and cardiorespiratory fitness (CRF) in adult males in prison. METHODS: 32 men (avg. age = 38.4±12.7 yrs) who were in a large state correctional facility in Indiana volunteered to be a part of this study. Pre- and post-intervention measures of obesity and CRF included height (HT) and mass (BM) for the calculation of body mass index (BMI), waist circumference (WC), and the 1.5-mile endurance run test (which allowed for the estimation of VO2max). Measurement procedures detailed by ACSM were used for each test. Testing occurred inside the correctional facility. The exercise intervention was an 8-week cross-training protocol. Workouts were conducted in the correctional facility's recreation building twice per week and consisted of a 10-minute warm up, 40 minutes of endurance and strength training, followed by a 10-minute cool down and stretching. RESULTS: After the 8-week intervention, the participants experienced non-significant ($p > .05$) decreases in BM (88.66±16.17 kg to 88.35±16.05 kg) and BMI (28.92±5.06 kg/m2 to 28.83±5.03 kg/m2) and a non-significant increase in WC (92.78±16.94 cm to 93.29±12.13 cm). Additionally, they significantly ($p < .05$) decreased their 1.5-mile endurance run test time (14.44±2.98 min to 12.79±3.24 min) as well as their VO2max estimations (38.32±6.99 ml/kg/min to 43.08±7.79 ml/kg/min). CONCLUSION: The intervention was effective in improving CRF in adult males in prison. Encouragingly, this improvement suggests the exercise intensity and participant adherence was sufficiently high. However, as obesity measures were unchanged, it is possible that the intervention duration was insufficient or dietary controls are needed. Given the success of the program, future intervention duration in this population should be longer to allow for significant improvements in obesity.

Keywords: Prison, obesity, exercise program

Board 20

EFFECTS OF FATIGUING PRACTICAL BLOOD FLOW RESTRICTION EXERCISE ON MUSCLE COACTIVATION

Rebecca Sunday (Ohio Dominican University), Yujiro Yamada (Ohio Dominican University), Jonathon Barnette (Ohio Dominican University), John Thistlethwaite (Ohio Dominican University), Trent Cayot (University of Indianapolis)

Abstract Significant increases in muscular strength and hypertrophy have been reported following practical blood flow restriction (pBFR) resistance training. However, the effects that pBFR resistance exercise has on

muscle coactivation (CA) remains elusive. Understanding the CA response may help identify joint stiffness trends following pBFR resistance exercise and thus aid in the safe implementation of pBFR techniques during resistance training programs. PURPOSE: To investigate how elbow CA is affected by fatiguing pBFR resistance exercise. METHODS: Seven active males (age = 25 ± 6 years, height = 177 ± 5 cm, weight = 82.3 ± 8.2 kg, 1RM = 49.4 ± 8.1 kg) completed a biceps curl 1RM on session 1. During sessions 2-4, four sets of fatiguing biceps curls were performed with either high (65% 1RM, HI), low (30% 1RM, LO), or occluded low (30% 1RM, pBFR) loads. Exercising muscle activation was recorded from the biceps brachii (BI) and triceps brachii (TRI) using surface electromyography (sEMG) techniques. CA was estimated during the last 25% of each exercise set from the normalized concentric sEMG data (CA = (TRI/(BI + TRI)) x 100%). Maximal voluntary isometric force produced at 90º of elbow flexion was recorded before (PRE-MVIF) and after each exercise session to assess fatigue (%Δ). Two-way, repeated measures ANOVA was used to examine the effects of exercise condition and exercise set on CA. One-way, repeated measures ANOVA was used to examine the effect of exercise condition on PRE-MVIF and fatigue (%Δ). RESULTS: No significant differences ($p > 0.05$) in PRE-MVIF were observed between exercise conditions. pBFR (-57 ± 12%) resulted in significantly ($p < 0.05$) greater fatigue compared to HI (-35 ± 13%), however, neither pBFR or HI were different from LO (-49 ± 15%). No significant differences in CA were observed between any exercise conditions (HI = 30 ± 12%, LO = 32 ± 16%, pBFR = 31 ± 14%) during any exercise set. CONCLUSION: According to our pilot findings, a longer recovery may be necessary for individuals performing pBFR resistance exercise due to an increased muscle fatigue as opposed to changes in the CA response.

Keywords: Resistance Exercise, Electromyography

Schedule – Friday Afternoon: Symposia

EIM Ambassador: Gerald R Ford Room – 2:00-2:50pm

Getting Involved with Exercise is Medicine®: The EIM Ambassador Program

Session Moderator:
Presenters: Jennifer Pesarchick

Jennifer Pesarchick has been the program coordinator for EIM since January of 2014. She is responsible for the day to day activities of the initiative, assists in the coordination of both national and international efforts, works with EIM and ACSM staff on multiple collaborative projects, and provides support to EIM Committees and ACSM leaders. Jennifer received her Bachelor's in Exercise Science, specializing in Human Performance and Psychology, in 2013 from the University of Central Florida in Orlando, FL.

Mission Statement
To develop and assist the next generation of physical activity and health professionals in spreading the mission and vision of Exercise is Medicine® as EIM Ambassadors in their institutions and local communities.

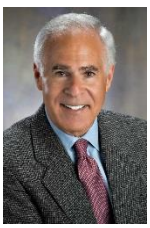
Goals (the 5 E's)

- **Educate** Ambassadors on the mission of Exercise is Medicine® (EIM) and how to integrate physical activity into health care using the EIM model.
- **Engage** Ambassadors in ongoing EIM initiatives and activities.
- **Expose** Ambassadors to EIM leaders and professional development opportunities.
- **Encourage** Ambassadors to share their experiences and knowledge of EIM with their institutions, local communities, and professional associations.
- **Empower** Ambassadors to engage healthcare providers to integrate EIM principles in their clinics and engage exercise professionals in becoming an extension of the health care system

Symposium #7: Pantlind Ballroom – 2:00-2:50pm

Cardiorespiratory Fitness, Physical Activity, and Cardiovascular Health: Clarifying the Risk Protection Paradox

Session Moderator:
Presenters: Barry A. Franklin, FACSM



Barry A. Franklin, PhD, FACSM, MAACVPR, FAHA, is the Director of Preventive Cardiology and Cardiac Rehabilitation at William Beaumont Hospital in Royal Oak, Michigan. He also serves as Professor of Internal Medicine, Oakland University William Beaumont School of Medicine. Dr. Franklin is a past editor-in-chief of the Journal of Cardiopulmonary Rehabilitation and Prevention, as well as a past president of the AACVPR (1989) and ACSM (2000). Currently, Dr. Franklin serves on the editorial boards of 15 scientific and clinical journals. He has written or edited more than 600 publications, including 27 books. His latest book is "The Heart-Healthy Handbook" (2017) (www.healthylearning.com). In 2015, he was listed by Thomson Reuters among the World's Most Influential Scientific Minds (Clinical Medicine).

THE PURPOSE OF THIS LECTURE WILL BE TO SUMMARIZE THE RELATIONS BETWEEN PHYSICAL ACTIVITY, CARDIORESPIRATORY FITNESS, SURGICAL OUTCOMES AND MORTALITY, WITH SPECIFIC REFERENCE TO PRACTICAL IMPLICATIONS FOR HEALTH-FITNESS PROFESSIONALS AND CLINICAL EXERCISE PHYSIOLOGISTS. We will also briefly discuss the cardioprotective adaptations that result from regular aerobic exercise and improved cardiorespiratory fitness. In addition, the presentation will compare moderate exercise versus high-intensity interval training, and the added effectiveness (if any) of extreme exercise on cardiovascular and all-cause mortality. Finally, I plan to discuss "at risk activities," and the physiology underlying the disproportionate, associated cardiac demands, for individuals with known or suspected cardiovascular disease, and provide practical recommendations to reduce the risk of exercise-related acute cardiac events.

Learning Objectives:

1. Review critical data regarding the role of decreasing physical activity during occupational work and leisure-time activity as a significant contributor to the current epidemic of chronic diseases.
2. Summarize the relationship between cardiorespiratory fitness, expressed as mL O2/kg/min or as metabolic equivalents (METs; 1 MET = 3.5 mL O2/kg/min), and surgical outcomes, with specific reference to bariatric and coronary artery bypass surgery.
3. Provide an overview of the relationship between cardiorespiratory fitness and mortality, highlighting the "subset" of patients who appear to demonstrate the greatest relative reduction in mortality by initiating an exercise program.

<u>Symposium #8:</u> Pantlind Ballroom – 3:00-3:50pm

Development and utilization of technology to promote physical activity across the lifespan

Session Moderator:
Presenters: Whitney Welch, Karin Pfeiffer FACSM, and Cheryl Howe FACSM

Whitney Welch is a postdoctoral fellow at Northwestern University Feinberg School of Medicine who will discuss the development of smart phone applications in accordance with wearable technology to track and increase physical activity in breast cancer survivors.

Karin Pfeiffer, FACSM is an Associate Professor of Kinesiolgy at Michigan State University focusing on her development of mobile technology to track physical activity in adolescents.

Cheryl Howe, FACSM is an Associate Professor of Kinesiology at Ohio University who has developed a community-based application system to track physical activity and other healthy lifestyle habit in 1st grade children and their families.

Wearable technology and technology-based applications were ranked as two of the top 25 worldwide fitness trends for 2017 according to ACSM's Health and Fitness Journal (#1 and #17, respectively). In the wake of the

consumer boom of wearable technology and applications, there has been strong interest in the use of wearable technology and development of smart phone applications to track and promote physical activity across the lifespan. Considering 77% of the population now owns a smartphone and spends, on average, over three hours per day using their smart phones (Pew Research Center, 2017), these devices present a unique and timely avenue to assist in the promotion of physical activity. The purpose of this symposium will be to discuss 1) the use of wearable technology across the lifespan, 2) the process involved in development of smart phone applications, and 3) deployment of technology in physical activity-related research. Three presenters will discuss their experiences in development and deployment of technology-mediated interventions through the presentation of three different populations.

Learning Objectives:

1. Provide an overview of current options and use of wearable technology and applications across the lifespan.
2. Discuss the process of developing and implementing wearable technology and applications to track and/or promote physical activity.
3. Identify advantages, challenges, and implementation processes when using technology to track and/or change physical activity in different populations through three unique examples.

<u>Symposium #9:</u> Pantlind Ballroom – 4:00-4:50pm

Sedentary behavior: What it is, why it matters, and what we can do about it

Session Moderator:
Presenters: Laura Ellingson, Jacob Meyer, and Keith Thraen-Borowski

Laura Ellingson's research focuses on investigating the effects of physical activity and sedentary behaviors on the mental health and quality of life of healthy individuals and those with, or at risk for developing, chronic health conditions. She also works to design effective behavior change interventions (e.g. decreasing sedentary time) and has conducted two successful interventions for reducing sedentary behavior, one in older adults and another in college students. She is also currently conducting an intervention to decrease sedentary behavior in patients with chronic low-back pain that is ongoing. In conjunction with these interests, Dr. Ellingson also works to refine methods of physical activity and sedentary measurement in order to better understand how these behaviors interact to influence mental health-related outcomes.

Jacob Meyer's research also focuses on the interactions between physical activity, sedentary behaviors and clinical mental health. Dr. Meyer's interests include the psychobiological pathways linking movement and mental health. He examines the relationships between physical activity behaviors and symptoms in depressed patients as well as other illnesses (e.g. acute respiratory illness). Using state-of-the-art techniques for processing accelerometer data, he looks forward to creating interventions aimed at changing sedentary behaviors and patterns that are the most salient and relevant for improving mental health.

Keith Thraen-Borowski's work globally focuses on physical activity and sedentary behavior in cancer survivorship. Specifically, Dr. Thraen-Borowski evaluates the feasibility of physical activity and sedentary behavior interventions in survivors of various types of cancer, as well as the effectiveness of these interventions to improve quality of life and prognostic indicators in this population. Currently, Dr. Thraen-Borowski is conducting an intervention evaluating different feedback mechanisms on reducing sedentary behavior. Findings from this collective work will be used to design community-based physical activity and sedentary behavior interventions for cancer survivors.

The primary purpose of this tutorial is threefold:

1. To provide an overview of sedentary behavior based on the recent publication from the Sedentary Behavior Research Network (June, 2017) and how it is assessed including objective and subjective measures. Dr. Ellingson was involved and is an author on this recent publication.
2. To describe the health consequences of sedentary behavior including mental and physical health conditions. Drs. Ellingson, Meyer, and Thraen-Borowski have complementary areas of expertise related to this. Drs. Ellingson and Meyer have investigated outcomes related to mood and overall wellbeing in healthy individuals and patients with chronic pain and depression, while Dr. Thraen-Borowski's work primarily focuses on cancer survivorship. All presenters have a working knowledge of this area outside of their own work and would be able to discuss health outcomes broadly including cardiometabolic, psychological, and disease-specific consequences of sedentary time.
3. To provide a critical review of the state of knowledge regarding how best to reduce time spent in sedentary activities. Drs. Ellingson, Meyer, and Thraen-Borowski co-authored a recent publication of this topic in the Translational Journal of the American College of Sports Medicine and would expand this information to cover both feasibility and effectiveness of existing interventions targeting the spectrum of sedentary behaviors.

Attendees will learn what sedentary behavior is and how it is related to various health outcomes in the healthy population and also in different disease states. Attendees will understand current intervention techniques and targets for sedentary behavior interventions and the associated best practices based on evidence published to date.

Symposium #10: Imperial Ballroom – 4:00-4:50pm

Sudden Cardiac Arrest -Anomalous Origin of the Right Coronary Artery: Rescue, Treatment and Follow-up

Session Moderator:
Presenters: Sandra K. Knecht and Carol Weideman

Sandy Knecht, MS, RCEP, Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio, completed her bachelor's degree in Sports Medicine at the University of Evansville, Indiana and her master's degree from California University of Pennsylvania, Pennsylvania. She has been a Clinical Exercise Physiologist at Cincinnati Children's Hospital Medical Center, Cincinnati, Ohio for 18 years and is involved with the testing of pediatric and adult congenital heart patients, research projects and publications, and more recently, the Cardiopulmonary Lab's educational and internship programs.

Carol Weideman, PhD, Exercise Physiology, Western Michigan University, HPHE Department, Kalamazoo, Michigan, is a 18yr faculty at Western Michigan University where she teaches senior level courses in the undergraduate Exercise Science program. She is the Health and Wellness Coordinator and supervisor of the Graduate Assistants for the Human Performance and Health Education Department. She also serves as the faculty adviser of the Exercise Science Student Organization. She is the proud gigi of two grandsons.

Statement of Purpose:
Anomalous origin of the coronary artery can be an incidental autopsy finding, but is also a well-known cause of sudden death and is found relatively more frequently in young persons who die during exercise. We will describe the case study of a 16-year old African American athlete who survived a sudden cardiac arrest during basketball practice. Later diagnosis revealed an anomalous coronary artery origin. We will present a step by

step by step approach to his initial diagnosis and follow-up care including specific diagnostic testing and treatment plan. Discussion will include:

1. Initial presentation
2. EKG findings
3. GXT test results with and without nuclear imaging
4. Blood test results
5. Ancillary testing

Learning objectives:

- Describe the differential for initial presentation and emergency responses
- Discuss findings of initial labs and studies
- Discuss treatment plan
- Use ACSM's New Exercise Prescription Guidelines for Cardiac Rehab recommendations
- Describe anatomy, clinical significance and prognosis of anomalous coronary arteries for this specific patient and review of the literature
- Discuss GXT results and follow-up

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Symposium #11: Pantlind Ballroom – 5:00-5:50pm

Cell phones: a modern sedentary device?

Session Moderator:
Presenters: Jacob E. Barkley, PhD and Andrew Lepp, PhD

The symposium will be presented by Jacob E. Barkley, PhD. Dr. Barkley is an associate professor of Exercise Science at Kent State University and is at the forefront of the study of the relationship between cell phone use and sedentary/physical activity behavior. Dr. Barkley has published over 50 peer-reviewed scientific manuscripts and his research has been featured in numerous media outlets (e.g., TIME, the Today Show, NPR, Huffington Post).

Andrew Lepp, PhD. is an Associate Professor at Kent State University.

According to the Pew Research Center nearly 100% of college-aged adults own a cellular telephone (henceforth, cell phone) and 92% of those own a smart phone (i.e., a cell phone with internet connectivity and capable of running a variety of software applications or apps) (4). Average use in this population is over four hours per day (2, 3, 6). This would suggest that smartphones use has become a nearly ubiquitous behavior in

college-aged adults. Of concern, here is the fact that modern smartphones provide access to a variety of functions such as internet browsing, streaming videos, and playing video games, which are traditionally associated with sedentary behavior (i.e., sitting) (8, 11). This is potentially problematic as the modern cell phone, unlike traditional screen-based activities (e.g., watching a television), is portable giving the user access to these activates in any environment.

While cell phones give the user portable access to a variety of functions which may promote sedentary behavior, there is evidence that other cell phone functions may promote positive health behaviors. Cell phones are portable by nature thus it is possible to utilize many of their functions while moving. There are also numerous cell phone apps which are designed to promote physical activity (i.e., fitness apps). While these fitness apps are not well-studied, content analyses of certain apps indicates that these apps may have the potential to promote behavior change (9). Additional research examining mobile health (mHealth) has demonstrated that cell phones can be used by practitioners to provide health advice to patients. In this capacity, the cell phone can be used to promote physical activity participation in patients (5). Because cell phones provide access to functions which may promote sedentary behavior (e.g., watching videos) and others which may promote physical activity (e.g., using fitness apps) the relationships between cell phone use and physical activity/sedentary behavior is unclear.

The purpose of this proposed symposium is to discuss the results of five separate studies from our research group that examined the effect of modern cell phone use upon physical activity and sedentary behavior in college students. These studies utilized a variety of research techniques (e.g., experimental, non-experimental) to examine if cell phone use was related to sedentary behavior, physical activity and cardiorespiratory fitness. These five studies are outlined in the subsequent sections.

Study 1.) Assessing the association between cell phone use and physical and sedentary activities.
For this study, 236 college students completed surveys assessing total cell phone use (min/day), sedentary behavior (min of sitting/day) and physical activity. Subsequent correlation analyses demonstrated that while there was no relationship ($r = 0.02$, $p = 0.90$) between cell phone use and physical activity, there was a positive association ($r = 0.33$, $p < 0.001$) between cell use and sedentary behavior. In other words, as cell phone use increased, sitting increased. Participants were then split into even tertiles based upon cell phone use (low, moderate and high cell phone use groups) and sedentary behavior across these three groups was compared. The high cell phone users (495.1 ± 227.6 min of sitting/day) reported significantly ($p \leq 0.03$) greater sitting than their moderate (417.1 ± 208.3 min/day) and low use (395.2 ± 180.0 min/day) peers. In conclusion, while cell phone use did not predict physical activity, high users allocated 18.7% and 25.3% more time to daily sitting than moderate and low users, respectively (3).

Study 2.) Assessing the effect of cell phone use on free living walking behavior.
For this study, researchers observed 1142 individuals' walking speed while traversing a 50m walkway on a college campus. Researchers recorded the time it took these individuals to traverse the walkway and coded the walkers based upon their cell phone use: no use (n = 929), talking on the phone (n = 95), or texting/similar activity on the phone (n = 118). Only walkers who maintained a given activity (e.g. talking on the phone) for the entire 50m walkway were included in the final analysis. Subjects took significantly ($p < 0.001$) longer traversing the walkway when talking (39.3 s) and texting (37.9 s) versus no use (35.3 s). In conclusion, cell phone use significantly reduced average speed during free-living walking (1).

Study 3.) Assessing the effect of cell phone use on exercise intensity.
For this study, 44 college students participated in treadmill exercise during four different 30-minute conditions: while talking on a cell phone, while texting, while listening to music and a control condition with no cell phone use. Participants could adjust the speed of the treadmill at any time. However, the treadmill

speed display was covered and grade was fixed at zero. Average speed while listening to music (3.4 ± 1.3 miles/hour) was greater ($p \leq 0.014$) than the other conditions. Average speed during the control condition (3.1 ± 1.2 miles/hour) was greater than the talking and texting conditions (2.8 ± 1.1 miles/hour). In conclusion, listening to music via cell phone can increase the intensity of treadmill exercise. However, other common cell phone uses (texting and talking) may interfere with treadmill exercise and reduce intensity (10).

Study 4.) Assessing the prevalence of cell phone use during exercise.
For this study, 226 college students completed validated surveys assessing their total cell phone use (minutes/day). Students also reported the likelihood that they use their cell phones, apart from listening to music, during mild, moderate and vigorous physical activity. The likelihood of using a cell phone during mild and moderate intensity exercise was greater ($p \leq 0.006$) in high cell phone users (73% very likely to use during exercise) than moderate (61%) and low (51%) cell phone users. In conclusion, the greater likelihood of using a cell phone during exercise in high frequency users relative to their lower use peers may be problematic as cell phone use may decrease exercise intensity (2).

Study 5.) Assessing the relationship between cell phone use and cardiorespiratory fitness.
For this study, 49 college students were assessed for percent fat, and completed surveys assessing total cell phone use (minutes/day) and self-efficacy for physical activity. Participants then completed a graded exercise test to exhaustion and peak oxygen consumption (VO2 peak) was recorded. Using regression analyses, there was a significant, negative relationship ($\beta = -0.25$, $p = 0.04$) between cell phone use and VO2 peak independent of sex, self-efficacy and percent fat. In conclusion, cell phone use, like traditional sedentary activities is inversely associated with fitness (7).

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<u>Symposium #12:</u> Imperial Ballroom – 5:00-5:50pm

Sports Concussion: Management from the Sidelines to Office

Session Moderator:
Presenters: Leonardo Oliveira, MD, FACP

Dr.Oliveira is a board certified(internal medicine & primary care sports medicine), fellowship trained sports medicine physician, Fellow of the American College of Physicians, who sees concussions related to organized athletic events in the high school and college population as well as from weekend warriors or work accidents. Dr. Oliveira has lectured at this topic at the Florida Medical Association Annual Meeting and University of Chicago's Primary Care Orthopaedic Conference as well as for physical therapy groups. Most recently, Dr. Oliveira presented at the 2017 American Medical Society Annual Meeting on the effects of omega-3 supplementation in mild traumatic brain injuries. Dr. Oliveira is an Assistant Professor of Orthopaedic Surgery and Rehabilitation Medicine – University of Chicago and is the team physician for Concordia University Chicago, Bremen High School (Orland Park, IL), and Hillcrest High School (Orland Park, IL).

Purpose:
The goal is this tutorial is to provide an overview of sports concussions and post-concussion syndrome and its pathophysiology. Subsequently explain and demonstrate how athletes can be assessed and managed in the sidelines and office for their concussion. This lectured is primarily directed for exercise & science professionals and physicians who are involved in athlete care.

Outline:
1. Sports Concussion
    - 1.1. Pathophysiology
    - 1.2. Epidemiology
2. Sports Concussion Evaluation at the Sidelines
    - 2.1. Demonstration of the Use of the Standardized Concussion Assessment Tool(SCAT)#5
    - 2.2. Demonstration of the Use of the King-Devick Test
    - 2.3. Demonstration on the Use of Sideline Neurological Assessment
    - 2.4. Review of Signs and Symptoms which would warrant emergency care
    - 2.5. Post Assessment Discussion on Management and Communication of Findings with Athletes Relatives
3. Sports Concussion Evaluation in The Office
    - 3.1. Demonstration of the Neurological Examination and explanation of maneuvers
    - 3.2. Explanation and Demonstration of the Use of the Computer Based Neuropsychological Testing
    - 3.3. Explanation of Post-Visit Discharge Instructions and Follow-up Management
        - 3.3.1. Non-Pharmacological Management
        - 3.3.2. Pharmacological Management
4. Post-Concussion Syndrome(PCS)
    - 4.1. Evaluation
    - 4.2. Non-pharmacological management
    - 4.3. Explanation of the Buffalo Concussion Treadmill Test and its use for PCS and Concussion Management
    - 4.4. Pharmacological Management
5. Cases
    - 5.1. Sports Concussion

5.2. Post-Concussion Syndrome

Learning Objectives:

1.Understand basic pathophysiology of Sports Concussion and how it leads to the respective symptoms.
2.Be able to assess a concussion on the sidelines of a sport event.
3.Understand the in-office concussion evaluation and management
4.Undersand the main sign and symptoms of post-concussion syndrome and how to address them

Free Communication/Slides #4: Gerald Ford Room – 3-4:00pm

3:00-3:15pm

PRENATAL HEALTH CARE PROVIDER PHYSICAL ACTIVITY AND NUTRITION DISCUSSIONS ACCORDING TO BMI

Kiersten M. Mead (Saginaw Valley State University), Samantha J. Deere (Saginaw Valley State University), Rebecca A. Schlaff (Saginaw Valley State University), Meghan Baruth (Saginaw Valley State University)

Abstract: Prior research suggests health care providers (HCP) do not regularly discuss physical activity (PA) and nutrition during patient interactions, particularly when patients are considered overweight or obese by body mass index (BMI). These discussions are important during pregnancy, yet it is unknown if prenatal HCPs discuss these behaviors with all patients. PURPOSE: To investigate the differences in 1) patient value of prenatal HCP advice, and 2) the likelihood of prenatal HCP discussion/recommendation of PA and nutrition behaviors according to BMI categories. METHODS: Participants (n=46) included pregnant women enrolled in a pilot PA and nutrition behavioral intervention. A baseline survey included assessment of 1) demographics, 2) pre-pregnancy height and weight, 3) the degree (1=do not value through 5=highly value) participants valued their prenatal HCP's opinions, and 4) whether the patient's prenatal HCP discussed PA behaviors, recommended PA participation, or gave nutritional advice. Means(SD) and percentages were calculated for all variables of interest. Participants were categorized into BMI categories of normal weight (<25 kg/m^2) and overweight/obese (≥25 kg/m^2). An independent samples t-test and chi-square analyses were utilized to assess differences in the value of HCP's opinions, and whether or not the patient's HCP discussed PA behaviors, recommended PA participation, or gave nutritional advice according to BMI category. RESULTS: A majority of the sample was Caucasian (82%), married (70%), and a college graduate (59%). On average, participants were 28.3(4.4) years of age, had a pre-pregnancy BMI of 28.0(9.7)kg/m^2 and valued their HCP's opinions 4.6(0.6). A majority of participants discussed current PA habits (61%), received a PA recommendation (57%), and received nutritional advice from their prenatal HCP (59%). Normal (45.6%) and overweight/obese (54.4%) participants valued their HCP's advice similarly: 4.6(0.60) and 4.6(0.64), respectively (p=0.71). Although not statistically significant, more normal weight participants discussed PA, received a PA recommendation, and received nutritional advice than overweight/obese participants (p=0.10-0.50). CONCLUSION: Prenatal HCP opinions were highly valued within our sample. HCPs discussed and recommended PA/nutrition behaviors to women across all BMI categories. A large number of participants received no PA/nutrition advice from their prenatal HCP. Future research should explore ways to consistently incorporate PA/nutrition discussions in obstetric appointments.

This project was supported by a SVSU Allen Foundation research grant, SVSU Faculty-led research grants, and Ted & Ruth Braun fellowships

Keywords: Pregnancy, recommendations, advice

3:15-3:30pm

EFFECT OF COMPRESSION STOCKINGS ON PSYCHO-PHYSIOLOGICAL RESPONSES IN AN INSUFFICIENTLY

ACTIVE COHORT

Summer S. Besteman (Hope College), Evan Augustine (Hope College), Brian C. Rider (Hope College)

Abstract: Athletes use compression stockings (CS) to improve performance and aid in recovery. Though the literature supports some performance-related benefits from wearing CS during exercise, research on such effects amongst an insufficiently active cohort is lacking. PURPOSE: The purpose of this study was to examine the effects of CS on psycho-physiological responses during exercise among insufficiently active individuals. METHODS: Ten (females N=6) insufficiently active individuals (60.5 ± 40.9 minutes of moderate PA/wk) volunteered for this study. The study utilized a randomized, crossover design with 2 conditions (with CS and without CS). Both conditions involved participants completing a maximal treadmill test. During the test, treadmill incline increased 2% every 2 minutes while speed remained constant at 3.3mph. Once volitional fatigue was achieved, the treadmill was lowered to 0% incline for a recovery period of 5 minutes (3.3mph), followed by 5 minutes of seated recovery. Seven days later, the participants repeated the maximal test under the opposite CS condition. Heart rate (HR), blood lactate (BLa), and rating of perceived exertion (RPE) were measured at rest, at the end of each 2-minute stage, and during minutes 1, 5, and 10 of recovery. Lower leg discomfort was assessed 24 and 48 hours post using 100mm visual analogue scales (VAS). Repeated measures analysis of variance was run on all psycho-physiological variables. RESULTS: RPE, HR, and BLa showed no significant differences between CS conditions ($p > 0.05$). However, the VAS revealed that leg discomfort was significantly decreased 24 hours post testing. Specifically, participants reported lower perceived "soreness,"(14.9 vs. 26.7, p=0.002) "tightness,"(15.5 vs. 28.6, p=0.049) "tenderness,"(12.5 vs. 21.5, p=0.048) and "pulling"(13.4 vs. 24.2, p=0.046) in their lower legs 24 hours following the CS trial. This difference in reported "tightness" (13.7 vs. 35.4, p=0.02) and "pulling" (13.7 vs. 31.3, p=0.046) persisted for 48 hours. CONCLUSION: CS appear to reduce lower leg discomfort for 24 and 48 hours when worn during the exercise. This decrease in lower leg discomfort could lead to increased positive feelings towards exercise and thus improved exercise adherence among insufficiently active individuals.

Funded by Jacob E. Nyenhuis Collaborative Faculty Student Development Grant

Keywords: Performance, Discomfort, Ergogenic Aid

3:30-3:45pm

EXAMINING RELATIONSHIPS BETWEEN PREGNANCY SYMPTOMS AND GESTATIONAL WEIGHT GAIN

Ashlyn A. Swafford (Saginaw Valley State University), Rebecca A. Schlaff (Saginaw Valley State University), Meghan Baruth (Saginaw Valley State University), Samantha J. Deere (Saginaw Valley State University)

Abstract: Self-reported pregnancy symptoms may impact physical activity levels and dietary behaviors, thereby influencing gestational weight gain (GWG). However, little is known about the relationship between symptoms and GWG. PURPOSE: To examine the associations among various pregnancy symptoms (fatigue, back pain, pelvic pain, swelling, and nausea) and GWG. METHODS: Women who were 14-20 weeks gestation were recruited into a physical activity and nutrition behavioral intervention. At study enrollment, women completed an online survey that assessed various demographic variables, height and pre-pregnancy weight, and the presence (yes/no) of fatigue, back pain, pelvic pain, swelling, and nausea. GWG was calculated by subtracting pre-pregnancy weight from last recorded weight during pregnancy (range: 31-40 weeks gestation). Linear regression analyses were utilized to investigate relationships among individual symptoms and GWG,

controlling for gestational age at last weight and pre-pregnancy body mass index (BMI). An alpha level of 0.05 was used to determine statistical significance. RESULTS: Participants (n=38) averaged 28.7±4.1 years of age and 18.1±2.5 weeks gestation at enrollment. A majority of women were married (76.3%), college graduates (65.8%), white (86.5%), and employed (84.2%). Pre-pregnancy BMI averaged 27.9±10.4 kg/m2, and gestational age at the last recorded weight averaged 35.9±1.6 weeks, with total GWG averaging 30.9±13.3 pounds. Women reporting nausea had significantly greater GWG than those not reporting nausea (p=0.0015). There were no significant relationships between GWG and fatigue (p=0.97), back pain (p=0.19), pelvic pain (p=0.44), or swelling (p=0.98). CONCLUSION: Overall, the presence of nausea during early pregnancy was the only significant predictor of GWG. Specifically, women who reported nausea gained significantly more weight than those who did not. Future research should prospectively investigate the mechanisms by which nausea impacts health behaviors (thereby influencing GWG) within larger, more diverse samples. This information could prove to be valuable targets for behavioral interventions seeking to optimize GWG and maternal/child health outcomes.

This project was supported by a SVSU Allen Foundation research grant, SVSU Faculty-led research grants, and Ted & Ruth Braun fellowships

Keywords: prenatal, behavioral intervention, obstetrics, body weight

3:45-4:00pm

ASSESMENT OF ACTIVITY MONITOR PLACEMENT DURING FREE-LIVING CONDITIONS

Monroe J. Molesky (Alma College), John Vusich (Alma College), Alexander H.K. Montoye (Alma College)

Abstract: Despite the popularity of consumer-based physical activity monitors (AMs), many of these AMs have little data examining their comparability when worn on different body locations. PURPOSE: Our study's purpose was to determine placement-related differences of a popularly available AM for estimated steps, Calories (kcals), distance traveled, active minutes, and sleep time in a free-living setting. METHODS: Participants (n=48) aged 18-28 years completed an unstructured, free-living protocol in which participants wore two identical AMs, one on the non-dominant (ND) wrist and one on the dominant (D) wrist, for five days. Participants were given the AM early Monday morning and then instructed to return it Friday afternoon. Participants were instructed to wear the AMs 24 hours per day during all of their regular daily activities excluding contact sports and water-based activities. Data were averaged across the three full days (Tuesday-Thursday) and compared between wrists using paired t-tests for each of the five recorded variables (steps, kcals, distance traveled, active minutes, and sleep time).
RESULTS: The AMs had varied results in recording steps, kcals, distance traveled, active minutes, and sleep time in the comparison of the ND and D wrist locations. For all variables, estimates from the ND wrist were higher than the D wrist. AM step differences were significantly significant at 354 steps/day (3.5%; $p<0.001$), kcals were 27.8 kcals/day different (1.2%; $p=0.002$), distance was 0.2 miles/day different (3.3%; $p<0.001$), and active minutes were 3.2 minutes/day different (11.4%; $p<0.001$). Participant sleep duration trended toward statistical significance ($p=0.074$) at 28.1 minutes/day (6.9%) difference between wrists. CONCLUSION: Data collected from AMs placed on the ND and D wrists are not equivalent. While differences for some variables were relatively small, others were substantial. Caution is warranted when wearing AMs on different wrists despite the seemingly all purpose and multi-locational nature of AMs. Future research should investigate other AM placements and optimum conditions for use.

Keywords: Fitbit, Flex2, wrist, physical activity

Free Communication/Slides #5: Gerald Ford Room – 4-5:00am

4:00-4:15pm

COMPARISON OF METHODS FOR ANALYZING GLOBAL POSITIONING SYSTEM PLUS ACCELEROMETRY DATA FROM RECESS

Kimberly A. Clevenger (Michigan State University), Karin A. Pfeiffer, FACSM (Michigan State University), Cheryl A. Howe, FACSM (Ohio University)

Abstract: Combining Global Positioning System receiver units (GPS) with accelerometry provides a monitor-based assessment of how physical activity changes with recess environment, but the accuracy and comparability of existing approaches to analyzing this data is unknown. PURPOSE: To compare five previously used methods for analyzing GPS plus accelerometry data from recess. METHODS: Children (N=23) wore an accelerometer and GPS on their hip for two recesses to determine location and activity intensity (counts/sec or classified by cut-points). Recesses were videotaped, and location and activity intensity were coded. Five approaches for interpreting GPS and accelerometer data were considered in comparison to video observation: 1) graduated color dot map, 2) 1 m fishnet grid, 3) hot spot analysis with Getis Ord G* statistic, 4) zonal approach, and 5) interpolation of a continuous surface of intensity over the schoolyard. To compare the results of the zonal analysis to video, weighted kappa was calculated to characterize how accurately the GPS determined location second-by-second, and paired t-tests were conducted to compare percentage of time in each location and intensity according to GPS plus accelerometry versus video. RESULTS: Hot spot analysis revealed significant clusters of high intensity values on the field, near the swings, and on the court, which was supported by the two visualization approaches. Interpolation also indicated a high intensity peak in the court. Weighted kappa was 0.76, with 81% agreement between GPS and video-determined location. There were no differences in time spent in each zone according to GPS versus video (court: 45.2 vs. 43.7%, fixed equipment: 31.1 vs. 33.2%, field: 23.7 vs. 26.2%). Sedentary behavior was higher according to GPS versus video overall (22.1 vs. 12.1%) and for court (29.1 vs. 10.1%) and fixed equipment (19.1 vs. 4.6%). Moderate-to-vigorous physical activity was lower according to GPS versus video overall (43.9 vs. 62.2%) and in court (36.6 vs. 68.6%) and fixed equipment (28.9 vs. 53.0%). CONCLUSION: GPS plus accelerometry accurately classified location, but not intensity by location, potentially due to missing data or differences in the way accelerometer and video intensity are classified. Future research should consider how GPS plus accelerometry data analysis influences study outcomes.

Funded by Ohio University Interdisciplinary Research Grant

Keywords: Environment, physical activity, child, monitor

4:15-4:30pm

OBJECTIVE AND SELF-REPORT ASSESSMENT OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR IN INDIVIDUALS WITH CHRONIC LOW BACK PAIN

Jeni E. Lansing (Iowa State University), Maria Perez (Iowa State University), Katy Southward (Iowa State

University), Laura Ellingson (Iowa State University)

Abstract: Low back pain affects >80% of adults in their lifetime, with 4-14% experiencing chronic low back pain (CLBP). Exercise training can reduce pain in CLBP patients, but activity patterns in this population have yet to be well-described, with existing data coming solely from self-report measures. PURPOSE: Our aim was to describe physical activity (PA) and sedentary (SED) behaviors and compare patterns assessed using objective vs. self-report measures in individuals with CLBP. METHODS: Measures of PA and SED were obtained from ActiGraph and activPAL accelerometers and the International Physical Activity Questionnaire (IPAQ) in individuals with CLBP (N=57; 52% female; 43±10 years old). Accelerometer data were processed using the Sojourns Including Posture (SIP) method and the IPAQ was scored to calculate time spent in moderate and vigorous PA (MVPA) and SED. Minutes of MVPA and SED from each method were analyzed descriptively (means (SD)) and compared using correlation coefficients and Bland-Altman Plots. RESULTS: Objective data demonstrated that few (12.3%) participants met recommended levels of PA. Contrasting this, self-report data showed that 81.7% were active enough to meet guidelines. Average minutes of MVPA per week in bouts of 10+ minutes measured objectively and subjectively were 57.1 (59) and 430.1 (330) minutes, respectively. Objective and subjective measure of MVPA were weakly correlated (r=0.25), and the Bland-Altman plot demonstrated wide limits of agreement (311.3 and -1097) and a systematic bias for over-reporting PA. For SED, mean minutes per day measured objectively and subjectively were 530.3 (85.7) and 458.3 (138.8), respectively. Measures were also weakly correlated (r=0.13). The Bland-Altman plot had wide limits of agreement (373.2 and -229.3) and demonstrated a systematic bias for under-reporting SED. CONCLUSION: Objective data demonstrate that patients with CLBP are inactive and highly sedentary. Their tendency to under-report SED and over-report MVPA indicates they may lack awareness regarding their actual levels of these behaviors. The identified disconnect between perceived and actual PA and SED behavior in the CLBP population suggests that addressing these misconceptions may be critical for the success of future interventions aiming to alter movement patterns to reduce pain.

Keywords: exercise, measurement

4:30-4:45pm

RESISTANCE EXERCISE ON PULSE WAVE REFLECTION AND ARTERIAL STIFFNESS

Erica M. Marshall (Kent State University), Jason C. Parks (Kent State University), Yu Lun Tai (Kent State University), Alaina Glasgow (Kent State University), Leslie Sensibello (Kent State University), Katy Geither (Kent State University), J. Derek Kingsley, FACSM (Kent State University)

Abstract: Blood flow restriction (BFR) has primarily been achieved through the use of an automated blood pressure cuff. On the other hand, knee wraps to restrict flow are used as a form of practical BFR (pBFR). The effects of resistance exercise with BFR and pBFR on pulse wave reflection is unclear. PURPOSE: To examine the effects of BFR, pBFR, and traditional high-intensity (HI) bench press resistance exercise on pulse wave reflection in resistance-trained individuals. METHODS: Twenty-three (Age: 23±3yrs) resistance-trained men underwent either bench press with BFR, pBFR [30% 1-repetition maximum (1RM), 4 sets, 30-15-15-15 repetitions, 30sec of rest], HI [70% 1RM, 4 sets, 8 repetitions, 60sec of rest] or a control. Measurements were taken at rest and 10mins postexercise. A 4x2 ANOVA was used to evaluate condition (BFR, pBFR, HI, Control) across time (rest, recovery) on pulse wave reflection. RESULTS: There were significant (p=0.0001) increases in heart rate [(BFR: rest: 60±7bpm; recovery: 69±7bpm), (pBFR: rest: 58±10bpm; recovery: 64±11bpm), (HI: rest: 58±12; recovery: 72±13bpm)] such that all three conditions were different compared to rest and the control

session. There was a significant interaction (p=0.0001) for the augmentation index (AIx) in that during recovery from BFR (rest: 117.9±8.2%; recovery: 126.2±9.0ms), pBFR (rest: 114.9±4.9ms; recovery: 127.9±9.8ms) and HI (rest: 115.6±6.2ms; 122.8±6.4ms) it was elevated compared to rest, and the control. There was also a significant (p=0.0001) interaction for the AIx normalized at 75bpm (AIX@75) [BFR: rest: 8.8±13.3%; recovery: 25.9±9.5%; pBFR: rest: 2.7±8.5%; recovery: 23.3±14.2%; HI: 4.4±12.1%; recovery: 21.2±9.9%)] in that it was augmented during recovery to rest and the control. The subendocardial viability ratio (SEVR) for BFR (rest: 138.4±19.5; recovery: 111.2±11.3), pBFR (152.2±27.5; recovery: 125.5±33.5), and HI (rest: 152.9±37.9; recovery: 111.9±28.7) also demonstrated a significant (p=0.0001) condition by time interaction such that they were elevated above rest in all three resistance exercise conditions, which were different than the control. CONCLUSION: These data demonstrate that BFR using an automated cuff or using knee wraps has similar effects as traditional high-intensity resistance exercise on pulse wave reflection in resistance-trained men after the bench press.

Keywords: Training status, strength exercise, augmentation index, subendocardial viability ratio

4:45-5:00pm

COMPARISON OF THE PREGNANCY PHYSICAL ACTIVITY QUESTIONNAIRE AND ACCELEROMETERS DURING PREGNANCY AND POSTPARTUM

Michelle R. Conway (Michigan State University), Mallory R. Marshall (Samford University), Rebecca A. Schlaff (Saginaw Valley State University), Karin A. Pfeiffer (Michigan State University), James M. Pivarnik (Michigan State University)

Abstract: The Pregnancy Physical Activity Questionnaire (PPAQ) is a commonly used tool to assess pregnant women's current physical activity (PA) levels. However, few studies have evaluated the level of agreement between the PPAQ and PA measurement devices during free living conditions at multiple time points throughout pregnancy. PURPOSE: The purpose of this study was to compare the PPAQ and device based PA assessment across phases of pregnancy and postpartum. METHODS: PA behaviors of 38 women were quantified by the PPAQ and accelerometers worn at the right hip and ankle, at approximately 21 and 32 weeks of pregnancy, and 12 weeks postpartum. Women were evaluated at least eight hours per day for at least three week days and one weekend day. Percent time spent in sedentary, light, moderate, and vigorous PA were compared between the PPAQ and accelerometers using a two-way repeated measures analysis of variance (ANOVA). RESULTS: Average percent of total PA time spent in sedentary, light, and moderate activity levels was similar between hip (83.0, 10.1, 5.8%, respectively) and ankle (82.9, 6.5, 5.6%, respectively) accelerometers, compared to 9.3, 43.1, 41.5%, respectively, for the PPAQ ($p < 0.01$). Specifically, the PPAQ results indicated significantly less time in sedentary PA and more time in light and moderate activity. The hip and ankle accelerometers and the PPAQ showed closer agreement for average time spent in vigorous activity (0.9, 4.8, 5.7%, respectively). CONCLUSION: Discrepancies between PA measurement modalities may be due to recall bias where the women overestimated the amount of light and moderate PA and underestimated their time in sedentary PA. Alternatively, accelerometers may have underestimated light and moderate PA and overestimated sedentary PA. Our findings are similar to results found with non-pregnant populations (Troiano et al., 2008). Researchers should consider these results when utilizing the PPAQ or accelerometers to collect PA data throughout pregnancy and postpartum as different conclusions could be made depending on the method used.

Keywords: Exercise, self-report, measurement

Free Communication/Slides #6: Gerald Ford Room – 5-5:00pm

5:00-5:15pm

AN EVALUATION OF NIGHTTIME MEDIA USAGE AND SLEEP PATTERNS IN FIRST-YEAR COLLEGE STUDENTS

Jonathon Whipps (Ohio University), Mark Byra (University of Wyoming), Kenneth Gerow (University of Wyoming), Emily Hill Guseman (Ohio University),

Abstract Smartphone and tablet presence in the bedroom may negatively impact sleep behaviors. Poor sleep hygiene is common in students and the negative effects of poor sleep are well known. The role nighttime media usage (NMU) plays on sleep patterns is not fully understood. PURPOSE: Our objective was to evaluate how nighttime media devices are associated with sleep behaviors in first year college students. METHODS: First-year students were administered a 2-part survey evaluating NMU and sleep behaviors (Pittsburgh Sleep Quality Index, PSQI). RESULTS: Students (n=114) reported a mean total sleep duration of 7.26 ± 0.93 h. Only 33% (n=38) of students reported meeting sleep recommendations (≥ 8 h). Nighttime media usage was found to negatively influence sleep quality. Increased Global PSQI scores (indicating poor sleep quality) were weakly correlated with increased reports of texting after bed (r=0.199, p=0.04). Total time in bed was weakly correlated with texting in bed (r=0.217, p=0.026) and with device-related sleep interruptions (r=0.215, p=0.028). Finally, social media usage (r=0.270, p=0.005), mobile gaming (r=0.208, p=0.033), and texting (r=0.293, p=0.002) were weakly to moderately correlated with reported sleep interruptions in participants. CONCLUSION: Our results suggest that overall NMU is associated with reduced sleep quality and quantity. Campus health officials should examine opportunities for intervention to improve sleep habits among first year students.

Keywords: smart phones, sleep hygiene, young adults, campus health

5:15-5:30pm

SCHOOL'S PHYSICAL ENVIRONMENT AND SELF-EFFICACY AMONG CHILDREN IN PUERTO RICO

Maria E. Santiago-Rodriguez (University of Illinois at Chicago), Mercedes Rivera (University of Puerto Rico, Rio Piedras Campus), Farah A. Ramirez-Marrero (University of Puerto Rico, Rio Piedras Campus)

Abstract Physical activity self-efficacy (PASE) and the school's physical environment (SPE) can influence children's moderate-to-vigorous physical activity (MVPA) participation. However, the association between PASE and the SPE has not been clearly established in this population. PURPOSE: To evaluate the relationship between PASE and SPE among elementary school children in Puerto Rico. METHODS: Sixty-eight girls and 63 boys (age= 7.8 ± 0.7 years) completed a questionnaire to assess PASE by interview. SPE was evaluated taking into consideration the physical education class, recess time, and use of facilities that promoted PA. Time in physical education and recess was provided by the school's administration. To determine the use of facilities, a score was generated based on self-reported activities and time spent in each. Children wore a GT3X+ accelerometer during 5 consecutive school days to determine MVPA and sedentary time (ST) during school time. MVPA and ST data was included if participants wore accelerometers ≥ 3 school days for ≥ 3 hr/day. Correlation analysis was conducted to test the relationship between the use of facilities and PASE. Mann-Whitney U-test was conducted to test the difference in PASE by recess time and Kruskal-Wallis test was used

to evaluate difference in PASE by physical education time. Secondary correlation analyses were conducted to test the relationship between 1) PASE and MVPA (min/wk); and 2) PASE and ST (hr/wk). RESULTS: Participants accumulated 110.94 ± 21.81 min/wk in MVPA, and 3.48 ± 0.48 hr/wk in ST. No significant correlations were observed between: 1) use of facilities and PASE (rs = 0.122, p = 0.22); 2) PASE and MVPA (rs = 0.010, p = 0.91); and 3) PASE and ST (rs = 0.068, p = 0.45). No significant differences were found in PASE by recess time (U = 1815.00, p = 0.86) and by physical education time (H(2) = 0.830, p = 0.66). CONCLUSION: School time allowed participants to comply with one fourth of the PA recommendation (60 min/day ≈ 420 min/wk). Lack of relationship between SPE and PASE could be explained by an overall high PA self-efficacy score, which requires further investigation. Funded by University of PR –FIPI Institutional Grant.

Keywords: childhood, psychological aspect, physical activity, elementary students

5:30-5:45pm

A BIOMECHANICAL COMPARISON OF ROMANIAN AND CONVENTIONAL DEADLIFTS

Sangwoo Lee (Western Michigan University), Jacob R. Schultz (Western Michigan University), Joseph D. Timgren (Western Michigan University), Katelyn M. Staelgraeve (Western Michigan University), Katelyn M. Staelgraeve (Western Michigan University)

Abstract Several variations of the deadlift, such as conventional deadlift (CD) and Romanian deadlift (RD), exist to target specific muscle groups. In spite of the potential differences between CD and RD, it has not been thoroughly determined if RD is a better deadlift technique for developing glutes and hamstrings than CD. PURPOSE: To compare biomechanical variables between RD and CD. METHODS: 21 recreationally trained healthy males volunteered for this study. On day one, RD 1 repetition maximum (1RM) was determined. One week after 1RM testing, participants returned for actual deadlift testing. Each participant performed 10 deadlift trials (2 techniques × 5 trials per technique) with 70% of RD 1RM in alternating order. The variables compared were net joint torque (NJT) and flexion angles of the lower extremity joints, whole body center-of-mass (COM) vertical displacement, and myoelectric activities of rectus femoris, biceps femoris, and gluteus maximus muscles. These variables were calculated and extracted through kinetic and kinematic analysis using a 3-dimensional motion capture system, force plates, and electromyography (EMG). The peak values of the respective 5 trials were averaged for each variable and used for statistical analysis. A paired samples t-test was used to compare the biomechanical variables between RD and CD. RESULTS: CD indicated significantly greater knee NJT and ankle NJT than RD (knee NJT: CD = 0.21 Nm/kg·m, RD = -0.28 Nm/kg·m; ankle NJT: CD = -0.33 Nm/kg·m, RD = -0.29 Nm/kg·m). CD showed significantly greater flexion angles of the lower extremity joints than RD (hip flexion: CD = 90.63°, RD = 79.97°; knee flexion: CD = -85.17°, RD = -33.86°; dorsiflexion: CD = 111.89°, RD = 90.47°). CD also indicated a significantly greater whole body COM vertical displacement than RD (CD = 0.33 m, RD = 0.24 m). For EMG analysis, CD exhibited a significantly greater myoelectric activity of the rectus femoris muscle than RD during both the descending and ascending phases (descending: CD = 69.21 μV, RD = 33.52 μV; ascending: CD = 164.58 μV, RD = 55.6 μV). CONCLUSION: RD is not a better deadlift technique for building glutes and hamstrings than CD.

Keywords: Biomechanics; resistance training; motion analysis

5:45-6:00pm

OPTIMAL INSPIRATORY MUSCLE TRAINING DOSE(S) TO ENHANCE RESPIRATORY FUNCTION

CHARACTERISTICS AND RUNNING PERFORMANCE

Kyle R. Barnes (Grand Valley State University), Sara M Danforth (Grand Valley State University), Katie G. Smyth (Grand Valley State University)

Abstract PURPOSE Inspiratory muscle training (IMT) is a form of resistance training for the muscles primarily involved in the processes of breathing using a resisted breathing trainer. However, the optimal IMT loading parameters to elicit specific physiological adaptations are unknown. The authors adopted a dose-response design to determine the IMT load most effective for enhancing various inspiratory muscle function characteristics and performance. METHODS: 29 trained runners performed a 1-mile (1609-m) time trial and a series of breathing tests using an inspiratory breathing trainer and software. Runners were then randomly assigned to 1 of 5, six week IMT programs ranging in resistance from 30-70% of peak strength index (SIND) in 10% increments. Maximal and submaximal inspiratory breathing tests were repeated each week and 1-mile performance was repeated after six weeks. To identify the optimal IMT group (resistance) for each measure, each runner's percentage change was modeled as a quadratic function of the rank order of the intensity of IMT. Uncertainty in the optimal IMT and in the corresponding effect on the given measure was estimated as 90% confidence limits (CL) using bootstrapping. RESULTS: There was a clear optimum for performance at Group 3.2 (52% of SIND) with a possibly beneficial effect of 3.2% (CL = 2.8-3.5%). There was a strong trend toward Groups 2 to 3 (40-50% of SIND) having the optimal IMT resistance to improve SIND (mean improvement of 36.5%, CL = 29.2-45.7%), peak inspiratory flow (19.5%, 13.3-24.4%), training load (37.8%, 27.4-46.3%), flow (40.3%, 28.6-54.1%), power (52.3%, 43.5-65.1%), and energy (45.6%, 29.4-60.9%) with very-likely beneficial effects on all measures. Improvements in inspiratory volume (15.3%, 10.7-17.4%) were optimal at Group 4.0 (60% SIND). Correlations between changes in performance and changes in inspiratory muscle function characteristics were trivial-small. IMT training at 2-wk was unlikely or possibly beneficial with the magnitude of effects trivial-small. At 4- and 6-wk, effects were greater and more beneficial than the previous 2-wk with no visual plateau in improvements. CONCLUSION: IMT between 40-50% of SIND appears to be optimal for most inspiratory muscle characteristics, while IMT at slightly higher resistances (~52% SIND) is optimal for 1-mile performance.

Keywords: Dose-response, respiratory muscle training, exercise performance, breathing

Poster Session #3: Crown Foyer – 2-3:25pm

Board 1

EFFECTS OF ACUTE FLOTATION RESTRICTED ENVIRONMENTAL STIMULATION TECHNIQUE ON MEASURES OF AUTONOMIC FUNCTION: A PILOT STUDY

Lydia K. Caldwell (The Ohio State University), William J. Kraemer, FACSM (The Ohio State University) Gregory L Sudberry (Henry Jackson Foundation), Joshua A. Hagen (Air Force Research Laboratory)

Abstract: Flotation-restricted environmental stimulation technique (Flotation-REST) creates a reduced sensory experience, by removing light, sound, tactile sensation and gravitational inputs to the brain. The treatment has been used in a variety of clinical populations with positive outcomes including adjustments to mood, well-being and chronic pain. Flotation-REST creates a state of deep relaxation which is theorized to reduce the stress response. The hallmark of the stress response is activation of the hypothalamic-pituitary-adrenal (HPA) axis, creating a shift in the autonomic nervous system towards a state of greater sympathetic activity. PURPOSE: The purpose of this study was to determine whether a single one-hour flotation-REST session could alter autonomic nervous system function as measured by change in heart rate variability (HRV). METHODS: 80 healthy adults volunteered to participate in this investigation. Resting, supine HRV was measured with an electrocardiogram chest strap immediately before and after a one hour flotation-REST session. Both frequency (High frequency, low frequency, HF/LF ratio, total power) and time domain (SDNN, RMSSD) HRV characteristics were assessed as well as proprietary scores of sympathetic and parasympathetic activity. In order to characterize flotation effects more clearly, participants were divided into 2 groups: (1) In Balance (Pre-float sympathetic activity ≤ 45) and (2) Highly Sympathetic (Pre-float sympathetic activity > 45). Mean pre-float/post-float differences were assessed for each group using paired samples t-test (alpha = .05). Magnitude of change was assessed by calculating effect sizes (ES) for statistically significant results. RESULTS: For the In Balance group, flotation-REST increased sympathetic activity (ES = .32) and high frequency contribution (ES = .47). In the Highly Sympathetic group, flotation-REST decreased sympathetic activity (ES = -.41) and increased parasympathetic activity (ES = .38), SDNN (ES = .40), and total power (ES = .36). CONCLUSION: Flotation-REST adjusts autonomic imbalances as measured by HRV. This has incredible implications for recovery from mental and physical stressors including illness, injury and exercise stress.

Keywords: Sensory deprivation, float tank, stress, recovery

Board 2

INTERVENTIONS FOR INCREASING ENERGY EXPENDITURE DURING A TYPING TASK

Erica M. Custer (Ohio University), David Russ (Ohio University), Michael Kushnick (Briar Cliff University)

Abstract: There is an emphasis being placed on the scientific community to create solutions to address the obesity epidemic. Obesity is often linked to a reduction in physical activity and may be related to an increase in sedentary-type jobs. Standing workstations have been suggested to reduce the negative consequences of

sedentary jobs. It remains unknown if this effect of standing is solely due to increased energy cost or the change in position carries inherent benefits. Neuromuscular electrical stimulation (NMES), has been used to maintain or build muscle strength and size in rehabilitation, and offers a potential method to examine this issue. PURPOSE: To explore NMES as a tool to increase energy expenditure in seated typing as compared to standing typing without added stimulation. METHODS: In this pilot study four women (age 38±8 years old; BMI 29.59±2.71 kg/m2) were recruited who self-identified as healthy sedentary-desk job workers. In addition the subjects completed a questionnaire to determine that they were not routinely active. The participants completed two trials in random order separated by at least 48 hours. Each trial was performed in the morning at the same time (±2hrs) and consisted of 10 minutes of semi-recumbent seated rest + 10 minutes of upright, seated typing followed by either 10 minutes of seated typing with NMES (~120% of motor threshold) or 10 minutes of standing typing; where the typing task was standardized and the subjects were asked to perform at a comfortable pace. Ventilatory gas was collected during the entire 30 minute trials. Means±standard deviations are reported and an effect size was determined using treatment differences. RESULTS: The difference between VO2 of the treatment minus seated typing was greater (0.08±0.02 vs 0.04±0.01L/min) in seated typing with NMES (seated NMES – seated typing) as compared to standing typing (standing typing – seated typing). This resulted in a large treatment effect (effect size: 1.74). CONCLUSION: In this pilot project, the effect of seated typing with NMES on sedentary women who reported they work desk-jobs, yielded greater energy expenditure than standing typing. This suggests that NMES may be an effective alternative to standing desks.

Keywords: KAATSU, Blood Flow Restriction

Board 3

THE EFFICACY OF DYNAMIC CYCLING IN AN INDIVIDUAL WITH ALS: A CASE STUDY

Bryan T. Dowdell (Kent State University), Kristin Noll (Kent State University), Angela Ridgel (Kent State University)

Abstract: Amyotrophic Lateral Sclerosis (ALS) is a neurodegenerative disease that is characterized by muscular atrophy which leads to increased fatigue, loss of balance, and spasticity. Currently, there is no cure for ALS and limited medical treatments are available. Weak muscles make it challenging for these individuals to exercise although physical activity is important to prevent deconditioning. However, dynamic cycling, which utilizes a motor to assist rapid movement of the legs, may be an effective mode of exercise for individuals with muscle weakness and has yet to be investigated in this population. PURPOSE: The purpose of this case study was to determine the efficacy of two weeks (6 sessions) of dynamic cycling at a high cadence on gait function and daily activity function in an individual with ALS. METHODS: One male individual with ALS (67 years old) completed an amyotrophic lateral sclerosis functional rating scale revised (ALSFRS-R) assessment and a 6-minute walk test (6MWT) on a treadmill before and after the two week intervention. After the baseline visit, the six subsequent visits consisted of the dynamic cycling intervention and 6MWT. The dynamic cycling sessions consisted of repeated bouts of cycling at 75-85 revolutions per minute for 5 minutes with 5 minutes of rest for a duration of 30 minutes. RESULTS: The 6MWT showed progressive improvement from baseline to after the last cycling session. The subject walked 306 m, 338 m, 370 m, 354 m, 354 m, 386 m, and 386 m respectively (a 21% improvement). The subject's ALSFRS-R score slightly improved from 41 to 42. CONCLUSION: The dynamic cycling paradigm proved to be effective in improving mobility and gait in our subject. The individual was able to successfully complete the intervention despite muscle weakness. The promising results of dynamic cycling in our subject warrants the need for further studies within the ALS

population.

Keywords: Neurodegenerative, forced exercise, 6MWT, ALSFRS-R

Board 4

CHILDREN'S PHYSICAL ACTIVITY STEP RATES: PHYSICAL ACTIVITY TRACKER vs DIRECT OBSERVATION

Kelsey A. Milano (Ohio University) and Cheryl A. Howe, FACSM (Ohio University)

Abstract: Background. While commercial physical activity (PA) trackers are valid tools for measuring PA in adults, very few have been tested for measuring children's PA. Therefore, this study evaluated the step rate (steps/min) of children's play, locomotion, and stationary PA from five different Trackers compared to video direct observation (ViDO) and assessed the relationship between Trackers and ViDO step rate and measured PA intensity. Methods. Healthy weight (HW) and overweight (OW) children (N=31; 15 girls) volunteered to be videotaped while participating in up to 7 free-play, locomotive, and stationary activities. Anthropometrics and resting metabolic rate (RMR) were measured using standard procedures. Children wore a portable metabolic unit to measure PA energy expenditure plus 2 research and 3 commercial Trackers to record total steps and step rate for self-paced activity played in random order. ANOVA assessed differences in PAEE and step rate by sex and weight status, while RMANOVA assessed differences and regression analyses assessed relationships among Tracker and ViDO step rate and PAEE. Results. The PAEE (6.5±0.2 METs) for all activities combined was similar by sex and weight status. Four of the five Trackers recorded higher step rates (range: 71±5 to 173±15 steps/min) compared to ViDO (37±4 steps/min) (adj. $p<0.01$). When activities were classified by PA intensity (moderate vs. vigorous) or type (play vs. locomotion), one Tracker recorded consistently higher step rate than ViDO (adj. $p<0.05$), while all Trackers recorded higher step rate during stationary PA (range: 6.5±2 to 141.5±69 steps/min) compared to ViDO (1.8±0.7 steps/min). Relationships among Tracker-derived step rates and measured PAEE ranged from r=0.25 to 0.36, while relationships among Tracker-derived vs. and ViDO-derived step rates ranged from r=0.32 to 0.68. Discussion. None of the PA Trackers consistently recorded an accurate step rate of children's play, locomotive, and stationary PA. With the tendency to inflate step rates, caution should be exercised when using PA Trackers to determine if children are meeting the recommended dose of daily activity.

Keywords: pediatric, pedometry, cadence, accelerometry

Board 5

PRIMARY CARE STUDENTS' PERCEPTIONS OF USING PHYSICAL ACTIVITY COUNSELING AS A MEDICAL INTERVENTION

Graceson C. Kerr (Saginaw Valley State University) and John Lowry (Saginaw Valley State University)

Abstract: Chronic diseases are among the most common and costly health problems in the U.S. Physical activity (PA) has been shown to be effective in treating and preventing many chronic diseases. The Exercise is Medicine initiative aims to promote PA counseling among healthcare providers. However, little is known about the education and perceptions of medical providers related to physical activity counseling. PURPOSE: To learn about the knowledge and perceptions that students in primary health care professions have related to using PA counseling. METHODS: Students currently enrolled in a DO or MD medical school, physician assistant,

or nurse practitioner (NP) program were recruited to take an online survey. Incorporating two previously validated surveys, subjects were asked about their own PA counseling training they have received, the importance of various PA counseling tasks, and their competency to do each task. Data analyses were performed on each Likert scale question. Open ended questions were analyzed thematically. RESULTS: Of the participants who completed the survey (n=72), 6.8% were MD, 52.3% were DO, 21.6% were physician assistant, and 18.2% were NP students. Primary care students rated many aspect of physical activity as being important (59.4-76.7% agreed/strongly agreed), but reported low confidence in their education and abilities to do them (19.7-51.3% agreed/strongly agreed). The most common barriers to physical activity counseling were patient motivation/compliance, lack of education, time, support system for patients, and cost/billing. The most common solutions they proposed to overcome these barriers were more education for primary care professionals, being able to refer patients to specialist, and help with psychological aspects of counseling. There was strong interest in taking an elective course, attending a CME/continuing education course, and having a certified fitness and/or nutrition professional in the office. CONCLUSIONS: There is a clear disconnect between what primary care students find important and what they feel competent to do in the field. There is a need for improving medical education related to physical activity counseling. There are many opportunities for physical activity professionals to work with primary care providers on physical activity counseling. Educating our healthcare professionals is essential in making them confident in PA counseling.

Keywords: Physical Activity Counseling, Exercise is Medicine, Primary Healthcare Students, Medical Education

Board 6

CONCURRENT VALIDITY AND INTER-RATER RELIABILITY OF A 400 M WALK TEST USING A GAIT APPLICATION VS. STOPWATCH

Uriel Ibarra-Moreno (University of Mount Union), Alyssa Braun (University of Mount Union) Morgan Kiser (University of Mount Union), Kennady Miller (University of Mount Union), Abigail Matsushima (University of Mount Union), Megan D. Salvatore (University of Mount Union), Nathan W. Saunders (University of Mount Union)

Abstract: Clinicians are always looking for new and improved tools to evaluate patients. The goal of this study was to develop a method that would facilitate aerobic fitness testing by allowing one clinician to assess multiple parameters of gait in a single trial and eliminate the need of expensive equipment. PURPOSE: To test the concurrent validity of newly developed Gait Application by comparing its results to the results found using a cell phone stopwatch when analyzing a video of a participant completing a 400 m Walk Test. The inter-rater reliability between 10 trained raters analyzing the video using the Gait Application was also studied. It was hypothesized that the Gait Application would be valid against a stopwatch and reliable among raters. METHODS: A video was taken of a participant performing a 400 m Walk Test. Using a cell phone stopwatch, 10 raters analyzed the same video twice, once to measure steady state gait speed and a second time for stride rate. Stride rate was multiplied by 2 to get cadence. The same 10 raters then used the Gait Application to analyze the same video. Once the Gait Application gave raw data feedback, gait speed, cadence, and turn duration were derived. Intraclass Correlation Coefficients (ICC) were used to assess inter-rater reliability, while paired t-tests were used to assess the agreement between the Gait Application and stopwatch. RESULTS: There were no significant differences between the Gait Application and stopwatch for steady-state gait speed (1.429 ± 0.034 m/s vs. 1.433 ± 0.034 m/s, respectively) or cadence (125.338 ± 2.079 steps/min vs. 125.484 ± 1.784 steps/min, respectively). The Gait Application also displayed excellent inter-rater reliability with ICC values of 0.99 for gait speed, and 0.90 for cadence; compared to stopwatch ICC values of 0.98 for gait speed

and 0.92 for cadence. CONCLUSION: As a valid and reliable means of gait analysis, the Gait Application makes testing of the 400 m Walk Test more efficient than previously used methods and permits the evaluation of steady-state gait speed and cadence.

Keywords: Mobile device, Gait, Cadence, Fitness Test

Board 7

BLOOD GLUCOSE CONTROL FOLLOWING SINGLE-LEG AND DOUBLE-LEG CYCLING

Shane Draper (Kent State University) and John McDaniel (Kent State University)

Abstract: When exercise is confined to a small muscle mass, greater blood flow to that muscle allows for greater muscle specific intensity compared to whole body exercise. The greater muscle specific intensity results in greater glucose oxidation for any given VO2 which may optimize exogenous blood glucose uptake following the exercise. PURPOSE: Thus, the purpose of this study was to determine the influence of reduced muscle mass exercise (single leg cycling) on post exercise blood glucose control. METHODS: Seven healthy college age students completed the study in which they arrived fasted and were administered an oral glucose tolerance test (OGTT) following 4 conditions: no exercise, following 30 minutes of single leg cycling, following 30 minutes of double leg cycling matched for VO2, and following 30 minutes of double leg cycling matched for power. VO2, RER, and carbohydrate oxidation were recorded throughout the exercise. Two 4 x 2 repeated measures ANOVAs were performed on condition (single leg, double leg VO2 and double leg power) and time (baseline and average blood utilization as well as baseline and peak blood glucose). RESULTS: Despite the fact that carbohydrate oxidation was greater during the single leg cycling ((1.4 ± 0.45 grams) of carbohydrate utilized per minute during single leg compared to (1.0 ± 0.49 g/min) during double leg matched for VO2 and (0.87 ± 0.43 g/min) during double leg cycling matched for power), there was no difference ($p > 0.05$) in average blood glucose uptake between single leg cycling (126 ± 8 mg/dL) and double leg cycling when matching for VO2 (121 ± 10 mg/dL) and power (125 ± 10 mg/dL) when compared to baseline (124 ± 13 mg/dL). Additionally, there was no difference in peak blood glucose between single leg cycling (160 ± 17 mg/dL) and double leg cycling when matching for VO2 (154 ± 20 mg/dL) and power (155 ± 19 mg/dL) when compared to baseline (159 ± 18 mg/dL). CONCLUSION: We conclude that the greater glucose utilization during single leg cycling had no effect on blood glucose uptake following an OGTT.

Keywords: Single Leg Cycling, Blood Glucose Control, Oral Glucose Tolerance Test

Board 8

HEALTH PROFILE CORRELATES AND FITNESS IN COLLEGE-AGED FEMALES UTILIZING A GUIDED EXERCISE PROGRAM

Nicole K. Arment (Grand Valley State University) and Christopher J. Dondzila (Grand Valley State University)

Abstract: Nearly two thirds of college-aged women in the United States are currently overweight or obese, placing them at elevated risk for adverse health outcomes. There are accompanying declines in physical activity and other health variables that also become prominent across the college years. Grand Valley State University openly offers a guided exercise program, UFIT, to promote fitness and health. It is unknown which health variables are most associated with fitness levels in those seeking exercise programming assistance via

UFIT. PURPOSE: To investigate associations between health variables and fitness in college-aged women participating in UFIT programming. METHODS: Data from females aged 18-22 years was collected (upon enrollment) in the UFIT program, including height, weight, body mass index, body fat percentage, waist-hip ratio, FEV1.0/FVC, blood pressure, and predicted VO2max via the YMCA submaximal cycle test. Pearson correlations were performed to assess the relationship between the aforementioned health variables and predicted VO2max between "young" (18-19 years) and "old" enrollees (21-22 years). RESULTS: The "young" group had significant correlations with weight (p= .000, r =-.334, SD= 33.86, 153.45 lbs.), body mass index (p= .000, r = -.357, SD=5.55, 25.7), body fat percentage (p= .000, r =-.309, SD=6.10, 26.6%), waist to hip ratio (p= .000, r = -.598, SD= .06, .758), diastolic blood pressure (p= .001, r = -.328, SD=7.22, 71.86 mmHg) and FEV1.0/FVC (p= .026, r = .175, SD= 16.27, 82.78). The "old" group had significant correlations with weight (p= .015, r = -.235, SD= 39.22, 158.28 lbs.), body mass index (p= .000, r = -.403. SD= 6.01, 26.44), body fat percentage (p= .000, r = -.376, SD= 6.35, 26.24%), and diastolic blood pressure (p= .005, r = -.388, SD= 7.57, 73.69 mmHg). CONCLUSION: Body weight measurements (weight, body mass index, body fat percentage and waist to hip ratio) remain an important correlate of fitness. The diastolic blood pressure was also a found correlate in both groups, however pulmonary measures (FEV1.0/FVC) were significant in only the "young" group. This information is useful in identifying who is most likely to benefit from the UFIT programming.

Keywords: Body weight and pulmonary measurements

Board 9

FOOTSTRIKE CHANGES ACROSS VELOCITIES RELATIVE TO MAXIMAL RUNNIING VELOCITY

Elizabeth Seewer (DePauw University), Brian Wright (DePauw University), Patrick Babington (DePauw University)

Abstract: INTRODUCTION: Initial contact that the foot makes with the ground during running is of interest as it relates to injury and potentially performance. Previous reports suggest that faster participants tend to use a midfoot/forefoot strike pattern. Additionally, as running velocity increases, runners shift from a rearfoot toward a midfoot/forefoot strike pattern between an absolute velocity of 5 and 6 m·s-1. Changes in footstrike have not been reported relative to a maximal running velocity. PURPOSE: To compare foot strike pattern, as measured by footstrike angle, across running velocities as a percentage of a maximal running velocity. METHODS: Maximal running velocity was measured during the last 10 meters of a 50 meter over ground sprint in 20 college age athletes (10 males and 10 females, Age 19.5 ± 1.4 years). Subjects then performed a treadmill run at 40, 50, 60, 70 and 80 percent of their maximal running velocity. Video was captured (120 fps) in the sagittal plane during the last 10 seconds of the 1-minute run at each velocity. Footstrike angle was determined by the methods of Altman and Davis (2012). A repeated measures Oneway ANOVA was used to determine changes in footstrike angle across the running velocities. RESULTS: Mean maximal running velocity was 7.2 ± 0.7 m·s-1. Mean running velocities at 40, 50, 60, 70 and 80 percent of maximal velocity were 2.9 ± 0.3, 3.6 ± 0.4, 4.3 ± 0.4, 5.0 ± 0.5 and 5.8 m·s-1, respectively. Mean footstrike angle at relative velocities of 40, 50, 60, 70 and 80 percent of maximal velocity were 5.4 ± 5.0˚, 4.5 ± 4.4˚, 3.9 ± 3.4˚, 2.2 ± 2.7˚ and 1.0 ± 3.7˚, respectively. The ANOVA revealed significance across velocities ($p<0.05$). Pairwise comparisons revealed differences between all relative velocities except between 50 and 60 percent and 70 and 80 percent. CONCLUSIONS: In this sample, it appears that footstrike angle decreases over the relative velocities used. This is suggestive of a gradual change toward a more midfoot/forefoot strike pattern as velocity increases relative to an individual's maximal running velocity.

Keywords: Midfoot Strike, Forefoot Strike, Strike Angle

Board 10

PREDICTORS OF LEAN BODY MASS AND FUNCTION IN OLDER ADULTS

Connor J. Cashman (Miami University), Megan C. Rigot (Miami University), Victoria E. Warren (Miami University), Kyle L. Timmerman (Miami University)

Abstract: Older adults(≥65y) make up approximately 14% of the population and sarcopenia is a growing issue within this group. Additionally, as they lose muscle mass and function, they become more prone to adverse physical outcomes. Therefore, identifying lifestyle factors such as physical activity (PA) and/or diet that may impact body composition and function in older adults has clinical relevance. The PURPOSE of this study was to examine potential associations among PA level, physical function, diet, muscle mass, and function in older adults. METHODS: In 95 older adults (77±8y), PA level was measured using the Community Healthy Activities Model for Seniors (CHAMPS) questionnaire. Physical function was measured by grip strength, Short Physical Performance Battery (SPPB), and the six-minute walk test (6MWT). Body composition was measured by bioelectrical impedance analysis (BIA). In a subset of 73 subjects, habitual dietary intake was measured using 3-day diet logs. Partial correlations were run between variables while controlling for age and gender. Significance was set to $p < 0.05$. RESULTS: Mean values for select variables include: moderate-to-vigorous PA (MVPA): 1353±1160 kcal·wk-1, SPPB: 9.9±2.2 (out of 12); grip strength: 26.4±8.7 kg; fat-free mass percentage (FFM%): 66.9±8.4%; relative protein intake: 1.1±0.36 g protein·kg body mass-1. Fat-free mass was significantly correlated with 6MWT ($r = 0.33$, $p<0.05$) and relative protein intake ($r = 0.37$, $p<0.05$), but not with grip strength, SPPB, or self-reported physical activity. CONCLUSION: These data show that indices of physical function and diet are correlated with fat free mass in older adults. These findings are important given that sarcopenia is associated with decreased muscle mass and function in older adults. Longitudinal randomized, controlled studies are needed to assess if increased protein intake in older adults can minimize declines in muscle mass and function.

Keywords: sarcopenia, physical activity, physical function, protein intake

Board 11

CHARACTERIZING PHYSICAL ACTIVITY IN THE PRESCHOOL CLASSROOM USING PROXIMITY TAGGING

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Abstract: Preschool-aged children spend large portions of time in child care centers, but they do not attain the recommended 15 min/hour of total physical activity (light-to-vigorous, TPA). The child care environment may be a target for TPA-promoting interventions, but little is known about specific locations where children are physically active, particularly in the classroom. PURPOSE: Our purpose was to characterize preschoolers' TPA within classroom locations and outdoors to identify locations that promote TPA participation. METHODS: Forty children (18 girls; 3-5 y) from six classrooms in five preschools wore a Bluetooth-enabled triaxial accelerometer on an elastic belt over their right hip during school for one to three days. Data were collected in 15-sec epochs and activity intensity was determined using age-appropriate cut-points (≥200 counts/15-sec). Proximity tagging was used to determine location within the classroom, wherein the worn accelerometer

acted as a “receiver” that recorded the serial numbers of nearby “beacons” at an epoch of 15-sec. Beacons continuously broadcasted their serial number from each classroom location. Outdoor time was identified from provided schedules and lack of receiver-beacon communication. Data from all days were averaged to obtain proportion of time in each location spent in TPA. A linear mixed model was developed using restricted maximum likelihood estimation to identify differences in TPA by location, with location as the fixed effect, accounting for nesting of children within classrooms. Post hoc comparisons were conducted with the Bonferroni correction. RESULTS: There were differences in TPA elicited by location, $F(14)=20.01$, $p<0.001$. Outdoors (marginal mean: 47.4±2.2%) elicited significantly more TPA than all other locations. Loft (33.4±3.2%) and music (32.3±3.1%) centers elicited significantly more TPA than snack (15.4±2.6%) and art (15.7±2.9%). Loft also elicited more TPA than science (20.9±2.6%) or manipulative (20.5±2.7%) centers. Books (26.9±2.3%) elicited more TPA than art, while snack elicited less TPA than books and blocks (26.1±2.2%). CONCLUSION: Results suggest that addition of loft or music areas within a classroom, or increased emphasis on outdoor playtime, would result in increased participation in TPA. Because of variation in school environments, more data need to be collected on a larger sample of schools to improve generalizability. Supported by Marco Cabrera Student Research Award, MWACSM Student Research Grant, Department of Kinesiology at Michigan State University

Keywords: childcare, accelerometer, environment, behavior

Board 12

CARDIORESPIRATORY FITNESS IS INVERSELY ASSOCIATED WITH METABOLIC SYNDROME AND CLUSTERING OF METABOLIC RISK FACTORS: THE BALL STATE UNIVERSITY ADULT PHYSICAL FITNESS STUDY

Mary T. Imboden (Ball State University), Elizabeth Kelley (Ball State University), Matthew P. Harber (Ball State University), Holmes W. Finch (Ball State University), Leonard A. Kaminsky (Ball State University), Mitchell H. Whaley (Ball State University)

Abstract: The metabolic syndrome (MetSyn) is a high-risk phenotype characterized by the clustering of cardio-metabolic risk factors (RF), including obesity, elevated triglycerides, high density lipoproteins, hypertension, and impaired fasting glucose. Cardiorespiratory fitness (CRF) has been associated with metabolic RF clustering and the presence of MetSyn. However, most studies assessing this relationship have used estimated CRF, which has been associated with estimation error of up to 40%, with only few studies using directly measured CRF assessed from cardiopulmonary exercise testing (CPX). However, these studies were small in size and predominately assessed men; therefore more information from studies using CPX derived CRF in both sexes may aid in the risk assessment for MetSyn and guide clinical decisions. Purpose: To assess the association between directly measured CRF and MetSyn RF clustering. Methods: A retrospective cross-sectional analysis was performed on 3,636 self-referred men and women who completed a health assessment including a CPX between 1969-2017. Inclusion criteria consisted of being ≥ 18 years of age, attainment of a respiratory exchange ratio ≥1.0 during the CPX, and having complete data on MetSyn RFs. Sequential regression models were run to assess the relationship between CRF and MetSyn and a univariate analysis of variance was performed to assess differences between number of MetSyn RF present and CRF. Results: Individuals with MetSyn (n=953) had a mean CRF 8.8 ml/kg/min lower than those without the syndrome (n=2,683). Number of RFs was inversely related to CRF; CRF was significantly lower ($p<0.05$) with each additional RF. There was also a negative relationship ($p<0.001$) between CRF quartile and the likelihood of having MetSyn. Each quartile increment was associated with a 50% relative reduction in likelihood of MetSyn ($p<0.001$). Conclusion: These findings with CPX measured CRF suggest that higher levels may confer

resistance to developing metabolic RFs, which could prevent MetSyn, and ultimately decrease cardiovascular disease risk. Further, the inverse, graded relationship found between CRF and number of MetSyn RFs has public health importance, as adoption of an endurance training program has been shown to increase CRF, and therefore should be promoted as an approach to improve health and decrease MetSyn risk.

Keywords: Cardiopulmonary exercise testing, aerobic capacity, cardiovascular disease, abdominal obesity

Board 13

NUTRITIONAL DIFFERENCES BY PHYSICAL ACTIVITY AND ADIPOSITY STATUS IN ADOLESCENTS

Dani Stanbouly (Michigan State University), Jeanette Ricci (Michigan State University) Karin A Pfeiffer, FACSM (Michigan State University)

Abstract: Physical activity participation can potentially affect heightened caloric needs of adolescents, who undergo significant growth and maturation around puberty. Additionally, excess consumption of certain macronutrients has been associated with higher adiposity levels. Much of existing nutrition literature focuses on youth from middle-class, White populations participating on athletic teams, rather than investigating nutritional differences amongst adolescents from underrepresented groups who participate in general physical activity (PA). Purpose: (1) To examine intake differences in total calories (TC), fruit/vegetables (FV), whole grains (WG), and calories from added sugars/solid fats (ASFC) in adolescents meeting PA recommendations vs. not. (2) To examine intake differences between low adiposity (LA) and high adiposity (HA) groups. Methods: A cross-sectional analysis of fifth grade students (N=60, 11 +/- 0.6 y; 46.7% males; 61.7% black; 56.7% overweight/obese) participating in the CrimFit youth program completed the self-report Block Kids Food Frequency Questionnaire (FFQ) to determine intake values. PA was assessed using a question asking the number of days/week students obtained >/=60 min moderate-to-vigorous physical activity (MVPA), which was used to classify 2 PA groups (meet=7 days, not meet<7 days). Percent body fat (%BF) was assessed using a bioelectrical impedance scale. Adiposity was categorized as LA or HA based on the FITNESSGRAM standards for %BF (HA = >25% males, >32% females). One-way ANOVA was employed to determine significant differences between PA and adiposity groups. Results: TC (2014 vs. 1873, $F(1,58)=0.30$, $p=0.59$), FV servings (1.6 vs. 1.3, $F(1,58)=0.71$, $p=0.40$), WG servings (0.3 vs. 0.3, $F(1,58)=1.06$, $p=0.31$), and ASFC (35.9 vs. 35.6, $F(1,58)=0.01$, $p=0.91$) were not different between PA groups. Between LA and HA groups, LA had higher TC (2150 vs. 1625, $F(1,58)=4.77$, $p<0.05$) and lower FV servings (1.2 vs. 1.6, $F(1,58)=2.93$, $p<0.05$), but no differences in WG servings (0.3 vs. 0.4, $F(1,58)=3.24$, $p=0.08$) and ASFC (36.4 vs. 34.8, $F(1,58)=0.60$, $p=0.44$) were found. Discussion: Results do not support previous research in a similar population that demonstrated higher junk food consumption in active youth. Contrary to other studies, HA participants reported lower TC and higher FV intake than LA. Future research should determine the validity of FFQs in this population in comparison to previous measures.

Supported by the Crim Fitness Foundation

Keywords: dietary behaviors, body composition

Board 14

FREE-WEIGHT RESISTANCE EXERCISE VERSUS WEIGHT MACHINES ON PULSE WAVE REFLECTION

Jason C. Parks (Kent State University), Erica M. Marshall (Kent State University), Yu Lun Tai (Kent State University), Alaina Glasgow (Kent State University) Leslie Sensibello (Kent State University), Katy Geither (Kent State University), J. Derek Kingsley, FACSM (Kent State University)

Abstract: Acute resistance exercise (ARE) has a profound effect on pulse wave reflection, but the data are limited when examining these responses in resistance-trained individuals after free-weight (FW) versus weight-machine (WM) exercises. PURPOSE: To evaluate alterations in pulse wave reflection after FW exercise compared to WM in resistance-trained individuals. METHODS: Forty-one resistance-trained individuals volunteered to participate in either FW (n=25) or WM (n=16) resistance exercises. Data were collected at rest, and 10-15min after ARE. The FW group completed 3 sets of 10 repetitions at 75%1RM on the squat, bench press and deadlift, while the WM group completed 3 sets of 10 repetitions at 75%1RM on the leg press, lat pulldown, leg extension, chest press, and the leg curl. A control condition was also performed for each individual. A 2x2x2 analysis of covariance (ANCOVA) was used to analyze the effects of group (FW, WM) across condition (ARE, control) and time (rest, recovery) with workload as the covariate. RESULTS: The groups were similar for anthropometrics ($p>0.05$), but differed in terms of years spent training (FW: 7±4 yrs; WM: 4±2 yrs, $p=0.0001$). There were also no differences at rest for any of the pulse wave reflection characteristics. Neither condition had an effect on brachial or aortic blood pressure. There was a significant 3-way interaction for heart rate (FW: rest: 59±8bpm, recovery: 88±13bpm; WM: rest: 65±9bpm, recovery: 89±13bpm, $p=0.04$) such that it was augmented during recovery from resistance exercise in the FW compared to the WM group. There were also significant 3-way interactions for the augmentation index (FW: rest: 116±8.4%, recovery:121.2±9.5%; WM: rest: 116.8±8.4%, recovery: 113.7±5.5%, $p=0.006$), augmentation pressure (FW: rest: 5.0±2.9mmHg, recovery: 8.4±5.9mmHg; WM: rest: 4.3±4.0mmHg, recovery: 3.8±3.6mmHg, $p=0.029$), and the augmentation index normalized at 75bpm (FW: rest: 4.9±8.1%, recovery: 24.1±14.5%; WM: rest: 8.7±12.3%, recovery: 16.8±8.2%, $p=0.015$) such that they were increased in the FW group compared to the WM group during recovery from ARE. CONCLUSION: These data demonstrate that recovery from free-weight resistance exercises has a significant effect on pulse wave reflection characteristics that supersede those of weight machine resistance exercises in resistance-trained individuals, despite no differences in brachial or aortic blood pressures.

Keywords: strength exercise, augmentation index, augmentation pressure, blood pressure

Board 15

DIFFERENCES BETWEEN NCAA DIVISION II MALE AND FEMALE ATHLETES' MOTIVATION TYPES OVER TIME

Addison Smith (University of Indianapolis), Mindy Hartman Mayol (University of Indianapolis), Urska Dobersek (University of Southern Indiana)

Abstract: According to the Self-Determination Theory, motivation lies on a continuum from being intrinsically motivated, extrinsically motivated, to amotivated (Deci & Ryan, 1985; 2000). PURPOSE: The purpose of this study was to investigate differences in motivation types between male and female student-athletes (SAs) over three time points. METHODS: Overall, 530 NCAA Division II SAs (nmales = 355, nfemales = 175) with an age range of 18 to 23 (M = 19.40, SD = 1.33) from 21 teams voluntarily completed a demographic questionnaire and the 18-item Sport Motivation Scale II used to measure six motivation types: intrinsic (IR), integrated (INTR), identified (IDR), introjected (INT), external (EXT), and amotivation (AMR) regulation. A 2x3 Mixed Analysis of Variance with Bonferroni post hoc tests were used to analyze the differences in male and female SAs' motivation types over the pre-season (PS), in-season (IS), and off-season (OS). An alpha level of $p \leq .05$

was set for statistical significance. RESULTS: Findings revealed that there were statistically significant differences between male and female SAs in IR, INTR, and IDR. For IR, differences were seen in the OS, F(1, 352) = 4.22, p = .041, with males SAs scoring higher in IR (M = 16.78, SD = 3.93) than female SAs (M = 15.94, SD = 4.26). For INTR, differences were seen in the OS, F(1, 352) = 10.77, p = .001, with males SAs scoring higher in INTR (M = 17.14, SD = 3.59) than female SAs (M = 15.87, SD = 4.33). For IDR, differences were seen in the OS, F(1, 352) = 3.90, p = .049, where males scored higher in IDR (M = 16.79, SD = 4.00) when compared to females (M = 15.92, SD = 4.19). No statistically significant differences were seen for ITR, EXTR or AMR (p >.05) or during the PS or IS. CONCLUSIONS: Results demonstrated that male SAs exhibited higher IR, INTR, and IDR scores than their female counterparts in the OS suggesting more sustainability in relation to autonomous-supportive motivation. According to Amorose and Horn (2002), differing coaching styles have been found to impact male and female SAs' levels of intrinsic motivation.

Keywords: sport motivation, collegiate athletes, sex differences

Board 16

GREATER MUSCULAR FATIGUE IS SHOWN USING DIFFERENT CUFF PRESSURES DURING DYNAMIC BLOOD FLOW RESTRICTED EXERCISE

Tyler Singer (Kent State University) and John Stavers (Penn State)

Abstract: Blood flow restricted (BFR) exercise is an emerging intervention that increases muscle size and strength during low intensity resistance training. Although the cuff pressures prescribed for this intervention are typically based on pressures required to occlude blood flow at rest, the impact these cuff pressures have on tissue perfusion during and after exercise is unclear. PURPOSE: To determine how various cuff pressures impact tissue perfusion and EMG during exercise. METHODS: Seven healthy male participants completed four sets of a knee extension exercise (30 reps per set at 30% of max torque, 15 minutes recovery between sets). Four different cuff pressures were used during each set (0%, 60%, 80%, and 100% of arterial occlusion pressure). Near infrared spectroscopy was used to measure tissue saturation index, oxygenated and deoxygenated hemoglobin at rest and during exercise. EMG was also recorded for the vastus lateralis during exercise. RESULTS: Tissue saturation showed greatest decrease during the100% occlusion trial (62± 5 to 39± 5; p=0.001) followed by 80% (62±8 to 40±8; p=0.001), 60% (63±12 to 45±12; p=0.012), and the control (66±9 to 52±9; p=0.019). Deoxygenated hemoglobin increased the most at 100% occlusion (2.0±7 to 31±7; p=0.001) followed by 80% (1.1±7 to 27±7; p=0.002), 60% (-0.7±14 to 15±14; p=0.029) and the control (-5.0±8 to 11±8; p=0.02). In addition, oxygenated hemoglobin decreased the most in the 100% condition (5.0±12 to -14±12; p=0.002) followed by 80% (6.0±14 to -12±14; p=0.007), 60% (7.0±15 to -9.0±15; p=0.023) and the control (4.0±11 to -7.0±11; p=0.014). There was no difference in total hemoglobin during those time points. EMG showed the largest increase in the 100% condition (10±9 to 23±9; p=0.002) compared to the control followed by 80% (9±14 to 19±14; p=0.002) and 60% (18±13 to 23±13; p=.03). CONCLUSION: This data suggests that during dynamic exercise 100% of aortic occlusion pressure still allows for some muscle perfusion during the exercise, but the reduced perfusion at higher pressures results in greater fatigue.

Keywords: Ischemia, Fatigue, Quadriceps

Board 17

ABDOMINAL DIAMETER AS A PREDICTOR OF OBESITY IN AGING ADULTS

Sarah G. Kearney (Kent State University), Amy L. Morgan (Bowling Green State University), Mary-Jon Ludy (Bowling Green State University) Matt Laurent (Tarleton State University)

Abstract: Obesity, particularly abdominal obesity, is associated with numerous negative health consequences. Clinically, body mass index (BMI) and waist circumference (WC) have been the preferred measures to predict human adiposity. Sagittal abdominal diameter (SAD) measures the abdomen directly and may be a more preferable measure to predict adiposity. PURPOSE: This study investigated if SAD was an appropriate measure of adiposity when compared to other body composition measures in those aged 50 and older. METHODS: Participants were 38 men (60 ±7.7 years) and 62 women (57 ±7.3 years). SAD was measured at the umbilicus, with participants in the supine position, using a Holtain-Kahn Abdominal Caliper. BMI was calculated using height and weight (kg/m2). WC was measured using a Gulick tape at two anatomical points; narrowest waist (WCN) and the umbilicus (WCU). Percent fat was analyzed via air-displacement plethysmography (ADP). ADP was used as the criterion measure of body composition. Correlations were calculated to observe relationships between all measures of weight related health risk and body composition. Sensitivity and specificity analyses were conducted to classify participants into categories (true positive, true negative, false positive, and false negative) to assess proper body composition identification. RESULTS: When using the SAD cut-point of <25cm, 28% of participants were correctly classified as lean according to percent fat via ADP. BMI (sensitivity = 84%) and WCN (sensitivity = 70%) were the best indicators of overweight/obesity. A lower SAD cut-point was investigated to determine if a new cut-point would improve sensitivity values or if SAD was not an appropriate measure for this population. With a lower cut-point of ≤22cm, sensitivity values increased to 78%. CONCLUSION: Based on the results in the current investigation, the SAD cut-point of <25cm is not an accurate indicator for obesity related risk in men and women over the age of 50.

Keywords: sagittal abdominal diameter, obesity

Board 18

THE EFFECTS OF A FITNESS TRACKER AND MOTIVATIONAL INTERVIEWING ON BODY COMPOSITION IN PATIENTS WITH CHRONIC LOW BACK PAIN

Kathryn J. Southard (Iowa State University), Laura Ellingson (Iowa State University), Jeni Lansing (Iowa State University), Maria Perez (Iowa State University), Greg Welk, FACSM (Iowa State University)

Abstract: PURPOSE: Individuals with low back pain (LBP) are encouraged to stay active to manage symptoms and maintain function. However, promoting physical activity and sustained weight loss has proven to be challenging. This study demonstrated the effects of using a consumer fitness tracker (FT) alone or in combination with motivational interviewing (MI) on changes in body composition in patients with chronic LBP. METHODS: Participants (N=57; 51% female; mean age: 43.5 ± 10.1) were randomly assigned to receive a FT alone, (FT; N=16) or in combination with MI, (FTMI; N=17) or a waitlist control condition (WLC; N=19) for 12 weeks. FT and FTMI received monthly phone calls to discuss satisfaction with the tracker. Participants in FTMI also discussed motivation for change and self-selected goals during calls. WLC participants were advised to maintain current activity-related behaviors. Height was measured at baseline using a stadiometer, and body composition was assessed pre and post intervention via Inbody 720 Body Composition Analyzer (N=52). Group differences for weight, BMI, and body fat percent (BFP) were analyzed using ANOVA and effect size calculations (Cohen's d). RESULTS: There were no group differences in outcome measures at baseline. Following the intervention both treatment groups lost non-significant amounts of weight (p=0.33) while WLC

maintained their weight (FTMI: 88.5 ± 24.3 vs 87.7 ± 23.5, FT: 86.9 ± 17.2 vs 85.6 ± 16.3, WLC: 78.9 ± 15.8 vs 78.8 ± 15.4 kg). Effect size calculations demonstrated a moderate difference between both treatment groups and WLC for weight loss post-intervention (d=0.45, 0.43). Following the intervention both treatment groups also showed non-significant decreases in BMI and BFP compared to WLC (BMI p=0.48; BFP: p=0.51). Effect size calculations demonstrated a small difference for BFP between treatment groups post-intervention (d=0.19, 0.23), as well as small and moderate differences for BMI between the FTMI, FT, and WLC (d=0.21, 0.46). CONCLUSION: These preliminary data provide support for facilitated health coaching methods such as FTMI. Results show the independent use of a FT can also have small benefits. Additional work is needed to determine the optimal dose and intervention strategies for patients with LBP.

Keywords: Facilitated Health Coaching

Board 19

THE EFFECTS OF A DIETARY NUTRITIONAL SUPPLEMENT THAT IS CAFFEINE BASED WITH ADDITIONAL VITAMINS AND MINERALS ON COGNITIVE PERFORMANCE

Emily M. Post (The Ohio State University), William H. Dupont (The Ohio State University), Lydia K. Caldwell (The Ohio State University), Matthew K. Beeler (The Ohio State University), Vincent H. Hardesty (The Ohio State University), Jeff S. Volek (The Ohio State University) William J. Kraemer (The Ohio State University)

Abstract: Research has shown positive effects of caffeine on cognitive function. This study compared two caffeinated beverages without the deleterious ingredients that most caffeinated beverages contain. One contained caffeine only and the other contained additional vitamins and minerals shown to have positive effects on cognitive function. Purpose: Compare the effects of caffeine only and caffeine plus additional beneficial vitamins and minerals on cognitive function. Methods: This study used a within subject, randomized, balanced, single blinded design. Twenty participants, 18-35-year-old (25.6 ± 5.0 yrs, 170.9 ± 7.6 cm, 72.1 ± 12.4 lbs). Participants were tested using 3 treatments; caffeine + vitamins and minerals (CS), caffeine only (CO), placebo (PL) under each condition, normal and 50% sleep, for total of 6 visits. Participants performed cognitive tests measuring decision-making and reaction time. Results were analyzed using repeated measures ANOVA. Results: Normal sleep condition-Both CO and CS supplement were significantly different than PL with median correct latency (CO p=0.006, CS p=0.01), median positive response time (CO p=0.002, CS p=0.02), and median negative response time (CO p=0.02, CS p=0.01) reflecting better quick decision-making, but not significantly different from each other ($p \geq 0.05$). CO and CS supplement were significantly different than PL with latency correct response time indicating a better reaction time (CO p=0.02, CS p=0.02), but not significantly different from each other ($p \geq 0.05$). Deprived sleep condition-Both CO and CS supplement were significantly different than PL with median correct latency (CO p=0.008, CS p=0.030) indicating better decision-making, but not significantly different from each other ($p \geq 0.05$). CO and CS supplement were significantly different than PL with latency correct response time indicating a better reaction time (CO p=0.037, CS p=0.002), but not significantly different from each other ($p \geq 0.05$). Conclusions: Both CsS and CO showed similar significant positive effects on cognitive performance compared to the PL, especially during sleep deprived conditions. Therefore, the CS supplement may provide a healthier alternative without many of the ingredients that can have deleterious effects on cognitive function found in many of the caffeine supplement beverages available today.

Funding, in part, by Advocare International, L.P., Plano, TX

Keywords: nutrition, cognition, sleep deprivation

Board 20

ACUTE RESISTANCE EXERCISE EFFECTS ON BLOOD FLOW IN RESISTANCE-TRAINED VERSUS UNTRAINED INDIVIDUALS

Kathryn A. Geither (Kent State University), Jason C. Parks (Kent State University), Erica M. Marshall (Kent State University), Leslie Sensibello (Kent State University), Alaina Glasgow (Kent State University) Yu Lun Tai (Kent State University), J. Derek Kingsley, FACSM (Kent State University)

Abstract: Data suggests that an acute bout of resistance exercise (ARE) increases forearm blood flow (FBF) and vasodilatory capacity compared to rest. However, the effects of training status on FBF and vasodilatory capacity at rest and during recovery from ARE are unknown. PURPOSE: To compare the effects of resistance exercise training status on measures of vascular function at rest and during recovery from ARE. METHODS: Fifteen resistance-trained (RT) individuals, and seven untrained (UT) individuals, volunteered to participate. Measurements were taken after a 10min supine rest, as well as 20min after ARE, or after a control session. Venous occlusion plethysmography was used to measure FBF and vasodilatory capacity at rest and during recovery from ARE, with 5min of occlusion (220mmHg) to induce reactive hyperemia. Area under the curve (AUC) was utilized to determine differences in blood flow. The ARE consisted of 3 sets of 10 repetitions at 75% 1-repetition maximum (1RM) on the leg press, leg curl, leg extension, lat pulldown, and chest press, with 2min of rest between sets and exercises. A 2x2x2 repeated measures ANOVA was used to evaluate group (RT, UT) across two conditions (ARE, control) and across time (rest, recovery). If the ANOVA was significant, t-tests were used for post-hoc comparisons. RESULTS: Groups were similar ($p>0.05$) for age, height, and BMI, but not for weight (RT: 74.5+13.0 kg; UT: 61.9+10/8 kg, $p=0.038$). The 1RMs for chest press, leg curl, leg press, and lat pulldown were significantly different between groups ($p<0.05$), but not for leg extension ($p=0.257$). The total volume of exercise for the acute resistance exercise session was similar between groups ($p=0.102$). There were no significant ($p>0.05$) group differences at rest for FBF or vasodilatory capacity. There were no significant ($p>0.05$) 3-way interactions for FBF or vasodilatory capacity. There was a significant condition by time interaction for FBF (RT: rest: 3.63+1.30ml/100ml of tissue/min, recovery: 5.90+4.17ml/100ml of tissue/min; UT: rest 3.81+1.29ml/100ml of tissue/min, recovery 6.21+3.71ml/100ml of tissue/min; $p<0.001$) and AUC (RT: rest: 67.84+23.60units, recovery 97.86+63.86units; UT: rest: 56.57+21.32units, recovery: 85.17+39.25units; $p<0.001$). CONCLUSION: These data demonstrate that acute resistance exercise significantly increases forearm blood flow and vasodilatory capacity regardless of training status.

Keywords: reactive hyperemia, strength exercise, training status, vasodilatory capacity

Poster Session #4: Crown Foyer – 3:30-4:55pm

Board 1

BENCH PRESS WITH AND WITHOUT BLOOD FLOW RESTRICTION ON ENDOTHELIAL FUNCTION

Yu Lun Tai (Kent State University), Erica M. Marshall (Kent State University), Alaina Glasgow (Kent State University), J. Derek Kingsley, FACSM (Kent State University)

Abstract: Resistance exercise has been shown to improve endothelial function. However, resistance exercise with blood flow restriction (BFR) on endothelial function is unknown. PURPOSE: We sought to determine the difference between an acute bout of bench press with and without BFR on endothelial function. METHODS: Sixteen young (23±3 yrs old), resistance-trained men performed three counterbalanced sessions consisting of an acute bout of low-intensity bench press with BFR (LI-BFR), traditional high-intensity bench press without BFR (HI), and a quiet control (CON). The LI-BFR consisted of 4 sets of 30, 15, 15, and 15 repetitions at 30% 1-repetition maximum (1RM) with 30-sec rest between sets. Knee wraps were placed to induce BFR on both arms, and a rating of perceived pressure at 6-7 on a 10-point Visual Analog Scale was used to determine tension of the wrap. The HI consisted of 4 sets of 8 repetitions at 70% 1RM with 60-sec rest between sets. The CON consisted of supine rest for 10 min. Forearm blood flow and peak blood flow were assessed using venous occlusion plethysmography. Area under the curve was used to determine total reactive hyperemia. A two-way ANOVA was used to compare the effects of condition (LI-BFR, HI, CON) across time (rest and recovery). RESULTS: There was a significant time-by-condition interaction for forearm blood flow (LI-BFR, rest: 3.21±1.50 ml/100ml/min, recovery: 7.13±4.28 ml/100ml/min; HI, rest: 3.73±1.79 ml/100ml/min, recovery: 6.09±2.25 ml/100ml/min; p≤0.001) such that it was augmented compared to rest and CON (2.66±1.85 ml/100ml/min). There was also a significant time-by-condition interaction for area under the curve (LI-BFR, rest: 73.3±31.7 AU, recovery:118.9±46.4 AU; HI, rest: 83.8±23.8 AU, recovery: 132.7±54.1 AU; p≤0.001) after LI-BFR and HI such that it was elevated above rest and the CON (70.4±40.9 AU). However, there was no time-by-condition interaction for peak blood flow. CONCLUSION: These data suggest that LI-BFR and HI significantly increased forearm blood flow and reactive hyperemia-induced blood flow in a similar fashion without any change in peak blood flow. In turn, this indicates that an acute bout of LI-BFR or HI increases vasodilatory capacity and arterial distensibility in a similar fashion.

Keywords: resistance exercise, reactive hyperemia, vasodilatory capacity, arterial distensibility

Board 2

MATCH-PLAY ANALYSIS OF PHYSIOLOGICAL AND MOVEMENT VARIABLES IN MEN'S AND WOMEN'S DIVISION I SOCCER PLAYERS

Ashley N. Triplett (Michigan State University), Michael Vorkapich (Michigan State University), James M. Pivarnik, FACSM (Michigan State University)

Abstract: The use of HR monitoring, accelerometers, and GPS tracking have become popular tools to quantify activity intensity during soccer matches. Limited research has examined differences between men and women collegiate players using these tracking modalities. PURPOSE: To quantify the activity profile of Division I collegiate soccer players during games using HR response and GPS and to examine differences based on gender and position. METHODS: A team heart rate monitoring system was used to evaluate in-game HR response and quantify match-play movement patterns of 21 men and 21 women NCAA Division I soccer players who played >70minutes in each of three games. Players were divided into three groups based on position (defender, midfielder, forward). Percentage of playing time spent above 80% of HR maximum and average %HRmax was calculated. Total distance/playing time and number of sprints above sprint threshold (men: accelerations >2.8m/s2, women: accelerations >2.4m/s2) were also calculated. ANOVA and student's t-test were used to determine differences. RESULTS: Forwards and midfielders had significantly greater distance/playing time than defenders (forwards: 115.2m/min, midfielders: 115.9m/min, defenders: 102.8m/min) ($p<0.05$). No difference was observed in average %HRmax or percentage of game >80% of HRmax. Forwards had significantly more sprints/min than defenders (forwards: 0.37sprints/min, defenders:

0.26sprints/min). No difference was observed in average %HRmax (men: 85.9%HRmax, women: 87.9%HRmax) or percentage of game >80% of HRmax (men: 82.5%, women: 89.9%) between genders. Men had a greater average distance/playing time than women (men: 115.3m/min, women: 107.3m/min) ($p<0.05$). Men had a significantly lower number of average sprints/min above threshold than women (men: 0.20/min, women: 0.43/min) ($p<0.05$). DISCUSSION: HR data illustrate that elite level soccer is a highly aerobic sport. Differences in distance/playing time and sprints based on position may be explained by positional requirements, with more constant movement required for midfielders and explosiveness for forwards. Men's soccer moves at a faster pace, explaining the difference in distance/playing time by gender; however, relative activity intensity was similar between positions and gender according to %HRmax values. The difference in number of game sprints between men and women may be at least partially related to the threshold differences determined by the GPS system.

Keywords: Heart Rate, Sport, GPS

Board 3

TENNIS COACHES' OVERCONFIDENCE IN NUTRITION KNOWLEDGE

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Abstract: The literature reports that a variety of sports coaches lack knowledge of appropriate weight loss, macronutrient intake, and disordered eating (DE). Yet, both college and high school coaches continue to disseminate inaccurate nutrition and weight loss counsel to their respective athletes who are often equally unknowledgeable. Further, there is little research that focuses on coaches of a specific sport (e.g. tennis). PURPOSE: To assess the confidence level of Indiana high school tennis coaches' nutrition knowledge for 2014-2016. METHODS: Adapted from Turk et al.'s survey, the Nutrition and Eating Disorders in Tennis Survey ("NETS") was created and validity tested through an expert panel before a pilot study. Organized in 5 Domains (e.g. Macronutrients), NETS included a "Confidence in Answer" question after each response using a 4-point Likert scale (1 = Not At All Sure, 2 = Not Very Sure, 3= Somewhat Sure, 4 = Very Sure). NETS was electronically delivered to 338 tennis coaches' email addresses in the Indiana High School Athletic Association (IHSAA) directory. Mean knowledge and confidence scores were calculated for each question. RESULTS: Seventy-nine coaches (male = 61, female = 18) ages 24 to 71 (M = 43.97, SD = 11.97) completed every question, which corresponds to a 23% rate of return or 90% statistical power. The mean total score was 70.6% (SD = 10.9%), falling below the 80% criterion for a competent level of knowledge along with a mean confidence score of 2.85 (SD = 0.11). The lowest mean domain (Macronutrients) score was 57.0% (SD = 12.4%) with mean confidence score of 3.09 (SD = .20). CONCLUSION: Results revealed that the coaches had high confidence in Domain 1 (Macronutrients), 3 (DE Etiology) and 5 (DE Treatment). Our findings suggest that these coaches are overconfident since overall knowledge scores fell below the criterion (80%) for adequate knowledge while concurrently having high confidence. One can infer that such overconfidence can lead these coaches to dole out misinformation. This phenomenon of overconfidence warrants additional research in other sports coaches as misinformation is a primary precursor to DE.

Keywords: Disordered Eating, Misinformation, Coach, Survey

Board 4

EFFECTS OF CUFF PRESSURE ON BLOOD FLOW DURING EXERCISE WITH BLOOD FLOW RESTRICTION

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Abstract: Exercise with blood flow restriction (BFR) is emerging as an effective modality for improving muscular function in clinical and athletic populations. Cuff pressure is critical because it affects the occlusion stimulus (i.e., metabolic stress) and safety of the participant. Investigators have measured how cuff pressure influences blood flow before and after exercise with BFR. It is unclear if these findings can be applied during exercise with BFR. Purpose: We evaluated changes in arterial blood flow, tissue oxygen saturation, and cardiovascular responses before, during, and after exercise with BFR across a range of cuff pressures. Methods: Ten males performed rhythmic handgrip exercise (30 contractions, 30% MVC) under five cuff pressures (0%, 60%, 80%, 100%, 120% of limb occlusion pressure (LOP)). Forearm blood flow, tissue oxygen saturation, and mean arterial pressure were measured. Results: Before exercise blood flow decreased with increased pressure in a nonlinear fashion (0% > 60% ≈ 80% > 100% ≈ 120%). With 60% and 80% LOP blood flow increased during exercise, and decreased post-exercise (pre-exercise = 48, 30 mL/min; exercise = 107, 68 mL/min; post-exercise = 65, 42 mL/min respectively; all $p<0.05$). Blood flow in the 100% and 120% LOP was minimal (< 10 ml/min). Compared to 0% LOP, relative blood flow for 60% and 80% LOP was reduced by 22-47% at rest, 22-48% during exercise, and 52-71% after exercise. Tissue saturation index decreased as pressure increased during exercise with BFR (0% = 65.78%; 60% = 58.65%; 80% = 56.25%; 100% = 52%; 120 = 48%; all $p<0.05$). Mean arterial pressure increased as a result of exercise ($p<0.01$) however cardiac output, mean arterial pressure and heart rate did not differ across cuff pressures. Conclusion: Results indicated that blood flow, tissue oxygen saturation, and cardiovascular responses change as a result of both exercise and cuff pressure. Moderate cuff pressures (60-80% LOP) increased metabolic stress without completely occluding blood flow during exercise. Results have implications for implementing exercise with BFR.

Keywords: vascular occlusion, Kaatsu, rhythmic handgrip exercise, arterial blood flow

Board 5

A SUGAR-FREE CAFFEINE BASED NUTRITIONAL SUPPLEMENT IMPROVES REACTION TIME TEST PERFORMANCE BETTER THAN CAFFEINE ALONE

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Abstract: Energy supplements that claim to improve performance saturate the market. However, many of these products are rife with sugar and excess levels of caffeine. Research abounds showing that caffeine has pronounced acute effects on measures of performance. However, doses of ~3-6 mg·kgBM-1 are typically needed to see these acute effects. Little research has been done to show if a lower dose of caffeine with neuroactive amino acids in a nutritional supplement (CS) can have similar or better effects on performance without the added sugar or excess caffeine. PURPOSE: To determine if a sugar-free CS with a normal dose of caffeine (120mg), the same dose of caffeine alone (CO), or a placebo (P) can improve reaction time (RT) between normal (NS) and 50% sleep (50S) conditions. METHODS: 10 men and 10 women (27 ± 5.52, 24.3 ± 4.3 years) volunteered for this study. Subjects were randomized and balanced to first receive the CS, CO, or P

in a NS or 50S condition. Each visit, subjects were checked for sleep condition adherence and hydration status. Subjects ingested their condition using similar tasting supplements with 8oz of water in an opaque container before testing. Six trials of 40 touches (3 normal, 3 reversed) with the lower body as fast as possible utilizing a QuickBoard were done. 3x2x2 mixed ANOVA was utilized to determine differences between supplement, sex, and sleep condition. RESULTS: The CS was significantly better than P in minimum RT normal and maximum RT reversed (mean RT: 0.59 to 0.62 seconds, 1.5 to 1.7, $p<.05$). A main effect for supplement was found for average reaction time and total reaction time normal and flipped, and total time flipped, with both CS and CO showing significant pairwise comparisons to P in these variables with no significant interaction between supplement and sex or sleep. CONCLUSIONS: In two variables, CS showed improvements over P with no improvement seen in CO. With four variables showing CS and CO having similar significant improvements over P, it appears that CS, with its neuroactive amino acids, may be as effective or slightly better for improving reaction time variables than CO.

This research was supported by a grant from AdvoCare International L.P.

Keywords: Energy, Focus, Cognition

Board 6

OBJECTIVE PHYSICAL ACTIVITY LEVELS IN YOUTH WITH OBESITY DURING CLINICAL PEDIATRIC WEIGHT MANAGEMENT

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Abstract: Few studies have objectively evaluated physical activity (PA) among youth with obesity during pediatric weight management (PWM). PURPOSE: The current study assessed PA among patients engaged in active clinical PWM that included a PA-based treatment arm. METHODS: Participants 5-16 years old with obesity participated in multidisciplinary PWM with a family-centered PA treatment arm led by the PWM clinical exercise physiologist (CHAMPS). Classes were held twice a week for 14 weeks, and included interactive wellness education and structured exercise sessions with a goal of helping patients achieve 60 min/d of moderate- to vigorous-intensity PA (MVPA). Participants wore a SenseWear Armband (BodyMedia Inc, USA) for seven consecutive days to assess PA during CHAMPS classes and throughout the week. Activity intensities were categorized as sedentary (SED: 0-3 METs), moderate (MPA: 3-6 METs), vigorous (VPA: 6-9 METs), and very vigorous (VVPA: ≥9 METs). RESULTS: A total of 41 youth (12.0±2.6 years) wore the armband during at least one of the two CHAMPS classes and 28 (68%) met the 8-hour wear time requirement. PA during CHAMPS included 47.4±16.6 min of MPA, 7.2±7.1 min of VPA, and 0.4±1.0 min of VVPA per session. Participants were at least moderately active during 65% of class time such that 41% and 75% of CHAMPS participants exceeded 60 min and 45 min of MVPA per class, respectively. Throughout the week, participants engaged in 106.2±64.1 min/d of MPA, 5.1±5.3 min/d of VPA, and 0.6±0.8 min/d of VVPA, and 71% achieved ≥60 min/d of MVPA. During CHAMPS classes, SED, MPA, VPA, and VVPA did not differ by age, sex, or ethnicity. During the week, SED was lower ($p=0.031$) and VPA was higher ($p=0.013$) among Hispanic vs. non-Hispanic participants, and MPA was higher in children ≤11years vs. >11 years ($p=0.035$). CONCLUSIONS: CHAMPS participants engaged in relatively high amounts of primarily MPA during class and throughout the week, on average, resulting in most achieving recommended MVPA levels. CHAMPS provides an opportunity for participants to achieve recommended activity levels and model these behaviors for other patients and families.

Keywords: exercise, class, treatment, wellness

Board 7

ANALYSIS OF GROUND REACTION FORCES OF VARIOUS JUMP TECHNIQUES

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Abstract: Jumping frequently occurs in many sports. Jumping is usually preceded by a quick eccentric action which increases the ground reaction forces (GRF), likely determining the magnitude of stimulation of the stretch-shortening cycle (SSC). However, the specific jumping strategy used may dictate the magnitude of overload during the eccentric phase, and thus jump performance. PURPOSE: This study was designed to investigate the peak take-off ground reaction forces (GRF) of a variety of jumping strategies. METHODS: Twelve women and twelve men (mean ± SD; age = 22 ± 3.3 yr; body mass = 81.45 ± 12.33 kg; height = 180.31 ± 8.24 cm) volunteered for this study and provided informed consent. This study was approved by the Institutional Review Board. Subjects participated in a standardized warm-up and were taught correct performance of five jumping strategies including the power step jump (PS), jump stop (JS), left-leg running jump (LL), right-leg running jump (RL), and the traditional countermovement jump (CMJ). Subjects were then tested and performed two trials of each exercise in a randomized order. Ground reaction forces were assessed via force platform. A repeated measures ANOVA was used to determine differences in GRF of the test exercises. Intraclass correlation coefficient (ICC) was used to assess trial-to-trial reliability between dependent variables. RESULTS: Significant main effects for GRF were found between exercises ($p \leq 0.001$, $\eta 2 = .97$, $d = 1.00$). Bonferroni pairwise comparisons showed significant differences ($p \leq 0.05$) between all test exercises. The JS displayed 1.62 times higher GRF compared to CMJ. The LL and RL produced 1.33 and 1.44 times higher GRF compared to CMJ, respectively. The PS demonstrated 1.12 times higher GRF compared to CMJ. CONCLUSION: This study shows substantial differences in take-off GRF between various jumping techniques. This finding likely explains why athletes can jump higher during running and power step jumps, compared to the stationary CMJ. Practitioners seeking to maximize jump height should consider prescribing jumps with high take-off GRF. Academicians may use this information to teach students about different jumping strategies and the kinetics associated with each.

Keywords: specificity, stretch-shortening cycle, force platform, unilateral

Board 8

THE NEGATIVE IMPACT OF BODY FATNESS ON CARDIORESPIRATORY FITNESS IN PERSONS WITH MULTIPLE SCLEROSIS

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Abstract: Multiple sclerosis (MS) is a disorder of the central nervous system that leads to demyelination and axonal loss overtime as well as sustained disability. Studies conducted in large samples of persons with MS (pwMS), estimates a combined prevalence of overweight (body mass index; BMI ≥ 25kg/m2) and obesity (BMI ≥ 30 kg/m2) ranging from approximately 50 to 65 percent. This is a concern as this measure appears to be strongly correlated with various adverse health outcomes. Excess body fat may have negative implications in health-related fitness and consequently in participation in this population. However, little is known about the

impact of body fatness on physical fitness in pwMS. PURPOSE: To examine the impact of body fatness on cardiorespiratory fitness (CRF) in pwMS with similar levels of disability. METHODS: This study involved a secondary data analysis and interpretation from a previous work where 62 pwMS were evaluated. For the purpose of this study participants were separated in three different groups based on established BMI categories (i.e., normal, overweight, obese). BMI was used as an indirect measure of body fatness and CRF was measured using peak oxygen consumption (i.e., VO2peak). ANCOVA controlling for age, sex, and disease duration was conducted to determine differences between groups of different BMI categories on CRF with significance set as $p < .05$. RESULTS: CRF of the entire sample was found to be 19.5 (7.2) mL.kg.min with a significant difference between groups of BMI categories; $F(2, 56) = 4.44$; $p = 0.016$. Subsequent analysis demonstrated that the average CRF level of the normal (20.9 [7.8] mL.Kg.min) and overweight (20.4 [10.2] mL.Kg.min) group were significantly higher ($p < .05$) compared to the obese group (16.0 [10.2] mL.Kg.min). CONCLUSION: The findings suggest that body fatness (i.e., BMI) has a negative impact on CRF in pwMS with similar levels of disability, with a marked difference for those classified as obese. This is important as low CRF and increased body fatness are important risk factors for developing cardiovascular diseases and the potential devastating impact of co-morbidities in this population.

Keywords: Aerobic Fitness, Body Fatness, Neurological Disease

Board 9

FUEL UTILIZATION AND COST OF TREADMILL WALKING WITH BLOOD FLOW RESTRICTION

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Abstract: The amount of energy (VO2 L/min) and choice of substrate (carbohydrate (CHO) vs fat) utilized during the stress of a single bout of exercise is a reflection of physiological work completed. A novel application to “traditional” exercise, blood flow restricted exercise (BFR) has been explored as a means to increase physiological stress placed on the body. PURPOSE: to compare energy expenditure and type of fuel utilization in “traditional” (CON) versus BFR treadmill walking at the same mechanical exercise workload. METHODS: 12 healthy individuals, seven men and five women (age 23±3yrs; BMI 25.75±5.25 kg/m2) performed two bouts of treadmill walking (BFR & CON) at 3mph with a 2% grade for 15 minutes. The trials were in random order and at least 24 hours apart. During exercise, ventilatory variables (VO2 & VCO2) were monitored to determine energy expenditure and relative (RER) and absolute (g/min) CHO/fat utilization. All data are reported as mean±stdev and 2×2 RM-ANOVAs were performed on steady state data between trials (BFR & CON) and across two time segments (1st & 2nd) within each trial. Significance was accepted at 0.05. RESULTS: in this pilot project, the data were compiled and is presented independent of gender. There were no interactions between or within trials. However, in the BFR trial energy expenditure (1.36±0.43 vs 1.03±0.22 L/min), RER (0.88±0.01 vs 0.82±0.03), and CHO utilized (1.41±0.10 vs 0.92±0.08 g/min) were significantly greater than CON, and fat utilization (0.26±0.13 vs 0.49±0.09g/min) was lesser in BFR than CON. In addition, subjects took more time at the beginning of exercise to achieve steady state (250.11±52.31 vs 176.44±70.31sec) in BFR than CON trial. CONCLUSION: according to this pilot data, there was a significant increase in physiological stress when completing BFR vs CON treadmill walking and greater CHO/lesser fat utilized.

Keywords: kaatsu, blood flow restriction, fuel utilization, energy expenditure

Board 10

THREE-YEAR TRACKING OF MODERATE-TO-VIGOROUS PHYSICAL ACTIVITY DURING STRUCTURED AND UNSTRUCTURED PLAY IN YOUTH

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Abstract: Tracking is the maintenance of a relative position within a group over time. Previous studies indicate that habitual, moderate-to-vigorous physical activity (MVPA) tracks at low to moderate levels in youth, but there is limited research on tracking of other forms of MVPA, such as during structured and unstructured play. PURPOSE: To characterize tracking of MVPA in youth across four time points during a three-year period for both structured and unstructured play. METHODS: Youth (N=108), 58.3% female and 41.7% male, 6-15 years old, visited the laboratory four times over three years. Approximately one third of participants were overweight or obese. During each visit, participants engaged in 30 minutes each of structured and unstructured play. Height and weight were measured, and youth wore a uniaxial accelerometer on an elastic belt over their right hip (data collected in 1-second epochs). MVPA minutes were determined using Evenson cut-points (≥574 counts/15-sec). Tracking of MVPA minutes was evaluated using tracking coefficients between each pair of time points [classified as low ($r<0.30$), moderate ($r=0.30$-0.60), or moderately high ($r>0.60$)] and intra-class correlations (ICC) via ANOVA. This provided an overall correlation across the four time points [classified as poor ($ICC<0.50$), moderate ($ICC=0.50$-0.75), good ($ICC=0.75$-0.90), or excellent ($ICC>0.90$)]. Participants were classified into quartiles of MVPA for each visit, and percent agreement and weighted kappa [classified as poor ($\kappa \leq 0.20$), fair ($\kappa=0.21$–0.40), moderate ($\kappa=0.41$–0.60), good ($\kappa=0.61$–0.80), or very good ($\kappa=0.81$–1.0)] were calculated. RESULTS: Tracking coefficients were non-significant to moderate for structured play ($r=-0.20$-0.30) and moderate to moderately high for unstructured play ($r=0.38$-0.66, p's<0.05). The ICC was classified as poor (0.42) for structured play and excellent (0.80) for unstructured play ($p<0.05$). Percent agreement ranged from 24.0-36.6% for structured play and 30.1-44.3% for unstructured play. Weighted kappa for structured play ranged from non-significant to poor (-0.09-0.19), but was fair to moderate (0.24-0.49, p's<0.05) for unstructured play. CONCLUSION: We found evidence of low to moderate tracking for participation in MVPA during structured and unstructured play. Results are similar to previous studies on habitual MVPA, suggesting that MVPA during structured and unstructured play tracks similarly to habitual physical activity in youth.

Keywords: Adolescents, Accelerometery, Children, Longitudinal

Board 11

KINETIC ASSESSMENT OF WALL PUSH-UPS

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Abstract: Push-up variations, such as wall push-ups may be useful for those with limited strength or undergoing rehabilitation. The physical demands associated with wall push-ups has not been investigated. PURPOSE: This study analyzed the kinetics of conventional push-ups as well as wall push-ups. METHODS: Eleven men (age = 47.18 ± 15.92 years) participated in this study. Subjects provided written informed consent prior to the study, which was approved by the Institutional Review Board. Subjects performed three push-up

conditions: the conventional push-up (CPU), and wall push-ups at an absolute angle of 60 degrees (WPU60) and 75 degrees (WPU75). Conventional push-ups and WPU60 and WPU75 were performed on a floor mounted force platform and a wall mounted force platform, respectively (Accupower, Advanced Mechanical Technology, Inc. Watertown, MA, USA). Ground reaction force (GRF) was determined for each push-up condition. Test exercises were randomized and a metronome was used to control repetition velocity, which was one second for each eccentric and concentric phase. Subjects performed three repetitions in each test condition. Each subject rested one minute between test exercises. A repeated measures ANOVA was used to assess the differences in subject GRF across all push-up conditions. A Bonferroni post-hoc analysis was used to identify specific differences between test exercises. The trial-to-trial reliability of each dependent variable was determined using average measures intraclass correlation coefficients. RESULTS: Significant differences in GRF were found for the test exercises ($p \leq 0.001$, $r2 = .92$, $d = 1.00$). Post hoc analysis showed that GRF was higher during CPU compared to both wall mounted push-up conditions ($p \leq 0.01$). A significant difference in GRF was also found between the WPU60 and the WPU75 ($p = 0.043$). Intraclass correlation coefficient for GRF in all conditions was .99. CONCLUSION: This study shows that the WPU60 produces 2.56 times less GRF than the CPU, and the WPU75 produces 2.65 times less GRF than the CPU. When comparing the wall push-ups with each other, the WPU75 produces 1.04 times less GRF than the WPU60. Thus, wall push-ups may be a better exercise for those with limited strength or those who are undergoing rehabilitation, though wall mounted push-ups at different absolute angles produced only minor kinetic differences.

Keywords: Ground reaction force, body weight exercise

Board 12

ALTERING PHYSICAL ACTIVIITY INFLUENCES INSULIN RESPONSES TO GLUCOSE INGESTION

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Abstract Short-term (i.e., 3-7 days) alterations in physical activity (PA) influence insulin sensitivity. Purpose: We determined if varying the level of PA the day prior to an oral glucose tolerance test (OGTT) differentially influenced postprandial glucose and insulin kinetics. Methods: Fifteen young, healthy adults participated in three OGTT trials the morning after performing 50% (LOW), 100% (HABITUAL), or 150% (HIGH) of their habitual PA. Habitual PA (7-day average: 12,900±914 steps·day-1) was determined by pedometry. Pedometers and accelerometers were worn the day prior to each OGTT trial to determine steps and PA intensity, respectively, for the LOW, HABITUAL, and HIGH conditions. Trials were separated by at least 1 wk and subjects were asked to follow a similar diet the day prior to each OGTT. For each OGTT trial, glucose and insulin were measured after an overnight fast and at 30 min intervals for 2 hours following ingestion of the glucose beverage (1 g·kg-1 body mass). Between trial differences for these variables were analyzed using a general linear model with repeated measures. Significance was set to $p \leq 0.05$. Results: Subjects successfully achieved the desired percentage of habitual steps prior to each trial: LOW: 51±5%, HABITUAL: 99±6%, and HIGH: 149±9%. Fasting plasma glucose and glucose area under the curve (AUC) did not differ between trials. Insulin AUC (50%: 5,866±1336 µIU·min·ml-1; 100%: 5,306±1,336 µIU·min·ml-1; 150%: 4,918±1,265 µIU·min·ml-1) was significantly lower ($p<0.05$) following the HIGH compared to LOW trial. Conclusions: These data suggest that varying the physical activity level (from 50 to 150% of habitual activity) the day prior to an OGTT does not influence the blood glucose response to an OGTT, but improves insulin sensitivity in healthy, young adults

Keywords: Physical Activity, glucose tolerance, insulin sensitivity

Board 13

INFLUENCE OF PHYSICAL ACTIVITY ON CLASSROOM BEHAVIOR OF CHILDREN WITH ADHD AND/OR DISRUPTIVE BEHAVIOR DISORDER USING OBJECTIVELY-MEASURED CLASSROOM OBSERVATION

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Abstract: Evidence suggests that physical activity influences children's neurocognitive function and ADHD symptoms. ADHD and Disruptive Behavior Disorder (DBD) are highly comorbid. Extra-curricular physical activity programs may improve academic achievement in ADHD and DBD by increasing engagement during instruction to levels closer to those of typically developing peers. However, few studies have tested the impact of physical activity on objectively-measured classroom behavior in children with ADHD and/or DBD. PURPOSE: To evaluate the impact of physical activity on objectively measured classroom behavior ADHD and/or DBD. METHODS: African American children with ADHD and/or DBD were randomized to a 10-week after-school physical activity program (n=19) or a sedentary control program (n=16). 58% of children were overweight or obese and only 18% had ever received mental health services despite 87% meeting positive or intermediate criteria for ADHD and/or DBD. At posttest, 3 systematic classroom observations were conducted for each student using the BOSS (Shapiro, 2004). For comparison, each BOSS observation also assesses behavior among non-participant classroom peers. ANOVA tested differences in academic engagement and off-task motor (OFT-M) and verbal (OFT-V) behaviors among the physical activity group, control group, and classroom peers. Bivariate correlations tested relationships between program attendance and classroom behavior. RESULTS: Omnibus tests revealed differences in OFT-M ($F[2,23]=16.9$, $p<.001$) and a trend for academic engagement ($F[2,23]=2.6$, $p=.09$). Pairwise comparisons revealed that the physical activity and control groups evidenced 52% and 49% more OFT-M (ps<.01), 34% and 33% more OFT-V (ns), and 11% and 15% less academic engagement (ns) than classroom peers. No differences were evident between intervention groups. Large non-significant correlations were found between program attendance and academic engagement in both physical activity ($r=.45$, $p=.08$) and control ($r=.45$, $p=.11$) groups. CONCLUSION: Neither after-school program improved classroom behavior of children with ADHD and/or DBD to levels of classroom peers. Extra-curricular physical activity programs will require greater intentionality to impact classroom behavior in this population.

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Keywords: Academic Achievement, Neurocognitive Function, Extra-Curricular, Randomized

Board 14

DIFFERENCES IN CVD RISK FACTOR STATUS AND MICRONUTRIENT INTAKE LEVELS BY PHYSICAL ACTIVITY LEVEL IN 5TH GRADERS

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Abstract: Physical inactivity is an established independent CVD risk factor. In adolescents there are few reports

on the influence of self-reported moderate to vigorous physical activity (MVPA) levels with multiple CVD risk factors, or with micronutrient intakes that contribute to cardiovascular health. PURPOSE: To determine if highly active youth have a better CVD risk factor status and higher intakes of micronutrients linked to cardiovascular health, compared to less active youth. METHODS: A cross-sectional analysis of data from 5th grade students (N=947, 11 +/- 0.5 y; 58.2% females; 58.4% white) was undertaken. Trained research assistants collected height, weight, percent body fat (%BF) via bioelectrical impedance, resting blood pressure (SBP,DBP,MAP), and non-fasting blood samples by finger prick for total cholesterol (TC), low density lipoprotein (LDL), high-density lipoprotein cholesterol (HDL-C) and TC:HDL levels. The micronutrient intakes were derived from the Block Kids Food Frequency Questionnaire. The number of days/week of ≥60 min of MVPA was used to determine PA groups by median split (High PA≥5days, Low PA<5days). One-way ANCOVAs were used to determine if CVD risk factors and micronutrients differed between High- and Low- PA groups, when controlling for age and gender. RESULTS: High PA adolescents had lower %BF (23.1 vs. 25.3, $F(1,926)=14.98$, $p<0.05$) and higher HDL-C (49.7 vs. 46.5, $F(1,667)=9.12$, $p<0.05$) compared to Low PA, with no differences in TC, TC:HDL, or BP measures. For micronutrients (nutrient amount/total kcals), High PA adolescents reported higher intakes of potassium ($F(1,890)=19.98$, $p<0.05$), magnesium ($F(1,890)=26.27$, $p<0.05$) vitamin A ($F(1,890)=5.04$, $p<0.05$), vitamin C ($F(1,890)=12.37$, $p<0.05$), vitamin E ($F=(1,890)=6.64$, $p<0.05$), and lower sodium ($F(1,890)=4.19$, $p<0.05$) compared to Low PA, with no differences in calcium or vitamin D. CONCLUSIONS: High PA youth had better CVD risk factor status compared to Low PA. This parallels previous research findings in PA interventions in youth. It should be noted that the micronutrients may also have contributed to better CVD risk status. Our finding that High PA youth reported higher intakes of several cardioprotective micronutrients has been reported in youth athletes, but not the general population.

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Keywords: cardiovascular disease, dietary behaviors, youth

Board 15

IMPACT OF SITTING ON A STABILITY BALL ON METABOLISM AND VASCULAR RESISTANCE DURING ARM ERGOMETRY

Charles R.C. Marks (Oakland University), Jennifer Duggan (Oakland University), Allison Cole (Oakland University), Emmanuel Jianis (Oakland University), Cecelia Goulette (Oakland University)

Abstract: Past studies demonstrated that sitting on a stability ball (SB) elevates submaximal VO2 without affecting heart rate during arm ergometry when compared to sitting on a chair (C). However, no reports have been made to determine if nutrient metabolism or vascular resistance (VR) are also affected. PURPOSE: To determine if sitting on a SB affects fat and carbohydrate metabolism and vascular resistance during arm ergometry when compared to C. METHODS: Twenty-nine young adults underwent two stages of submaximal arm ergometry under two conditions (order randomized): sitting on a SB or sitting on a C. VO2 and VCO2 were recorded after the third minute of each stage and used to determine fat g/min (FAT) and carbohydrate g/min (CHO). Cardiac Output (Q) was assessed by CO2 rebreathing and was measured immediately after the VO2 and VO2 recordings. Blood Pressure (BP) was measured following the Q. BP was used for calculating mean arterial pressure (MAP) and then MAP and Q used for calculating VR. Repeated Measures ANOVA was used to determine sitting mode effects (alpha = 0.05). RESULTS: There were no significant sitting mode effects for VR ($P = 0.334$) and CHO ($P = 0.120$). However, there was a significant sitting mode effect for FAT. FAT was 24% to

36% higher on the SB (Stage 1: 0.114 +/- 0.112 g/min; Stage 2: 0.059 +/- 0.075 g/min) than on C (Stage 1: 0.087 +/- 0.102 g/min; Stage 2: 0.038 +/- 0.013 g/min). CONCLUSION: When compared to sitting on a C, exercising on a SB during arm ergometry can elevate fat metabolism without affecting carbohydrate metabolism or vascular resistance.

Supported in part by an Oakland University Honors College Grant

Keywords: Fat Metabolism, Cardiovascular, Swiss Ball, Aerobic Arm Exercise

Board 16

THE EFFECT OF CONTRALATERAL, IPSILATERAL, AND BILATERAL EXERCISE PROTOCOLS ON CORE STABILITY IN HEALTHY ADULTS

Vered Arbel (University of Illinois – Chicago), Charles B. Walter (University of Illinois – Chicago), Kari L. Hamstra-Wright (University of Illinois – Chicago), John E. Coumbe-Lilley (University of Illinois – Chicago), Tal Amasay (Barry University)

Abstract: Core Stability training has been widely used in a variety of settings to enhance athletic performance, prevention of injuries, and rehabilitation. However, there is no evidence of the influence of Contralateral and Ipsilateral exercise protocols on core stability. PURPOSE: To observe the effect of eight weeks Contralateral, Ipsilateral, and Bilateral exercise protocol interventions on core stability test scores. METHODS: Twenty-two healthy female students, age 18-30 yrs. old participated in the study. Subjects were randomly divided into three intervention groups. Group A, Contralateral and Ipsilateral (N=8), Group B, Bilateral (N=6), and Group C, Control (N=8). All groups completed pre- and post-testing for core stability. The core stability testing included the Prone Bridge, Lateral Bridge, Torso Flexor, and Torso Extensor. Subjects in Groups A and B participated in an eight week exercise intervention of 55 minutes twice a week. Participants in Group C did not receive an intervention. The mean differences between groups were compared using ANOVA, with significant level of □<0.05. RESULTS: Significant main effect (p-value=0.021) was found in the Torso Extensor test. The Tukey post-hoc revealed that Group B surpassed Group A by 52 seconds. No significant main effects were found in the Torso Flexor (p=0.549), Prone Bridge (p=0.261), Right Side Bridge (p=0.138), and Left Side Bridge (p=0.061) tests. Although not significant, these results have shown that Group B had improved more than Group C in all tests; whereas Group A had improved more than Group C in most. CONCLUSION: This study suggests that Contralateral, Ipsilateral, and Bilateral exercise protocols may improve core stability in healthy female adults. The Bilateral protocol performed better in the Torso Extensor test than the Contralateral and Ipsilateral protocol. These results may be related to specificity of the movement. Future research is needed to develop a better understanding of the influence of Contralateral and Ipsilateral exercise protocols versus Bilateral exercise protocols, in order to develop specific training programs for a variety of populations such as older adults, athletes and those in a rehabilitative setting. This future research should consider a longer intervention time, progressive exercise protocols, and a larger size sample.

Keywords: Women, Muscular endurance, Neuromuscular control

Board 17

WEARING SPORTS KNEE BRACES AND SLEEVES DURING DROP JUMPS DOES NOT REDUCE ANTERIOR CRUCIAL LIGAMENT FORCE

Jeheon Moon (Western Michigan University), Hyeyoung Kim (Korea National Sport University), Sangwoo Lee (Western Michigan University), Siddhartha B. Panday (Seoul National University), Jusung Lee (Kangwon National University)

Abstract: Wearing knee braces to reduce anterior cruciate ligament (ACL) force is investigated primarily in clinical evaluations and applied to sports motions. PURPOSE: This study aims to evaluate the effect of wearing commercialized sports knee braces and sleeves on knee biomechanics and jumping height during drop jumps. We hypothesized that wearing sports knee braces and sleeves would change knee kinematics and kinetics, ACL force, and jumping height. METHODS: 19 male alpine skiers (22.7 ± 0.3 years of age, 1.75 ± 0.04 m in height, 71.6 ± 5.53 kg in mass) with no knee injuries participated in this study. The participants performed 5 trials of drop jumps from a 40-cm box under three conditions (without braces, with braces, and with sleeves). A 3-dimensional motion analysis was conducted to calculate jumping height, knee joint angles, knee shear forces, knee joint moments, and a musculoskeletal modeling was used to compute ACL force, respectively. To verify the differences in dependent variables (without braces, with braces, and with sleeves), a one-way repeated-measures multivariate analysis of variance (MANOVA) was conducted. And a paired t-test was performed as a post-hoc test. RESULTS: No statistically significant difference in the jump height among the three conditions. In the landing phase, the maximum abduction angle of the knee joint with braces was statistically lower than that without braces and with sleeves (without: 7.05 ± 4.97°, brace: 2.95 ± 2.12°, sleeve: 4.84 ± 2.63°). The maximum adduction moment of the knee joint with braces was statistically lower than that without braces and with sleeves (without: 33.8 ± 16.7 Nm, brace: 17.9 ± 7.8 Nm, sleeve: 26.6 ± 10.6 Nm). However, jumping height, maximum internal rotation angle, shear force, internal rotation moment, and ACL force exhibited no statistical differences. CONCLUSION: The knee braces and sleeves worn by alpine skiers reduced the knee joint flexion, abduction movements, and adduction moments; however, shear force, internal rotation moment, and ACL force was not reduced. Therefore, sports knee braces that could control the knee joint's shear force and internal rotation moment must be developed.

This research was supported by the Sports Science Convergence Technology Development Program of the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT, and Future Planning (NRF-2014M3C1B1034027)

Keywords: Biomechanics, Musculoskeletal modeling, ACL injury, Alpine skiers

Poster Session #5: Crown Foyer – 5-6:25pm

Board 1

HEART RATE VARIABILITY RESPONSE TO HIGH ALTITUDE EXPOSURE IN COLLEGE-AGED STUDENTS

Alex Claiborne (Miami University), Helaine Alessio FACSM (Miami University), Mark Walsh (Miami University), Eric Slattery (Miami University), Arden McMath (Miami University)

Abstract Heart Rate Variability (HRV) is one of many potentially sensitive clinical markers of cardiovascular health status. Acutely depressed HRV is often seen in response to physiological stressors. Altitude places a burden on cardiovascular homeostasis, and HRV thus may predict risk for acute mountain sickness (AMS) in novice or experienced climbers. AMS is associated with low blood oxygen saturation, and is characterized by excessive fatigue, headaches, gastrointestinal interruptions, and in extreme cases, death. PURPOSE To

compare HRV and symptoms of AMS at different altitudes in college-aged students of varying fitness levels, trekking in Nepal. METHODS Seated resting HRV data, oxygen saturation (pO_2) and heart rate (HR) were measured in college aged students (n=17,9F age=20±1.7yrs, BMI 23±3kg/m^2) at three different elevations (300m,1900m,4500m above sea level). One-minute average oxygen saturation was measured via fingertip pulse oximetry. Two-lead portable electrodes were used to collect high-quality Electrocardiogram (ECG) readouts. HRV analysis software identified all R waves, and calculated HRV variables, as well as mean HR. Seven well-researched HRV variables were analyzed. Root-mean-squared of the successive differences (RMSSD ms), percent of successive R-R intervals varying>50ms (pNN50), and Poincare-plot SD1(ms) and SD2(ms) describe time variation between adjacent R-wave-to-R-wave intervals. Low-Frequency and High-Frequency Power Spectral Analysis (LFP,HFPn.u.), which describe the balance of sympathetic and parasympathetic drive to the heart, were also involved.. RESULTS Oxygen saturation(pO_2=87±3), HRV mean and Stdev measures (300m;1900m;4500m) were obtained: HR(80±13;84±8; 83±11bpm), RMSSD(62±34;44±42;58±41ms), pNN50(23±15;13±14;20±19), LFPnu(58±16; 72±12;61±16), HFPnu(42±16;28±12;39±16), LF:HFnu(1.77±1;3.47±2;2.89±3), SD1(44±24; 31±30;41±29ms), SD2(123±42;80±45;98±52ms). Effects of RMSSD (p=0.001)**, Poincare plot SD1 (p=0.001)**, SD2(p=0.037)*, and pNN50(p=0.062) by altitude and HR were revealed by linear mixed-models analysis. CONCLUSION Statistically significant depressions of HRV by altitude and HR suggest that HRV is sensitive to an altitude stressor. Acute depression of HRV indicates a momentarily taxed cardiovascular system, and thus may be a novel indicator of AMS risk.

Keywords: cardiovascular, acclimatization, AMS, HRV

Board 2

CARDIAC FUNCTION AND SMO2 CHANGES DURING INTERVAL TRAINING AT ALTITUDE AND SEA LEVEL WITH AND WITHOUT OXYGEN RECOVERY

Frank R. Wojan (Northern Illinois University), Craig Broeder (Northern Illinois University), Peter Chomentowski (Northern Illinois University), Anthony Deldin (Northern Illinois University)

Abstract Purpose: This study investigated how high-intensity interval training (HIIT) at altitude (ALT) versus sea level (SL) with and without supplemental oxygen recovery (SRO2) affected cardiac function and skeletal muscle %O2 saturation (SMO2). Methods: Eight cyclists aged 40.9 ± 7.01 (HT: 68.4 ± 5.0; WT: 171.3 ± 33.3; Body Fat: 19.3% ±7.4%; VO2 max L/min 4.12 ± 1.17) performed a baseline cycling VO2max test and four treatment trials (TRA - ALTHIIT/SRO2; TRB - SLHIIT/SLrecovery; TRC - ALTHIIT/SLrecovery; TRD - steady-state (SS) cycling). Each HIIT work period (n=3) was 75s with 120s recovery at 75% and 50% of VO2max, respectively. For TRD, subjects cycled at a workload equal to the mean O2 uptake equal of TRB (Control-Trial). O2 uptake was measured using a breath X breath metabolic cart for VO2 max and TRB. Cardiac function (HR, Cardiac Output (Q), Stroke Volume SV) was assessed using impedance cardiography. SMO2 was measured in the vastus-intermedius quadricep muscles using Moxy NIR devices. Data was analyzed using a w/in repeated measures design (Treatment (4) X 3 HIIT/Recovery Periods). Results: Despite identical workloads, HR was significantly lower during SS cycling compared to the HIIT trials by 7.6% (SS: 118.0 ± 3.4; Mean HIIT TR HRs: 127.0 ± 3.7, p=0.002). ALTHIIT/SRO2 (TRA: 141.8 ± 9.2) showed a lower SV by 8.4% compared to the ALTHIIT/SLrecovery trial (TRC: 154.3 ± 9.2). Q was significantly lower during the HIITw/SRO2 (TRA:17.7 ± 1.1) compared to SLHIIT/SLrecovery & ALTHIIT/SLrecovery (TRB: 19.8 ± 1.1; TRC:19.8 ± 1.1) by 12% (P = 0.04). SMO2 data showed a trend for ALTHIIT/SRO2 & SS cycling to have higher SMO2 values compared to the both

HIIT trials without SRO2 (p=0.09). During recovery, ALTHIIT/SRO2 showed improved HR recovery 5.2% (p=0.01), increased SMO2 re-saturation rate 12.6% (p=0.05), and lowered Q 11.9% (p = 0.01) compared to the altitude-sea level recovery trial. Conclusion: These results suggested that supplemental O2 recovery lowered cardiac cardiac demand (Q) at the same HIIT workload by maintaining HIIT SMO2 better by enhancing the overall recovery process. Supported by a grant from LiveO2 and Exercising Nutritionally, LLC

Keywords: HIIT, Cardiac Function, Altitude, Supplemental Oxygen Recovery

Board 3

THE RELATIONSHIP AMONG ANTIOXIDANT INTAKE, ADIPOSITY, AND AEROBIC CAPACITY IN AN ATHLETE POPULATION

Emily N. Werner (Michigan State University), Sinclair A. Smith (Drexel University), Janell Mensinger (Drexel University), Brandy-Joe Milliron (Drexel University), Heather H. Betz (Albion College), Stella L. Volpe (Drexel University)

Abstract Many factors contribute to an athlete's performance, including dietary intake, body composition, and aerobic capacity. PURPOSE: To evaluate the relationships among antioxidant intake, adiposity, and aerobic capacity, and to determine what characteristics have the greatest relationship with aerobic capacity in an athlete population. METHODS: Athletes, defined as 18 years of age and older and exercising at least twice weekly, were recruited. Measurements included days of self-reported physical activity per week, height, weight, body mass index, and waist circumference. Percent body fat (PBF), lean body mass, and fat-free mass were measured using dual-energy X-ray absorptiometry. Maximal oxygen consumption (VO_2max) was analyzed using indirect calorimetry. Kilocalorie, macronutrient (carbohydrate, protein, fat), and antioxidant (β-carotene, vitamins A, C and E, iron, zinc, copper, and selenium) intakes were self-reported via Block 2005 Food Frequency Questionnaires. Antioxidants were analyzed as percentages of the Recommended Dietary Allowance. Bivariate Pearson Product Moment correlations were conducted to explore relationships among antioxidant intake, adiposity and aerobic capacity. A backwards multiple regression was used to determine which characteristic(s) had the strongest relationship with VO_2max. RESULTS: Thirty-two athletes (n=17 women, n=15 men; 35.7 ± 11.3 years of age) were measured. There were no differences between antioxidant intake and adiposity or aerobic capacity; however, there were significant negative relationships between PBF and VO_2max for women and men combined ($p<0.001$), as well as women ($p = 0.013$), and men ($p=0.013$), respectively. The backwards regression showed that PBF ($B = -0.504$, $p<0.001$), vitamin C intake ($B = -0.492$, $p=0.063$), and vitamin E intake ($B = 2.055$, $p=0.154$) combined explained approximately 51% of the variance in VO_2max [$R^2 = 0.514$, $F(3,28) = 0.9.853$, $p<0.001$]. After excluding vitamin C and vitamin E from the model, PBF alone explained 41% of the variance in VO_2max [$B = -0.493$, $p<0.001$; $R^2 = 0.442$, $F(1, 30) = 23.799$, $p<0.001$]. CONCLUSION: Percent body fat alone, or combined with vitamins C and E, may have a substantial relationship with VO_2max. Further research should consider antioxidant intake and body composition in the investigation of the nutrition-related exercise benefits.

Keywords: Fitness, Nutrition, Exercise, Diet

Board 4

ACCURACY OF PARENTIAL REPORTS OF PHYSICAL ACTIVITY IN THEIR CHILDREN WITH SPECIAL NEEDS: A PILOT STUDY

Bethany M Forseth (University of Wisconsin – Milwaukee), Dale A. Schoeller (University of Wisconsin Madison), Paula E. Papanek (Marquette University), Michele L. Polfuss (University of Wisconsin – Milwaukee)

Abstract Physical activity (PA) is an essential component of health that necessitates accurate measurement. Parents of children with special needs (SN) have an increased involvement in their child's daily life; therefore, it would seem plausible that they could provide an accurate assessment of their child's PA. The accuracy of self-report measures in children with SN has not been established. PURPOSE: Determined the accuracy of self-reported PA as compared to doubly labeled water (DLW) for children with SN. Furthermore, we assessed if child's age or diagnosis was related to the accuracy. METHODS: This prospective cross-sectional study, included 36 child/parent dyads stratified by child's age (4-7; 8-12; and 13-18 years), diagnosis and ambulatory status (spina bifida-ambulatory n= 9; spina bifida-wheelchair n= 9; Down syndrome n= 9, and control n= 9). PA energy expenditure (kcal·day^{-1}) was calculated from total energy expenditure, measured via DLW, by subtracting an estimated resting metabolic rate and thermic effect of food. Self-reported PA (MET·min^{-1}·day^{-1}) was measured by an activity journal completed by parents and children ≥13 years for four weekdays and two weekend days. T-tests compared MET·min·day^{-1} reported between the parents and children. Pearson correlations assessed relationships between journals and DLW. RESULTS: No significant differences were reported between activity levels by parents and children (24.53 vs. 26.57 MET·min·day^{-1}; p= 0.26). Parent and child self-reported activity levels were weak to moderately correlated to DLW (r= 0.32, p=0.078; r= 0.55, p= 0.102, respectively). When examined by age, parent reported activity and DLW were significantly related for older children (8-12 years, r= 0.63, p= 0.035; and 13-18 years, r= 0.65, p= 0.040), but not younger children. No significant relationship between self-reported activity levels and DLW based on diagnosis. CONCLUSION: With their increased involvement, parents of children with SN were able to report activity levels of their child similar to the child's self-reported activity. However, only the parent reported activity for older children was significantly related to PAEE measured by DLW. Self-report methods while cost-effective, have been minimally tested in children with SN. Therefore, further examination in larger samples is recommended along with utilizing objective measures of PA.

Keywords: energy expenditure, doubly labeled water, self-report

Board 5

IMPACT OF IMMEDIATE PRE-EXERCISE INGESTION OF BRANCHED-CHAIN AMINO ACID AND TAURINE ON MUSCLE SORENESS AND RECOVERY FOLLOWING ECCENTRIC EXERCISE

Morgan E. Kennedy (Grand Valley State University), Ross A. Sherman (Grand Valley State University)

Abstract Eccentric or unaccustomed exercise can cause structural damage and functional perturbations within muscle, characterized by inflammation, stiffness, loss of strength, and soreness several days following initial exercise. Both branched-chain amino acids (BCAAs) and taurine have been shown to provide either protection or improved recovery from such exercise-induced responses. However, it is unclear the impact of immediate pre-exercise ingestion on post-exercise responses. PURPOSE: To determine the impact of immediate pre-exercise ingestion of BCAAs and taurine on muscle soreness and performance following predominantly eccentric exercise. METHODS: 40 healthy and recreationally active participants (21 ± 4 years; 175 ± 9 cm; 71.8 ± 12.2 kg; 1-RM 92.8 ± 29.0 kg) were equally and randomly divided into four double-blind supplement groups – BCAAs and taurine (BCAA-TAU); BCAAs only (BCAA-P); taurine only (P-TAU); and placebo (P-P). Following baseline testing of perceived muscle soreness, 1-RM back squat, leg circumference, and performance output

(40-yd sprint, vertical jump, T-test and arrowhead agility), participants reported to the laboratory having refrained from damaging or high-intensity exercise for 48 h. After supplement ingestion, participants completed a predominantly eccentric exercise bout (3 x 12 barbell back squats at 65% 1-RM, 3 x 12 weighted alternating leg lunges, and 5 x 10 depth jumps from 18" box). Muscle soreness (overall perceived and muscle map), upper leg inflammation and performance output were assessed 1, 4, 24, 48 and 72-h post-exercise. Comparisons used two-way (time*supplement) repeated-measures ANOVA, with Bonferroni *post-hoc* testing used to determine specific location of significant changes. RESULTS: BCAA-TAU resulted in reduced perceived muscle soreness compared to P-TAU (6.1 ± 4.7 cm vs 7.7 ± 6.0 cm; p=0.097), however ingestion of both P-TAU (p=0.0005) and BCAA-P (7.0 ± 4.6 cm; p=0.021) cause increased perceived soreness compared to P-P (5.0 ± 4.2 cm). Both BCAA-TAU (54.6 ± 9.9 cm; p=0.074) and P-TAU (55.1 ± 13.5 cm; p=0.037) resulted in higher vertical jump compared to P-P (49.3 ± 11.4 cm). CONCLUSION: There was some evidence of benefit from ingestion of BCAAs and taurine on perceived muscle soreness and vertical jump, however there was no clear benefit from ingesting combined BCAAs and taurine immediately before eccentric exercise. This study was supported by a grant from the International Society of Sports Nutrition.

Keywords: Delayed-onset muscle soreness, Exercise-induced muscle damage, Supplementation

Board 6

CORRELATION BETWEEN HRV MEASUREMENTS AND FITNESS/HEALTH BIOMARKERS

Melissa McHenry (Miami University), Alex Claiborne (Miami University), Elisa Iglesia (Miami University), Eric Slattery (Miami University), Edwin Barth (Miami University), Helaine Alessio (Miami University), Ron H. Cox (Miami University)

Abstract Heart Rate Variability (HRV) may be a valuable biomarker of fitness related health that correlates with biomarkers including systolic blood pressure (SBP), diastolic blood pressure (DBP), body weight (BW) and body fat (%fat). Varsity college-aged athletes, while expected to present healthy blood pressure and body compositions, actually can show some at-risk measurements for certain health biomarkers. PURPOSE Determine correlations between HRV components and BW, %fat, SBP, DBP in apparently healthy and fit college aged varsity athletes. METHODS Electrocardiography readouts were obtained via two-lead electrodes, and HRV analysis software revealed LF Power (ms2), HF Power (ms2), RMSSD (ms), PNN50 (%), Poincare SD (ms), Mean RR (ms), and DFA. Pearson's Product-Moment Correlation was used to measure linear relationship between all normally distributed variables. RESULTS Body weight was correlated with HRV components: LF Power (r=-0.23, p=0.014*), HF Power (r=-0.25, p=0.009*), Poincare SD1 (r=-0.17, p=0.07), RMSSD (r=-0.17,p=0.07), FFT (r=-0.19, p=0.05*), and DFA (r=0.26, r=0.006*). Body fat was significantly correlated with HRV components: Poincare SD1 (r=-0.19, p=0.05*), Poincare SD2 (r=-0.23, p=-0.014*), RMSSD (r=0.19, p=0.05*), Mean RR (r=0.27, p=0.004*). Systolic blood pressure approached significance only with the HRV measurement, DFA (r=0.18, p=0.07). Diastolic Blood pressure was significantly correlated with HRV components: LF Power (r=-0.21, p=0.03*), HF Power (r=-0.20, p=0.04*), Poincare SD1 (r=-0.24, p=0.01*), Poincare SD2 (r=-0.21, p=0.031), RMSSD (r=-0.24,p=0.01*), PNN50 (r=-0.21, p=0.03*), Mean RR (r=-0.23, p=0.02*) and DFA (r=0.23, r=0.02*). CONCLUSION Although college aged athletes may be expected to be healthy and fit, some risk factors may be overlooked. Significant correlations between multiple HRV measures and some cardiovascular health/fitness variables indicate that HRV may be a useful biomarker of fitness related health in apparently healthy and fit college aged varsity athletes, and can indicate a reason for further health related assessment.

Keywords: Varsity, training, power, hrv

Board 7

THE EFFECT OF VARIOUS WARM-UP PROCEDURES ON VERTICAL JUMP PERFORMANCE

Erin Kishman (Western Michigan University), Kellen McCrary (Steel Athletic Performance), Timothy Michael (Western Michigan University)

Abstract A common test to determine lower body explosive power is the vertical jump test (VJT). Prior to performing the VJT, a warm-up prior to the test maybe executed. Sometimes circumstances result in a delay in performing the VJT that may affect the efficacy of the warm-up. For many years, the effect of a warm-up on subsequent power output has been discussed in the field of sports performance. PURPOSE: The purpose of this study was to determine if low intensity cycling immediately following a standardized dynamic warm-up would increase vertical jump performance in comparison to performing a standardized dynamic warm up followed by a period of inactivity in a standing position. METHODS: Ten recreationally trained males and females (age: 20.8 ± 2.6) participated in the study. The VJT was completed using a Jump Mat. Subjects were required to perform a standardized dynamic warm-up immediately followed by 5 different post warm-up scenarios. After completing each scenario, subjects executed 3 vertical jumps on a jump mat. Scenario 1: immediately execute the vertical jump. Scenario 2: stand in place for 5 minutes prior to the vertical jump test. Scenario 3: stand in place for 10 minutes prior to the vertical jump test. Scenario 4: cycle at 50-55% Heart rate reserve (HRR) for 5 minutes prior to the vertical jump. Scenario 5: cycle at 50-55% HRR for 10 minutes prior to the vertical jump. A repeated measures ANOVA was used to analyze the results with $p<0.05$ set as the a priori alpha level. RESULTS: There was no significant difference in jump height (cm) due to scenario completed (54.8 ± 10.9; 54.5 ± 11.9; 52.8 ± 12.0; 54.4 ±11.2; 55.2 ± 11.2). However, there was a significant difference in HR immediately prior to the VJT (153.1 ± 21.2; 115.7 ± 21.3; 108.8 ± 17.1; 136.9 ± 11.5; 143.1 ± 11.9). CONCLUSION Based on the results of this study, performance of a VJT is unaffected by periods of rest prior to the test or various warm-up procedures.

Keywords: Power, Anaerobic, Assessment

Board 8

DIFFERENTIAL CARDIAC PROTEIN EXPRESSION OF MICE EXPOSED TO POSTNATAL UNDERNUTRITION

Joseph R. Visker (Michigan State University), Lawrence J. Dangott (Texas A&M University), David P. Ferguson (Michigan State University)

Abstract PURPOSE: Evidence shows humans who suffered poor nutrition during early postnatal life have altered cardiovascular development and increased likelihood for chronic disease during adulthood. Several studies have shown using an animal model that inadequate nutrient intake during early life causes changes in cardiomyocyte nucleation, maturation, and function. Protein expression differences as a result of early life undernutrition has yet to be studied and protein networks remain unidentified. METHODS: All experiments were conducted according to IACUC at Michigan State University. FVB mouse dams were fed either a semi-purified control (CON: 20% protein), or a low-protein (LP) isocaloric diet (PUN: 8% protein) beginning 1 week before mating. LP females produce 15-20% less milk thus; pups nursed by LP females experience a global nutrient deficit.Following birth, pups were reorganized to 8 pups/female. After birth, day 1 (PN1) until day 21 (PN21) the PUN nursed and received milk from females fed the LP diet, the CON mice nursed from females

being fed the 20% protein diet. At PN21 the hearts were collected from the CON and PUN mice and cardiac tissue was frozen in liquid nitrogen. Two-dimensional differential in-gel electrophoresis (2-D DIGE),is a 2 step method of extracting proteins from the hearts of CON and PUN. Proteins are separated according to the electrochemical charge and weight. An ANOVA compared protein differences between diet (CON vs. PUN) and gender (male vs. female) using Decyder Protein identification software(standardized log abundance). RESULTS: 37 statistically significant proteins were identified from 2-D DIGE.Over-expressed PUN proteins (134% greater abundance than CON) included polymerase I transcript release factor, Fetuin, and $Ca2^{+}$activated K^{+} channels. CON over-expressed proteins included cyclin-dependent kinase inhibitor (114% greater abundance), and Alpha-1 type IV collagen (90% greater abundance). CONCLUSION: Identified proteins allow for a proposed mechanism that may explain the cellular change in the heart following undernutrition in early life and why there is an increase for cardiovascular disease in adulthood. By identifying proteins that are permanently altered with undernourishment it will serve as a guide in developing a mechanism and interventions in the future so cardiovascular disease may be prevented.

Keywords: Exercise Physiology, Undernourishment, Pediatric Development, Cardiac Function

Board 9

THE EFFECTS OF HIIT ON BODY COMPOSITION AND MUSCULAR ENDURANCE

Luke Cain (Indiana Wesleyan University), Danielle Balzano, Ellen Hornett (University of Indianapolis)

Abstract High Intensity Interval Training (HIIT) is a form of exercise that combines brief periods of rest interposed with periods of significantly increased intensity. This sequence of intermittent activity is typically performed in 30 minutes or less, creating a shorter workout with comparable results to longer, continuous workouts. PURPOSE: To investigate the effects of a HIIT program on body composition and muscular endurance for both sedentary and active populations. METHODS: After determining average activity level, twenty-four students (SD age 20 ± 2) were randomly assigned to the control or intervention group. Intervention groups were separated into active and inactive, leaving three groups total. Participants completed a 14-session HIIT program, which included a leg ergometer interval protocol, followed by a workout where participants complete as many rounds as possible (AMRAP) of a group of exercises including cardiorespiratory and upper and lower body resistance exercises. A 3X2 mixed design ANOVA assessed the change in body composition, and upper and lower body muscular endurance from pre measurement to post measurement as well as the difference between active and inactive groups. RESULTS: Pre- and post-measurements of body composition and upper and lower body muscular endurance were performed. Results from the push up test for muscular endurance showed an average increase of 12 repetitions (sedentary group) and 11.5 repetitions in the active group. The wall sit test results showed increases of 50.66 seconds and 61.7 seconds respectively. Significant increases were found in upper body ($F(1,18) = 34.464$, $p=0.00$) and lower body ($F(1,18) = 13.949$, $p = 0.002$) endurance. No significant changes were shown in body composition – all three groups maintained weight, BMI, and body fat percentage. CONCLUSION: Although a relatively brief program of 5 weeks, this HIIT program still showed improvements in muscular endurance in both sedentary and active individuals. While there was no impact on body composition or weight, this type of program may be a viable option for weight maintenance in college students. Overall, the research could benefit from a longer duration or more participants. However, the results indicate that HIIT is a good exercise prescription option.

Keywords: interval training, exercise intensity

Board 10

ANALYSIS OF NATIONAL GUARD FITNESS ASSESSMENTS

Lauren Dame (Ball State University), Nicole Koontz (Ball State Unversity), Tonya Skalon (Ball State University), Mary Imboden (Ball State University), Rebecca Smith (Ball State University)

Abstract: Introduction: Cardiorespiratory endurance (CRE) is considered a reflection of health, as it is related to the circulatory, respiratory, and musculoskeletal systems of the body. It is of high importance that soldiers of the National Guard have sufficient CRE to carry out their duties in combat, however, many soldiers fail this portion of the Army Physical Fitness Test. Individualized exercise prescriptions improve CRE in other military populations, but have not been assessed in soldiers within a Battalion of the Indiana National Guard (ING). Purpose: The purpose of this analysis was to evaluate the success of the home exercise prescriptions in improving CRE between the ING soldiers' pre-and post-tests. Methods: Participants were 21 ING soldiers (25±6y) who failed or had a history of failing a record APFT and who had completed a pre- and post-testing day ranging from spring 2015 through spring 2017. Soldiers completed a timed two-mile run, push-up and sit-up tests per APFT regulations. Additional health measures were collected or self-reported, including height, weight, resting heart rate, blood pressure, handgrip strength, sit-and-reach scores, waist and hip circumferences and 3-site skinfolds. SPSS V.24 was used to perform descriptive statistics and univariate analysis of variance to assess differences between pre- and post-assessment CRE. Results: There were no significant differences between pre- and post- tests for CRE ($p=0.639$). Furthermore, there were no significant differences between pre and post-tests for any of the other health parameters assessed. However, trends were observed in the desired direction according to the program's desired goal of passing the APFT; indicating minor improvement. Conclusions: CRE is an integral part of the APFT. Although there were no significant differences found between the pre- and post-testing for CRE, there was a trend observed indicating the potential for the home-based exercise prescription program to have success. Limitations include the length of each soldiers program between pre- and post-tests and the efficacy of each soldier completing the home-based exercise prescription. Therefore future research should assess CRE improvements in soldiers of the ING over a longer follow-up period and using a method to track adherence to the exercise prescription. (BSU Provost Immersive Learning Grant; BSU Cast Mini Grant)

Keywords: Cardiorespiratory endurance, home exercise program, soldiers

Board 11

AN INVESTIGATION INTO THE EFFECTIVENESS OF BRIEF GUIDED MEDITATION

Jamie VanDewerker (Cleveland State University), Karen Barrientos (Cleveland State University), Samantha Butterbaugh (Cleveland State University), Nicholas Chambers (Cleveland State Unversity), Jessica White (Cleveland State University), Douglas Wajda (Cleveland State University), Jeremy Genovese (Cleveland State University)

Abstract Meditation has many benefits for reducing stress and anxiety, by inducing a relaxation response. It is unclear how guided meditation compares to other forms of relaxation. PURPOSE: The purpose of this study is to determine if a guided meditation video is as effective as other methods of relaxation. METHODS: Skin conductance, respiration rate, and psychological state were measured on 30 male and female adults while

reading, meditating, and watching a video containing fight scenes. Each of these activities were separated by a brief flushing exercise to prevent carry over from the previous activity. Prior to the study each participant rated their psychological state and over all mental health using the Depression Anxiety Stress Scale (DASS) and Friedburg Mindfulness questionnaires. A repeated measures ANOVA and a related measure nonparametric test in IBM SPSS were used to analyze the physiological and psychological responses across subjects during the three conditions. RESULTS: There was a significant difference ($p < 0.05$) between the book and meditation in respiration rate ($p = .019$). A significant difference ($p < 0.05$) was found between the book and video in respiration rate ($p = .001$). There was also a significant difference ($p < 0.05$) between the meditation and video in physiological state, skin conductance, and respiration rate ($p = .025$, $p = .007$, $p = .000$ respectively). The DASS and Freiburg Mindfulness Inventory tests showed that the anxiety, stress, and depression rates of each participant did not affect the testing modalities. CONCLUSIONS: The data collected shows that a guided meditation video is an effective method in reducing stress and anxiety levels in the majority of individuals. This study was funded by the Cleveland State University Undergraduate Summer Research Award Grant.

Keywords: Stress reduction, skin conductance, relaxation

Board 12

ACCURACY OF VARIOUS ACTIVITY MONITORS FOR ASSESSMENT OF ENERGY EXPENDITURE

John W. Vusich (Alma College), John Mitrzyk (Alma College), Matthew Wiersma (Alma College), Alexander H.K. Montoye (Alma College)

Abstract: Wearable activity monitors use accelerometers and sometimes heart rate (HR) or other technology to estimate physical activity (PA) variables such as steps, kilocalories (kcals), active minutes, and sleep. PURPOSE: To test the effect of the heart rate function of PA monitors on kcal expenditure estimates and to validate the estimates of kcal expenditure. METHODS: Participants (n=23) aged 15-39 years wore six PA monitors and performed nine activities in the laboratory (only three presented in abstract) for five minutes each using a treadmill and a stationary cycle. Five monitors (F, A, AHR, B, C) were worn for the study. Activities included jogging at 5-10 mph at 0 and 3% grades and cycling (50-150W). Steps and kcals were recorded for each monitor, and HR was assessed for the AHR, B, and C monitors; kcals data were compared to the criterion (metabolic analyzer) using repeated measures ANOVA. RESULTS: Average kcal estimates for cycling were 15.2±11.1 for F, 15.8±8.7 for A, 61.4±15.7 for AHR, 69.5±18.0 for B and 54.4±18.3 for C; all monitors were significantly different from the criterion measure (40.2±11.1 kcals, $p<0.05$). For running at 3% grade, kcal estimates were 59.9±9.2 for F, 60.2±9.5 for A, 77.0±17.2 for AHR, 76.2±17.8 for B and 73.6±14.6 for C, with all but C significantly different from the criterion (68.2+17.7 kcals, $p<0.05$). Conversely, kcal estimates while running at 0% grade were 62.3±7.8 for F, 62.0±11.1 for A, 68.8±17.2 for AHR, 65.9±18.0 for B; and 66.6±16.0 for C; AHR, B, and C were significantly different from the criterion (58.2±15.2 kcals, $p<0.05$). CONCLUSION: Our study shows that monitors with HR (AHR, B, and C) do use HR in their estimation of kcals (along with accelerometry), whereas monitors without heart rate (F and A) only use accelerometry. However, PA monitors did not perform well in estimating kcals regardless of whether they used HR, as monitors with HR overestimated kcals and those without HR underestimated kcals. This study was supported by the Alma College CORE Research Program.

Keywords: heart rate, Fitbit, calories, physical activity

Board 13

COMPARISON OF HEART RATE, SPEED, AND SPRINTS PERFORMED BY A DIVISION I COLLEGE FEMALE FIELD HOCKEY TEAM USING GAME DATA

Jane A. Groetsch (Michigan State University), Ashley N. Triplett (Michigan State University), James M. Pivarnik (Michigan State Unversity)

Abstract Heart rate (HR) monitoring, GPS tracking, and accelerometry are new techniques for evaluating players' activity levels during competition. Results from live tracking can help coaches with practice schedules and game strategies. To date, few data are available from tracking modalities within NCAA varsity women's field hockey. PURPOSE: Our purpose was to determine descriptive information related to players' game performance, and analyze results by player position. METHODS: A team heart rate monitoring system was used to evaluate in-game HR responses and movement patterns of women field hockey players from a single NCAA Division I team. Players were divided into three groups based on position (back, midfielder, and forward). Data were collected and averaged among 15 women who played in three games, and analyzed by calculating 95% confidence intervals. HR max was determined through a continuous graded treadmill test with intensity increases every two minutes. Given that field hockey is a fast-paced game, variables of interest in this preliminary investigation included time spent at HRzone 4 (80-90%HRmax) and HRzone 5 (>90%HRmax), maximum speed achieved, and number of sprints performed. RESULTS: On average, players spent 31.3% of game time in HRzone 4, and 49.2% in HRzone 5. Differences were seen according to player position as backs spent less time in HRzone 4 (22%) compared to midfielders (34.9%) and forwards (37.1%); $P<0.05$. In contrast, forwards spent less time in HRzone 5 (35.6%) compared to backs (57.6%) and midfielders (54.5%); $P<0.05$. Overall, midfielders spent significantly more time in both HRzone 4 and 5 (89.4%) compared to forwards (72.7%); $P<0.05$. Maximum sprint speed was not statistically different by position; midfielders (435±56.2 m/min), backs (401±42.2 m/min) and forwards (393±31.9 m/min). Finally, backs engaged in fewer sprints (0.4±0.1 sprints/min) compared to midfielders (0.7±0.3 sprints/min) and forwards (0.6±.6 sprints/min); $P<0.05$. DISCUSSION: Heart rate data show clearly that field hockey games are played under very intense aerobic conditions, with high burst interval runs being performed throughout the competition. Our data suggest that backs achieve their HR values using less short bursts and likely, more constant movement, while overall aerobic intensity (according to HR response) appears greatest among the midfielders.

Keywords: sports, women, performance

Board 14

ACUTE ENDOTHELIAL FUNCTION IN RESPONSE TO CONSUMPTION OF A FAST FOOD OR HOMEMADE ISOCALORIC MEAL

Olivia Jones (Taylor University), Marette Starke (Taylor University), Hannah Boy (Taylor University), Erik Hayes (Taylor University)

Abstract It is well established that diet plays a significant role in CVD burden, in part due its impact on vascular health. Numerous studies have examined individual nutrients and their impact on acute vascular function yet few studies have examined whole meal patterns, a more practical approach to understanding the role of diet and health. PURPOSE: Consequently, the present study aims to explore the difference in acute endothelial function in response to two distinct dietary patterns; a highly processed typical fast food meal (FF) and a

similar isocaloric homemade meal (HM). METHODS: 10 college-aged males were recruited to consume, in randomized order FF (79 ingredients, 47.6% CHO, 13.8% PRO, 39.8% Fat) and HM (25 ingredients, 32.6% CHO, 14.9% PRO, 53.9% Fat). In general, both meals consisted of a cheeseburger with condiments, a baked potato or French Fries, a diet caffeine-free soft drink or water, and an ice cream dessert. Measures of blood pressure, blood glucose and vascular function were assessed pre-meal consumption and every hour for four hours post meal. Parameters for arterial stiffness (augmentation index at 75HR (AIx@75), Augmentation Pressure (AP), Aortic systolic pressure (SP), Aortic pulse pressure (PP)) were derived using pulse wave analysis via applanation tonometry at the radial artery. RESULTS: AP and AIx@75HR decreased from -0.2±0.5% to -3.8±0.7% and -8.7±2.2% to -19.1±2.2%, respectively, for both meals at one hour post consumption ($P<0.05$ from baseline). In both meals, PP was significantly increased at 1 hour post consumption (from 24.3±1.1% to 28.5±1.4%), while BG significantly increased (91.2±1.9mg/dl to 106±3.1mg/dl) at hour 2 and returned to baseline. SP did not significantly change in either group. No significant differences were found between meals ($P <0.05$ from baseline). CONCLUSION: FF did not acutely affect endothelial function when compared to HM. Notably, HM had a significantly higher percentage of total and saturated fat. The lack of difference between groups agrees with recent findings that saturated fat intake appears to have minimal impact on acute arterial function. More research examining the mechanisms behind dietary patterns and vascular health is warranted.

Keywords: saturated fat, arterial stiffness, pulse wave analysis

Board 15

A COMPARISON OF THE MECHANICAL PERFORMANCE OF GYMNASTICS SPRING FLOOR SYSTEMS

Madaline E. Hoffman (The University of Findlay), Edward Nyman, Jr. (The University of Findlay)

Abstract Developments in gymnastics spring floor technology have led to amplified elastic behavior corresponding with increased tumbling heights and skill difficulty. The mechanical properties of spring floors play a large role in the performance of the gymnast and injury prevention. PURPOSE: To evaluate the mechanical performance of gymnastics spring floor components, including surface foam and spring floor decking, as well as offer insight as to what cohesive units are optimal for performance and injury prevention. METHODS: 15 spring floor apparatus configurations from two manufacturers were tested as individual components and as functional units. A custom-built impactor system with an accelerometer mounted to the top was used to impact the floor apparatuses placed atop an in-ground force plate and recorded with 3D motion capture system. Three identical impacts from the 42kg impactor head being released from 1m above the floor surface were conducted and averaged for each condition. Maximum force, surface deflection, impaction device rebound height, coefficient of restitution, and spring constants were recorded. A MANOVA with Bonferroni post-hoc approach was employed for statistical analysis of the effect of the different foam/carpet layer independent variables. Pearson correlation coefficients were calculated to quantify the strength of the relationships between dependent variables using SPSS 23.0 (IBM, NY, USA). RESULTS: A significant increase ($p<0.001$) in the average peak vGRF of the foam-only surface (11276.8±1310.60 N/kg) was noted as compared to the coupled deck and foam unit (6556.1±1093.6 N/kg). However, the coupled deck and foam surface type showed significantly higher results in average time to peak vGRF ($p=0.002$), net rebound height ($p=0.002$), surface height ($p<0.001$), and coefficient of restitution (COR) ($p=0.004$). There was a significant correlation between the net rebound height and time to peak vGRF ($r=0.803$) as well as the peak vGRF ($r=0.715$). The coefficient of restitution was significantly correlated to surface height ($r=0.736$) and foam thickness ($r=0.708$). CONCLUSIONS: The data derived indicted that various manufacturer's floor designs exhibit

different mechanical behaviors that impact the performance of athletes. The results can be incorporated into future work involving musculoskeletal testing to theorize a “sweet spot” for floor exercise system construction balancing performance and injury prevention. Grant funding for this research project was provided by the Goal-Getter Grant awarded to Edward Nyman, Jr., Ph.D.

Keywords: gymnast, behavior, performance, force

Board 16

PHYSIOLOGICAL RESPONSES TO AN ACUTE BOUT OF HIGH-INTENSITY RESISTANCE EXERCSE IN YOUNG ADULTS

Danielle A. Scerbo (Miami University), Jarod C. Vance (Miami University), Emily J. Micsko (Miami University), Randal P. Claytor (Miami University)

Abstract Resistance exercise (RE) has become an integral part of a health-related physical activity/exercise plan. However, cardiorespiratory and metabolic responses to a series of resistance exercises and the relationship between the metabolic response and RE load is not completely understood at present. PURPOSE: To determine the cardiorespiratory responses to a bout of high-intensity RE and to examine the relationship between the O_2 & CO_2 cost of a RE routine and the total volume of work (VW). METHODS: Ten healthy males (4) and females (Age = 21.2+/-1.2 yrs) volunteered. Day 1: body composition (air plethysmography) and VO_2max were assessed, (HRmax = 191+/-5.7 b/min; VO_2max = 50.4+/-4.3 ml/kg/min; BF% = 18.3%+/-5.7). Day 2: Subjects completed a 1-repitition maximum (1-RM) for each of 7 resistance exercises. Exercise Day: Following 6 min of pre-RE seated Rest (PR), Subjects completed a RE routine (FW) in the following order: Chest Press, Shoulder Press, Leg Extension, Biceps Curl, Triceps Extension, Abdominal Leg Raises, Lat Pull-Down, & Leg Press while wearing a portable metabolic measuring system. Subjects performed 2 consecutive sets (12 reps/set) at 75% 1-RM separated by 1min of sitting Rest (R). VO_2, VCO_2, RER, VE & HR were measured continuously during the FW and Rand averaged across the entire FW. VW was calculated by multiplying resistance (Kg) X repetitions X sets for each RE and summed. Paired T-Tests and Pearson Correlations were used to test for statistical significance. RESULTS: FW RE VO_2 (FW: 15.1(+/-1.6) vs PR: 5.4(+/-0.86) ml/kg/min), VCO_2 (FW: 17.4(+/-2.2) vs PR: 4.6(+/-0.72) ml/kg/min), VE (FW: 43.7(+/-12.4) vs PR: 10.9(+/-1.82) l/min), HR (FW: 126(+/-14.8) vs PR: 69(+/-12.7) bpm) ($p<0.01$) were all significantly greater than PR. VE (.723) & VCO_2 (.805) were significantly correlated with VW ($p<0.05$), however VO_2 (.567) ($p>0.10$) was not. DISCUSSION: These data suggest that even though VO_2, VCO_2, VE & HR responses to a FW-RE routine were significantly increased above PR; VO_2 was not related to VW. However, because VCO_2 & VE were related to VW, this is suggests VCO_2 & VE are indicative of the acute metabolic milieu during a high-intensity RE routine.

Keywords: Metabolic, Volume of Work

Board 17

GO SKATE!: THE PHYSIOLOGICAL RESPONSES AND PERCEPTION OF TRAINING ON INLINE SKATES

Nicholas Chambers (Cleveland State University), Karen Barrientos (Cleveland State University), Jessica White (Cleveland State University), Samantha Butterbaugh (Cleveland State University), Jamie VanDewerke (Cleveland State University), Emily Kullman (Cleveland State University), Kristine Fondran (Cleveland State University)

Abstract: It is unclear how inline skate training affects the performance and enjoyment of other modes of exercises. PURPOSE: The purpose of this study is to determine if inline skating is an effective and enjoyable alternative method of exercise when compared to running and using the elliptical. METHODS: Seven healthy participants (male=1, female=6) completed the study. Each participant's functional movement, body composition, and efficiency in running, skating, and using the elliptical was assessed before and after an inline skate training program. Efficiency was assessed by comparing distance traveled and VO_2 while maintaining 80% of age-predicted maximum heart rate for each mode of exercise before and after the skating program. This determined if an inline skating program improved efficiency of inline skating, as well as efficiency in running and elliptical exercise. Functional movement was assessed using the Functional Movement Screen (FMS), and body composition was measured with air displacement plethysmography. The skate training program consisted of three 45-minute training sessions for 6 weeks. After all training and testing was completed each participant was given a custom questionnaire regarding their perceptions of enjoyment and preferred method of exercise. A repeated measures ANOVA in IBM SPSS was used to analyze the differences between pre- and post-tests on exercise efficiency, body composition, and functional movement. RESULTS: While there were no significant differences in weight or resting heart rate, there was a significant change in systolic blood pressure (pre=102±10mmHg; post=111±5mmHg; p=0.046), diastolic blood pressure (pre=63±11mmHg; post=75±6mmHg; p=0.016), body fat percentage (pre=18.4±4.6; post=20.9±5.6; p=0.044) and lean mass (pre=51.0±12.4kg; post=49.5±12.1kg; p=0.011). There were also significant improvements in the elliptical average heart rate (pre=155±2bpm; post=150±5; p=0.007) despite no change in distance traveled (pre=2.13±0.53miles; post=2.17±0.55miles; p=0.381), the skate VO_2 (pre=1.2±0.3L/min; post=1.5±0.4; p=0.005) and the distance traveled during skating (pre=1.36±0.29miles; post=1.60±0.22miles; p=0.005). In addition, there was significant improvement in the FMS trunk stability push-up (pre=1.43±0.53; post=2.57±0.79; p=0.005). All of the subjects considered participating in inline skating in the future. CONCLUSION: Inline skating is an enjoyable method of exercise that also provides an effective workout that carries over to other forms of exercise, and improves core strength. This study was funded by the Cleveland State University Undergraduate Summer Research Award Grant.

Keywords: Cross-training, core strength, functional movement screen

Board 18

ACCURACY OF AN ACTIVITY MONITOR FOR ASSESSMENT OF RESISTANCE TRAINING EXERCISES

Joe R. Mitrzyk (Alma College), Scott A. Conger (Boise State University), Jeremy A. Steeves (Maryville College), Alexander H.K. Montoye (Alma College)

Abstract: Resistance training is an increasingly popular exercise activity that has many physiological benefits. Recently, physical activity monitors have been designed to recognize specific exercises and the number of repetitions performed. However, little is known about the accuracy of these monitors. Purpose: To validate the ability of a wrist-worn activity monitor to recognize specific resistance exercises and number of repetitions performed during a resistance training workout. Methods: Male and female participants (n=42) aged 17-52 yrs. wore the monitor on the left wrist and performed two sets of 14 resistance training exercises (10 upper body, 4 lower body). Each exercise was performed for 12 repetitions per set. Correct form was monitored, and repetitions were counted by a research assistant. Classification accuracies were calculated for correctly identified exercise and repetitions predicted by the monitor. Mean Absolute Error (MAE) and Mean Absolute Percent Error (MAPE) were calculated for repetitions of each exercise, and the average repetitions for each

exercise were calculated. Results: Lower body exercises were correctly identified by the monitor 64.3-96.4% of the time, with two exercises >70%, and upper body exercises were correctly identified 23.8-100.0% of the time, with eight exercises >70%. The monitor under counted lower body repetitions (9.5-54.6%), and many upper body repetitions (35.7-97.6%). Five exercises had >70% of repetition counted. MAE for all exercises ranged from 0.0-3.3 repetitions, and MAPE for all exercises ranged 0.3-27.6%. The lower body exercises had the highest MAE and MAPE. Conclusion: Overall, the monitor had higher accuracy for exercise recognition and repetition counting while participants were performing upper body exercises compared to lower body exercises, likely due to monitor placement on the wrist. Future research should examine participants' resistance training background in further detail and examine if experience plays a role in the monitor's performance. This study was supported by the Alma College CORE Research Program

Keywords: Fitness, Physical Activity, Validation

Board 19

WHOLE-BODY VIBRATION EXERCISE DOES NOT AFFECT FIBRINOLYTIC POTENTIAL IN OLDER ADULTS – A PILOT STUDY

Kayla M. Soave (Ball State University), Ashton A. Freeman (Ball State University), Rachel Aschenbrenner (Ball State University), Andrew T. Del Pozzi (Ball State University), Clark Dickin (Ball State University), Matthew P. Harber (Ball State University), Paul R. Nagelkirk (Ball State University)

Abstract In addition to measuring steps and Calories, activity monitors are designed to measure sleep quantity and quality. However, little research has assessed activity monitors' sleep tracking accuracy. PURPOSE: To validate several activity monitors for assessment of total sleep time and stages of sleep throughout a night. METHODS: Twenty participants, aged 18-31 years old, wore four activity monitors on their wrists (MF and FC on left; FF and JU on right) and three electroencephalogram (EEG) electrodes on their head. The study took place overnight in a sleep laboratory, with participants going to bed and waking up as they would on a normal day. Totals for light, deep, REM sleep, and number of awakenings were recorded from the four activity monitors and compared to criterion-measured values from the EEG. Repeated measures ANOVA was used to determine differences between predicted and measured values. RESULTS: For total sleep time, participants averaged 369.3±46.8 minutes/night. Compared to the EEG, the FC ($p=0.005$) and MF ($p=0.002$) overestimated total sleep by 32.4-38.1 minutes, while the FF and JU were not significantly different from the EEG. For total minutes of light sleep, the FC ($p<0.001$) and FF ($p<0.001$) underestimated by 176.5-191.2 minutes when compared to the EEG's time, 206.0±58.0 minutes. For deep sleep, all the monitors except the JU significantly overestimated when compared to the EEG (163.3±39.0 minutes), by 72.8-214.4 minutes ($p<0.01$ for all). For REM sleep, the JU was not significantly different from the EEG (88.5±32.2 minutes), while none of the other monitors assessed REM sleep. The number of times the participants woke up throughout the night averaged 3.1±2.2 times. Compared to the EEG, all monitors except the FF significantly underestimated by 1.3-2.0 times ($p=0.001-0.036$). CONCLUSION: Overall, the JU was the most accurate for all stages of sleep and total sleep, but significantly underestimated the number of times awake. All other monitors had large differences from the EEG in at least one sleep variable and should be used with caution if assessing sleep.

Keywords: Fibrinolysis, aerobic training, elderly, tissue plasminogen activator

Board 20

PERCEPTIONS OF STUDENT STAFF MEMBERS ON THEIR EXPERIENCE A CANCER REHAB PROGRAM

Mallory A. Korbar (Southern Illinois University Carbondale), Philip M. Anton (Southern Illinois University Carbondale)

Abstract The Strong Survivors program uses exercise as a therapeutic tool to help cancer survivors and caregivers get through their treatment and recovery period. Program participants receive personal training from staff members who have completed a staff training course. Staff members directly relate knowledge gained in the classroom, as well as gain practical professional/personal experience that they can apply in their future professions; however, little research exists regarding the experiences of students in the role of cancer exercise trainer. PURPOSE: To gain insight into the program experience of staff members. METHODS: This descriptive qualitative study utilized a semi-structured interview guide to collect information. Participants in the study were program staff members who were asked about various topics including their motivation for staff participation, the knowledge gained while they worked with survivors/caregivers, and the influence that their experience had on their lives, both professionally and personally. The interviews were transcribed verbatim and an inductive content analysis procedure was used to analyze the resulting data. Lower and higher order themes were identified. RESULTS: Three distinct, yet interrelated, higher order themes emerged from the data analysis: 1) the desire of participants to continue work with this population as professionals 2) enlightened perspective regarding the struggle of chronic disease patients 3) enhancement of potential success in professional opportunities (both employment and graduate/professional school). CONCLUSION: Serving as a Strong Survivors staff member is a unique experience that affords both undergraduate and graduate students the opportunity to develop both professional skills that are invaluable in their pursuit of a variety of career goals. This experience also enhances empathy among program staff, which potentially creates graduates better suited to work with populations that require higher levels of care and compassion.

Keywords: Cancer, Exercise, Rehabilitation

Board 21

ACCURACY OF ACTIVITY MONITORS IN ASSESSING SLEEP

John Mitrzyk (Alma College), Natashia Swalve (Alma College), Brianna Harfmann (Alma College), Alexander H.K. Montoye (Alma College)

Abstract: In addition to measuring steps and Calories, activity monitors are designed to measure sleep quantity and quality. However, little research has assessed activity monitors' sleep tracking accuracy. PURPOSE: To validate several activity monitors for assessment of total sleep time and stages of sleep throughout a night. METHODS: Twenty participants, aged 18-31 years old, wore four activity monitors on their wrists (MF and FC on left; FF and JU on right) and three electroencephalogram (EEG) electrodes on their head. The study took place overnight in a sleep laboratory, with participants going to bed and waking up as they would on a normal day. Totals for light, deep, REM sleep, and number of awakenings were recorded from the four activity monitors and compared to criterion-measured values from the EEG. Repeated measures ANOVA was used to determine differences between predicted and measured values. RESULTS: For total sleep time, participants averaged 369.3±46.8 minutes/night. Compared to the EEG, the FC ($p=0.005$) and MF ($p=0.002$) overestimated total sleep by 32.4-38.1 minutes, while the FF and JU were not significantly different from the EEG. For total minutes of light sleep, the FC ($p<0.001$) and FF ($p<0.001$) underestimated by 176.5-191.2 minutes when compared to the EEG's time, 206.0±58.0 minutes. For deep sleep, all the monitors except the JU

significantly overestimated when compared to the EEG (163.3±39.0 minutes), by 72.8-214.4 minutes ($p<0.01$ for all). For REM sleep, the JU was not significantly different from the EEG (88.5±32.2 minutes), while none of the other monitors assessed REM sleep. The number of times the participants woke up throughout the night averaged 3.1±2.2 times. Compared to the EEG, all monitors except the FF significantly underestimated by 1.3-2.0 times ($p=0.001$-0.036). CONCLUSION: Overall, the JU was the most accurate for all stages of sleep and total sleep, but significantly underestimated the number of times awake. All other monitors had large differences from the EEG in at least one sleep variable and should be used with caution if assessing sleep.

Keywords: Fitbit, Jawbone, EEG, fitness tracker

Schedule – Saturday Morning: Symposia

Symposium #13: Gerald R Ford Room – 8:00-8:50am

Physiological Impact of Acute Exercise, Physical Inactivity, and Postprandial Metabolism on Vascular Function

Session Moderator:
Presenters: J. Derek Kingsley, Ph.D., FACSM and Kevin D. Ballard, Ph.D.

Dr. Kingsley is an Assistant Professor in the Exercise Physiology program at Kent State University. He earned his Ph.D. in Exercise Physiology from Florida State University. He is a Fellow of the American College of Sports Medicine (ACSM), and is certified by the ACSM and the National Strength and Conditioning Association. The research conducted in his laboratory, the Cardiovascular Dynamics Laboratory, investigates the effects of resistance exercise and resistance exercise training on autonomic and vascular health.

Dr. Ballard is an Assistant Professor in the Department of Kinesiology and Health at Miami University. Prior to joining the Miami faculty, he worked as a Senior Scientist in Preventive Cardiology at Hartford Hospital, completed a post-doctoral fellowship at the University of Connecticut in Nutritional Sciences, and earned his Ph.D. in Kinesiology from the University of Connecticut. The research conducted in Dr. Ballard's laboratory investigates the impact of exercise and/or dietary strategies on vascular function, oxidative stress, and cardiometabolic risk in healthy and clinical populations. Recent studies have focused on the impact of prolonged sitting on vascular health.

Compelling evidence indicates that acute exercise (aerobic and resistance) exerts numerous beneficial effects on the vasculature that, when repeated over time, contribute to lower chronic disease risk. Conversely, short-term decreases in physical activity and even single bouts of prolonged sitting have been recently shown to negatively impact vascular health. In addition to exercise/physical activity, examination of acute responses to dietary challenges is of importance to human health consistent with evidence that metabolic alterations during the postprandial period transiently impair vascular function and contribute to chronic disease risk.

Thus, the **purpose** of this symposium is to highlight recent studies examining physiological mechanisms by which acute exercise, physical inactivity, and postprandial metabolic alterations influence vascular function in healthy and clinical populations.

At the conclusion of the symposium, the audience should be able to:

1. Recognize the importance of the vasculature as it relates to the risk for development of cardiovascular disease (CVD).
2. Explain how an acute bout of exercise (aerobic and resistance) affects the vasculature, and how it alters the risk for CVD.
3. Describe the deleterious effects of physical inactivity on the vasculature.
4. Explain how vascular function is affected by metabolic alterations during the postprandial period.

Symposium #14: Pantlind Ballroom – 8:00-8:50am

OPEN

Session Moderator:

Presenters:

Symposium #15: Imperial Ballroom – 8:00-8:50am

Eccentric Muscle Contractions: Physiological Responses, Mechanisms, Applications, and Historical Lessons

Session Moderator:
Presenters: Steven J. Elmer, PhD

Dr. Elmer is an Assistant Professor in the Department of Kinesiology and Integrative Physiology at Michigan Technological University. His goals are to find better ways to restore musculoskeletal function, maintain health, and improve performance in healthy and clinical populations. Specifically, his research is focused on: 1) mechanics of muscle contraction, 2) coordination of locomotor tasks, and 3) exercise interventions to improve physical conditioning. This research is supported by the National Science Foundation and American College of Sports Medicine. Applications for his research range from basic aspects of neuromuscular function to applied human performance in settings including injury, rehabilitation, and sport.

Purpose
The purposes of this symposium are to: 1) describe the unique physiological characteristics of eccentric muscle contractions and 2) highlight the use of eccentric exercise as a training modality to restore function, maintain health, and improve performance in both athletic and clinical populations.

For over 100 years, researchers have been intrigued by the observation that skeletal muscle can produce greater absolute force during active lengthening (eccentric) compared to active shortening (concentric) muscle actions. In addition to this increased capacity for force production, eccentric muscle actions can be performed at lower levels of metabolic and cardiorespiratory demand compared to concentric muscle actions. Taken together, these observations highlight the high-force, low-cost nature of eccentric muscle actions and suggest that eccentric exercise training could serve as stimulus for improving muscular function. In this presentation, I will discuss how Resistance Exercise via Negative, Eccentrically-induced Work (RENEW) has served as an effective method for increasing lower-body muscle size, strength and mobility in a variety of populations ranging from patients with central limitations to competitive athletes. Subsequently, I will present some preliminary work in which my laboratory has extended the application of RENEW to the upper-body for use with healthy adults and wheelchair users. During the presentation, I will also discuss the underlying mechanisms of eccentric muscle contractions, provide recommendations for researchers and clinicians, and identify questions that remain to be answered. Finally, I will share an educational activity implemented in our undergraduate and graduate exercise physiology courses where students re-enact Abbott et al.'s classic 1952 Journal of Physiology experiment (The physiological cost of negative work) to experience first-hand the differences between eccentric and concentric exercise and preserve the history of classic physiological experiments.

Learning Objectives
At the end of the symposium students will be able to:

- Describe differences in the physiological responses (metabolic, cardiorespiratory, neuromuscular, and perceptual) between eccentric and concentric muscle contractions
- Identify possible underlying mechanisms contributing to these differences
- Explain general benefits to eccentric exercise training
- Connect findings presented in the symposium to real-world scenarios in rehabilitation and sport training

The following publications form the basis for this proposal

1. Elmer, S.J. et al. (2017). Chronic eccentric arm cycling improves maximum upper-body strength and power. European Journal of Applied Physiology, Epub May 17. doi: 10.1007/s00421-017-3642-9.
2. Kilgas, M.A., Elmer, S.J. (2017). Back to the future! Revisiting the physiological cost of negative work as a team-based activity for exercise physiology students. Advances in Physiology Education, 41, 120-129.
3. Leong, C., McDermott, W., Elmer, S.J., & Martin, J.C. (2014). Chronic eccentric cycling improves quadriceps muscle structure and maximum cycling power. International Journal of Sports Medicine, 35, 559-565.
5. Elmer, S.J., Danvind, J., & Holmberg, H.C. (2013). Development of a novel eccentric arm cycle ergometer for training the upper body. Medicine & Science in Sports & Exercise, 45, 206-211.
6. Elmer, S.J., Marshall, C.S., McGinnis, K.R., Van Haitsma, T.A., & LaStayo, P.C. (2013). Eccentric arm cycling: physiological characteristics and potential applications with clinical and athletic populations. European Journal of Applied Physiology, 113, 2541-2552.
7. Elmer, S.J., Hahn, S.A., McAllister, P.D., Leong, C., & Martin, J.C. (2012). Improvements in multi-joint leg function following eccentric exercise. Scandinavian Journal of Medicine & Science in Sports, 22, 653-661.
8. Elmer, S.J., & Martin, J.C. (2010). Joint-specific power loss after eccentric exercise. Medicine & Science in Sports & Exercise, 42, 1723-1730.

<u>Symposium #16:</u> Gerald R Ford Room – 9:00-9:50am

Aging- and Obesity-Related Inflammation: Consequences and Countermeasures

Session Moderator:
Presenters: Kyle L. Timmerman, Ph.D. and Kevin D. Ballard, Ph.D.

Dr. Timmerman is an Associate Professor in the Department of Kinesiology and Health at Miami University. He earned his Ph.D. from Purdue University in Exercise Science, and completed a post-doctoral fellowship in Muscle Physiology from the Sealy Center on Aging at the University of Texas Medical Branch. His research investigates mechanisms underlying 1) age-related inflammation; 2) the anti-inflammatory effects of exercise and weight-loss; and 3) the development of sarcopenia.

Dr. Ballard is an Assistant Professor in the Department of Kinesiology and Health at Miami University. Prior to joining the Miami faculty, he worked as a Senior Scientist in Preventive Cardiology at Hartford Hospital, completed a post-doctoral fellowship at the University of Connecticut in Nutritional Sciences, and earned his Ph.D. in Kinesiology from the University of Connecticut. The research conducted in Dr. Ballard's laboratory investigates the impact of exercise and/or dietary strategies on vascular function, oxidative stress, and cardiometabolic risk in healthy and clinical populations.

Between 10-33% of older adults are afflicted with sarcopenia, the clinically significant loss of skeletal muscle mass and function associated with increased risk of falls, fractures, and loss of independence. Further, 69% of the U.S. population is overweight or obese, putting them at higher risk of developing chronic disease. In younger adults, muscle protein balance is regulated by alternating and relatively equivalent periods of muscle protein breakdown and synthesis. Emerging evidence suggests that aging- and obesity-related inflammation may disrupt this homeostatic balance, contributing to higher chronic disease risk. Indeed, research conducted by Dr. Timmerman and others has revealed that inflammation may disrupt muscle protein balance by; 1) impairing the ability of nutrient intake to "turn-on" muscle protein synthesis (anabolic resistance); 2) stimulating muscle protein breakdown (proteolysis); and 3) attenuating amino acid delivery to the muscle due to inflammation-induced impairment of vascular endothelial function. Thus, the purpose of this symposium is

to examine the consequences of, and review potential preventive/treatment options targeting sarcopenia and obesity-related inflammation.

At the conclusion of the symposium, the audience should be able to:
1. Communicate the clinical definition of sarcopenia, as well as the consequences associated with this condition.
2. Describe the molecular signaling pathways that are involved in the maintenance of skeletal muscle protein balance.
3. Describe the role of inflammation and impaired vascular endothelial function in disrupting skeletal muscle protein balance.
4. Explain how modifiable lifestyle strategies, including increased physical activity and/or decreased fat mass, may prevent the development of sarcopenia.

Symposium #17: Pantlind Ballroom – 9:00-9:50am

Staying In Shape To Infinity and Beyond: Exercise in a microgravity environment.
Exercise in a microgravity environment. Physiologic adaptations

Session Moderator:
Presenters: John Davis, PhD, Nathan Garvin, PhD, and Phil Anton, PhD.

Dr. Davis is in his 33rd year at Alma College where he holds the title of Charles A. Dana Professor of Integrative Physiology and Health Science. He received funding from NASA for studies on the use of exercise and fluid loading as countermeasures for microgravity and served as a summer faculty fellow at Johnson Space Center. He has studied altitude physiology in Colorado and Ecuador and last year with Department of Defense funding, he worked on a grant with collaborators at the Altitude Research Center that looked to protect Special Forces from the stress of high altitude.

Dr. Garvin received his bachelor's degree in Exercise and Health Science from Alma College in 2010 and subsequently received his PhD from Penn State University in Integrative and Biomedical Physiology in 2017. His graduate research involved the association of variability in cardiovascular responsiveness to reflex activation of the autonomic nervous system with genetics of peripheral sensory receptors. Dr. Garvin is currently an Instructor of Exercise Physiology at Northern Arizona University.

Dr. Anton earned his bachelor's degree in Exercise and Health Science from Alma College in 1992. He then earned a Master's degree in Kinesiology and Applied Physiology from University of Colorado at Boulder in 1999 and a PhD in Sport and Exercise Science from University of Northern Colorado in 2006. He currently is an Associate Professor of Exercise Physiology at Southern Illinois University Carbondale and directs the SIUC Cancer Rehabilitation Laboratory and Strong Survivors Program. Recently, he was a part of the NASA EDGE Eclipse Megacast, making a presentation on exercise in astronauts prior to and during extended space travel.

PURPOSE: The purpose of this symposium is to inform conference participants of various aspects related to the physical training of astronauts prior to and during extended space travel.

With the recent plans to send humans to Mars and back to the moon there has been a renewed interest in the physiological and physical consequences that accompany long-duration spaceflight. Countermeasures proposed to minimize these changes are currently being developed. Two of the most important

countermeasures for long-term microgravity exposure include aerobic and resistive exercise. In this symposium, Dr. Anton will give a brief introduction of the topic and then Dr. Garvin will provide participants with a brief history of humans in space including some of the important studies that have been performed in microgravity. Physiological adaptations in cardiac and neurophysiology function and their consequences for human health will be highlighted. Following Dr. Garvin's presentation, Dr. Davis will describe the potential countermeasures for some of these health risks with a focus on exercise as a countermeasure for some of the negative physiological changes that accompany microgravity. Specific exercise devices and programs will be discussed.

Symposium #18: Imperial Ballroom – 9:00-9:50am

Where Are We and How Did We Get Here?

Session Moderator:
Presenters: Ronald H. Cox, Ph.D., Kyle L. Timmerman, Ph.D., Kevin D. Ballard, Ph.D.

Dr. Ron Cox is an Associate Professor in the Department of Kinesiology and Health at Miami University. He received his Ph.D. in Psychology at The U. of Tennessee under James Lawler and did post-doctoral work in exercise physiology with Dr. Ed Howley. His early work primarily focused on the physiological adaptations produced by endurance activity, particularly as they influenced the physiological responses to psychological stress. Currently research interests focus on the utility and feasibility of altering the work environment to include low intensity, extended duration activity via active work stations. This work has extended to the area of bodyweight regulation.

The purpose of this symposium is to acquaint new students to some of the important investigators in the exercise physiology field. Investigators and papers, one might argue all students should know. A sampling of the seminal papers and conflicts that "pushed" exercise physiology in new directions and that resulted in significant advances in our understanding of physiology are discussed. These include autonomic balance, cardiovascular adaptations and the limits of maximal oxygen consumption, lactate threshold (anaerobic threshold), and muscle fiber type and hypertrophy and hyperplasia. Often, the advances in understanding of these processes were the result of "enthusiastic" differences of opinion between various investigators and their perspectives. This "venom" often greased the tracks of progress in our understanding and these conflicts will be noted.

At the conclusion of the symposium, the audience should be able to:

1. Identify key investigators involved with exercise and autonomic function, training induced cardiovascular adaptations, fiber typing, and lactate threshold.
2. Describe the historical antecedents of the methods and questions posed by these investigators
3. Gain a sense of humility that is inherent with studying past accomplishments.
4. Recognize that very often a contentious issue begins as a dichotomy and is resolved by recognition that a continuum is at play

Poster Session #6: Crown Foyer – 8-9:25pm

Board 1

SEX DIFFERENCES IN SENSORY NERVE-MEDIATED RAPID CUTANEOUS THERMAL HYPEREMIA: A PILOT STUDY

Zachary T. Martin (Ball State University), Andrew T. Del Pozzi (Ball State University)

Abstract: Cutaneous blood flow increases rapidly in skin sites encountering local thermal stimuli. Sensory nerves releasing substance P and calcitonin gene-related peptide primarily modulate this response, although adrenergic nerves and chemical modulators like nitric oxide and endothelial-derived hyperpolarization factors also play a role. Sensory nerve-mediated rapid cutaneous thermal hyperemia (SNM-RCTH) is important for local skin temperature (T_{loc}) regulation and wound healing. While age, fitness, and regional differences in SNM-RCTH have been discovered, it is unknown if there are sex differences in this response. PURPOSE: To determine if there are sex differences in SNM-RCTH. METHODS: Three female and five male participants had a 4 cm^2 area on one forearm and one calf treated with a eutectic mixture of local anesthetic (EMLA cream; sensory nerve blocker). After confirming sensory nerve blockade, EMLA and control sites were instrumented with laser-Doppler probes and local skin heaters. Blood pressure was measured every 5 min on the contralateral arm. Baseline (33 °C) skin blood flow data were measured for 10 min before increasing T_{loc} at each site by 1 °C • 20 s^{-1} to 42 °C to induce rapid cutaneous vasodilation. Once skin blood flow plateaued after 30 min at 42 °C, T_{loc} was raised to 44 °C for 30 min to achieve maximal vasodilation. Data were expressed as a percentage of maximal cutaneous vascular conductance (%CVCmax). Independent samples *t*-tests were performed to analyze sex differences in %CVCmax. Statistical significance was set at $p < .05$. RESULTS: SNM-RCTH in the forearm was 29 ± 6%CVCmax in females and 21 ± 4%CVCmax in males ($p = .30$). In the leg, SNM-RCTH was 18 ± 19%CVCmax in females and 10 ± 4%CVCmax in males ($p = .36$). CONCLUSION: While this pilot study had a very small number of participants, blocking local cutaneous sensory nerves in the forearm and lower leg of both sexes permitted an investigation into whether sex differences exist for SNM-RCTH. Although not statistically significant, a trend for females having a higher contribution of sensory nerves during the thermal hyperemic response was observed. This finding coupled with the results from previous investigations warrants further inquiry with more participants.

Keywords: skin blood flow; laser Doppler flowmetry; local heating; EMLA cream

Board 2

PHYSIOLOGICAL VARIABLES THAT PREDICT SUCCESS IN THE SPORT OF TRIATHLON

Todd Buckingham (Michigan State University), Rebecca W. Moore (Eastern Michigan University), David Ferguson (Michigan State University), Nicholas Myers (Michigan State University), Karin Pfeiffer (Michigan State University)

Abstract Many individuals are new to triathlon, making it difficult for them to accurately predict and maximize their performance. Researchers (Schabort and Hue) have developed equations to predict Olympic-distance

triathlon performance. However, participants were elite triathletes and the sample was 10 or fewer in both studies. Therefore, these findings may not be relevant to a larger sample of amateur triathletes. An online calculator (QT2) is also available for triathletes to predict Olympic-distance triathlon performance, but it has not been verified by scientific research. PURPOSE: To assess the criterion and convergent validity of two scientific equations and the QT2 in predicting actual finish time of an Olympic-distance triathlon for amateur triathletes. METHODS: Participants were non-professional, college-aged triathletes who completed an Olympic-distance triathlon during 2017. Participants performed six exercise tests, as close to their race as possible, either before or after. They also had body composition assessed via BodPod. For three of the exercise tests (peak treadmill speed, 4W/kg cycle, 30-minute bike/20-minute run), participants visited the laboratory at Michigan State University or Eastern Michigan University. Blood lactate was measured for each laboratory test. Participants performed the remaining three exercise tests on their own (400y swim, 20-minute cycle, 5k run). Pearson correlations evaluated relationships for criterion and convergent validity. Several amateurs could not complete the 4W/kg cycle test, so analyses were also run with their data removed. RESULTS: Twenty-two triathletes (20.1±1.4 years, 36.3% female, actual finish time 2:49:12±00:36:00) have completed testing. The QT2 ($r=0.907$, $p<0.001$), Hue ($r=0.893$, $p<0.001$), and Schabort ($r=0.545$, $p<0.01$) were associated with actual finish time. The QT2 and Schabort ($r=0.487$, $p<0.05$), QT2 and Hue ($r=0.850$, $p<0.001$), and Schabort and Hue ($r=0.528$, $p<0.05$), were associated with each other. When athletes who modified the test were removed from the analyses, relationships with Schabort disappeared. DISCUSSION: The QT2 was most closely associated with actual finish time which is encouraging for amateur triathletes because it involves easily accessible tests, unlike both scientific equations which require blood lactate testing. Because the scientific equations were developed using elite triathletes and include a more demanding testing protocol as compared to QT2, they may not be necessary for amateurs.

Keywords: Triathletes, performance, calculator, equation

Board 3

FOUR-WEEK UPPER-EXTREMITY EXERCISE PROGRAM ON A BALANCE DEVICE IMPROVES POWER AND STABILITY IN COLLEGIATE GOLFERS

Elise Strutt (Briar Cliff University), Andrew Shim (College of Saint Mary), Mike Waller (Arkansas Tech University), Daniel Jung (Briar Cliff University)

Abstract Purpose: The purpose of the study was to investigate if upper body power and flexibility could improve over a period of four weeks on college overhead athletes using an experimental balance board. Relatively little research has been conducted examining the combination of power and flexibility and if both variables could be enhanced through the use of an experimental device. Methods: 23 collegiate athletes who participate in overhead sports. Age (20.4 ± 1.4 years), height (67.7 in ± 6.6 in.), weight (171.8 lb ± 87.6 lb) were assessed before the group selection. A two group non-equivalent pre-test/post-test design was selected for this study. 10 college athletes were selected for the experimental group while 13 were selected as the control group. Testing included shoulder flexion, hyper-extension (shoulder flexibility) by a goniometer and using a Closed-Kinetic Chain Upper-Extremity Stability test to determine upper body power output. Testing was conducted before and after a 4-week upper-extremity exercises conducted on a balance device. The experimental group participated in a 4-week training program, consisting of 8 exercises, 3 times a week. Each exercise was a dynamic upper-body exercise with a certain number of repetitions. The exercises had a 2-minute break in between to achieve maximal effort for every exercise. A two tailed dependent t-test was selected to analyze differences, if any between the experimental and control group. Results: The

experimental group revealed a significant improvement (p=0.001) in upper-extremity power (63.34 sd ± 4.48) and stability (.13 sd ± .01)). The shoulder flexibility for the experimental group demonstrated no significance (p=0.058) in the left shoulder hyperextension, but showed significance (p=0.033) in the right shoulder hyperextension (7.22 sd ± 2.83). The control group demonstrated a (180.69 sd ± 5.35) decrease in shoulder flexion in the right shoulder. Conclusion: This study demonstrated that performing specific exercises improves upper-extremity power and over-head shoulder flexibility within 4 weeks on college overhead athletes.

Keywords: Closed-Kinetic Chain Upper-Extremity Stability Test, Golf, Conditioning

Board 4

CARDIORESPIRATORY RESPONSES AND GENDER DIFFERENCES BETWEEN TWO TYPES OF ABDOMINAL EXERCISES

Samantha Butterbaugh (Cleveland State University), Karen Barrientos (Cleveland State University), Nicholas Chambers (Cleveland State University), Jamie VanDewerker (Cleveland State University), Jessica White (Cleveland State University), Kenneth Sparks (Cleveland State University), Eddie Lam (Cleveland State University)

Abstract: One of the biggest problems in fitness is finding a workout method that is effective yet enjoyable. PURPOSE: The purpose of this study is to compare cardiovascular and gender-specific responses to two different methods of abdominal exercise using commercially available abdominal-targeting whole-body exercise devices. A secondary aim was to determine which type of device is more enjoyable. METHODS: Two commercially available exercise devices designed to target primarily the abdominal muscles while utilizing whole-body movement were used in this study. One device required the subject to use a standing posture, while the other device required the subjects to sit. Heart rate, Rate of Perceived Exertion (RPE), ventilation, oxygen consumption (VO_2), and total kilocalories were all measured on 21 males and 20 females while performing abdominal exercise using the standing and sitting devices for 10 minutes each. Subjects were instructed to work at an intensity that elicited 75% of their age predicted maximal heart rates. Heart rate was monitored using wireless ECG telemetry. Ventilation, oxygen consumption and total kilocalories were assessed using a portable metabolic cart. Each subject performed both types of exercise on separate days in a random order. At post-testing for each type of exercise, subjects completed the Perception of Exercise Experience questionnaire. A repeated measures ANOVA in IBM SPSS was used to analyze the cardiorespiratory responses and their differences across gender. RESULTS: Between the two types of exercise there was a significant difference ($p < 0.05$) between heart rate (stand=118±15 bpm, sit=128±16 bpm), RPE (stand=11.2±1.9, sit=13.5±1.9), and ventilation (stand=30.2±7.6 L/min, sit=36.9±11.8 L/min). The results across gender also showed that there were significant differences in VO_2 (stand: females=0.86±0.15 L/min, males=1.22±0.28 L/min; sit: females=0.94±0.16 L/min, males=1.13±0.25 L/min) and total kilocalories (stand: females=44.2±7.7, males=64.8±15.8; sit: females=50.4±8.8, males=61.0±15.2). The post-test questionnaire showed that the standing abdominal exercise device was more enjoyable than the sitting abdominal exercise device. CONCLUSION: The data collected displayed that the subjects preferred the standing abdominal exercise over the sitting abdominal exercise. The sitting device elicited a higher heart rate; however, both exercises burned the same amount of calories. This study was funded by the Cleveland State University Undergraduate Summer Research Award Grant.

Keywords: Core training, energy expenditure, enjoyment

Board 5

RELATIONSHIP BETWEEN WORK POWER & VELOCITY & EMG INDICES OF FATIGUE DURING RESISTANCE EXERCISE

Andrew Renggli (Miami University), Jarod Vance (Miami University)

Abstract Methods for monitoring resistance exercise (RE) loads have been popularized through new technologies. However, little is known about the use of these technologies to explore the relationship between mechanical & neuromuscular indices of muscle fatigue during RE. Purpose: (1) To examine the relationship between changes in external mechanical variables such as Work (W), concentric Power (P), and concentric Velocity (V) and the quadriceps EMG during 1 set of 1-leg knee extension (RE) to failure. (2) To determine if external mechanical variables can be used as a proxy to predict EMG-based acute muscle fatigue during RE. Methods: 28 males familiar with resistance training volunteered. Body composition (air plethysmography) and 1-RM for a 1-leg knee extension RE was completed. After at least 96 hours, subjects performed as many reps (5.4+/-1.1) as possible at 90% 1-RM until failure. EMG was collected from the vastus medialis (VM), vastus lateralis (VL), and rectus femoris (RF) of the exercise leg. Total Power (TP), Mean frequency (MF) and Area (A) spectral/amplitude data were used for EMG analysis. External mechanical data was collected via an ultrasound sensor and custom-built software to measure weight-stack movement (i.e., time and distance). 1 X 4(Reps) ANOVA with RM and 3(Muscle) X 5(Reps) MANOVA with RM, and a-priori contrasts were used to make specific pairwise comparisons. Results: V and P for Reps1&2 (V=23.6+/-15.5cm/s; P=182.5+/-125.4J/s) were significantly greater than Reps3-5 (V=14.3+/-9.4cm/s; P=107.3+/-77.8J/s); $p<0.05$. W was not statistically different across Reps1-5. EMG for VM, VL RF exhibited similar patterns of activation (no between muscle differences or interactions). TP, M & A during Reps1&2 (TP=118758+/-18066mV^2/Hz; MF=254.0+/-20.7Hz; A=571.2+/-84.5) were significantly less than Rep3-5 (TP=229874+/-66374mV^2/Hz; MF=318.8+/-21.2Hz; A=994.0+/-155.5); $p<0.05$). Conclusion: Quadriceps EMG responses representative of local neuromuscular fatigue begins to occur after Rep2 during 90% of 1-RM RE. Similarly, V and P during the concentric phase of the muscles' action significantly decrease after Rep2, without a decrease in W. These data suggest that external measures of V and P can be used as proxy measures of local neuromuscular fatigue during localized high-intensity RE.

Keywords: muscle, neuromuscular

Board 6

THE EFFECTS OF BINGOCIZE ON MUSCULAR STRENGTH, BALANCE, BODY COMPOSITION AND CONFIDENCE IN ADLS IN THE ELDERLY

Caroline Moore (Indiana Wesleyan University), Melissa Cook (Indiana Wesleyan University), Aly Williams (Indiana Wesleyan University), Nate Foster (Indiana Wesleyan University), Brooke Meinert (Indiana Wesleyan University), Kayla Deaton (Indiana Wesleyan University), Lindsay Rogan (Indiana Wesleyan University)

Abstract In the elderly, fall risk increases due to a lack of balance, coordination, and physical fitness (Skalko, et al., 2013). This rising issue affects older adults and the medical professionals who provide care in a geriatric setting. By promoting a healthier lifestyle and an increased awareness of this problem, this study aimed to determine if exercise improved strength and balance, which could decrease fall risk. PURPOSE: The purpose of this study is to investigate the impact of Bingocize on body composition, muscular strength, balance and

confidence in ADLs in the elderly. METHODS: Subjects were 14 adults (13 females/1 male; mean age = 71 yrs.) Pre-assessments for balance (8 ft Up and Go (8UG)), strength (arm curl test (AC), handgrip dynamometer (HG), 30 sec chair stand (30CS)), body composition (body fat percentage (BF%) and body mass index (BMI)), and confidence in ADLs (ABC scale) were conducted, followed by the exercise intervention. Bingocize engages elderly in exercise by combining Bingo with exercise. After 5 rolls of Bingo, subjects complete 2 sets of 3 resistance band exercises. The Bingocize™ program lasted 10 sessions (two sessions/week). Afterward, post-assessments were completed by participants of the pre-assessment, for comparison. Paired t-tests using SPSS software determined the significance of Bingocize™ on the measured variables. RESULTS: Results from this study indicated a statistically significant increase in AC test (mean±SD 17±4.32 pre, 21.5±4.38 post) (t(13)= -3.64, p<.05), 30CS (mean±SD 10.85±4.18 pre, 12.54±3.71 post) ((t(12)=-3.027, p<.05), and 8UG (mean±SD 8.10±3.60 pre, 7.09±3.28 post) (t(13)=3.011, p<.05). All other measures, BF%, BMI, ABC scale, and HG were not significant. Although not significant, increases in ABC score (mean±SD 70.81±24.52 pre, 77.26±18.95 post, p=.055) and HG (mean±SD 20.29±7.89 pre, 22.79±6.76, p=.075) are noteworthy. CONCLUSION: The research findings suggest Bingocize™ is an effective exercise program that increases 1) confidence in the elderly population's ADLs, 2) upper and lower body strength, and 3) balance. Greater increases in strength occurred with increase resistance from the bands. Participants continually emphasized personal enjoyment of the program from the social environment and the desire to continue exercise at study's completion. A wide-variety of clinicians can use these results to encourage exercise engagement in elderly patients. Retirement or elderly communities can adopt this protocol as a successful way to implement an enjoyable and effective exercise program.

Keywords: resistance bands, exercise, older adults, games

Board 7

THE INFLUENCE OF COMBINED WHOLE BODY VIBRATION AND DYNAMIC EXERCISE TRAINING ON PERIPHERAL AND CENTRAL BLOOD PRESSURE IN HEALTHY OLDER MEN AND WOMEN

Cody A. Altherr (Ball State University), Rachel Aschenbrenner (Ball State University), Matthew P. Harber (Ball State University), Andrew Del Pozzi (Ball State University), Paul Nagelkirk (Ball State University), Ashton Freeman (Ball State University)

Abstract Whole body vibration (WBV) interventions can result in favorable hemodynamic changes, however little in known about the influence of WBV in older adults. PURPOSE: To analyze the influence of 12 weeks of WBV and dynamic exercise training on peripheral ($_b$BP) and central blood pressure ($_c$BP) in apparently healthy older adults. The secondary purpose was to examine the effect of WBV and dynamic exercise training on body METHODS: Five individuals (3 female/2males, age 66±2y; BMI 30.0±2.1 kg/m2) completed all testing and training procedures. Each subject performed 12 weeks of WBV and dynamic exercise training 3 days per week. The vibration amplitude was set at low (1-2mm) for weeks one through six and high (3-4 mm) for weeks seven through 12. There were periodized increases in frequency throughout the 12 weeks such that frequency increased 10 Hz every two weeks, beginning at 30 Hz. Once 50 Hz was reached, the frequency returned to 30 Hz and progressively increased back up to 50 Hz until the conclusion of the training. Pulse wave analysis (PWA) and dual x-ray absorptiometry (DXA) were performed pre- and post-training. Means from Pre and Post-Training for each dependent variable were compared with a dependent T-test. RESULTS: Adherence to the program was 96% (34.6/36 sessions). Mean session duration was 31.1±0.5 minutes with a total vibration exposure of 14.4±0.6 minutes. $_b$BP was lower (p=0.009) after training (74.2±1.0 mmHg) compared to before (77.2±1.2 mmHg). $_c$BP was also lower (p=0.003) after training (75.4±1.0 mmHg) compared to before (78.0±1.0

mmHg). No significant differences were found with brachial or central systolic BP or pulse pressure (PP), augmentation index (AIx), augmentation index normalized to a heart rate of 75 bpm (AIx@HR75), augmentation pressure (AP), PWV, total lean mass, total fat mass, or body fat percentage from pre-training to post-training. CONCLUSION: This pilot data suggest that WBV plus dynamic exercise may favorably impact peripheral and central hemodynamics in older adults without significant changes in body composition. Further research is warranted to evaluate the effects of WBV training in healthy older men and women.

Keywords: Cardiovascular Disease, Augmentation Index, Body Composition, Pulse Wave Velocity

Board 8

THE EFFECTS OF NEONATAL UNDERNUTRITION ON EXERCISE CAPACITY IN ADULT MICE

William J. Clark (Michigan State University), Olivia S. Lord (Michigan State University), Ashley N. Triplett (Michigan State University), David P. Ferguson (Michigan State University)

Abstract Previous research has found that early life undernutrition increases the risk of cardiovascular disease later in life. It is hypothesized that exercise training could mitigate the cardiovascular impairments of early life undernutrition. PURPOSE: To evaluate the effects of early life undernutrition on changes in exercise capacity after 4 weeks of treadmill training in a mouse model. METHODS: FVB mice were cross-fostered to dams fed either a 20% (control) or 8% (low protein) diet. Dams fed a low protein diet induces growth restriction by early life undernutrition resulting in gestation undernutrition (GUN), lactation undernutrition (PUN), gestation plus lactation undernutrition (GUN+PUN), or a nutritionally complete control (CON) group. At PN21 (21 days post-natal), all mice were weaned and fed a control diet. Thus, all physiological effects of undernutrition were isolated to early life. To evaluate exercise capacity, maximal work on a treadmill was performed at PN39 (baseline) and PN67 (post). Starting at PN41, 20 mice were trained on the treadmill for 4 weeks with alternating 8 minutes at 85% and 2 minutes at 55% of their maximum workload for one hour for 5 days/week. The sedentary group of 18 mice ran on the treadmill 3 days/week for 15 minutes at 10m/min. Data were analyzed using an ANOVA and Tukey post-hoc test (alpha level $p<0.05$). RESULTS: After 4 weeks of treadmill training, the CON, GUN, and PUN+GUN groups had significant increases in exercise capacity (CON: 3.4+/-1.4J, GUN: 2.8+/-1.3J, PUN+GUN: 6.0+/-1.2J) ($p<0.05$). The PUN group experienced no significant changes (PUN: 1.7+/-1.2J) after training. CONCLUSION: Results indicate that 4 weeks of exercise training can improve exercise capacity in mice who were undernourished during gestation and gestation plus lactation, but not undernutrition during lactation only. PN1-21 is associated with cardiac growth and the nutrient restriction could potentially limit cardiac growth factors preventing stroke volume adaptations with training.

Keywords: Exercise training, cardiovascular, early life

Board 9

BDNF MAY ACT AS A METABOTROPHIN MEDIATOR FOR DIET- AND EXERCISE-INDUCED COGNITIVE AND METABOLIC IMPROVEMENTS

Alex P. Eason (Grand Valley State University), Mark H. Baker (Grand Valley State University), Lauren N. Miutz (University of Calgary), Amy M. Gyorkos (Grand Valley State University)

Abstract Metabolic syndrome (MetS) has been recognized as one of the most important clinical challenges and global health issues of today. Growing evidence suggests that mechanisms of energy metabolism may play a key role in mediating aspects of cognitive function by common factors exhibiting both neurotrophic and metabotrophic roles. One such factor is Brain-derived neurotrophic factor (BDNF), which is well known for its critical role in neuronal plasticity, including memory and learning, and more recently metabolic processes, including body weight control, food intake and energy homeostasis. BDNF expression increases with interventions such as diet and exercise; particularly with restricted carbohydrate (RC; ≤50gCHO) diets and high intensity interval training (HIIT). PURPOSE: The purpose of this study is to investigate the effect of diet and exercise on cognitive and metabolic function in individuals characterized with MetS. METHODS: Eleven subjects with MetS (according to ATP III) followed a crossover design with two 4-wk interventions, including a RC diet with high intensity interval training (RC-HIIT) and a RC diet with sedentary activity (RC-Sed), separated by a 4-wk washout period. RESULTS: Compared to baseline, RC-Sed and RC-HIIT improved cognitive function, including improved serum BDNF (+20%, +38%), psychomotor speed and cognitive flexibility (-6%, -11%), and self-perceived cognitive flexibility (+8%, +16%), respectively. Compared to baseline, RC-Sed and RC-HIIT also improved metabolic markers including improved waist adiposity (-15%, -18%), weight loss (-3%, -5%), body fat % (BF%; -7%, -12%), fasting plasma glucose (GLU; -20%, -27%), triglycerides (TG; -47%, -52%), HDL-C (+22%, +36%), and mean arterial pressure (MAP; -28%, -34%), respectively. RC-Sed and RC-HIIT also improved fasting insulin (-34%, -39%), HOMA-IR (-37%, -41%), and adiponectin (+33.7%, +38%) levels, respectively when compared to baseline. BDNF was positively correlated with RC-Sed and RC-HIIT psychomotor speed/cognitive flexibility (r=0.28, r=0.26; P<0.001), HDL-C (r=0.27, r=0.26; P<0.001) and adiponectin (r=0.47, r=0.42; P<0.005), and inversely correlated with BF% (r=-0.15, r=-0.17; P<0.001), GLU (r=-0.19, r=-0.18; P<0.001), TG (r=-0.24, r=-0.21; P<0.01), and HOMA-IR (r=-0.28, r=-0.25; P<0.001) levels, respectively. CONCLUSION: These findings suggest both RC-Sed and RC-HIIT were able to improve cognitive and metabolic factors, while RC-HIIT outperformed RC-Sed results in all instances. Also, these effects may be dependent on BDNF as a metabotrophin mediator.

Keywords: HIIT, Restricted Carbohydrate Diet

Board 10

COMPARISON OF PHYSIOLOGICAL RESPONSES TO A BOUT OF UPPER BODY & LOWER BODY RESISTANCE EXERCSES IN YOUNG ADULTS

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Abstract Cardiorespiratory responses during a bout of resistance exercise (RE) are not well understood, given the nature of RE. PURPOSE: To compare cardiorespiratory responses during upper & lower body RE and to determine the relationship between the O_2 cost of upper (UB) and lower body (LB) RE and the volume of work (V). METHODS: Ten healthy males (4) and females (18-25 yrs) volunteered. Day1: body composition (air plethysmography) and VO_2max were assessed. Day2: Subjects completed a 1-repetition maximum (1-RM) for each of 7 RE. Exercise Day: Following 6 min of seated Rest, each subject completed an RE routine in the following order: Chest Press (CP), Shoulder Press, Leg Extension (LE), Biceps Curl (BC), Triceps Extension, Abdominal Leg Raises, Pull-Down, & Leg Press (LP) while wearing a HR transmitter and portable metabolic measuring system. Each subject performed 2 consecutive sets (12 reps/set) of each RE at 75% 1-RM. Each RE set was separated by 1min of sitting Rest (R). V was calculated by multiplying resistance X repetitions X sets. VO_2, VCO_2, RER, Ve & HR were measured continuously. For each RE, data were averaged across both sets & R

intervals. LP & LE (LB) and CP & BC (UB) were the RE used for comparisons. Paired T-Tests and Pearson's partial correlation coefficients were used to test for statistical significance. RESULTS: VO_2 (UB: 13.2(1.8) vs LB: 17.5(2.0) ml/kg/min) VCO_2, HR (UB: 118.9(13.6) vs LB: 132.8(15.3) b/min) & V (UB: 1883(691) vs LB: 4064(964) kg) were significantly higher during Lower Body RE ($p<0.01$). UB VO_2 & VCO_2 were significantly correlated with V (VO_2: .671, VCO_2: .741; $p<0.05$). CONCLUSION: LB RE resulted in significantly higher VO_2, VCO_2 and HR responses during this specific RE routine. Further, UB VO_2 & VCO_2 was significantly correlated with UB V, however LB VO_2 & VCO_2 was not correlated with LB V even after controlling for body weight or Total V. These results suggest that even though VO_2, VCO_2 & HR responses to LB RE are greater when compared to UB RE; this relationship deteriorates as a function of the muscle mass activated to perform these specific RE.

Keywords: Metabolic, upper-body, lower-body

Board 11

ACUTE INFLUENCE OF CAFFEINE ON ARTERIAL STIFFNESS AND CENTRAL BLOOD PRESSURES FOLLOWING AEROBIC EXERCISE

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Abstract Caffeine ingestion is known to alter blood pressure, however, the interactive effect of caffeine and exercise on central blood pressure is unknown. PURPOSE: To examine the acute influence of caffeine and moderate-intensity aerobic exercise on post-exercise central blood pressures and arterial stiffness. METHODS: Ten non-hypertensive males (aged 55±5; range 31-71 years) completed two exercise trials after ingestion of caffeine (400 mg) or placebo. Measurements were taken before and 30 minutes post-ingestion via pulse wave analysis (PWA) to evaluate peripheral (brachial) and central (aortic) blood pressures. Arterial stiffness was assessed via pulse wave velocity (PWV). Participants then performed a 40-minute continuous cycling bout at 65-75% of estimated HRmax using identical workloads. PWA and PWV were collected again 10 and 30 minutes post-exercise. Data were analyzed via two-way ANOVA with repeated measures. RESULTS: Prior to exercise, compared to placebo, caffeine increased ($P<0.05$) brachial diastolic blood pressure (bDBP) (+8mmHg), central systolic blood pressure (cSBP) (+11mmHg) and central diastolic blood pressure (cDBP) (+7mmHg) while brachial SBP was unchanged. PWV was higher 30 minutes after caffeine ingestion, independent of trial ($P<0.05$) while there was a trend for an interaction ($P=0.074$), suggesting an increase in PWV with caffeine. After exercise, bSBP and PWV were higher in caffeine ($P<0.05$) likely due to the influence of caffeine prior to exercise. cSBP and bDBP were lower after exercise, independent of trial ($P<0.05$) while bSBP and cDBP trended ($P=0.07$) to be lower after exercise, independent of trial. PWV remained higher ($P<0.05$) after exercise in caffeine compared to placebo but was not influenced by exercise. At rest, augmentation pressure (AP) and index (AIx) were not influenced by caffeine ingestion. Conversely, both AP and AIx were lower ($P<0.05$) after exercise in placebo only. CONCLUSION: These findings confirm previous reports that central blood pressures are more sensitive to acute stimuli relative to peripheral measures. Caffeine ingestion elevates central hemodynamics and arterial stiffness, which persists even after exercise. Furthermore, pre-exercise caffeine ingestion appears to blunt the normal hypotensive response to exercise leading to a greater afterload on the heart.

Keywords: Pulse wave analysis (PWA), Pulse wave velocity (PWV), Augmentation Index (AIx), Central Hemodynamics

Board 12

THE EFFECTS OF VIRTUAL REALITY ON MOTOR BEHAVIOR: APPLICATIONS TO PHYSICAL THERAPY

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Abstract PURPOSE: A rich body of knowledge exists in the literature outlining the motor learning process, particularly when motor skills are physically practiced (Magill & Anderson, 2014; Tresilian, 2012). However, very little is known about the motor learning process when skills are practiced utilizing relatively new virtual reality technology such as the Oculus Rift system. The aim of this study was to compare the motor learning effects between two practice groups; physical practice and virtual reality. The information provided by this study provides a foundation for motor learning research when skills are practiced in a virtual environment. It was hypothesized that the motor learning effects of virtual reality practice would be comparable to more traditional physical practice. METHODS: Participants were split into two groups; physical practice (n=35) and virtual reality practice (n=33). The protocol for each group involved two consecutive days of testing which included a identical testing phases at the beginning and the end of each day of practice. During each testing phase, participants were required to putt a golf ball on a putting accuracy surface 10 times. Accuracy data were recorded and ranged from 0 (most accurate) to 16 (least accurate). In between the testing phases each group practiced golf putting in the environment according to their assigned group for 50 total putts each day. Both of the two days were identical and consisted of testing and practice phases. The only difference between the two groups was the environment in which they practiced the skill (i.e., physical practice or virtual reality). RESULTS: A 2 (condition) X 4 (test phase) repeated measures ANOVA was used to test if significant differences existed between the experimental conditions. The results of this test revealed that there was a significant main effect for test phase but there was not a significant effect for condition. Post-hoc testing indicated that both groups improved their putting accuracy during the course of the study. The physical practice group improved its scores from ~7.6 to ~7 and the virtual reality practice group improved its scores from ~8.3 to ~6.8 indicating an increase in accuracy over the two day period. CONCLUSION: The results of this study indicate that virtual reality practice was equally effective when compared to traditional physical practice for improving motor performance in a golf putting task. This project was funded with a grant from Southern Illinois University in Carbondale's Center for Undergraduate Research and Creative Activities (CURCA) through the Research Enriched Academic Challenge (REACH) Award

Keywords: Motor-Learning Practice Golf-Putting

Board 13

ANCESTRAL BASED DIET AND EXERCISE IMPROVES METABOLIC AND INFLAMMATORY PROFILES IN METABOLIC SYNDROME

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Abstract One approach to slow the pandemic of obesity and chronic disease is to look to our evolutionary past for clues of the changing behaviors contributing to the emergence of 'diseases of civilization'. One theory is that agricultural and technological advances have introduced pressures (diet and activity changes) quicker than our genetic ability to respond, causing a mismatch between our systems and the environment.

Researchers have shown that returning humans to an ancestral--based Paleolithic diet (with restricted carbohydrates; RC) results in improved blood pressure, body fat percentage, waist circumference, fasting blood glucose, gut, lipid and metabolic profiles, as well as lower levels of systemic inflammation and oxidative stress when compared to other diets. In addition, exercise, particularly high intensity interval training, has been shown to reduce the pro--inflammatory state and improve gut health, blood lipid panels, metabolic profiles, cognition, and quality of life. PURPOSE: The purpose of this study was to investigate the effects of diet and exercise patterns that more closely resemble those of our evolutionary past on inflammatory and metabolic profiles in individuals characterized as having Metabolic Syndrome (MetS). METHODS: Eleven subjects with MetS followed a crossover design with two 4-wk interventions, including a restricted carbohydrate (RC; ≤50gCHO) diet with high intensity interval training (RC-HIIT) and a RC diet with sedentary activity (RC-Sed), separated by a 4-wk washout period. RESULTS: Compared to baseline, RC-Sed and RC-HIIT improved peak aerobic capacity (+22%, +29%), and improved metabolic markers including waist adiposity (-15%, -18%), weight loss (-3%, -5%), body fat % (BF%; -7%, -12%), fasting plasma glucose (GLU; -20%, -27%), triglycerides (TG; -47%, -52%), HDL-C (+22%, +36%), mean arterial pressure (MAP; -28%, -34%), fasting insulin (-34%, -39%), HOMA-IR (-37%, -41%), adiponectin (+33.7%, +38%), and leptin (+33.7%, +38%), levels, respectively when compared to baseline. RC-Sed and RC-HIIT also improved inflammatory markers including hsCRP (-32%, -36%), TNF-alpha (-35%, -41%), IL-6 (-29%, -40%), and ICAM-1 (-19%, -23%), respectively, when compared to baseline. CONCLUSION: A paleolithic diet (CHO <50g/day) alone and with exercise (HIIT) improves inflammatory and metabolic profiles. Adopting behaviors from our evolutionary past, including diet and exercise, shows favorable metabolic and inflammatory profiles in those that characterize with MetS.

Keywords: Low carbohydrate diet, HIIT, Paleolithic diet

Board 14

THE IMPACT OF TREADMILL WORKSTATION USE DURING THE WORKDAY ON RISK FACTORS OF CARDIOVASCULAR DISEASE

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Abstract Treadmill workstations (TMWS) have been used to increase physical activity in the workplace. However, the effect of long-term TMWS on cardiovascular disease (CVD) risk factors is unknown. PURPOSE: To examine the effects of a nine-month TMWS intervention in sedentary university employees on CVD. METHODS: Twenty-two sedentary university employees (3 males/19 females; age 52.7±7.3 years; BMI 29.5±3.3 kg/m2) participated in this investigation (n=13 TMWS, n=9 control group). Intervention subjects were provided a TMWS and instructed to reduce workday sitting time by 75% using the TMWS. Control subjects were instructed to maintain normal daily activity levels. Plasma levels of high-density lipoprotein (HDL), total cholesterol (TC), glucose (BG), hemoglobin A1c (HbA1c), C-reactive protein (CRP), as well as resting supine blood pressure (BP), body weight, waist circumference, steps/day, and iDXA measured body composition were assessed at baseline and at four and nine months of the intervention. Comparisons of the variables were made using two-factor multivariate analyses of variance (group × time) with repeated measures on time. RESULTS: Workday steps, measured using an ActiGraph GT3X+ accelerometer, increased (+3800±840 steps; p=0.045) in the intervention group. There were no changes in steps three hours following work, indicating no compensation for increased activity during the workday. Total percent body fat (-0.71±2.12%; p=0.016), total fat mass (-414±644 g; p=0.032), and total lean body mass (+650±244 g; p=0.015) were altered at nine months, independent of group, while waist circumference was lowered in the TMWS group (-1.72±0.87 cm, p=0.043)

only. Additionally, total body weight trended to be lower (p=0.095) after the intervention in the TMWS group. HbA1c increased at four months, (p=0.025) and decreased between four and nine months (p=0.003), independent of group. DBP increased from four to nine months in the intervention group and decreased in the control group (p=0.032). No changes in SBP, HDL, TC, BG, and CRP were observed for either group. CONCLUSION: The nine month TMWS intervention did not result in a direct measurable reduction on CVD risk factors in low to moderate risk individuals. However, TMWS may favorably impact body composition and physical activity levels, which supports the TMWS as a preventative strategy for overall health.
Keywords: Body composition, hemoglobin A1c, blood pressure, workday steps

Board 15

THE EFFECTS OF ELEVATION TRAINING MASKS ON AEROBIC ENDURANCE IN TRAINED INDIVIDUALS

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Abstract Aerobic endurance is the body's ability to supply oxygen to its working muscles over an extended period and is tested using a VO_2max test. Oxygen-dependent exercise at altitude has demonstrated ability to increase maximal oxygen uptake over a time. Traditional means of altitude training can be time-consuming and expensive, so alternative methods that simulate altitude exposure have been developed. These masks maintain that they induce the same cardiorespiratory fitness changes that an athlete training at altitude would experience. They also claim that these improvements occur in a shorter training periods than typical altitude training protocols. However, there is little research to support these claims. PURPOSE: The purpose of this study is to measure the potential effects of training at a simulated altitude on aerobic endurance using a two-week YMCA cycle ergometer protocol. METHODS: Based on subjects' VO_2max scores, 17 subjects were put into one of three groups, a control group (CG), a group training without the mask (No-mask), and a group training with the mask (mask). Each training session had the participants cycle for twelve minutes, at 50-60% of their heart rate reserve (HRR), followed by a 3-minute cool-down. Eight training sessions were completed within two weeks. RESULTS: Using a 3X2 mixed ANOVA, for within subjects, there was not a significant increase in VO_2max ($F(1,2,14)=.873$, $P>.05$). Means ± standard deviations for CG were pre 44.72±9.69ml/kg/min and post 45.07±8.96ml/kg/min. Means ± standard deviations for no-mask group were pre 42.70±8.83ml/kg/min and post 44.10±11.47ml/kg/min. Lastly, the means ± standard deviations for mask group means were pre 45.50±8.72ml/kg/min and post 47.91±8.96ml/kg/min. There were no significant differences in VO_2max between the control and experimental groups ($F(1,2,14)=.170$, $P> .05$) either. Although the between groups data was not statistically significant, there was a greater increase in the mask group's aerobic endurance compared to the two other groups. CONCLUSION: When looking at the increase in VO_2max in response to a leg ergometer protocol, all three groups demonstrated an increase in VO_2max at the completion. Those who trained with simulated altitude masks showed the greatest improvement from pre- to post-testing, which could be a result of the mask use, in addition to the participant's outside training. The improvement shown in the other two groups may be a result of the participants' continued training outside of the study, as well as other factors.

Keywords: simulated altitude, YMCA protocol, maximal oxygen consumption

Board 16

RELATIONSHIP BETWEEN ANAEROBIC WORK AND METABOLIC VARIABLES

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Abstract Resistance Exercise (RE), due to its short high intensity nature, primarily uses glycolysis; producing more CO_2 than utilizing O_2. The relationship between Mechanical Work, O_2, CO_2, and acute muscular fatigue during RE is not well understood. **PURPOSE:** To investigate the relationship between volume of O_2 (VO_2), volume of CO_2 (VCO_2), and total mechanical work (TMW) in response to multiple sets of high intensity (90% 1-RM) 1-Leg Leg Extension (LE) RE completed to failure. **METHODS:** 25 males, Age=20.3±1.1yrs, BMI=24.2±2.1, BodyFat%=13.7±6.1, volunteered: Day1 included body composition (air-plethysmography) and 1-RM assessment of dominant 1-leg LE. On Day2: (at least 96 hours later) subjects' completed multiple sets of 90%1-RM LE Each set was completed to failure; 15-20 seconds later another set to failure was completed. This sequence (sets to failure) continued until a set was composed of < 1 repetition; subjects' then completed 10 minutes of sitting rest (Post-RE R). Metabolic measures were recorded on a breath-by-breath basis. VO_2 and VCO_2 were calculated as the sum totals, in ml/min, for the total RE time period (all reps & sets) & Post-RE R. TMW was measured with an ultrasound sensor (distance & time of weight stack movement) and custom-built software. Correlations, Linear Regression, and Min-Max Accuracy were used to assess the relationship between TMW, VO_2, and VCO_2. **RESULTS:** Averages and standard deviations for comparison variables of interest: TMW=3491.1±2127.9Nm,VO_2=13210.9±2858.5ml/min, VCO_2=15407.4±4136.1ml/min, and failure-set=3.1±1.2. Insignificant correlations were found between TMW and VO_2 (r=0.28) & TMW and VCO_2 (r=0.213). Linear Regressions suggested TMW had little explanatory power for VO_2(p=0.175, AdjR^2 = 0.038), and VCO_2(p=0.306, AdjR^2 = 0.004). Min-Max Accuracy measures, comparing in-sample predictions (TMW data plugged into Linear Regression Models) to observed values, were 84.5% for VO_2, and 79.14% for VCO_2. **CONCLUSION:** Weak Correlations and low AdjR^2 values suggest very little relationship between TMW and metabolic measures during and following RE. Min-Max Accuracy measures suggest TMW does not predict VO_2 & VCO_2 well. These results are not unexpected as the work of RE is primarily governed by anaerobic processes and O_2 is not the primary energy source for this type and intensity of activity.

Keywords: Work, Anaerobic, Metabolics, VO2

Board 17

DIFFERENCES IN VELOCITY OUTPUT IN THE BACK SQUAT, BENCH PRESS, AND DEADLIFT AMONG COLLEGIATE HOCKEY PLAYERS

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Abstract: Resistance-training loads are commonly assigned as a percentage of an individual's one-repetition maximum (1-RM). Unfortunately, repetition maximums do not account for an athlete's current state of readiness (training state). The use of velocity-based training (VBT) provides objective data about training state, and is an effective and reliable method of examining an athlete's movement efficiency. Currently, there is insufficient evidence regarding velocity profiles of exercises that are body-weight dependent (BWD) such as the free-weight back squat (BS) and deadlift (DL) compared to non-body-weight dependent (NBWD) such as

the barbell bench-press (BP). PURPOSE: The purpose of this study is to determine velocity profiles for the BS, BP and DL in Division III collegiate male hockey players. METHODS: Fourteen Division III male collegiate hockey players, (age 21.3 ± 1.5 years; height 181.2 ± 5.0 cm; mass 88.6 ± 8.8kg) completed this study. Prior to velocity testing, body composition via air displacement plethysmography (BodPod) and one repetition maximum (1RM) for the BS, BP, and DL were measured. On separate days, subjects performed nine repetitions each of the BS, BP and DL (10, 20, 30, 40, 50, 60, 70, 80, and 90% of their 1RM). Average velocity was measured with a Tendo Power Analyzer (Tendo Sports Machines, Slovak Republic). A repeated measures ANOVA was used to investigate the impact of exercise on mean velocity (alpha level of $p \leq 0.05$). RESULTS: Subject anthropometric measurements included: BMI (26.95 ± 2.0 kg/m^2) and percent body fat (17.12 ± 3.4 %). 1-RMs for the BS, BP, and DL were 146.0 ± 13.1 kg, 103.7 ± 15.3 kg, and 156.84 ± 14.9 kg), respectively. A significant exercise x %1-RM interaction was found ($p < .05$). Mean velocity for the BP was significantly greater at 10%, 20% and 30% of 1-RM compared to the BS and DL and 90% compared to the DL ($p <.05$). There were no significant differences in mean velocity between the BS and DL. CONCLUSION: The BS and DL, BWD exercises, demonstrated significantly slower average velocities at various levels of %1-RM compared to the BP, a NBWD exercise. While the differences were not seen throughout the entire range of %1-RM, practitioners should account for body-mass when using VBT with BWD exercises.

Keywords: Resistance Exercise, Training loads

Board 18

COMPARISON OF HEART RATE VARIABILITY RESPONSE TO ALTITUDE BETWEEN NEPALI SHERPA AND COLLEGE STUDENTS

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Abstract Himalayan guides lead trekking adventures, often completing two or more four-week hikes per year. Similar to Sherpa guides, they are typically males, aged 30-50 years, and live and work for long periods at altitude in the Himalayan mountains. They acclimatize to high altitude exposure with little or no signs and symptoms of acute mountain sickness (AMS). Heart Rate Variability (HRV) is a proposed indicator of altitude acclimatization, and a possible predictor of AMS. PURPOSE To compare HRV and symptoms of AMS at altitude (4500m above sea level) between Himalayan Trekking Guides and novice college-aged students trekking in Nepal. METHODS Resting HRV data was collected on 7 male guides (age 46±12yrs, BMI 25±3 kg/m^2, avg 17 yrs experience) and 7 male college student trekkers (age 19±0.9yrs, BMI 24±2kg/m^2) at 4500m elevation above sea level. Analyzed HRV variables were root-mean-squared standard-deviation (RMSSDms), percent of successive R-R intervals varying>50ms (pNN50), Low-Frequency and High-Frequency Power normalized-units (LFP,HFPnu) and Poincare-plot SD1ms & SD2ms. Blood oxygen levels were measured by a finger scanner. RESULTS Components of HRV mean and StDev measures at an altitude of 4500m were compared and analyzed by independent samples t-tests. (Guide;student): RMSSD (28±17;69±53, p=0.095), pNN50 (8±11;24±23, p=0.135), LFPnu (58±21;63±20, p=0.63), HFPnu (41±21;37±20, p=0.681), LF:HFnu (2.75±4;3.13±3, p=0.85), SD1 (20±12;49±37, p=0.09). SD2, representing successive R-R intervals was the only significant HRV variable between guides and students (46±22;110±62, p=0.035*). No significant differences between groups were found for oxygen saturation(86±5;85±4, p=0.06) and heart rate (HR) (81±13;83±13, p=0.72). CONCLUSION Although components of HRV have been reported to change with age in most population studies, older Himalayan Trekking Guides share a similar HRV profile with college-aged students when exposed to high altitude. Lack of significant HRV differences between older trekking guides and younger college aged

students suggest living and working at altitude maintains autonomic regulation over time. Furthermore, HRV may be a useful biomarker of acclimatization.

Keywords: HRV, altitude, age