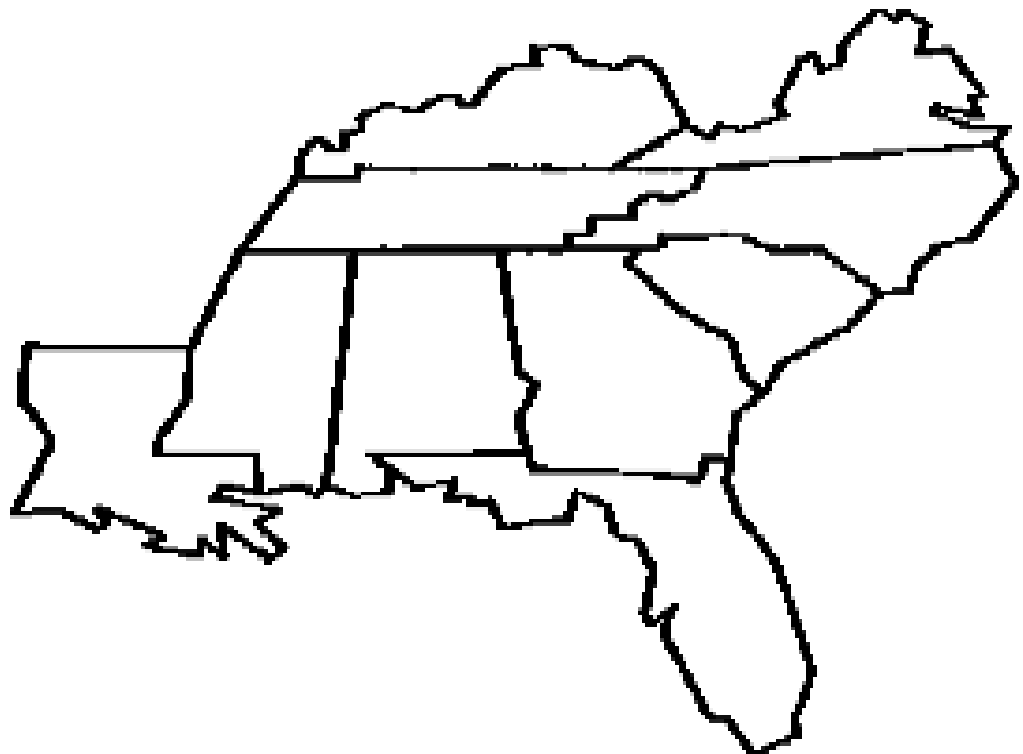


**AMERICAN COLLEGE  
of SPORTS MEDICINE**  
SOUTHEAST REGIONAL CHAPTER

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**February 15-17, 2018  
46<sup>th</sup> Annual Meeting  
Chattanooga Hotel  
Chattanooga, Tennessee**

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Jointly Sponsored by: The American College of Sports Medicine (ACSM)  
and the Southeast Chapter of the American College of Sports Medicine (SEACSM)

**Forty-Sixth Annual Meeting**

**SOUTHEAST REGIONAL CHAPTER  
AMERICAN COLLEGE OF  
SPORTS MEDICINE**

**Chattanooga Hotel  
Chattanooga, Tennessee  
February 15-17, 2018**

**Officers**

**President:** Michael McKenzie, Winston Salem State University

**Past President:** John Quindry, University of Montana

**President-Elect:** Lynn Panton, Florida State University

**Executive Board:**

Kenneth P. Barnes, Clinical Representative, Greensboro Orthopaedics

Allan Goldfarb, Representative to ACSM, University of North Carolina/Greensboro

Alicia Bryan, At-Large Member, Columbus State University

Tiffany Esmat, At-Large Member, Kennesaw State University

Amy Knab, At-Large Member, Queens University of Charlotte

Jonathan Wingo, At-Large Member, University of Alabama

Sam Buckner, Student Representative, University of Mississippi

Ashlyn Schwartz, Student Representative, University of Tennessee/Knoxville

**Executive Director:**

Carolynn Berry, Winston Salem State University

**Exhibits, Sponsorships & Fund Raising:**

Michael Berry, Wake Forest University

**Publisher and Editor:**

Don Torok, Florida Atlantic University



## **SEACSM Meeting Objective**

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

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

### **Continuing Medical Education Objectives: Clinical Track Program**

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

1. Understand the pathophysiology behind overuse injuries in the overhead athlete and principles to help prevent further injury
2. Recognize current concepts in the treatment of labral tears in the hip and return to sport considerations in athletes
3. Consider tendon dysfunction and new research ideas in its treatment
4. Understand the importance of mental health and the effects of bullying on the adolescent athlete population
5. Differentiate between various biologic therapies used in sports medicine, and the appropriate indications and potential benefits for each
6. Consider factors related to the decision to fix or not fix mid-shaft clavicle fractures in athletes
7. Discuss new methods used in the treatment of concussions in athletes such as neuro-vestibular rehabilitation
8. Confidently describe the female athlete triad and its contributing factors, and how it is evaluated and treated
9. Describe current doping and illegal performance enhancing methods employed by today's athletes
10. Develop a better understanding of the nutritional needs of the athlete, and how to formulate appropriate recommendations

### **Continuing Education Credits**

SEACSM is an approved provider for 18 Continuing Education Credits (CECs) through ACSM. A certificate of attendance will be provided in the registration packet.

### **Continuing Medical Education (Clinical Track Program)**

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the South Carolina Medical Association (SCMA) through the joint provider ship of The Hawkins Foundation and the Southeast Chapter of the American College of Sports Medicine.

The Hawkins Foundation is accredited by the South Carolina Medical Association to provide continuing medical education for physicians.

The Hawkins Foundation designates this live activity for a maximum of 10.0 *AMA PRA Category 1 Credits*™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

## **Acknowledgement of Commercial Support**

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges the program support from: Hologic and Gatorade Sports Science Institute.

## **Acknowledgement of Other Support**

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges program support from the American College of Sports Medicine, Gannon University, and Nova Southeastern University.



**AMERICAN COLLEGE  
of SPORTS MEDICINE®**

## **Acknowledgement of Exhibitors**

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges the following exhibitors at the meeting: BioPac Systems, Cosmed USA, Creative Health Products, Parvo Medics, Tekscan, and University of South Florida.

## **Planning Committee**

John Quindry, Michael McKenzie, Lynn Panton, Kenneth Barnes,Carolynn Berry, Michael Berry, Alicia Bryan, Sam Buckner, Matthew Close, Tiffany Esmat, Allan Goldfarb, Amy Knab, Ashlyn Schwartz, W. Franklin Sease, Don Torok, and Jonathan Wingo.

## **SEACSM List of Reviewers**

Nicole Rendos, Andrews Research & Education Foundation; Becki Battista & Andy Shanely, Appalachian State University; Danielle Wadsworth, Auburn University; Jennifer Bunn, Campbell University; George "Will" Lyerly & Greg Martel, Coastal Carolina University; Clayton Nicks & Brian Tyo, Columbus State University; Richard Storie, Cumberland University; Timothy Sell & Zachary Zenko, Duke University; Takudzwa Madzima & Srikant Vallabhajosula & Matthew Wittstein, Elon University; Renee Jeffreys Heil, Florida Gulf Coast University; David Rice, Florida Southern College; Ashley Artese & Jeong-Su Kim, Florida State University; Charlie Robison, George Mason University; Kelly Massey & Emily Simonavice, Georgia College; Catalina Casaru, Georgia Southwestern State University; Vicki Nelson, Greenville Health System; Colin, Elvis Foli, Greenville Technical College/University of North Carolina Greensboro; Carriker & Matthew Kuennen, High Point University; Elizabeth Edwards, James Madison University; Garrett Hester & Yuri Feito & Brian Kliszczewicz, Kennesaw State University; Martin Carmichael, Lander University; Andy Bosak, Liberty University; Jeremy Townsend, Lipscomb University; Sean Collins, Lynchburg College; Jeremy Steeves, Maryville College; Erica Roelofs, Meredith College; Jennifer Caputo, Middle Tennessee State University; Suzanne McDonough, Mississippi College; JohnEric Smith, Mississippi State University; Donna Wolf, Norfolk State University; Patrick Wilson, Old Dominion University; Blake Crabb, Pfeiffer University; Mallory Marshall, Samford University; Christopher Sole, The Citadel; John Garner, Troy University; Bob Bowen, Truett McConnell University; Jill Maples & Cody Morris & Mark Schafer, Western Kentucky University; Mary Pat Meaney & Amanda Price, Winston-Salem State University; Janet Wojcik, Winthrop University; Hayley MacDonald, University of Alabama; Eric Plaisance, University of Alabama at Birmingham; David Fukuda, University of Central Florida; Daniel Herman, University of Florida; Christopher Mojock & Albino Schifino, University of Georgia; Haley Bergstrom & Stuart Best, University of Kentucky; David Bellar & Gregory Davis, University of Louisiana at Lafayette; Kathy Carter, University of Louisville; William Adams & Katie Hirsch & Jacob Mota & Anthony (Tony) Hackney & Lee Stoner, University of North Carolina at Chapel Hill; Joseph Marino, University of North Carolina at Charlotte; Paula Seffens (aka, Pullen), University of North Georgia; Ray Thompson, University of South Carolina; Brian Parr, University of South Carolina Aiken; Elizabeth Easley, University of South Carolina at Lancaster; Greg

Heath & Karissa Peyer, University of Tennessee at Chattanooga; Gene Fitzhugh & Samuel LaMunion & Lyndsey Hornbuckle-Lampkin & Alvin Morton & Kelley Strohacker, University of Tennessee – Knoxville; David Hryvniak, University of Virginia; Anson Blanks, Virginia Commonwealth University; Shane Larson, Womack Army Medical Center.

Clinical Case Reviewers: Chad Asplund, MD Georgia Southern University; R. Amadeus Mason, MD Emory University; Shane Larson, MD Womack Army Medical Center; Brent H. Messick, MD, UNC-Chapel Hill.

**SEACSM Meetings & Officers**

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
1 <sup>st</sup>	Fall 1973 Gatlinburg, TN	Andrew Kozar	
2 <sup>nd</sup>	Fall 1974 Atlanta, GA	Clyde Partin	
3 <sup>rd</sup>	Fall 1975 Charlottesville, VA	Dan Copeland	
4 <sup>th</sup>	Fall 1976 Murfreesboro, TN	Rankin Cooter	
5 <sup>th</sup>	Fall 1977 Lexington, KY	Ed Howley	Steve Blair Ron Byrd Joe Smith
6 <sup>th</sup>	Fall 1978 Columbia, SC	Russ Pate	
7 <sup>th</sup>	Feb. 16-17, 1979 Atlanta, GA	Dennis Wilson Ed Howley Ron Byrd	Earl Allen Thad Crews Art Weltman
8 <sup>th</sup>	Feb. 8-9, 1980 Charlotte, NC	Ron Byrd Dennis Wilson Paul Ribisl	Bruce Gladden Jay Kearney Russ Pate
9 <sup>th</sup>	Feb. 6-7, 1981 Charleston, SC	Paul Ribisl Ron Byrd Bill Herbert	Joe Chandler Tom Cronan Kirk Cureton
10 <sup>th</sup>	Feb. 5-6, 1982 Blacksburg, VA	Bill Herbert Paul Ribisl Russ Pate	Harvey Murphy (ES) Jon MacBeth (ES) Joe Chandler Tom Cronan Kirk Cureton Robert McMurray
11 <sup>th</sup>	Feb. 4-5, 1983 Gainesville, FL	Russ Pate Bill Herbert Kirk Cureton	Jon MacBeth (ES) Earl Allen David Cundiff Scott Powers
12 <sup>th</sup>	Feb. 3-4, 1984 Auburn, AL	Kirk Cureton Russ Pate Chris Zauner	Ron Bos (ES) Emily Haymes Phil Sparling Mike Stone
13 <sup>th</sup>	Jan. 31-Feb. 2, 1985 Boone, NC	Chris Zauner Kirk Cureton Robert McMurray	Ron Bos (ES) John Billings Harry DuVal Diane Spitler J. W. Yates
14 <sup>th</sup>	Jan. 23-25, 1986 Athens, GA	Robert McMurray Chris Zauner Scott Powers	Ron Bos (ES) Terry Bazarre John Billings J. Larry Durstine Russ Pate (N) Diane Spitler

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
15 <sup>th</sup>	Jan. 29-31, 1987 Charleston, SC	Scott Powers Robert McMurray Diane Spittler	Ron Bos (ES) Terry Bazarre J. Larry Durstine Steve Messier Allen Moore (S) Russ Pate (N) Janet Walberg
16 <sup>th</sup>	Jan. 28-30, 1988 Winston-Salem, NC	Diane Spittler Scott Powers Phil Sparling	Ron Bos (ES) Dalynn Badenhop Gay Israel Steve Messier Russ Pate (N) Janet Walberg Rankin Mark Senn (S)
17 <sup>th</sup>	Jan. 19-20, 1989 Atlanta, GA	Phil Sparling Diane Spittler Emily Haymes	Ron Bos (ES) Dalynn Badenhop Kirk Cureton (N) Mark Davis Gay Israel Ben Kibler (MD) David Peltzer (S) Art Weltman
18 <sup>th</sup>	Feb. 1-3, 1990 Columbia, SC	Emily Haymes Phil Sparling Harry DuVal	Ron Bos (ES) Jerry Brandon Maria Burgess (S) Kirk Cureton (N) Mark Davis Ben Kibler (MD) Dianne Ward Art Weltman
19 <sup>th</sup>	Jan. 31-Feb. 2, 1991 Louisville, KY	Harry DuVal Emily Haymes Steve Messier	Ron Bos (ES) Jerry Brandon Maria Burgess (S) Kirk Cureton (N) Kevin Davy (S) Alan Rogol (MD) Jeff Rupp Amanda Timberlake Dianne Ward
20 <sup>th</sup>	Jan. 30-Feb. 1, 1992 Auburn, AL	Steve Messier Harry DuVal Gay Israel	Ron Bos (ES) Kevin Davy (S) Bill Duey (S) Ben Kibler (MD) Mindy Millard-Stafford Bob Moffatt Alan Rogol (MD) Jeff Rupp Phil Sparling (N) Amanda Timberlake

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
21 <sup>st</sup>	Jan. 28-30, 1993 Norfolk, VA	Gay Israel Steve Messier J. Mark Davis	Vaughn Christian (ES) Barbara Ainsworth Michael Berry Jeff Chandler (CC) Shala Davis (S) Mindy Millard-Stafford Bob Moffatt Alan Rogol (MD) Phil Sparling (N) Kevin Tipton (S)
22 <sup>nd</sup>	Jan. 20-22, 1994 Greensboro, NC	J. Mark Davis Gay Israel Janet Walberg Rankin	Vaughn Christian (ES) Barbara Ainsworth Michael Berry Jeff Chandler (CC) Shala Davis (S) Allan Goldfarb Victoria Schnyder (S) Phil Sparling (N) Beverly Warren
23 <sup>rd</sup>	Feb. 2-4, 1995 Lexington, KY	Janet Walberg Rankin J. Mark Davis J. Larry Durstine	Vaughn Christian (ES) Carolyn Berry Jeff Chandler (CC) Allan Goldfarb Ed Howley (N) David Nieman Victoria Schnyder (S) Beverly Warren
24 <sup>th</sup>	Feb. 1-3, 1996 Chattanooga, TN	J. Larry Durstine Janet Walberg Rankin Bruce Gladden	Vaughn Christian (ES) Carolyn Berry Ed Howley (N) Tim Lightfoot Patricia Mosher David Nieman Stewart Trost (S) George Wortley (MD)
25 <sup>th</sup>	Jan. 23-25, 1997 Atlanta, GA	Bruce Gladden J. Larry Durstine Bob Moffatt	Vaughn Christian (ES) Dave Bassett Ed Howley (N) Tim Lightfoot Patricia Mosher Ann Swank Stewart Trost (S) George Wortley (MD) Don Torok
26 <sup>th</sup>	Jan. 29-31, 1998 Destin, FL	Bob Moffatt Bruce Gladden Dianne Ward	Vaughn Christian (ES) Dave Bassett Mark Davis (N) Bonita Marks Mike Overton Ann Swank Melicia Whitt (S) George Wortley (MD) Don Torok



	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
27 <sup>th</sup>	Feb. 4-6, 1999 Norfolk, VA	Dianne Ward Bob Moffatt Jeff Rupp	Vaughn Christian (ES) Mark Davis (N) Steve Dodd Bonita Marks Mike Overton Dixie Thompson Melicia Whitt (S) George Wortley (MD) Don Torok
28 <sup>th</sup>	Jan. 27-29, 2000 Charlotte, NC	Jeff Rupp Dianne Ward Mindy Millard-Stafford	Vaughn Christian (ES) Ted Angelopoulos Linda Chitwood Mark Davis (N) Keith DeRuisseau (S) Steve Dodd Dixie Thompson George Wortley (MD) Don Torok
29 <sup>th</sup>	Jan. 25-27, 2001 Columbia, SC	Mindy Millard-Stafford Jeff Rupp David Nieman	Vaughn Christian (ES) Ted Angelopoulos Linda Chitwood Bruce Gladden (N) Keith DeRuisseau (S) Craig Broeder Liz Dowling George Wortley (MD) Don Torok
30 <sup>th</sup>	Jan 31-Feb.2, 2002 Atlanta, GA	David Nieman Mindy Millard-Stafford Michael Berry	Vaughn Christian (ED) Anne Allen (MD) Craig Broeder Bruce Gladden (N) Greg Hand Pat Nixon Ray Thompson (S) Liz Dowling Don Torok
31 <sup>st</sup>	Jan 30-Feb 1, 2003 Atlanta, GA	Michael Berry David Nieman Beverly Warren	Carolynn Berry (ED) Anne Allen (MD) Bruce Gladden (N) Greg Hand Pat Nixon David Pascoe Ray Thompson (S) Liz Dowling Don Torok Alan Utter
32 <sup>nd</sup>	Jan.29-31, 2004 Atlanta, GA	Beverly Warren Allan Goldfarb Michael Berry	Carolynn Berry (ED) Stephen Bailey B. Sue Graves Ron Lee (MD) David Pascoe Janet Rankin (N) Daniela Rubin (S) Alan Utter Liz Dowling

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
			Don Torok
33 <sup>rd</sup>	Jan. 27-29, 2005 Charlotte, NC	Allan Goldfarb Beverly Warren Tim Lightfoot	Carolynn Berry (ED) Stephen Bailey B. Sue Graves Judith Flohr Andrew Gregory (MD) Janet Rankin (N) Daniela Rubin (S) Debra M. Vinci Liz Dowling Don Torok
34 <sup>th</sup>	Feb. 9-11, 2006 Charlotte, NC	Tim Lightfoot Allan Goldfarb Dixie Thompson	Carolynn Berry (ED) Paul Davis Judith Flohr Peter Grandjean Andrew Gregory (MD) Janet Rankin (N) Abigail Turpyn (S) Debra M. Vinci Liz Dowling Don Torok
35 <sup>th</sup>	Feb. 8-10, 2007 Charlotte, NC	Dixie Thompson Tim Lightfoot Jerry Brandon	Carolynn Berry (ED) Michael Berry (N) Paul Davis Peter Grandjean Tracy Ray (MD) Kevin McCully Michael Turner Abigail Turpyn (S) Liz Dowling Don Torok
36 <sup>th</sup>	Feb. 14-16, 2008 Birmingham, AL	Jerry Brandon Dixie Thompson Judith Flohr	Carolynn Berry (ED) Michael Berry (N) Chuck Dumke Erica Jackson Tracy Ray (MD) Kevin McCully Michael Turner Amy Knab (S) Liz Dowling Don Torok
37 <sup>th</sup>	Feb. 12-14, 2009 Birmingham, AL	Judith Flohr Jerry Brandon Alan Utter	Carolynn Berry (ED) Michael Berry (N) Chuck Dumke Erica Jackson Tracy Ray (MD) Edmund Acevedo Lynn Panton Amy Knab (S) Don Torok

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
38 <sup>th</sup>	Feb. 11-13, 2010 Greenville, SC	Alan Utter Judith Flohr Peter Grandjean	Carolynn Berry (ED) Michael Berry James Churilla Mark Loftin Sean Bryan (MD) Edmund Acevedo Lynn Panton Brandon Hollis (S) Beverly Warren (N) Don Torok
39 <sup>th</sup>	Feb. 3-5, 2011 Greenville, SC	Peter Grandjean Alan Utter David Pascoe	Carolynn Berry (ED) Michael Berry James Churilla Mark Loftin Sean Bryan (MD) Cherilyn Hultquist John Quindry Brandon Hollis (S) Beverly Warren (N) Don Torok
40 <sup>th</sup>	Feb. 9-11, 2012 Jacksonville, FL	David Pascoe Peter Grandjean Paul Davis	Carolynn Berry (ED) Michael Berry Matt Green Micheal McKenzie Kyle Cassas (MD) Cherilyn Hultquist John Quindry Lindsey Miller (S) Beverly Warren (N) Don Torok
41 <sup>th</sup>	Feb. 14-16, 2013 Greenville, SC	Paul Davis David Pascoe Edmund Acevedo	Carolynn Berry (ED) Michael Berry Andy Bosak Matt Green Kyle Cassas (MD) Michael McKenzie Paul Miller Lindsey Miller (S) Judith Flohr (N) Don Torok
42 <sup>nd</sup>	Feb. 13-15, 2014 Greenville, SC Meeting Cancelled Due to weather	Edmund Acevedo Paul Davis Kevin McCully	Carolynn Berry (ED) Michael Berry Andy Bosak John Petrella W. Franklin Sease (MD) Paul Miller Danielle D. Wadsworth Mindy Millard-Stafford (N) Amber W. Kinsey (S) Don Torok

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board)</u>
43 <sup>rd</sup>	Feb. 12-14, 2015 Jacksonville, FL	Kevin McCully Edmund Acevedo Sue Graves	Carolynn Berry (ED) Michael Berry Rebecca Battista John Petrella W.Franklin Sease (MD) James Carson Danielle D. Wadsworth Mindy Millard-Stafford (N) Amber W. Kinsey (S) Bridget Peters (S) Don Torok
44 <sup>th</sup>	Feb. 18-20, 2016 Greenville, SCL	Sue Graves Kevin McCully John Quindry	Carolynn Berry (ED) Michael Berry W.Franklin Sease (MD) Rebecca Battista James Carson Jody Clasey Ron Evans Alan Utter (N) Brittany Overstreet (S) Bridget Peters (S) Don Torok
45 <sup>th</sup>	Feb. 16-18, 2017 Greenville, SCL	John Quindry Sue Graves Michael McKenzie	Carolynn Berry (ED) Michael Berry Kenneth Barnes (MD) Jody Clasey Ron Evans Amy Knab Jonathan Wingo Alan Utter (N) Brittany Overstreet (S) Sam Buckner (S) Don Torok
46 <sup>th</sup>	Feb. 15-17, 2018	Michael McKenzie John Quindry Lynn Panton	Carolynn Berry (ED) Michael Berry Kenneth Barnes (MD) Amy Knab Jonathan Wingo Allan Goldfarb (N) Alicia Bryan Tiffany Esmat Sam Buckner (S) Ashlyn Schwartz (S) Don Torok

ES = Executive Secretary  
N = National Representative

S = Student Representative  
MD = Physician Representative

CC = Clinical Consultant  
ED = Executive Director

**SEACSM Award Winners**

	<b><u>Scholar Award</u></b>	<b><u>Service Award</u></b>	<b><u>Student Award</u></b>	<b><u>Clinical Award</u></b>
1989	Hugh Welch	Ron Bos		
1990	Russ Pate	Harvey Murphy		
1991	Wendell Stainsby	Paul Ribisl	Paul Davis	
1992	Robert Armstrong	Phil Sparling	Brian Hinson	
1993	Michael Pollock	Dennis Wilson	Steve Bailey	
1994	Kirk Cureton	Ed Howley	David Criswell	
1995	Scott Powers	Gay Israel	Marian Kohut	
1996	Mel Williams	Russ Pate	Marvin Rainwater	
1997	Henry Montoye	Emily Haymes	Kathryn Gracey	
1998	Ed Howley	Kent Johnson	Heather Vincent	
1999	Steve Messier	Vaughn Christian	Christopher Hewitt	
2000	Bruce Gladden	J. Larry Durstine	Katherine Brittingham	
2001	Barbara Ainsworth	Janet Walberg Rankin	Jamie Golden	
2002	J. Mark Davis	Jeff Rupp	Joseph M. McClung	
2003	Robert McMurray	Don Torok	Mahmoud Alomari	
2004	Rod Dishman	Mindy Millard-Stafford	Elizabeth Murphy	
2005	Emily Haymes	George Wortley	Martin Carmichael	
2006	David Nieman	Carolynn Berry	Heather Webb	Stefanie Shaver
2007	David Bassett, Jr.	Liz Dowling	Dawn Hayes-Doc Seam Courtney-MS/UG	Jason Blackham
2008	J. Larry Durstine	Anne Allen	Mary Beth Brown-Doc Jacqueline Del Giorno- MS/UG	Jeffrey B. Roberts
2009	Kevin McCully	Bruce Gladden	Daniel Credeur-Doc Ashley Williams- MS/UG	John Hulvey
2010	J. Timothy Lightfoot	Michael Berry	Robert Bowen-Doc Emily Main- MS/UG	Kristina Wilson
2011	Steven Blair	Kirk Cureton	Benjamin Gordon-Doc Graham McGinnis-MS Derrick Thomas & Kara Hardin-UG	Catherine Rainbow
2012	Gordon Warren	Beverly Warren	Bradley Gordon-Doc Brittany Collins-MS Timothy Brady-UG	Doug Connor

<b><u>Scholar Award</u></b>	<b><u>Service Award</u></b>	<b><u>Student Award</u></b>	<b><u>Clinical Award</u></b>
2013 Dianne Stanton Ward	Judith Flohr	Melissa Puppa-Doc W.M. Southern-MS Kojo Thompson-UG	Daniel Hermman
2014 Arthur Weltman	Andrew Gregory	Graham McGinnis-Doc W. Michael Southern-MS Rebecca Dale-UG	
2015 Anthony C. Hackney	Dixie Thompson	Justin Hardee-Doc Jordan Lee-MS Arun Maharaj-UG	Sally Hinman
2016 Michael Berry	Jesse Pittsley	Melissa Erickson-Doc Ashton Celec-MS Caroline Hubbard-UG	Ben Oshlag
2017 Dixie Thompson	Scott Powers	T.Bradley Willingham-Doc Natalie Eichner-MS Christine L. Seltman-UG	Josh Hellums

## Student Registration

### WELCOME!

Welcome to the 2018 Southeast American College of Sports Medicine Annual meeting! Stop by this spot any time if you have questions or need more information!



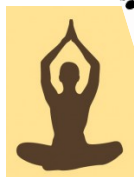
### Keynote Address

Dr. Tim Lightfoot will provide the opening remarks and provide a talk on "Is the Revolution Underway? The Use of Genetics in Exercise Physiology" **Thursday Feb 15<sup>th</sup> from 7:30-9pm in Ballrooms 1,2,3,4.** Meet old and new friends at the social in the Lobby following the presentation!



### Featured Lectures - Friday Feb 16<sup>th</sup>

**Ballrooms 1,2,3,4** will be busy today as Dr. Walter Thompson presents on the history of step counting and step cadence training from **10:00-11am**. For those interested in clinical medicine, stay from **11am-12pm** for our annual Clinical Crossover Talk. From **1:15-2:15pm** Dr. Michael Reid will present on Physiology of Motorsport Athletes.



### Morning Yoga

SEACSM is bringing group fitness to the annual meeting **Saturday morning February 17<sup>th</sup> from 6:30-7:30am in Crabtree (Pre-registration required).**



**WAIT!** Before you leave be sure to vote for your 2018 SEACSM leaders! You will find your ballot in your welcome packet. Deadline to Vote is **FRIDAY: FEB 16<sup>th</sup> @ 5pm**

### WAIT!

Be sure to check out the poster sessions going on throughout the entire conference in **Ballroom Foyer!** Also - don't forget all the other great **symposiums** listed in the full program!

### Special Interest Groups!

Another first this year! Don't miss out on a chance to specialize in a research area and network. Stop by Littleton for Biomechanics and Frierson for Minority Health Research from **12:00-1:15pm**

### Graduate Student Fair- Friday Feb 16th

Looking for the next step in your academic career? Come chat with representatives from different programs in the Walker and Rose from **6:15-7:45pm**.

### Henry J. Montoye Award Lecture

Join us Saturday February 17<sup>th</sup> from 11-12 as Janet Rankin speaks to the lessons she has learned throughout her impressive career!

### WAIT!

### Pre-Conference

This year we will be hosting our second pre-conference sessions Thursday February 15<sup>th</sup> from 2-4pm in the Rose and Walker. We have special sessions for students and a brand new rapid fire presentation style! Don't miss it!



### Mentoring Breakfast

Join us **Friday Feb 16<sup>th</sup> from 6:45-7:45am in Ballroom 1,2,3,4** for breakfast as Judith Flohr leads us in a wonderful morning gathering with peers and professionals from all over the region!



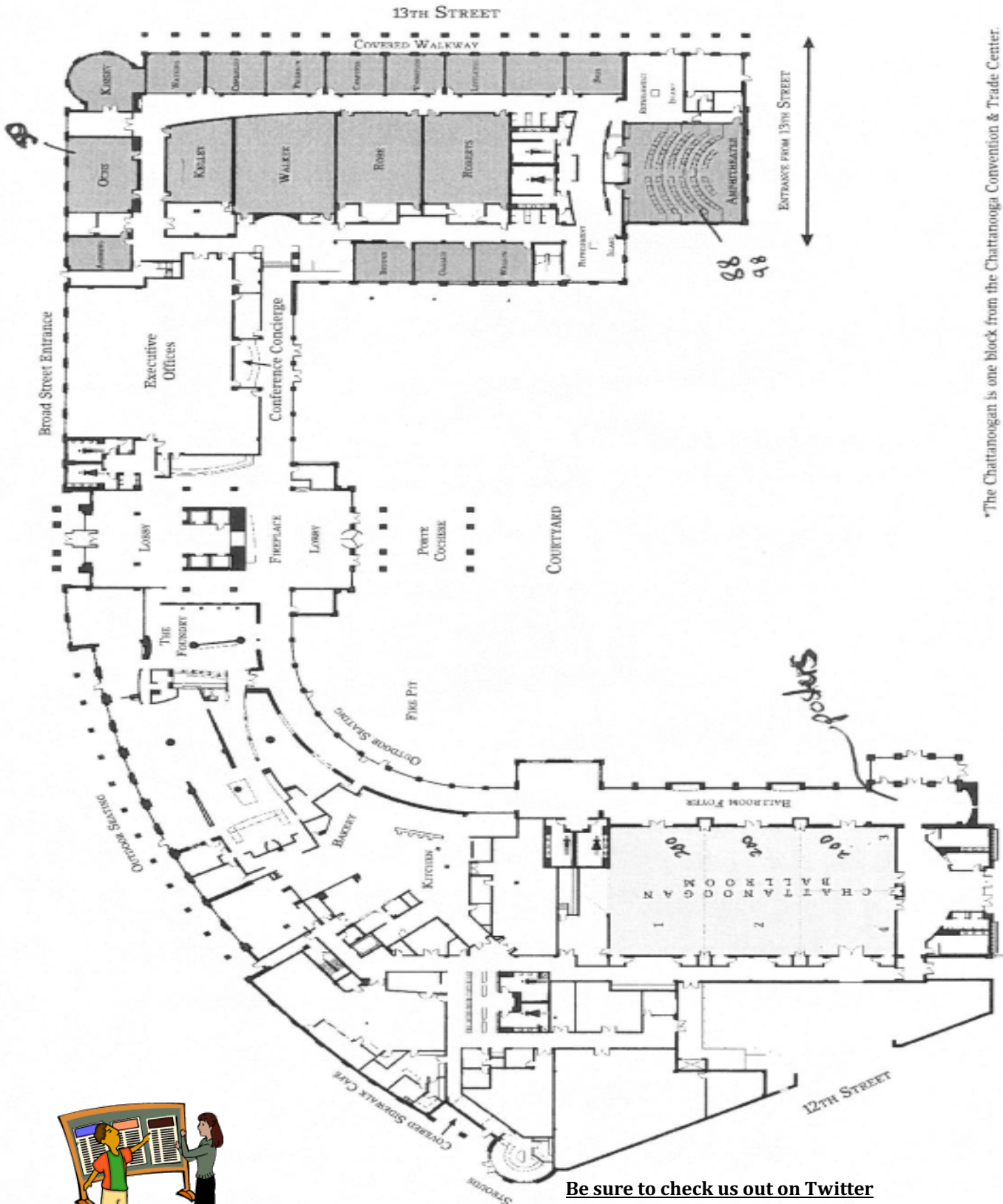
### Student Bowl- Friday Feb 16th

Game on! Come watch students from the region show off their knowledge as they compete to represent the entire SEACSM region at the National meeting in Minneapolis this year! This event will be from **4:30-6:00pm in Ballroom 1,2,3,4.**



### Luncheon & Lecture

Now you've made it to the end of the conference! Join us for a delicious lunch as Sofiya Alhassan presents in **Ballrooms 1,2,3,4 Saturday February 17<sup>th</sup> from 12-2pm. (Pre-registration required).**



\*The Chattanooga is one block from the Chattanooga Convention & Trade Center.



**Be sure to check us out on Twitter @SEACSM and Facebook - SEACSM Chapter.**

**Make sure to take part in our scavenger hunt for the chance to win a special edition SEACSM T-shirt! See volunteers at the student help desk for more**





## **SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE 2018 ANNUAL MEETING SCHEDULE (OUTLINE)**

### **THURSDAY, February 15, 2018**

- 11:00-1:00 SEACSM EXECUTIVE BOARD MEETING (Kinsey)**
- 1:00-6:00 REGISTRATION AND STUDENT HELP DESK (Lobby)**
- 1:00-1:45 AUDIOVISUAL TEAM MEETING (Littleton)**
- 2:00-2:50 PRE-CONFERENCE SYMPOSIUM (Rose)**  
**PC1** Peeling Back the Curtain - A Pre-Conference Symposium on the Fellowship Application From a Reviewer
- 2:00-2:50 PRE-CONFERENCE TUTORIAL (Walker)**  
**PC2** Going Anywhere Starts Here! Everything You Need to Know Before the SEACSM Annual Meeting Begins
- 3:00-3:50 PRE-CONFERENCE SYMPOSIUM (Walker)**  
**PC3** Rapid Research Race: A Preconference Presentation
- 4:00-6:30 EXHIBITS (Conference Concierge)**
- 4:00-6:00 STUDENT AWARD POSTER FREE COMMUNICATIONS I: (Ballroom Foyer)**  
**D1-D8, M1-M8, U1-U8**  
Authors present, 4:00-6:00 p.m.  
Chair: John Quindry, Ph.D., SEACSM Past-President, University of Montana
- 4:00-6:00 POSTER FREE COMMUNICATIONS I (Ballroom Foyer)**  
**P1-P48** Authors present, 4:30-6:00 pm  
Endocrinology/Immunology                      Epidemiology  
Growth, Development & Aging                      Reproduction  
Research Design and Statistics
- 4:00-5:30 THEMATIC POSTERS SESSION I (Ochs)**  
**TP1-TP6** Nutrition and Exercise/Sports
- 4:00-6:00 ORAL FREE COMMUNICATIONS I (Kelley)**  
**O1-O8** Psychology/Psychiatry/Behavior
- 4:00-4:50 SYMPOSIUM SESSION I (Walker)**  
**S1** Acute Sedentarism and Cardiovascular Health: Interactions Between Peripheral and Systemic Vascular Health
- 4:00-4:50 SYMPOSIUM SESSION II (Rose)**  
**S2** Student Run Programs Providing Community-Based Physical Activity Programs for Individuals with Special Needs
- 4:00-4:50 TUTORIAL SESSION I (Roberts)**  
**T1** Bone Mineral Density and Body Composition Relationships in Multicultural Non- and Menopausal Runners and Non-Runners
- 4:00-4:50 TUTORIAL SESSION II (Amphitheater)**  
**T2** The Adverse Effects of High-Fat Meals on Metabolic and Cardiopulmonary Outcomes: What Role Does Exercise Have?
- 5:00-5:50 SYMPOSIUM SESSION III (Walker)**  
**S3** If You Build It, Will They Come? Physical Activity and the Built Environment
- 5:00-5:50 SYMPOSIUM SESSION IV (Rose)**  
**S4** Chronic External Loading During Daily Living: A "Lost" Training Strategy to Improve the Force-Velocity Curve

- 5:00-5:50 TUTORIAL SESSION III (Roberts)**  
**T3** Does Adding Pharmacology to Exercise Enhance or Attenuate Management of Type 2 Diabetes?
- 5:00-5:50 TUTORIAL SESSION IV (Amphitheater)**  
**T4** Dynamics of Pre-Health Screening: Application of Current ACSM Guidelines
- 7:30-9:00 OPENING REMARKS AND KEYNOTE ADDRESS (Chattanooga Ballroom 1,2,3,4)**  
**Is the Revolution Underway? The Use of Genetics in Exercise Physiology**  
 Tim Lightfoot, Ph.D., SEACSM Past President  
 Huffines Institute at Texas A & M  
 Presiding: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University  
 Introduction: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University
- 9:00-10:30 SEACSM SOCIAL (Lobby)**

**FRIDAY, February 16, 2018**

- 6:45-7:45 MENTORING BREAKFAST (Chattanooga Ballroom 1,2,3,4)**  
**(Pre-Register by February 5)**  
 Naming of Breakfast in Honor of Emily Haymes, Ph.D., SEACSM Past President  
 Remarks: Judith A. Flohr, Ph.D., SEACSM Past President
- 8:00-5:00 REGISTRATION AND STUDENT HELP DESK (Lobby)**
- 8:00-6:00 EXHIBITS (Conference Concierge)**
- 8:00-9:30 POSTER FREE COMMUNICATIONS II (Ballroom Foyer)**  
**P49-P120** Athletic Care/Trauma/Rehabilitation      Fitness/Testing/Assessment  
 Motor Control      Respiratory Physiology
- 8:00-9:30 THEMATIC POSTERS SESSION II (Ochs)**  
**TP7-TP12** Competitive Athletes
- 8:00-10:00 ORAL FREE COMMUNICATION II (Kelley)**  
**09-016** Biomechanics/Gait/Balance
- 8:00-8:50 SYMPOSIUM SESSION V (Walker)**  
**S5** Multifaceted Regulation of Skeletal Muscle Growth, Regeneration, and Metabolism
- 8:00-8:50 SYMPOSIUM SESSION VI (Rose)**  
**S6** Visual System Impairments Following Sport-Related Concussion: Updates from the Consensus Statement
- 8:00-8:50 TUTORIAL SESSION V (Roberts)**  
**T5** Automating Data Collection on the Cheap with Microprocessor and Microcontroller Technologies
- 8:00-8:50 TUTORIAL SESSION VI (Amphitheater)**  
**T6** Carbohydrate Intake During Endurance Exercise: Scientific Approaches to Optimize Athletic Performance
- 9:00-9:50 SYMPOSIUM SESSION VII (Walker)**  
**S7** Low Carbohydrate-High Fat Diets for Endurance Athletes: Have We Focused on the Wrong Population?
- 9:00-9:50 TUTORIAL SESSION VII (Rose)**  
**T7** Got Gold? Everything You Wanted to Know About the Updated ACSM Certifications and More
- 9:00-9:50 TUTORIAL SESSION VIII (Roberts)**  
**T8** From Graduate Student to Assistant Professor and Everything in Between
- 9:00-9:50 TUTORIAL SESSION VIII (Amphitheater)**  
**T9** Autonomic Adjustments to Physical Stress: Insights from Microneurographic Recordings
- 10:00-11:00 ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS (Chattanooga Ballroom 1,2,3,4)**

## **The State of the American College of Sports Medicine**

Walter Thompson, Ph.D., President ACSM, Georgia State University

Presiding: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

Introduction: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

### **11:10-12:00 CLINICAL CROSSOVER LECTURE (Chattanooga Ballroom 1,2,3,4)**

#### **Stepping Back to Move Forward: Diabetes Prevention in the 21st Century**

Elizabeth Joy, M.D., M.P.H., ACSM Past-President, Intermountain Healthcare

Medical Director, Community Health & Food and Nutrition

Presiding: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

Introduction: Kenneth Barnes, M.D., M.Sc., Clinical Representative, Greensboro Orthopaedics

### **12:00-1:00 PAST PRESIDENT'S LUNCH (Crabtree)**

### **12:30-1:15 BIOMECHANICS INTEREST GROUP (Roberts)**

Hunter Bennett, Ph.D., Old Dominion University

Zac Domire, Ph.D., East Carolina University

### **12:30-1:15 MINORITY HEALTH AND RESEARCH INTEREST GROUP (Kelley)**

Lyndsey Hornbuckle, Ph.D., University of Tennessee

Alvin Morton, M.S., University of Tennessee

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### **SEACSM CLINICAL TRACK Amphitheater)**

#### **"Hot Topics in Sports Medicine"**

#### **12:30 pm Welcome and Announcements**

Matthew Close, DO (Health Fit Sports Medicine)

12:45 pm "Icarus and Asclepius: Doping and the Role of the Physician" Kevin Sprouse, DO (Podium Sports Medicine)

1:15 pm "Fueling an Athlete" Kim Kaiser, MD (U. of Kentucky)

1:45 pm "Mid-shaft Clavicle Fractures: To Fix or Not to Fix?" David Liddle, MD (Vanderbilt University)

#### **2:15 pm Break**

2:45 pm Fellow Case #1-PJ Bourde, Vanderbilt: The Breaking Pitch

3:00 pm Fellow Case #2-Jenna Crowder-GHS: Bilateral Exertional Leg Pain in a High School Athlete

3:15 pm Fellow Case #3-Daniel Smith-Phoebe: An Unusual Contributor to DeQuervain's Tenosynovitis: A Case Study

3:30 pm "Bullying and hazing in the Adolescent Athlete" Alex B. Diamond, DO MPH FAAP (Vanderbilt University)

#### **4:00 pm Break**

4:15 pm "The Female Athlete Triad: Recommendations for Screening, Evaluation, Management and Return to Play" Liz Joy, MD (Intermountain Healthcare)

5:15 pm "Neuro-vestibular Rehabilitation Following Concussion" Amadeus Mason, MD (Emory University)

5:45 pm Adjourn

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### **1:15-2:15 BASIC SCIENCE LECTURE 2018 (Chattanooga Ballroom 1,2,3,4)**

#### **Physiology of Motorsport Athletes**

Michael Reid, Ph.D., Dean and Professor of the College of Health and Human Performance University of Florida

Presiding: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

Introduction: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

### **2:30-4:00 POSTER FREE COMMUNICATIONS III (Ballroom Foyer)**

- P121-P192** Body Composition/Energy Balance/Weight Control  
Nutrition and Exercise/Sports  
Psychology/Psychiatry/Behavior
- 2:30-4:00** **THEMATIC POSTERS SESSION III (Ochs)**  
**TP13-TP18** Biomechanics/Gait/Balance
- 2:30-4:30** **ORAL FREE COMMUNICATION III (Kelley)**  
**017-023** Athletic Care/Trauma/Rehabilitation
- 2:30-3:20** **SYMPOSIUM SESSION VIII (Walker)**  
**S8** Fitness Essential to the Mission? The Shift in Military Physical Fitness in the 21st Century
- 2:30-3:20** **SYMPOSIUM SESSION IX (Rose)**  
**S9** Validity and Practical Utility of 3D Body Fat Scanners
- 2:30-3:20** **TUTORIAL SESSION X (Roberts)**  
**T10** Hey Kid! Go Take a Hike!: Strategies to Get Children and Youth Outside and Active
- 3:30-4:20** **SYMPOSIUM SESSION X (Walker)**  
**S10** Theory and Practical Application of the ISAK Protocol: Kinanthropometry from the Lab to the Field
- 3:30-4:20** **TUTORIAL SESSION XI (Rose)**  
**T11** How to Interpret Near-Infrared Spectroscopy Measurements of Oxygen Levels from Skeletal Muscle
- 3:30-4:20** **TUTORIAL SESSION XII (Roberts)**  
**T12** Experiential Learning Can Help the Next Gen Win
- 4:30-6:00** **STUDENT BOWL SPONSORED BY GANNON UNIVERSITY**  
**(Chattanooga Ballroom 1,2,3,4)**  
MC: Judith A. Flohr, Ph.D., SEACSM Past President  
Professor Emeritus James Madison University
- 6:15-7:45** **SEACSM GRADUATE STUDENT FAIR SPONSORED BY NOVA SOUTHEASTERN UNIVERSITY (Walker and Rose)**

**SATURDAY, February 17, 2018**

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**SEACSM CLINICAL TRACK (Amphitheater)**

**"Hot Topics in Sports Medicine"**

- 7:30 Welcome and Announcements: Matthew Close, DO (Health Fit Sports Medicine)
- 7:45 Overuse Throwing Injuries in Adolescents & Pitch Counts: Is the Answer in Front of Us?" Jason Zaremski, MD CAQSM FACSM FAAPMR (U. of Florida)
- 8:15 "Hip Injuries in Athletes and Weekend Warriors" Stephen Duncan, MD (U. of Kentucky)
- 8:45 "Stem Cells Evidence Based Medicine: Is the Evidence There Yet?" Andrew Gregory, MD (Vanderbilt University)
- 9:15 **Break**
- 9:45 Fellow Case #4 –Andrew Schleihauf-UK-19-Year Old Female Collegiate Soccer Goalie with Left Arm Cramping and Discoloration
- 10:00 Fellow Case #5 –Elizabeth Barton-GHS-Leg Pain in a Recreational Athlete
- 10:15 Fellow Case #6-Timothy Dekker-Mayo-Wrist Pain in Mechanic-Volleyball and Softball
- 10:30 Tendinopathy: Treatment and Research Ideas" David Berkoff, MD (U. of North Carolina)
- 11:00 **Break**

11:15 "Experiences of an International Traveling Fellow: United Kingdom 2017" Ken Barnes, MD MSc. CAQSM FACSM (Greensboro Orthopaedics)

11:45 Fellow Case #7 –Paul Meirick-Vanderbilt-Thumb Pain in a CrossFit Athlete: Collateral Damage?

12:00 Fellow Case #8-Jeremy Schmitz-Cone-Basketball: A Contact Sport After All

12:15 Fellow Case #9-Victor Ratajczak-Cabarrus Sports Medicine-My Shoulder is Eating into my Wrestling Season

12:30 Voting for Best Case Presentation

12:45 Adjourn

**6:30-7:30 YOGA (Crabtree) Must Pre-Register at Student Help Desk (Lobby)**

**6:30-7:30 Run through Downtown Chattanooga (Meet in Lobby)**

**8:00-12:00 EXHIBITS (Conference Concierge)**

**8:00-9:25 POSTER FREE COMMUNICATIONS IV (Ballroom Foyer)**  
**P193-P264** Biomechanics/Gait/Balance  
 Competitive Athletes  
 Connective Tissue/Bone/Skeletal Muscle

**8:00-9:30 THEMATIC POSTERS SESSION IV (Ochs)**  
**TP19-TP24** Cellular Regulatory Mechanisms

**8:00-10:00 ORAL FREE COMMUNICATION IV (Kelley)**  
**024-O31** Nutrition and Exercise/Sports

**8:00-8:50 TUTORIAL SESSION XIII (Walker)**  
**T13** Tracking Athlete Training Load: It Takes a Village to Monitor a Team

**8:00-8:50 TUTORIAL SESSION XIV (Rose)**  
**T14** Hello Professors: Engaging Students and Teaching Through the Gaps of Knowledge

**9:00-9:50 TUTORIAL SESSION XV (Walker)**  
**T15** Animal Research and Training for Exercise Science Professions!

**9:00-9:50 TUTORIAL SESSION XVI (Rose)**  
**T16** Socioeconomic Status, Concussion and Adolescents: How to Work with a Growing Population

**9:00-9:50 SYMPOSIUM SESSION XI (Roberts)**  
**S11** The Utility of Heart Rate Variability Monitoring in Athletic Settings: From the Laboratory to the Field

**9:30-11:00 POSTER FREE COMMUNICATIONS V (Ballroom Foyer)**  
**P265-P336** Cardiovascular Physiology Cellular Regulatory Mechanisms  
 Chronic Disease and Disability Environmental Physiology  
 Exercise Evaluation/Clinical Hematology/Immunology  
 Metabolism/Carbohydrate, Lipid, Protein

**10:00-10:50 TUTORIAL SESSION XVII (Walker)**  
**T17** Lactate Metabolism: History and Update

**10:00-10:50 TUTORIAL SESSION XVIII (Rose)**  
**T18** Training Sports Officials: An Exciting, Yet Relatively New Opportunity in Exercise Science and Sports Performance

**10:00-10:50 TUTORIAL SESSION XIX (Roberts)**  
**T19** Evaluating Biometric Wearables: From Academics to Industry

**11:00-12:00 HENRY J. MONTOYE AWARD LECTURE 2018 (Walker)**  
**Health to Higher Performance: Research at the Intersection of Nutrition & Physical Activity**

Janet Walberg Rankin, Ph.D., FACSM, ACSM Past President, Virginia Tech University  
Presiding: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University  
Introduction: John Quindry, Ph.D., SEACSM Past President, University of Montana

**12:00-2:00 SEACSM LUNCHEON AND LECTURE (Chattanooga Ballroom 1,2,3,4)  
(Pre-Register by Feb 5)  
It's Not Always Sunny Side Up! Lessons Learned from Preschool Physical  
Activity Interventions**

Sofiya Alhassan, Ph.D., FACSM

Director, Pediatric Activity Laboratory

University of Massachusetts

Presiding: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State  
University

Introduction: Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State  
University

**2:00-4:00 SEACSM EXECUTIVE BOARD MEETING (Kinsey)**

2/09/18

**SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE  
2018 ANNUAL MEETING SCHEDULE**

**THURSDAY, February 15, 2018**

- 11:00-1:00 SEACSM EXECUTIVE BOARD MEETING (Kinsey)**
- 1:00-6:00 REGISTRATION AND STUDENT HELP DESK (Lobby)**
- 1:00-1:45 AUDIOVISUAL TEAM MEETING (Littleton)**
- 2:00-2:50 PRE-CONFERENCE SYMPOSIUM (Rose)**  
**PC1 PEELING BACK THE CURTAIN - A PRE-CONFERENCE SYMPOSIUM ON THE FELLOWSHIP APPLICATION FROM A REVIEWER**  
M. J. McKenzie, Dept. of Exercise Physiology, Winston Salem State University, Winston-Salem, NC.  
**Chair:** Karissa Peyer, Ph.D., University of Tennessee - Chattanooga
- 2:00-2:50 PRE-CONFERENCE TUTORIAL (Walker)**  
**PC2 GOING ANYWHERE STARTS HERE! EVERYTHING YOU NEED TO KNOW BEFORE THE SEACSM ANNUAL MEETING BEGINS**  
Tiffany Esmat<sup>1</sup>, Ashlyn Schwartz<sup>2</sup>, Samuel Buckner<sup>3</sup>. <sup>1</sup>Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA; <sup>2</sup>Dept. of Child and Family Studies, University of Tennessee, Knoxville, TN; <sup>3</sup>Dept. of Health, Exercise Science and Recreation Management, University of Mississippi, University, MS  
**Chair:** Nicholas Boer, Ph.D., University of Tennessee - Chattanooga
- 3:00-3:50 PRE-CONFERENCE SYMPOSIUM (Walker)**  
**PC3 RAPID RESEARCH RACE: A PRECONFERENCE PRESENTATION**  
B. Sue Graves<sup>1</sup>, Samuel Buckner<sup>2</sup>, and Ashlyn Schwartz<sup>3</sup>; <sup>1</sup>Florida Atlantic University, Boca Raton, Florida; <sup>2</sup>University of Mississippi, Oxford, Mississippi; <sup>3</sup>University of Tennessee, Nashville, Tennessee  
**Chair:** Sue Graves, Ph.D., Florida Atlantic University
- 4:00-6:00 EXHIBITS (Conference Concierge)**
- 4:00-6:00 STUDENT AWARD POSTER FREE COMMUNICATIONS I: (Ballroom Foyer)**  
**D1-D8, M1-M8, U1-U8**  
Authors present, 4:00-6:00 p.m.  
**Chair:** John Quindry, Ph.D., SEACSM Past-President, University of Montana
- D1 SOY PROTEIN SUPPLEMENTATION IS NOT ADIPOGENIC OR ESTROGENIC IN YOUNG MEN WHEN COMBINED WITH RESISTANCE TRAINING**  
Cody T. Haun<sup>1</sup>, C. Brooks Mobley<sup>1</sup>, Christopher G. Vann<sup>1</sup>, Matthew A. Romero<sup>1</sup>, Paul A. Roberson<sup>1</sup>, Petey W. Mumford<sup>1</sup>, Wesley C. Kephart<sup>1</sup>, James C. Healy<sup>1</sup>, Romil K. Patel<sup>1</sup>, Shelby C. Osburn<sup>1</sup>, Darren T. Beck<sup>2</sup>, Michael D. Roberts<sup>1, 2\*</sup>. <sup>1</sup>Molecular and Applied Sciences Laboratory, School of Kinesiology, Auburn University, Auburn, AL; <sup>2</sup>Department of Cell Biology and Physiology, Edward Via College of Osteopathic Medicine – Auburn Campus, Auburn, AL
- D2 HEART RATE COVERAGE OF WEARABLE ACTIVITY MONITORS IN YOUTH WITH DEVELOPMENTAL DISABILITIES**  
K. Brazendale<sup>1</sup>, A. Brazendale<sup>2</sup>, C. Monroe<sup>3</sup>, R.G. Weaver<sup>1</sup>, M.W. Beets<sup>1</sup>. <sup>1</sup>Department of Exercise Science, University of South Carolina, Columbia, SC; <sup>2</sup>Autism Academy of South Carolina, Columbia, SC; <sup>3</sup>Health Promotion Education and Behavior Department, University of South Carolina, Columbia, SC
- D3 EXERCISE INTENSITY REDUCES CIRCULATING ANNEXIN V- CD105 MICROPARTICLES IN ADULTS WITH PREDIABETES**  
N.Z.M. Eichner, N.M. Gilbertson, E.M. Heiston, J.M. Gaitan, L. Musante, S. LaSalvia, E.J. Barrett, A. Weltman (FACSM), U. Erdbrügger, and S.K. Malin (FACSM). University of Virginia, Charlottesville, VA

- D4**      **COMPARISON OF BONE AND BODY COMPOSITION IN THE AFFECTED AND UNAFFECTED ARMS IN BREAST CANCER SURVIVORS**  
A.L. Artese, R.L. Hunt, D.R. Marshall, J-S. Kim, R. Moffatt, M.J. Ormsbee, L.B. Panton. Florida State University, Tallahassee, FL
- D5**      **THE VALIDITY OF AGE-BASED MAXIMAL HEART RATE EQUATIONS IN YOUTH: A SYSTEMATIC REVIEW AND META-ANALYSIS**  
Zackary S. Cicone, Michael V. Fedewa, Hayley V. MacDonald, Michael R. Esco. Department of Kinesiology, University of Alabama, Tuscaloosa, AL.
- D6**      **ACUTE AND CHRONIC AEROBIC EXERCISE EFFECTS ON Nrf2 PROTEIN CONCENTRATION IN MULTIPLE BRAIN REGIONS**  
Vervaecke, L.<sup>1</sup>, Goldfarb, A.H.<sup>2</sup>, Wideman, L.<sup>2</sup>, Starnes, J.<sup>2</sup>, Erikson, K.<sup>3</sup>. <sup>1</sup>Dept. of Exercise Science, The University of South Carolina Upstate, Spartanburg, SC; <sup>2</sup>Dept. of Kinesiology, The University of North Carolina Greensboro, Greensboro, NC; <sup>3</sup>Dept. of Nutrition, The University of North Carolina Greensboro, Greensboro, NC
- D7**      **CHANGES IN AMINO ACID TRANSPORTERS AND METABOLIC PROTEINS AFTER 12 WEEKS OF RESISTANCE TRAINING WITH VARYING SUPPLEMENTATION**  
Roberson PA<sup>1</sup>, Mobley CB<sup>1</sup>, Haun CT<sup>1</sup>, Mumford PW<sup>1</sup>, Romero MA<sup>1</sup>, Kephart WC<sup>1</sup>, Osburn SC<sup>1</sup>, Vann CG<sup>1</sup>, Lockwood CM<sup>2</sup>, Roberts MD<sup>1</sup>; <sup>1</sup>School of Kinesiology-Auburn University, Auburn, AL; <sup>2</sup>Lockwood, LLC, Draper, UT.
- D8**      **INFLUENCE OF SEX AND MUSCLE QUALITY ON MOTOR UNIT RECRUITMENT PATTERNS OF THE VASTUS LATERALIS**  
MA. Trevino<sup>1</sup>, T.J. Herda<sup>2</sup>, J.D. Miller<sup>2</sup>, and A.J. Sterczala<sup>2</sup>. <sup>1</sup>Georgia Southern University, Armstrong Campus, Savannah, GA; <sup>2</sup>The University of Kansas, Lawrence, KS
- MS1**     **LOW INTENSITY RESISTANCE TRAINING TO FAILURE ON 1RM STRENGTH IN UNTRAINED FEMALES**  
Taylor K. Dinyer<sup>1</sup>, Matthew J. Garver<sup>2</sup>, Alex J. Rickard<sup>2</sup>, William Miller<sup>2</sup>, Steve Burns<sup>2</sup>, Haley C. Bergstrom<sup>1</sup>; <sup>1</sup>University of Kentucky, Lexington, KY; <sup>2</sup>University of Central Missouri, Warrensburg
- MS2**     **LIFELONG KETOGENIC DIET OR KETONE SALT SUPPLEMENTATION IN RATS INCREASES LONGEVITY WITHOUT ALTERING OXIDATIVE STRESS MARKERS**  
Hailey Parry<sup>1</sup>, Wesley C. Kephart<sup>1</sup>, Petey Mumford<sup>1</sup>, Matthew Romero<sup>1</sup>, Cody Haun<sup>1</sup>, C. Brooks Mobley<sup>1</sup>, Dominic P. D'Agostino<sup>2</sup>, Ryan P. Lowery<sup>3</sup>, Jacob M. Wilson<sup>3</sup>, Michael D. Roberts<sup>1</sup>, and Andreas N. Kavazis<sup>1</sup>. <sup>1</sup>School of Kinesiology, Auburn University, Auburn, AL; <sup>2</sup>Department of Molecular Pharmacology and Physiology, University of South Florida, Tampa, FL; <sup>3</sup>Applied Science and Performance Institute, Tampa,
- MS3**     **ACUTE CAFFEINE CONSUMPTION DOES NOT AFFECT BODY COMPOSITION ANALYSIS**  
C. Williamson<sup>1</sup>, B.M. Kliszczewicz<sup>1</sup>, B. Nickerson<sup>2</sup>, E.E. Bechke<sup>1</sup>, C. McLester<sup>1</sup>. <sup>1</sup>Dept. of Exercise Science & Sport Management Kennesaw State University, Kennesaw; <sup>2</sup>Dept. of Curriculum & Pedagogy, Texas A&M International University, Laredo, TX
- MS4**     **CHILD DEVELOPMENT MAJORS PHYSICAL ACTIVITY COMPETENCE AND ATTITUDES**  
R.K. Hess, R.A. Battista. Department of Health and Exercise Science, Appalachian State University, Boone, NC
- MS5**     **THE EFFECTS OF MICRO-RNA-26A IN LIPID INDUCED INSULIN RESISTANCE**  
JJ. Petrocelli, N. Stott, CL. Beach, and JS. Marino. Dept. of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC
- MS6**     **CONCUSSION SYMPTOM CLUSTERS AND RETURN-TO-PLAY TIME IN COLLEGE ATHLETES WITH SPORTS-RELATED CONCUSSIONS: 2009-2010 AND 2013-2014 DISC**  
A.J. Boltz<sup>1</sup>, M.H. Feinberg<sup>3</sup>, T.D. Smith<sup>1</sup>, T.M. Johnson<sup>2</sup>, M.R. Richardson<sup>1</sup>, J.R. Churilla<sup>1</sup>. <sup>1</sup>Department of CAMS; <sup>2</sup>Department of Public Health, University of North Florida, Jacksonville, FL; <sup>3</sup>S Florida Neurology Assoc, Boca Raton, FL



- MS7 THE VALIDATION OF THE INBODY 770 FOR THE ASSESSMENT OF BODY COMPOSITION IN COLLEGE-AGED INDIVIDUALS**  
 VG. Nocera<sup>1</sup>, AJ. Fradkin FACSM<sup>1</sup>, CB. Dixon FACSM<sup>2</sup>, and JL. Andreacci FACSM<sup>1</sup>. <sup>1</sup>Dept. of Exercise Science, Bloomsburg University, Bloomsburg, PA; <sup>2</sup>Dept. of Health Sciences, Lock Haven University, Lock Haven, PA
- MS8 SEMITENDINOSUS TENDON MATERIAL PROPERTIES DEFICITS PERSIST FOUR YEARS POST-ACL RECONSTRUCTION**  
 C Amat-Fernandez, Z Domire, A Kulas. Dept. of Kinesiology, East Carolina University, Greenville, NC
- UG1 MUSCLE AKT SIGNALING SENSITIVITY TO SHORT-TERM FASTING IN TUMOR BEARING MICE**  
 Nancy K. Kaura<sup>1</sup>, Brandon N. VanderVeen<sup>1</sup>, Dennis K. Fix<sup>1</sup>, Brittany R. Counts<sup>1</sup>, Justin P. Hardee<sup>1</sup>, and James A. Carson, FACSM<sup>1,2</sup>. <sup>1</sup>Integrative Muscle Biology Laboratory, University of South Carolina, Columbia, SC; <sup>2</sup>Center for Colon Cancer Research, University of South Carolina, Columbia, SC
- UG2 EFFECTS OF LUMBOPELVIC-HIP COMPLEX STABILITY ON OVERHEAD THROWING MECHANICS AMONGST COLLEGIATE SOFTBALL ATHLETES**  
 G.G. Gilmer, J.K. Washington, G.D. Oliver, FACSM. School of Kinesiology, Auburn University, Auburn, AL
- UG3 FITNESS-RELATED BENEFITS: LAND-BASED VERSUS AQUA-BASED**  
 R. Swiezy<sup>1</sup>, R. Williams<sup>1</sup>, M. Patterson<sup>1</sup>, R. McCormick<sup>1</sup>, B. Bonner<sup>1</sup>, A. Ausley<sup>1</sup>, R. Santee<sup>1</sup>, A. Burgess<sup>1</sup>, V. Wilson<sup>1</sup>, H. Grimes<sup>1</sup>, M. Heijnen<sup>1</sup>, T.V. Barreira<sup>2</sup>, W. Tseh<sup>1</sup>. <sup>1</sup>School of Health and Applied Human Sciences, University of North Carolina Wilmington, Wilmington, NC; <sup>2</sup>School of Education, Syracuse University, Syracuse, NY
- UG4 EFFECT OF CROSS-SLOPED SURFACES ON RUNNING KINEMATICS**  
 E. Heald, M. McKinney, M. Andrews, D. Barney, and R. McCoy, Kinesiology & Health Sciences Department, College of William and Mary, Williamsburg, VA
- UG5 ASSESSING THE EFFECT OF YMCA MOVING FOR BETTER BALANCE PROGRAM ON BALANCE, ELECTROMECHANICAL DELAY AND BODY COMPOSITION**  
 CE Corle, JR Wingert, DF Saccone, GG Evins, and AE Rote. Department of Health and Wellness, University of North Carolina at Asheville, Asheville, NC
- UG6 THE EFFECTS OF PALMITIC ACID ON MICRO-RNA-23A EXPRESSION AND MYOTUBE FORMATION**  
 CL. Beach, JJ. Petrocelli, N. Stott, and JS. Marino. Dept. of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC
- UG7 DIFFERENCES IN COACH AND ATHLETE PERCEPTIONS OF PHYSICAL AND MENTAL DEMAND DURING A COLLEGIATE SEASON**  
 W. Davis, H. Demeester, J. OShaughnessy, J. Kutz. Dept. of Exercise Science & Dept. of Mathematics, Shenandoah University, Winchester, VA
- UG8 THE EFFECTS OF NOTCH AND MTOR ON MYOGENESIS**  
 B. Q. Thompson, C. McMullen, J.R. Huot, S. Arthur. Dept. of Kinesiology: Laboratory of System Physiology, University of North Carolina at Charlotte, Charlotte, NC
- 4:00-6:00 P1-P48 POSTER FREE COMMUNICATIONS I (Ballroom Foyer)**  
**Authors present, 4:30-6:00 pm**  
**ENDOCRINOLOGY/IMMUNOLOGY** **EPIDEMIOLOGY**  
**GROWTH, DEVELOPMENT & AGING** **REPRODUCTION**  
**RESEARCH DESIGN AND STATISTICS**

**Chair:** Curtis Fennel, Ph.D., University of Montevallo

- P1 ERK1/2 AND CCR2 EXPRESSION IN FIT AND UNFIT MALES**  
Anson M. Blanks, Lauren N. Pedersen, Virginia L. Mihalick, Attiya Shah, R. Lee Franco, Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P2 AERBOIC TRAINING STATUS AND THE PENTRAXIN (PTX3)-MEDIATED INNATE IMMUNE RESPONSE FOLLOWING MAXIMAL EXERCISE**  
A.L. Slusher, Zúñiga T.M., Acevedo E.O., FACSM. Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P3 ENDOGENOUS IGG IN WESTERN BLOTTING: TRASH TO TREASURE?**  
AL. Letsinger, JZ. Granados, C. Nagel, VA. Garcia, JD. Velasco, K. Stiegel, B. Nevares, and JT. Lightfoot (FACSM). Dept. of Health & Kinesiology, Texas A&M University, College Station, TX
- P4 A TWO WEEK LOW-CALORIE DIET PLUS INTERVAL EXERCISE IMPROVES METABOLIC FLEXIBILITY AND ADIPOSOPATHY IN OBESE WOMEN**  
N.M. Gilbertson; N.Z.M. Eichner; J.M. Gaitan; E.M. Heiston; J.H. Mehaffey; T.E. Hassinger; P.T. Hollowell; A. Weltman (FACSM); S.K. Malin (FACSM). University of Virginia, Charlottesville, VA
- P5 TESTOSTERONE RESPONSE FOLLOWING FIVE CROSSFIT® OPEN WORKOUTS**  
P. Serafini, T. VanDusseldorp, Y. Feito, FACSM, A. Holmes, G. Mantine Department of Exercise Science & Sport Management, Kennesaw State University, Kennesaw, GA
- P6 CARDIOMETABOLIC RISK ASSESSMENT IN ADOLESCENTS USING LATENT PROFILE ANALYSIS**  
Gabaldon, J., Gangel, M., Dollar, J., Shanahan, L., Calkins, S. D., Keane, S., & Wideman, L. The University of North Carolina Greensboro, Greensboro, NC and University of Zurich, Zurich, SW.
- P7 POST-STEMI AGE DIFFERENCES IN CD14 RESPONSE TO LPS**  
Lauren N. Pedersen, Anson M. Blanks, Justin M. Canada, Edmund O. Acevedo (FACSM), Antonio Abbate, R. Lee Franco. Department of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P8 STRESS HORMONES INCREASE MONOCYTE CD14 AND CD16 POST-MI**  
Virginia L. Mihalick, Anson M. Blanks, Lauren N. Pederson, Justin M. Canada, Edmund O. Acevedo FACSM, Antonio Abbate, R. Lee Franco, Dept of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P9 CORTISOL RESPONSES TO EXERCISE FOLLOWING SLEEP DEPRIVATION ARE INTENSITY DEPENDENT**  
T. Anderson<sup>1</sup>, K. Ritsche<sup>2</sup>, N.T. Berry<sup>1</sup>, J.A. Janssen<sup>1</sup>, J.A. Diekfuss<sup>3</sup>, A.B. Slutsky<sup>1</sup>, L.D. Raisbeck<sup>1</sup>, J.L. Etnier<sup>1</sup>, L. Wideman<sup>1</sup>; <sup>1</sup>Department of Kinesiology, University of North Carolina at Greensboro; <sup>2</sup>Winston-Salem State University; <sup>3</sup>Cincinnati Children's Hospital Medical Center
- P10 THE EFFECT OF SLEEP ON SYSTEMIC INFLAMMATION DURING THE ULTRAMAN TRIATHLON**  
K.A. Smith, J.N. Kisiolek, M.C. Morrissey, P.G. Saracino, B.D. Willingham, S.M. Leyh, D.A. Baur, and M.J. Ormsbee, FACSM. Institute of Sports Sciences and Medicine, Florida State University, Tallahassee, FL
- P11 EFFECT OF ACUTE HIGH-INTENSITY INTERVAL EXERCISE VS. CONTINUOUS MODERATE-INTENSITY EXERCISE ON THE BDNF, LACTATE, AND CORTISOL RESPONSES IN OBESE INDIVIDUALS**  
Alexandra A. Rodriguez, Michael Whitehurst, FACSM, Brandon G. Fico, Katelyn M. Dodge, Peter J. Ferrandi, Gabriel Pena, Avraham Adelman, Chun-Jung Huang, FACSM. Exercise Biochemistry Laboratory, Department of Exercise Science and Health Promotion, Florida Atlantic University, Boca Raton, FL

- P12 DEVELOPMENT OF A TURN-BY-TURN WHEEL RUNNING SYSTEM**  
O.R. Darley, C.E. Lombard, K.A. West, D.O. Lawrence, B.K. Butts, N.L. Stott, and R.S. Bowen. Pilgram Marpeck School of STEM, Truett McConnell University, Cleveland, GA & Department of Kinesiology, University of North Carolina Charlotte, Charlotte, NC
- P13 THE EFFECT OF INTENTIONAL WEIGHT LOSS ON THE HEALTHY AGING INDEX IN OLDER ADULTS WITH OBESITY**  
LN. Shaver, BS<sup>1</sup>, DP. Beavers, PhD<sup>2</sup>, SB. Kritchevsky, PhD<sup>3</sup>, KM. Beavers, PhD<sup>1</sup>. Depts. of <sup>1</sup>Health and Exercise Science, <sup>2</sup>Biostatistics, and <sup>3</sup>Internal Medicine, Wake Forest University, Winston-Salem, NC.
- P14 PHYSICAL ACTIVITY BY LOCATION OF MARYVILLE COLLEGE ATHLETES, NON-ATHLETES, AND FACULTY/STAFF**  
T. Smith, C. Beach, J.I. Flynn, T. Haydu, B. Guillaume, J.A. Steeves. Div. of Education, Maryville College, Maryville, TN
- P15 THE ATHLETIC DIFFERENCE: DIFFERENCES IN PHYSICAL ACTIVITY BETWEEN STUDENT ATHLETES, NON-ATHLETES AND FACULTY/STAFF**  
C. Beach, T. Smith, B. Guillaume, J. I. Flynn, T. Haydu, J. A. Steeves. Division of Education, Maryville College, Maryville, TN
- P16 DEVELOPING A FIT. GREEN. HAPPY™ CAMPUS: A DESCRIPTIVE STUDY OF OUTDOOR ACTIVITY AND SEDENTARY TIME IN FRESHMAN STUDENTS**  
L.G. Marttala, T. Haydu, B. Guillaume, J.A. Steeves & J.I. Flynn, Division of Education, Maryville College, Maryville, TN
- P17 FEASIBILITY OF A COLLABORATIVE INTERVENTION TO IMPROVE HEALTHY BEHAVIORS IN TEACHERS AND SCHOOL STAFF: A PILOT STUDY**  
Kayla M. Baker, Jaime L. Best, David H. Fukuda, Jeanette M. Garcia, University of Central Florida, Orlando, FL
- P18 SELF-REPORTED SEDENTARY TIME AND CUMULATIVE RISK OF PRESERVED AND REDUCED EJECTION FRACTION HEART FAILURE (FROM THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS)**  
B.S. Rariden<sup>1</sup>, M.R. Richardson<sup>1</sup>, T.M. Johnson<sup>2</sup>, C.A. Brawner<sup>3</sup>, S.O. Pinkstaff<sup>1</sup>, J.R. Churilla<sup>1</sup>; <sup>1</sup>Department of CAMS, <sup>2</sup>Department of Public Health, University of North Florida, Jacksonville, FL; <sup>3</sup>Division of Cardiovascular Medicine, Henry Ford Hospital, Detroit, MI.
- P19 MEAN COMBINED RELATIVE GRIP STRENGTH AND METABOLIC SYNDROME: 2011-2014 NHANES**  
M.E. Summerlin, M.R. Richardson, J.R. Churilla. Dept. of Clinical & Applied Movement Sciences; University of North Florida, Jacksonville, FL
- P20 Diabetic Risk Profiling in Charlotte Hispanic Community**  
Anna Tart Carly Munchel, Ali Hinton, Blake Loman, Adam Lavis, Julianna Mills, Jimmy Joyner, Jibril Ash-Shakoor, Wendy Pascual, Scott Gordon PhD, Trudy Moore-Harrison PhD. University of North Carolina at Charlotte
- P21 SO YOU THINK YOU ARE BETTER THAN A 12-YEAR-OLD?**  
Katherine E. Wood<sup>1</sup>, Megan E. Holmes<sup>1</sup>, YonJoong Ryuh<sup>1</sup>, Chih Chia Chen<sup>1</sup>, Pamala H Kulinna<sup>2</sup>. <sup>1</sup>Mississippi State University, Starkville, MS; <sup>2</sup>Arizona State University, Phoenix, AZ
- P22 THE IMPORTANCE OF HIGH CARDIORESPIRATORY FITNESS AND OVERWEIGHT OBESITY TO CARDIOMETABOLIC HEALTH IN PRE-ADOLESCENT CHILDREN**  
Katie Burnet<sup>1</sup>, Nicholas Castro<sup>2</sup>, Lee Stoner<sup>1</sup>. <sup>1</sup>Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, Chapel Hill, NC; <sup>2</sup>School of Sport and Exercise, Massey University, Wellington, NZ

- P23 THE BENEFITS OF A REQUIRED WELLNESS COURSE IN A LIBERAL ARTS EDUCATION**  
Anna K. Leal<sup>1</sup>, Ph.D., Edien Fernandini<sup>2</sup>, B.S., Brandon Jackson<sup>3</sup>, Madeleine Mason<sup>4</sup>, David Elmer<sup>4</sup>, Ph.D., <sup>1</sup>Bridgewater College (Bridgewater, VA); <sup>2</sup>University of Tennessee Chattanooga (Chattanooga, TN); <sup>3</sup>Georgia Southern University (Statesboro, GA); <sup>4</sup>Berry College (Mt. Berry, GA)
- P24 DOMAIN-SPECIFIC CORRELATIONS BETWEEN PHYSICAL ACTIVITY INTENSITY AND CELL-PHONE ADDICTION IN COLLEGE STUDENTS**  
V.K. Lewis<sup>1</sup>, A.L. Moskowski<sup>1</sup>, B.L. Tretter<sup>1</sup>, M.L. Stough<sup>1</sup>, E.D. Hathaway<sup>2</sup>, M.V. Fedewa<sup>1</sup>. <sup>1</sup>University of Alabama, Tuscaloosa, AL; <sup>2</sup>University of Tennessee at Chattanooga, Chattanooga, TN.
- P25 SEX-RELATED DIFFERENCES IN PHYSICAL ACTIVITY, SEDENTARY BEHAVIOR AND CELL-PHONE ADDICTION**  
S.C. Leatherwood<sup>1</sup>, T.D. Glover<sup>1</sup>, C.M. Brunton<sup>1</sup>, A.L. Moskowski<sup>1</sup>, T.A. Henson<sup>1</sup>, E.D. Hathaway<sup>2</sup>, M.V. Fedewa<sup>1</sup>. <sup>1</sup>University of Alabama, Tuscaloosa, AL; <sup>2</sup>University of Tennessee at Chattanooga, Chattanooga, TN.
- P26 SEDENTARY BEHAVIOR IS ASSOCIATED WITH PHYSICAL ACTIVITY AND CELL-PHONE ADDICTION IN YOUNG ADULTS**  
A.L. Moskowski<sup>1</sup>, T.A. Henson<sup>1</sup>, T.D. Glover<sup>1</sup>, S.C. Leatherwood<sup>1</sup>, C.M. Brunton<sup>1</sup>, E.D. Hathaway<sup>2</sup>, M.V. Fedewa<sup>1</sup>. <sup>1</sup>University of Alabama, Tuscaloosa, AL; <sup>2</sup>University of Tennessee at Chattanooga, Chattanooga, TN.
- P27 A COMPARISON OF MODERATE TO VIGOROUS PHYSICAL ACTIVITY DURING TRADITIONAL AND NON-TRADITIONAL SCHOOL ACTIVITY OPPORTUNITIES**  
Michelle L. Whitfield, G. Stewart, L. Decker, K. Brazendale, M. W. Beets, R.G. Weaver  
Dept. of Exercise Science, University of South Carolina, Columbia, SC
- P28 PHYSICAL ACTIVITY OPPORTUNITIES THROUGHOUT A SEGMENTED SCHOOL DAY**  
Emily C. Burrell, K. Brazendale, L. Decker, L.Schisler, M. Whitfield, B. Mealing, E. Hunt, M. Aziz , M. W. Beets , R.G. Weaver. Dept. of Exercise Science, University of South Carolina, Columbia, SC
- P29 ASSOCIATION OF PHYSICAL ACTIVITY AND SEDENTARY TIME ON SLEEP QUALITY IN FIRST-YEAR COLLEGE FEMALES**  
G.M. Frederick<sup>1</sup>, M.V. Fedewa<sup>2</sup>, B.M. Das<sup>3</sup>, E. Rees-Punia<sup>1</sup>, W.J. McConnell<sup>4</sup>, M.D. Schmidt<sup>1</sup>, E.M. Evans<sup>1</sup>, FACSM. <sup>1</sup>Department of Kinesiology: University of Georgia, Athens, GA; <sup>2</sup>Department of Kinesiology, The University of Alabama, Tuscaloosa, AL; <sup>3</sup>Department of Kinesiology, East Carolina University, Greenville, NC; <sup>4</sup>University Health Center, University of Georgia, Athens, GA.
- P30 PHYSICAL ACTIVITY PARTICIPATION AND CHRONIC DISEASE RISK FACTORS IN AFRICAN AMERICAN COLLEGE STUDENTS**  
A.A. Price<sup>1,2</sup>, T. Fair<sup>1</sup>, G. McCauley<sup>1</sup>, V. Duren-Winfield<sup>1</sup>. <sup>1</sup>Winston-Salem State University, Winston-Salem, NC; <sup>2</sup>Gramercy Research Group, Winston-Salem, NC.
- P31 EFFECTS OF EXERCISE AND WINE ON GLYCEMIC CONTROL IN TYPE 2 DIABETES**  
K.A. Abraham, M. Wasson, and H. Woggon. Exercise Science Program, Transylvania University, Lexington, KY.
- P32 PHYSICAL ACTIVITY AND PLAY BEHAVIORS DURING INDOOR AND OUTDOOR FREE PLAY IN TODDLERS**  
T.J. Kybartas, J.T. Ramsey, and D.P. Coe, FACSM. Department of Kinesiology, Recreation, & Sport Studies, The University of Tennessee, Knoxville, TN
- P33 WNT PROTEIN RESPONSE TO ACUTE AND CHRONIC RESISTANCE EXERCISE**  
Petey W. Mumford, C. Brooks Mobley, Cody T. Haun, Matthew A. Romero, Paul A. Roberson, Wesley C. Kephart, Kaelin C. Young, Michael D. Roberts; Auburn University, Auburn, AL; University of Wisconsin-Whitewater, Whitewater, WI; Edward Via College of Osteopathic Medicine – Auburn Campus, Auburn, AL

- P34 ENERGY EXPENDITURE IN OUTDOOR PLAY IN YOUNG CHILDREN**  
A.N. Schwartz<sup>1,2</sup>, R.A. Brookshire<sup>2,3</sup>, L.M. Hornbuckle<sup>1</sup>, E.C. Fitzhugh<sup>1</sup>, M.J. Moran<sup>2</sup>, S.E. Crouter<sup>1</sup>, and D.P. Coe<sup>1</sup>. <sup>1</sup>Department of Kinesiology, Recreation, and Sport Studies; <sup>2</sup>Department of Child and Family Studies; <sup>3</sup>Early Learning Center for Research and Practice, The University of Tennessee, Knoxville, TN
- P35 EFFICACY OF BINGOCIZE®: A GAME-CENTERED MOBILE APPLICATION TO IMPROVE PHYSICAL AND COGNITIVE PERFORMANCE IN COMMUNITY-DWELLING OLDER ADULTS**  
A. Kathryn Dispennette, K. Jason Crandall, Matthew Shake, Rilee P. Mathews, Western Kentucky University, Bowling Green, KY
- P36 THE IMPACT OF A 1-YEAR PHYSICAL ACTIVITY PROGRAM FOR PRESCHOOLERS ON FUNDAMENTAL MOTOR SKILLS, PERCEIVED COMPETENCE, AND PHYSICAL ACTIVITY**  
A.P. Venezia, M.E. Rudisill and D.D. Wadsworth, School of Kinesiology, Auburn University, Auburn AL
- P37 THE IMPACT OF NOTCH ON MUSCLE INJURY, COLLAGEN FORMATION AND FAT DEPOSITION FOLLOWING DOWNHILL RUNNING**  
J.Chesson, J. Huot, B. Thompson, B. Wilson & S. Arthur. Dept. of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC
- P38 SEX MAY INFLUENCE EFFECTS OF AN EXERCISE INTERVENTION ON CHANGE IN PHYSICAL FUNCTION, LONELINESS, AND SOCIAL SUPPORT**  
R.E. Salyer, E.R. Williams, C.X. Torres, E.M. Evans, FACSM. Department of Kinesiology: University of Georgia, Athens, GA.
- P39 THE EFFECTS OF TAI CHI INTERVENTION ON HEALTHY ELDERLY BY MEANS OF NEUROIMAGING AND EEG**  
Su, X.1, Pan, Z.2, McWhirter, K. 2, Fang, Q.2, Hou, L. 1, Chen, C-C. 2, Lee, Y. 2, Kim, M.3, <sup>1</sup>College of Physical Education and Sports, Beijing Normal University, China, <sup>2</sup>Department of Kinesiology, Mississippi State University, MS State, MS; <sup>3</sup>Department of Sports, Leisure and Recreation, Soonchunhyang University, Korea
- P40 EFFECTS OF SHORT-TERM RESISTANCE TRAINING ON MAXIMAL AND RAPID TORQUE CHARACTERISTICS IN OLDER MALES**  
A.A. Olmos<sup>1</sup>, G.M. Hester<sup>1</sup>, Z.K. Pope<sup>2</sup>, M.A. Magrini<sup>2</sup>, R.J. Colquhoun<sup>2</sup>, A. Barrera-Curiel<sup>2</sup>, C.A. Estrada<sup>2</sup>, J.M. DeFreitas<sup>2</sup>. <sup>1</sup>Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA; <sup>2</sup>Applied Neuromuscular Physiology Laboratory, Oklahoma State University, Stillwater, OK
- P41 THE INFLUENCE OF RACE ON GESTATIONAL EXERCISE AND BIRTH OUTCOMES**  
Alex Babineau<sup>1</sup>, Christy Isler<sup>1</sup>, Linda E. May<sup>1,2</sup>. <sup>1</sup>College of Health and Human Performance, East Carolina University (ECU), Greenville, North Carolina; <sup>2</sup>Department of Obstetrics and Gynecology, ECU, Greenville, NC
- P42 PHYSICIAN-PROVIDED PHYSICAL ACTIVITY ADVICE DURING PREGNANCY AND ADVICE ADHERENCE**  
Cara Warren, Christopher G. Ballmann, John K. Petrella, FACSM, Rebecca R. Rogers, Mallory R. Marshall; Dept. of Kinesiology, Samford University, Birmingham, AL
- P43 WEARABLES FOR KIDS – VALIDATION OF CONSUMER-WEARABLE HEART RATE IN CHILDREN**  
L.Decker, M.W. Beets, E.Hunt, M.Whitfield, K.Brazendale, R.G. Weaver, Dept. of Exercise Science, University of South Carolina, Columbia, SC
- P44 EXAMINING THE DIFFERENCES IN BMI CHANGES OVER THE SUMMER AMONG CHILDREN ATTENDING YEAR-ROUND VERSUS TRADITIONAL SCHOOLS**  
Breonna A. Mealing, K. Brazendale, M. Whitfield, L. Decker, E. Burrell, L. Decker, E. Hunt, M. Aziz, M. W. Beets, R. G. Weaver; Dept. of Exercise Science, University of South Carolina, Columbia, SC

- P45 MODIFYING ACCELEROMETER CUT-POINTS AFFECTS CRITERION VALIDITY IN FREE-LIVING YOUTH AND ADULTS**  
P.R. Hibbing, D.R. Bassett FACSM, and S.E. Crouter FACSM. Dept. of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville, TN
- P46 QUALITY OF REPORTING FOR SINGLE-CASE EXPERIMENTAL DESIGNS TARGETING PHYSICAL ACTIVITY BEHAVIOR: A SYSTEMATIC REVIEW**  
Paula-Marie M. Ferrara, Kelley Strohacker. Department of Kinesiology, Recreation, & Sport Studies, University of Tennessee, Knoxville, TN
- P47 VALIDITY OF ADHESIVE WORN ACTIGRAPH GT3X+ ACCELEROMETER**  
AnnaMagee Morris, Eleanor Stevenback, Roxanna Lopez, Katherine H. Ingram, Ph.D. Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA
- P48 CAN A PARTICIPANT-TAILORED PHYSICAL ACTIVITY INTERVENTION IMPACT MVPA IN LOW-SES, URBAN SCHOOL ADOLESCENTS?**  
A. Grant, K.C. Hamilton, S. Howard-Baptiste. Department of Health & Human Performance, University of Tennessee-Chattanooga, Chattanooga TN
- 4:00-5:30 THEMATIC POSTERS SESSION I (Ochs)**  
**TP1-TP6 NUTRITION AND EXERCISE/SPORTS**  
**Chair:** Trisha VanDusseldorp, Ph.D., Kennesaw State University
- TP1 EFFECT OF BETA-HYDROXY BETA-METHYLBUTYRATE SUPPLEMENTATION ON SPRINT KINETICS ACROSS A COLLEGIATE RUGBY SEASON**  
K.L. Hayes, J.M. Julian, T.A. VanDusseldorp, G.M. Hester, Y. Feito, and G.T. Mangine. Dept. of Exercise Science and Sport Management Kennesaw State University, Kennesaw, GA.
- TP2 PRELIMINARY ANALYSIS: MODERATING THE STRESS PERCEPTION OF COLLEGIATE DISTANCE RUNNERS USING BRANCHED-CHAIN AMINO ACIDS**  
Asher Flynn, Tara Whiton, Kimitake Sato, Joseph Walters, Caleb Bazylar, Michael H. Stone, Brad DeWeese. East Tennessee State University, Johnson City, TN
- TP3 NITRATE SUPPLEMENTATION DOES NOT INFLUENCE SUPRAMAXIMAL CYCLING PERFORMANCE OR LACTATE CLEARANCE**  
M.J. Webster<sup>1</sup>, M.R. Gross<sup>2</sup>, V.A. Blades<sup>1</sup>, and C.D. Rogers<sup>1</sup>. <sup>1</sup>Dept. of Exercise Physiology, Valdosta State University, Valdosta, GA; <sup>2</sup>Dept. of Kinesiology, University of North Georgia, Dahlonega, GA
- TP4 EFFECTS OF ACUTE GOLDEN ROOT EXTRACT (RHODIOLA ROSEA) SUPPLEMENTATION ON ANAEROBIC EXERCISE CAPACITY**  
Shelby Maze, Abby Wells, Rebecca R. Rogers, Mallory R. Marshall, John K. Petrella, FACSM, Christopher G. Ballmann, Dept. of Kinesiology, Samford University, Birmingham, AL
- TP5 SUB-CHRONIC PHYSIOLOGICAL EFFECTS OF BETALAIN SUPPLEMENTATION ON CYCLING PERFORMANCE**  
Shelby C. Osburn, Petey W. Mumford, C. Brooks Mobley, Cody T. Haun, Matthew A. Romero, Paul A. Roberson, Wesley C. Kephart, William C. Ruffin, Jeffery S. Martin, Kaelin C. Young, Michael D. Roberts, Auburn University, Auburn, AL; University of Wisconsin-Whitewater, Whitewater, WI; Edward Via College of Osteopathic Medicine – Auburn Campus, Auburn, AL
- TP6 EFFECTS OF EXOGENOUS KETONE SUPPLEMENTATION ON ANAEROBIC AND AEROBIC PHYSICAL PERFORMANCE**  
Ahmed S. Qazi, Hillary Gaines, Matthew Sharp, Ryan Lowery, Jacob Wilson, A. Maleah Holland. Department of Kinesiology, Augusta University, Augusta, GA
- 4:00-6:00 ORAL FREE COMMUNICATIONS I (Kelley)**  
**O1-08 PSYCHOLOGY/PSYCHIATRY/BEHAVIOR**  
**Chair:** Rebecca Ellis, Ph.D., Georgia State University

- 01 4:00 BASELINE CHARACTERISTICS OF MIDDLE SCHOOL EMPLOYEES PARTICIPATING IN A WORKPLACE PHYSICAL ACTIVITY INTERVENTION**  
M. Lima, R. Ellis, R. Gurvitch, & J. Lund. Dept. of Kinesiology and Health, Georgia State University, Atlanta, GA
- 02 4:15 BARRIERS TO A WORKPLACE PHYSICAL ACTIVITY PROGRAM**  
A. Davis, D. Biber, & R. Ellis. Georgia State University, Atlanta, GA
- 03 4:30 EFFECT OF MOTIVATIONAL SIGNAGE ON STAIR USAGE IN MUNICIPAL BUILDING**  
Aram Yoon<sup>1</sup>, Timothy Hughley<sup>1</sup>, Laxmi Paudel<sup>2</sup>, Hui Jun Yun<sup>2</sup>. <sup>1</sup>Department of Health and Human Performance; <sup>2</sup>Department of Math and Computer Science, Albany State University, Albany, GA
- 04 4:45 RACE, AGE, AND TYPES OF MOTIVATION IN INDOOR GROUP CYCLING**  
Alvin L. Morton, Derrick T. Yates, Miguel Aranda, Lyndsey M. Hornbuckle. Dept. of Kinesiology, Recreation, & Sports Studies, University of Tennessee, Knoxville, TN
- 05 5:00 TURN STRESS INTO SWEAT: THE EFFECTS OF PHYSICAL ACTIVITY CLASSES ON STRESS IN COLLEGE STUDENTS**  
K. Cooper, J.R. Wojcik, FACSM. Dept. of Physical Education, Sport and Human Performance, Winthrop University, Rock Hill, SC
- 06 5:15 ACUTE EXERCISE TO LIFT AFFECTIVE STATES IN INDIVIDUALS WITH PTSD**  
Daniel R. Greene, Augusta University, Augusta GA; Steven J. Petruzzello, University of Illinois at Urbana-Champaign, Urbana IL
- 07 5:30 REDUCING THE DISPLEASURE OF A PAINFUL EXERCISE: INDUCING BENIGN MASOCHISM**  
C. Loflin, Z. Zenko, C. J. Berman, J. D. O'Brien, and D. Ariely, Center for Advanced Hindsight, Duke University, Durham, NC
- 08 5:45 IMPACT OF A MOTHER-DAUGHTER PHYSICAL ACTIVITY INTERVENTION ON MATERNAL ENJOYMENT AND SUPPORT**  
D. Dlugonski and L. Schwab, Dept. of Kinesiology, East Carolina University, Greenville, NC
- 4:00-4:50 S1 SYMPOSIUM SESSION I (Walker)**  
**ACUTE SEDENTARISM AND CARDIOVASCULAR HEALTH: INTERACTIONS BETWEEN PERIPHERAL AND SYSTEMIC VASCULAR HEALTH**  
Lee Stoner<sup>2</sup>, Daniel Credeur<sup>2</sup>, William Evans<sup>1</sup>, Sabina Miller<sup>2</sup>, Quentin Willey<sup>1</sup>; <sup>1</sup>Dept. of Sport & Exercise Science, University of North Carolina, Chapel Hill, NC; <sup>2</sup>Dept. of Kinesiology, University of Southern Mississippi, Hattiesburg, MS  
**Chair:** Trudy Moore-Harrison, Ph.D., University of North Carolina - Charlotte
- 4:00-4:50 S2 SYMPOSIUM SESSION II (Rose)**  
**STUDENT RUN PROGRAMS PROVIDING COMMUNITY-BASED PHYSICAL ACTIVITY PROGRAMS FOR INDIVIDUALS WITH SPECIAL NEEDS**  
Dr. Kathy Carter- University of Louisville, Dr. Kevin McCully - University of Georgia, Dr. Jason Crandall - Western Kentucky University, Megan Osbourn - University of Georgia  
**Chair:** Erica Roelofs, Ph.D., Meredith College
- 4:00-4:50 T1 TUTORIAL SESSION I (Roberts)**  
**BONE MINERAL DENSITY AND BODY COMPOSITION RELATIONSHIPS IN MULTICULTURAL NON- AND MENOPAUSAL RUNNERS AND NON-RUNNERS**  
Doris J. Morris<sup>1</sup>, L. Jerome Brandon<sup>2</sup>, FACSM; <sup>1</sup>Kennesaw State Univ., Kennesaw, GA; <sup>2</sup>Georgia State University, Atlanta, GA  
**Chair:** Catalina Casaru, Ph.D., Georgia Southern University
- 4:00-4:50 T2 TUTORIAL SESSION II (Amphitheater)**  
**THE ADVERSE EFFECTS OF HIGH-FAT MEALS ON METABOLIC AND CARDIOPULMONARY OUTCOMES: WHAT ROLE DOES EXERCISE HAVE?**  
Stephanie P. Kurti, Ph.D., James Madison University, Harrisonburg, VA  
**Chair:** Eric Plainsance, Ph.D., University of Alabama - Birmingham

- 5:00-5:50 S3 SYMPOSIUM SESSION III (Walker)**  
**IF YOU BUILD IT, WILL THEY COME? PHYSICAL ACTIVITY AND THE BUILT ENVIRONMENT**  
 GW Heath, KL Peyer, K Hamilton, A Bailey. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN  
**Chair:** Elizabeth Skidmore Edwards, Ph.D., James Madison University
- 5:00-5:50 S4 SYMPOSIUM SESSION IV (Rose)**  
**CHRONIC EXTERNAL LOADING DURING DAILY LIVING: A "LOST" TRAINING STRATEGY TO IMPROVE THE FORCE-VELOCITY CURVE**  
 JD Simpson<sup>1</sup>, EM Scudamore<sup>2</sup>, & EK O'Neal<sup>3</sup>. <sup>1</sup>Mississippi State University, Mississippi State, MS; <sup>2</sup>Arkansas State University, Jonesboro, AR; <sup>3</sup>University of North Alabama, Florence, AL  
**Chair:** Jennifer Bunn, Ph.D., Campbell University
- 5:00-5:50 T3 TUTORIAL SESSION III (Roberts)**  
**DOES ADDING PHARMACOLOGY TO EXERCISE ENHANCE OR ATTENUATE MANAGEMENT OF TYPE 2 DIABETES?**  
 Steven K. Malin<sup>1, 2, 3</sup>. <sup>1</sup>Dept. of Kinesiology; <sup>2</sup>Division of Endocrinology & Metabolism; <sup>3</sup>Robert M. Berne Cardiovascular Research Center, University of Virginia, Charlottesville, VA  
**Chair:** Juliana Marino, MA, University of North Carolina - Charlotte
- 5:00-5:50 T4 TUTORIAL SESSION IV (Amphitheater)**  
**DYNAMICS OF PRE-HEALTH SCREENING: APPLICATION OF CURRENT ACSM GUIDELINES**  
 J.M. Green and L.G. Killen, Dept. of HPER, University of North Alabama, Florence, AL  
**Chair:** Christopher Mojock, Ph.D., University of Georgia
- 7:30-9:00 OPENING REMARKS AND KEYNOTE ADDRESS (Chattanooga Ballroom 1,2,3,4)**  
**IS THE REVOLUTION UNDERWAY? THE USE OF GENETICS IN EXERCISE PHYSIOLOGY**  
 Tim Lightfoot, Ph.D., SEACSM Past President  
 Huffines Institute at Texas A & M  
**Presiding:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University  
**Introduction:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

**9:00-10:30 SEACSM SOCIAL (Lobby)**

**FRIDAY, February 16, 2018**

- 6:45-7:45 MENTORING BREAKFAST (Chattanooga Ballroom 1,2,3,4)**  
**(Pre-Register by February 5)**  
 Naming of Breakfast in Honor of Emily Haymes, Ph.D., SEACSM Past President  
**Remarks:** Judith A. Flohr, Ph.D., SEACSM Past President
- 8:00-5:00 REGISTRATION AND STUDENT HELP DESK (Lobby)**
- 8:00-6:00 EXHIBITS (Conference Concierge)**
- 8:00-9:30 POSTER FREE COMMUNICATIONS II (Ballroom Foyer)**  
**P49-P120 ATHLETIC CARE/TRAUMA/REHABILITATION MOTOR CONTROL**  
**FITNESS/TESTING/ASSESSMENT**  
**RESPIRATORY PHYSIOLOGY**  
**Chair:** Kathy Carter, Ph.D., University of Louisville
- P49 WHO'S USING IT: UTILIZATION OF STRENGTH AND CONDITIONING FACILITIES AND STAFF BY HIGH SCHOOL ATHLETIC TEAMS**  
 WD. Shaver, & TG. Coffey. Dept. of Health, Athletic Training, Recreation, and Kinesiology, Longwood University, Farmville, VA
- P50 EXAMINATION OF SCHOOL TYPE, ENROLLMENT, AND LOCATION ON THE SQUARE FOOTAGE OF HIGH SCHOOL STRENGTH AND CONDITIONING FACILITIES**  
 AM. Bielen, & TG. Coffey. Dept. of Health, Athletic Training, Recreation, and Kinesiology, Longwood University, Farmville, VA



- P51 CONCUSSION EDUCATION AWARENESS AMONG DIVISION III COLLEGE ATHLETES AND COACHES**  
Jamie L Langford, Michael R. Bamman, Huntingdon College, Birmingham, AL
- P52 EXAMINING THE IMPACT OF A SUMMER LEARNING PROGRAM ON CHILDREN'S WEIGHT STATUS, CARDIORESPIRATORY FITNESS**  
Ethan T. Hunt, Michelle L. Whitfield, Keith Brazendale, Michael W. Beets, Robert G. Weaver, Dept. of Exercise Science, University of South Carolina, Columbia, SC
- P53 GENDER COMPARISONS FOR VERY SHORT-TERM DYNAMIC CONSTANT EXTERNAL RESISTANCE TRAINING**  
M. Travis Byrd, Haley C. Bergstrom, University of Kentucky, Lexington, KY
- P54 COMPARISON OF ELECTROMYOGRAPHICAL SIGNAL ANALYSES FOR ESTIMATING LACTATE THRESHOLD**  
Ronald L. Snarr<sup>1</sup>, Danilo V. Toluoso<sup>2</sup>, Ashleigh V. Hallmark<sup>3</sup>. <sup>1</sup>Georgia Southern University, Statesboro, GA; <sup>2</sup>The University of Alabama, Tuscaloosa, AL; <sup>3</sup>The University of Alabama at Birmingham, Birmingham, AL
- P55 EXERCISE ENJOYMENT ASSOCIATED WITH HIIT AND RESISTANCE TRAINING IN WOMEN**  
K. Suire, A. Peart and D.D. Wadsworth, School of Kinesiology, Auburn University, Auburn AL
- P56 THE IMPACT OF OBESITY ON PENTRAXIN 3 AND ENDOTHELIAL FUNCTION FOLLOWING ACUTE HIGH-INTENSITY INTERVAL EXERCISE VS. CONTINUOUS MODERATE-INTENSITY EXERCISE**  
K.M. Dodge, B.G. Fico, R.S. Garten, P.J. Ferrandi, A.A. Rodriguez, G. Pena, and C-J. Huang, FACSM. Exercise Biochemistry Laboratory, Dept. of Exercise Science and Health Promotion, Florida Atlantic University, Boca Raton, FL
- P57 PREDICTABILITY OF MAXIMAL OXYGEN CONSUMPTION USING SUBMAXIMAL RATING OF PERCEIVED EXERTION IN CHILDREN**  
Danilo V. Toluoso, Mike R. Esco FACSM. Department of Kinesiology, The University of Alabama, Tuscaloosa, AL
- P58 PREDICTING ENERGY EXPENDITURE WITH THE ACTIGRAPH GT9X IMU USING ARTIFICIAL NEURAL NETWORKS**  
S.R. LaMunion, P.R. Hibbing, A.S. Kaplan, D.R. Bassett FACSM, S.E. Crouter FACSM, Dept. of Kinesiology, Recreation, & Sport Studies, The University of Tennessee, Knoxville, TN
- P59 LOWER FOOD SECURITY IS ASSOCIATED WITH LESS PHYSICAL ACTIVITY IN RURAL APPALACHIA**  
Jeremy A. Steeves<sup>1</sup>, C. Beach<sup>1</sup>, J. I. Flynn<sup>1</sup>, E.T. Anderson Steeves<sup>2</sup>, <sup>1</sup>Maryville College, Maryville, TN, <sup>2</sup>University of Tennessee, Knoxville, TN
- P60 USING THE WRIST-WORN ATLAS MONITOR TO OBJECTIVELY MEASURE STRENGTH TRAINING EXERCISES**  
T. Perry<sup>1</sup>, J. Collett<sup>1</sup>, C. Johnson<sup>1</sup>, S.A. Conger<sup>2</sup>, A.H.K. Montoye<sup>3</sup>, J.A. Steeves<sup>1</sup>. <sup>1</sup>Maryville College, Maryville, TN; <sup>2</sup>Boise State University, Boise, ID; <sup>3</sup>Alma College, Alma MI.
- P61 EVALUATING THE POTENTIAL IMPACT OF FATIGUE ON ULTIMATE FRISBEE PLAYERS DURING TOURNAMENT PLAY**  
J. Feister, R. Sanders, C. Carver, H. Nelson, J. Kelly, A. Bosak. Dept. of Health Professions, Liberty University, Lynchburg VA
- P62 RELIABILITY AND VALIDITY OF THE RUNNING READINESS SCALE™**  
A.W. Kercheville<sup>1</sup>, M.G. Michael<sup>1</sup>, C.J. Reed<sup>1</sup>, K.C. Palmer<sup>1</sup>, Z. Sutton<sup>2</sup>, D. Levine<sup>1</sup>, S. Payne<sup>3</sup>, D.S.B. Williams III<sup>4</sup>. <sup>1</sup>University of Tennessee at Chattanooga, Chattanooga, TN; <sup>2</sup>McMinnville Physical Therapy, McMinnville, TN; <sup>3</sup>Otterbein University, Westerville, OH; <sup>4</sup>Virginia Commonwealth University, Richmond, VA

- P63 ASSESSING THE IMPACT OF BODY FAT PERCENTAGE AND LEAN MASS, ON WINGATE PERFORMANCE**  
Robert Taylor Sanders, Andrew Bosak, Matthew Sokoloski, Hannah Nelson, Jared Feister; Department of Health Professions, Liberty University & Department of Kinesiology, Texas Woman's University, Lynchburg, VA
- P64 AN ASSESSMENT OF A 15 VS. 30 SECOND RECOVERY PERIOD ON VERTICAL JUMP PERFORMANCE**  
H. Nelson, A. Bosak, R. Lowell, B. Ziebell, R. Sanders, J. Feister, and M. Phillips. Dept. of Health Professions, Liberty University, Lynchburg, VA
- P65 PHYSIOLOGICAL PROFILING OF COLLEGIATE CLUB MALE ULTIMATE FRISBEE ATHLETES**  
A. Smith<sup>1</sup>, A. Bosak<sup>2</sup>, J. Houck<sup>3</sup>, M. Sokoloski<sup>4</sup>, C. Carver<sup>2</sup>. <sup>1</sup>Center of Excellence for Sport Science and Coach Education, Department of Sport, Exercise, Recreation, and Kinesiology. East Tennessee State University, Johnson City, TN; <sup>2</sup>Liberty University, Lynchburg, VA. <sup>3</sup>University of New Mexico, Albuquerque, NM; <sup>4</sup>Texas Women's University, Denton, TX.
- P66 AN EVALUATION OF DIFFERENT PASSIVE RECOVERY PERIODS ON VERTICAL JUMP PERFORMANCE IN COLLEGIATE FEMALES**  
A. Bosak<sup>1</sup>, R. Sanders<sup>1</sup>, H. Nelson<sup>1</sup>, J. Feister<sup>1</sup>, and M. Sokoloski<sup>2</sup>. <sup>1</sup>Liberty University, Lynchburg, VA and <sup>2</sup>Texas Women's University, Denton, TX.
- P67 COMPARATIVE RESPONSES TO SQUATS DONE WITH FREE WEIGHTS AND AN EXOSKELETON.**  
LJ Vargas, MK Daunis, T Bayers, L Bai, TB Symons, JF Caruso. The University of Louisville, Louisville KY
- P68 EFFECTS OF 12-WEEKS OF AEROBIC EXERCISE TRAINING ON INSULIN SENSITIVITY UNDER ENERGY BALANCED CONDITIONS IN WOMEN**  
Chandler, M. Gentz<sup>1</sup>, Douglas, M Moellering<sup>2</sup>, Samuel T. Windham<sup>3</sup>, Barbara A. Gower<sup>2</sup>, Gary R. Hunter<sup>1, 2</sup>, and Gordon Fisher<sup>1, 2</sup>. <sup>1</sup>Departments of Human Studies; <sup>2</sup>Nutrition Sciences; <sup>3</sup>Medicine University of Alabama at Birmingham
- P69 ARTERIAL STIFFNESS IS REDUCED IN AN EXERCISE DOSE DEPENDENT MANNER IN ADULTS WITH PREDIABETES**  
M. Khurshid, N.Z.M. Eichner, J.M. Gaitan, N.M. Gilbertson, E.J. Barrett, A. Weltman (FACSM), S.K. Malin (FACSM). University of Virginia, Charlottesville VA
- P70 THE EFFECT OF DIETARY MANIPULATIONS ON ULTRASONOGRAPHY DERIVED MEASURES OF MUSCLE ARCHITECTURE**  
Philip A. Sapp, Jeremy R. Townsend, Autumn C. Marshall, Kent D. Johnson FACSM, William C. Vantrease. Exercise and Nutrition Science, Lipscomb University, Nashville, TN
- P71 DIFFERENCES BY PHYSICAL EDUCATION CLASS AND RECESS TIME AMONG CHILDREN IN PUERTO RICO**  
M. E. Santiago-Rodríguez<sup>1</sup>, M. A. Amalbert-Birriel<sup>2</sup>, F. A. Ramírez-Marrero<sup>2</sup>, FACSM, <sup>1</sup>University of Illinois at Chicago – Chicago, IL; <sup>2</sup>University of Puerto Rico – Rio Piedras Campus, San Juan, PR
- P72 THE EFFECTS OF REPEATED BOUTS OF FOAM ROLLING ON HIP RANGE OF MOTION, PAIN AND PERFORMANCE ACROSS DIFFERENT TISSUES**  
S. Carter, Coastal Carolina University, Conway, SC
- P73 FAMILIARIZATION PROTOCOLS PROVE USEFUL WITH MAXIMAL EXERCISE TESTING IN SEDENTARY MIDDLE-AGED FEMALES**  
C.W. Wagoner, E.D. Hanson, E.D. Ryan, R. Brooks, J.T. Lee, & C.L. Battaglini, FACSM, Exercise Oncology Research Laboratory, Neuromuscular Research Laboratory, Department of Exercise & Sport Science, University of North Carolina at Chapel Hill, Chapel Hill, NC

- P74 PHYSICAL ACTIVITY BEHAVIORS AND SMARTPHONE USE IN COLLEGE AGED STUDENTS**  
A.V. Farrell<sup>1</sup>, N.T. Penglee<sup>3</sup>, E Rosenberg<sup>2</sup>, R.W. Christiana<sup>1</sup>, R.A. Battista<sup>1</sup>,. <sup>1</sup>Department of Health and Exercise Science; <sup>2</sup>Department of Sociology. Appalachian State University, Boone, North Carolina; <sup>3</sup>Department of Physical Education, Kasetsart University, Bangkok, Thailand.
- P75 CONCURRENT VALIDITY OF THE MYMO PHYSICAL ACTIVITY MONITOR**  
Katharine McComiskey, G.W. Heath and K.L. Peyer, Dept. of Health and Human Performance, University of Tennessee at Chattanooga Chattanooga, TN
- P76 EVALUATION OF A GOALKEEPER-SPECIFIC ADAPTATION TO THE YO-YO INTERMITTENT RECOVERY TEST LEVEL 1: RELIABILITY AND VARIABILITY**  
AM Ehlert<sup>1</sup>, JR Cone<sup>2</sup>, L Wideman<sup>1</sup>, AH Goldfarb<sup>1</sup>. <sup>1</sup>Department of Kinesiology, The University of North Carolina at Greensboro, Greensboro, NC; <sup>2</sup>Athletes Research Institute, Inc., Chapel Hill, NC.
- P77 EFFECTS OF CONTINUOUS AND NON-CONTINUOUS TREADMILL DESK WALKING ON FREE-LIVING PHYSICAL ACTIVITY**  
Erica Disbrow, Rebecca R. Rogers, Mallory R. Marshall, John K. Petrella, FACSM, Christopher G. Ballmann, Dept. of Kinesiology, Samford University, Birmingham, AL
- P78 THE MEASURE OF FUNCTIONAL MOVEMENT IN RECREATIONAL CYCLISTS AND CLIMBERS**  
N.T. Bacon, K. Koch. Dept. of Sport Science, Belmont University, Nashville, TN
- P79 CHANGES IN BENCH PRESS VELOCITY FOLLOWING OVERLOAD AND TAPER MICROCYCLES**  
TS Queen<sup>1</sup>, PA Bishop<sup>2</sup>, and MR Esco<sup>2</sup>, TD Williams<sup>1,2</sup>. <sup>1</sup>Samford University, Birmingham, AL; <sup>2</sup>University of Alabama, Tuscaloosa, AL
- P80 VENTILATORY AND BREATHLESSNESS ALTER SELF-SELECTED POWER OUTPUT DURING A CYCLING TIME TRIAL**  
H.E. Snyder, V.P. Georgescu, A.B. McMichael, E.M. Larson, J.T. Oliver, and J.L. Stickford. Department of Health & Exercise Science, Appalachian State University, Boone, NC
- P81 PREDICTING OXYGEN UPTAKE RESPONSES DURING CYCLING USING AN ARTIFICIAL NEURAL NETWORK**  
A. M. Borrer<sup>1</sup>, M. J. Mazzoleni<sup>2</sup>, J. Coppock<sup>3</sup>, B. P. Mann<sup>4</sup>, & C. L. Battaglini<sup>1</sup>. <sup>1</sup>The University of North Carolina, Chapel Hill, NC; <sup>2</sup>Under Armour, Inc., Baltimore, MD; <sup>3</sup>The University of North Carolina, Greensboro, NC; <sup>4</sup>Duke University, Durham, NC
- P82 ASSESSING THE IMPACT OF A GOVERNED FOCAL POINT ON BROAD JUMP PERFORMANCE IN COLLEGIATE FEMALES**  
M. Phillips, R. Sanders, J. Feister, A. Bosak, H. Nelson, R. Lowell, and B. Ziebell. Dept. of Health Professionals, Liberty University, Lynchburg, VA
- P83 COMPARING INTENSITY LEVELS OF EXERCISE ACHIEVED BETWEEN AN OUTDOOR FITNESS PARK AND A STANDARD INDOOR FITNESS FACILITY**  
R. Butler, S. Stutts, K.L. Peyer, G.W. Heath, FACSM, B. Oglesby, N. Boer, and K.C. Hamilton. Dept. of Health and Human Performance, University of Tennessee Chattanooga, Chattanooga
- P84 HYPERTROPHIC RESPONSES DO NOT COMPLETELY EXPLAIN INCREASES IN STRENGTH AFTER 12 WEEKS OF RESISTANCE TRAINING IN PREVIOUSLY UNTRAINED YOUNG MEN**  
Christopher G. Vann<sup>1</sup>, Cody T. Haun<sup>1</sup>, C. Brooks Mobley<sup>1</sup>, Matthew A. Romero<sup>1</sup>, Paul A. Roberson<sup>1</sup>, Pete W. Mumford<sup>1</sup>, Wesley C. Kephart<sup>1</sup>, Shelby C. Osburn<sup>1</sup>, Michael D. Roberts<sup>1,2</sup>. <sup>1</sup>Molecular and Applied Sciences Laboratory, School of Kinesiology, Auburn University, Auburn, AL; <sup>2</sup>Department of Cell Biology and Physiology, Edward Via College of Osteopathic Medicine – Auburn Campus, Auburn, AL

- P85 EFFECTS OF GRIP DIAMETER ON MUSCLE ACTIVITY AND PERFORMANCE DURING DEADLIFT AND BENT-OVER ROW EXERCISES**  
B.D. Shepherd, B.M. Krings, P.L. Williamson, J.C. Swain, A.J. Turner, H.S. Waldman, H. Chander, M.J. McAllister, A.C. Knight, & J.W. Smith. Dept. of Kinesiology, Mississippi State University, Mississippi State, MS
- P86 THE EFFECT OF PERSONAL PROTECTIVE EQUIPMENT ON FIREFIGHTER OCCUPATIONAL PERFORMANCE**  
A. Lesniak<sup>1</sup>, H. Bergstrom<sup>2</sup>, J.L. Clasey<sup>2</sup>, A.J. Stromberg<sup>2</sup>, M. Abel<sup>2</sup>; <sup>1</sup>Department of Exercise Physiology, Lynchburg College, Lynchburg, VA., <sup>2</sup>Department of Kinesiology and Health Promotion, University of Kentucky, Lexington, KY
- P87 STRIDE TIME CONSISTENCY MAY IMPROVE DISTANCE RUNNING PERFORMANCE**  
Nicholas A. Hadgis & Dr. Matthew W. Wittstein, Elon University, Elon, NC
- P88 VALIDITY OF FOUR HEART RATE MEASUREMENT METHODS AT REST AND DIFFERENT EXERCISE INTENSITIES**  
E. Spradling, N. Wiggins, D. Williams, R.R. Rogers, C. Ballmann, J.K. Petrella, FACSM and M.R. Marshall; Department of Kinesiology, Samford University, Birmingham, AL
- P89 ARMY ROTC CADET PERFORMANCE ON A MODIFIED RANGER PHYSICAL ASSESSMENT TEST- A DESCRIPTIVE STUDY**  
BL. Johnson, KI. Moore, DP. Meckley, KM. Hulbert, JJ. Houck, WA. Stewart, and JH. Hornsby. Dept. of Health Professions, Liberty University, Lynchburg, VA
- P90 ACTIVITY CLASSIFICATION WITH THE ACTIGRAPH GT9X IMU USING ARTIFICIAL NEURAL NETWORKS**  
A.S. Kaplan, S.R. LaMunion, P.R. Hibbing, D.R. Bassett FACSM, S.E. Crouter FACSM, Dept. of Kinesiology, Recreation, and Sports Studies, University of Tennessee, Knoxville, TN
- P91 THE EFFECTS OF VARIOUS INTERVALS OF PASSIVE RECOVERY ON PEAK POWER OUTPUT DURING BOUTS OF HIGH-INTENSITY INTERMITTENT CYCLING EXERCISE**  
S.M. Mitchell<sup>1</sup>, K. Muskaj<sup>2</sup>, R.J. Henderson-Mitchell<sup>3</sup>, SH Bishop<sup>1</sup>, M. Webb<sup>1</sup>, J.B. Mitchell<sup>1</sup>.  
<sup>1</sup>Dept. of Exercise and Nutrition Science, The University of Montevallo, Montevallo, AL;  
<sup>2</sup>Dept. of Kinesiology, The University of South Alabama, Mobile, AL; <sup>3</sup>Rural Health Institute, The University of Alabama, Tuscaloosa, AL
- P92 EFFECTS OF TRANSDERMAL MAGNESIUM CHLORIDE ON MUSCLE STRENGTH AND SORENESS FOLLOWING ECCENTRIC EXERCISE: PRELIMINARY FINDINGS**  
M.L. Moore, W.S. Evans, M. Bass, G. Gerstner, J.W. Beaulieu, C.L. Battaglini, FACSM, E.D. Hanson. Exercise Oncology Research Laboratory, Neuromuscular Research Laboratory, Dept of Exercise & Sport Science, University of North Carolina, Chapel Hill, NC
- P93 INCREASED RESISTED SPRINTING LOAD DECREASES BILATERAL ASYMMETRY IN SPRINTING KINETICS**  
J McNabb, T VanDusseldorp, G Hester, Y Feito FACSM, & G Mangine, Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA
- P94 COMPARISON OF HR AND RPE DURING SELF-SELECTED AND PRESCRIBED EXERCISE BOUTS IN COLLEGE STUDENTS**  
A. Ewald, N. F. Boér, K.C. Hamilton; Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN
- P95 GESTURE ANALYSIS OF YOGA POSES FOR EXERGAME USING MACHINE INTELLIGENCE**  
S. Fouche, H. Crumley, M. Martin, R. Martucci, W. Seffens, and P. Pullen. Dept. of Kinesiology, University North Georgia, Gainesville, GA, and Seftec, Inc., Atlanta, GA.

- P96**      **COMPARISON OF PLETHYSMOGRAPHY AND BMI-BASED EQUATIONS FOR ESTIMATING BODY FAT IN FEMALE COLLEGIATE GYMNASTS**  
Lea Ann Porter, and Jason C. Casey, Department of Exercise Science, LaGrange College, LaGrange, GA
- P97**      **VALIDITY AND RELIABILITY OF FLYWHEEL-BASED MUSCLE PERFORMANCE TESTING**  
Jason T. Brantley, J. Kohl Tarlton, Paul A. Baker, Jenna Abbott, and Lance M. Bollinger. Department of Kinesiology and Health Promotion, University of Kentucky, Lexington, KY
- P100**      **THE RELATIONSHIP AMONG MANUAL DEXTERITY, UPPER AND LOWER EXTREMITY STRENGTH IN OLDER ADULTS RESIDING IN INDEPENDENT LIVING**  
Choi, P., Talwar, S., Key, J., Hartmann, K., Bass, M., Chen, C-C., Pan, Z. Dept. of Kinesiology, Mississippi State University, MS State, MS
- P101**      **COMPARISON OF UPPER EXTREMITY STRENGTH AMONG DIFFERENT AGE GROUPS OF THE OLDER ADULT POPULATION**  
Ryuh, Y., Talwar, S., McBeth, J., McWhirter, K., Siosin, N., Chen, C-C., Pan, Z. Dept. of Kinesiology, Mississippi State University, MS State, MS
- P102**      **PHYSIOLOGICAL MEASURES OF STRESS CAN PREDICT MARKSMANSHIP SUCCESS IN BASIC TRAINING SOLDIERS**  
McGinnis K, McAdam JS, Sefton JM. Warrior Research Center, School of Kinesiology, Auburn University, Auburn, AL
- P104**      **HEART RATE VALIDITY OF CONSUMER WRIST-BASED MONITORS**  
N. Sealover<sup>1</sup>, JC. Sieverdes<sup>2</sup>, DD. Thomas<sup>1</sup>, DB. Bornstein<sup>3</sup>, AM. Hoover<sup>1</sup>, HM. Puleo<sup>1</sup>, and WD. Dudgeon<sup>1</sup>. <sup>1</sup>Dept. of Health and Human Performance, College of Charleston, SC; <sup>2</sup>CON, Medical University of South Carolina, Charleston, SC; <sup>3</sup>Dept. of Health Exer., and Sport Science, The Citadel, Charleston, SC
- P105**      **BIOMARKERS OF INFLAMMATION AND ANGIOGENESIS FOLLOWING SHORT VS. LONG BOUTS OF HIGH-INTENSITY TRAINING**  
K.N. Clemons<sup>1</sup>, C.D. Markert<sup>1</sup>, E.E. Bechke<sup>2</sup>, C.M. Williamson<sup>2</sup>, M.J. McKenzie<sup>1</sup>, B.M. Kliszczewicz<sup>2</sup>. <sup>1</sup>Dept. of Exercise Physiology, Winston-Salem State University, Winston-Salem, NC; <sup>2</sup>Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA
- P106**      **ASSESSMENT OF STEP ACCURACY DURING WALKING USING THE CONSUMER TECHNOLOGY ASSOCIATION STANDARD**  
Alexis Oliveira<sup>1</sup>, Caleb Jones<sup>1</sup>, L. Chris Eschbach<sup>2</sup>, Jennifer Bunn<sup>1</sup>, <sup>1</sup>Campbell University, Department of Physical Therapy, Buies Creek, NC; <sup>2</sup>Valencell Inc., Raleigh, NC
- P107**      **ASSESSMENT OF STEP ACCURACY DURING RUNNING USING THE CONSUMER TECHNOLOGY ASSOCIATION STANDARD**  
Caleb Jones<sup>1</sup>, Alexis Oliveira<sup>1</sup>, L. Chris Eschbach<sup>2</sup>, Jennifer Bunn<sup>1</sup>, <sup>1</sup>Campbell University, Department of Physical Therapy, Buies Creek, NC; <sup>2</sup>Valencell Inc., Raleigh, NC
- P108**      **MUSCLE QUALITY IS A PREDICTOR OF A SINGLE TASK AND A COMPOSITE MEASURE OF PHYSICAL FUNCTION IN OLDER ADULTS**  
J.A. Moody, J.S. Walker, and A.O. Brady, Department of Kinesiology, The University of North Carolina at Greensboro, Greensboro, NC
- P109**      **COMPARING THE GARMIN VIVOSMART HR VS THE COSMED K4B2 METABOLIC BACKPACK IN MEASURING ENERGY EXPENDITURE**  
Brandi R. Washell, Alexandra P. Lucas, Ethan Hayes, G. William Lyerly FACSM. Department of Kinesiology, Coastal Carolina University, Conway, SC
- P110**      **COMPARING THE GARMIN VIVOSMART HR VS THE ACTIGRAPH GT3X ACCELEROMETER IN MEASURING ENERGY EXPENDITURE**  
Ethan M. Hayes, Alexandra P. Lucas, Brandi R. Washell, G. William Lyerly FACSM Department of Kinesiology, Coastal Carolina University, Conway, SC

- P111**      **COMPARING THE GARMIN VIVOSMART HR ACTIVITY MONITOR TO THE COSMED K4b2 METABOLIC BACKPACK IN MEASURING HEART RATE**  
Alexandra P. Lucas, Ethan M. Hayes, Brandi R. Washell, G. William Lyerly FACSM,  
Department of Kinesiology, Coastal Carolina University, Conway, SC
- P112**      **EXERCISE INTENSITY AFFECTS THE KINEMATIC APPROACH USED TO IMPROVE PERFORMANCE OF A 3-DIMENSIONAL TARGET TASK**  
JF Baird, ME Gaughan, HM Saffer, MA Sarzynski, TM Herter, SL Fritz, DB den Ouden, & JC Stewart. Exercise Science, University of South Carolina, Columbia, SC
- P113**      **RELATIONSHIP BETWEEN NEUROCOGNITIVE TESTING AND SACCADIC EYE MOVEMENTS IN SYMPTOM FREE DIVISION I ATHLETES**  
S. Wilhoite<sup>1</sup>, B. Szekely<sup>1</sup>, P. Chrysoferidis<sup>1</sup>, K. Neitz<sup>1</sup>, D. Powell<sup>2</sup>, B. Munkasy<sup>1</sup>, N. Murray<sup>1</sup>,  
<sup>1</sup>Georgia Southern University, Statesboro, GA; <sup>2</sup>University of Memphis, Memphis, TN.
- P114**      **ASSOCIATIONS OF PHYSICAL SELF-WORTH & GLOBAL SELF-ESTEEM WITH PHYSICAL ACTIVITY & MOTOR SKILLS IN CHILDREN**  
AP. Wood<sup>1</sup>, TD. Raedeke<sup>1</sup>, A. Gross McMillan<sup>2</sup>, KD. DuBose<sup>1</sup>, FACSM. Depts. of <sup>1</sup>Kinesiology and <sup>2</sup>Physical Therapy, East Carolina University, Greenville, NC
- P115**      **EFFECTS OF SHORT-TERM RESISTANCE TRAINING ON MOTOR UNIT-SPECIFIC PROPERTIES IN OLDER MALES**  
P.L. Ha<sup>1</sup>, G.M. Hester<sup>1</sup>, Z.K. Pope<sup>2</sup>, R.J. Colquhoun<sup>2</sup>, M.A. Magrini<sup>2</sup>, A. Barrera-Curiel<sup>2</sup>, C.A. Estrada<sup>2</sup>, J.M. DeFreitas<sup>2</sup>. <sup>1</sup>Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA; <sup>2</sup>Applied Neuromuscular Physiology Laboratory, Oklahoma State University, Stillwater, OK
- P116**      **RELATIONSHIP OF FINE MOTOR FUNCTIONS AND FUNDAMENTAL MEMORY AND COGNITIVE FUNCTIONS IN OLDER ADULTS**  
Talwar, S.<sup>1</sup>, Hommel, M.<sup>1</sup>, Ross, K.<sup>1</sup>, Pate, T.<sup>1</sup>, Hunt, A<sup>1</sup>, Lamberth, J.<sup>1</sup>, Liu, K.<sup>2</sup>, Pan, Z.<sup>1</sup>.  
<sup>1</sup>Department of Kinesiology, Mississippi State University, MS State, MS; <sup>2</sup>Department of Psychiatry, Yale University School of Medicine, New Haven, CT
- P117**      **EFFECT OF CADENCE ON VENTILATORY KINETICS AT THE ONSET OF EXERCISE**  
R.W. Thompson, D.C. Potter, R. Dorion, University of South Carolina, Columbia, SC
- P118**      **LOCOMOTOR-RESPIRATORY COUPLING IS NOT RELATED TO ATTENTIONAL STRATEGIES IN TRAINED RUNNERS**  
Jordan C. Stamey<sup>1</sup>, Courtney N. Collins<sup>1</sup>, Jonathon L. Stickford<sup>1</sup>, Joel M. Stager<sup>2</sup>, Robert F. Chapman<sup>2</sup>, Abigail S.L. Stickford<sup>1</sup>. <sup>1</sup>Appalachian State University, Department of Health and Exercise Science, Boone, NC; <sup>2</sup>Indiana University, Department of Kinesiology, Bloomington, IN
- P119**      **QUANTIFYING THE SHAPE OF THE MAXIMAL EXPIRATORY FLOW-VOLUME CURVE FOLLOWING ACUTE ELECTRONIC CIGARETTE USE**  
J.T. Oliver, A.B. McMichael, V.P. Georgescu, E.M. Larson, and J.L. Stickford. Department of Health & Exercise Science, Appalachian State University, Boone, NC
- P120**      **PREDICTED LUNG ELASTIC RECOIL PRESSURE DOES NOT ACCURATELY ESTIMATE THE DYSPANAPSIS RATIO**  
R.E. Bragg and J.L. Stickford. Department of Health & Exercise Science, Appalachian State University, Boone, NC
- 8:00-9:30**      **THEMATIC POSTERS SESSION II (Ochs)**  
**TP7-TP12**      **COMPETITIVE ATHLETES**  
**Chair:** Yuri Feito, Ph.D., Kennesaw State University
- TP7**      **IMPACT OF HIGH-INTENSITY INTERVAL TRAINING ON DIVISION I COLLEGE 800M/1500M RUNNER'S PERFORMANCE**  
F.G. Price, A.J. Turner, B.M. Krings, H.S. Waldman, H. Chander, A.C. Knight, M.J. McAllister, & J.W. Smith. Dept. of Kinesiology, Mississippi State University, Mississippi State, MS

- TP8 AN ELECTROMYOGRAPHY COMPAIRSON OF BENCH PRESS VOLUME FOLLOWING VARIED WARM-UPS.**  
K. Mehls, J. Coons Dept. of Health and Human Performance, Middle Tennessee State University
- TP9 PHYSIOLOGICAL, PERCEPTUAL, AND PERFORMANCE METRICS OF A UPPER-BODY HIGH INTENSITY FUNCTIONAL TRAINING WORKOUT**  
Robert L. Herron<sup>1</sup>, Jason C. Casey<sup>2</sup>. <sup>1</sup>Univ. of Alabama, Tuscaloosa, AL; <sup>2</sup>Department of Exercise Science, LaGrange College, LaGrange, GA
- TP10 PHYSIOLOGICAL, PERCEPTUAL, AND PERFORMANCE METRICS OF A FULL-BODY HIGH INTENSITY FUNCTIONAL TRAINING WORKOUT**  
Ashlan T. Bloodworth<sup>1</sup>, Robert L. Herron<sup>2</sup>, Jason C. Casey<sup>1</sup>. <sup>1</sup>Department of Exercise Science, LaGrange College, LaGrange, GA; <sup>2</sup>The Univ. of Alabama, Tuscaloosa, AL
- TP11 SKELETAL MUSCLE SIZE AND PERFORMANCE: MUSCLE BIOPSY OR ULTRASONOGRAPHY?**  
KM Carroll, CD Bazylar, K Sat1. Department of Sport, Exercise, Recreation, and Kinesiology, East Tennessee State University, Johnson City, TN
- TP12 COMPARING NATIONAL FOOTBALL LEAGUE (NFL) COMBINE PERFORMANCE TO DRAFT POSITION FOR THE 2017 NFL DRAFT**  
A. Hartman<sup>1</sup>, P. Chrysoferidis<sup>1</sup>, R. Herron<sup>2</sup>, S. Bishop<sup>2</sup>, C. Katica<sup>3</sup> & G.A. Ryan<sup>1</sup>  
<sup>1</sup>Georgia Southern University, Statesboro, GA; <sup>2</sup>University of Montevallo, Montevallo, AL; <sup>3</sup>Pacific Lutheran University, Tacoma, WA
- 8:00-10:00 ORAL FREE COMMUNICATION II (Kelley)**  
**09-016 BIOMECHANICS/GAIT/BALANCE**  
**Chair:** G. William Lyerly, Ph.D., Coastal Carolina University
- 09 8:00 IMPACT OF REPEATED BALANCE PERTURBATIONS ON LOWER EXTERMITY MEAN MUSCLE ACTIVITY**  
C.M. Hill<sup>1</sup>, S.J. Wilson<sup>1</sup>, J.G. Mouser<sup>1</sup>, C.C.Williams<sup>1</sup>, L.L. Luginland<sup>1</sup>, P.T. Donahue<sup>1</sup>, H. Chander<sup>2</sup>  
<sup>1</sup>University of Mississippi University MS; <sup>2</sup>Mississippi State University, Mississippi State, MS
- 010 8:15 EFFECT OF ARCH FLEXIBILITY ON PROPULSIVE PARAMETER OF HOPPING**  
W.H. Weimar, C.M. Wilburn, B.E. Decoux, R. Fawcett L.E. Brewer, & N.H. Moore, School of Kinesiology, Auburn University, Auburn, AL
- 011 8:30 EFFECT OF TEXTURED INSOLES ON ONSET OF LOWER EXTREMITY MUSCULAR ACTIVITY DURING NORMAL WALKING**  
B.H. Romer<sup>1</sup>, J.W. Fox<sup>2</sup>, and W.H. Weimar<sup>3</sup>. <sup>1</sup>Dept. of Exercise Science, High Point University, High Point, NC; <sup>2</sup>Department of Physical Therapy, Methodist University, Fayetteville, NC; <sup>3</sup>School of Kinesiology, Auburn University, Auburn, AL
- 012 8:45 ARCH STIFFNESS, VERTICAL STIFFNESS, AND HOPPING FREQUENCY DURING UNILATERAL STATIONARY HOPPING AMONG MALE COLLEGIATE ATHLETES**  
B.E. Decoux, C. M. Wilburn, R.T. Fawcett, L.E. Brewer, P.T. Williams, N.H. Moore, L.L. Smallwood, & W.H. Weimar, School of Kinesiology, Auburn University, Auburn, AL
- 013 9:00 GROUND REACTION FORCE FROM THE HIP, KNEE, AND ANKLE IN ISOMETRIC LEG EXTENSION**  
J. W. Fox, C.M. Wilburn, A.E. Jagodinsky, L.L. Smallwood, & W.H. Weimar, Physical Therapy, Methodist University, Fayetteville, NC
- 014 9:15 COMPARISON OF POSTURAL CHANGES BETWEEN TRIALS USING NINTENDO WII FIT SOCCER**  
A. Koenig<sup>1</sup>, B. Szekely<sup>1</sup>, S.V. Wilhoite<sup>1</sup>, P. Chrysoferidis<sup>1</sup>, K. Neitz<sup>1</sup>, D. Powell<sup>2</sup>, B.A. Munkasy<sup>1</sup>, N.G. Murray<sup>1</sup>; <sup>1</sup>Georgia Southern University, Statesboro, GA; <sup>2</sup>University of Memphis, Memphis, TN

- 015 9:30 RELATIONSHIP BETWEEN BODY COMPOSITION AND POSTURAL MEASURES OF COLLEGIATE ATHLETES**  
A. Millett<sup>1</sup>, S. Wilhoite<sup>1</sup>, P. Chrysosferidis<sup>1</sup>, B. Szekely<sup>1</sup>, D. Powell<sup>2</sup>, B. Munkasy<sup>1</sup>, Greg A. Ryan<sup>1</sup>, N. Murray<sup>2</sup>. <sup>1</sup>Georgia Southern University, Statesboro, GA <sup>2</sup>University of Memphis, Memphis, TN
- 016 9:45 COMPARISONS OF HIP BIOMECHANICS DURING WALKING USING FOUR ANATOMICAL HIP JOINT CENTER PREDICTION METHODS**  
Hunter J Bennett<sup>1</sup>, Kristina Fleenor<sup>1</sup>, Joshua T Weinhandl<sup>2</sup>. <sup>1</sup>Old Dominion University, Norfolk, VA; <sup>2</sup>University of Tennessee, Knoxville, TN
- 8:00-8:50 S5 SYMPOSIUM SESSION V (Walker) MULTIFACETED REGULATION OF SKELETAL MUSCLE GROWTH, REGENERATION, AND METABOLISM**  
N.L. Stott and J.R. Huot. Laboratory of Systems Physiology, Department of Kinesiology, University of North Carolina Charlotte, Charlotte, NC  
**Chair:** Gordon Fisher, Ph.D., University of Alabama - Birmingham
- 8:00-8:50 S6 SYMPOSIUM SESSION VI (Rose) VISUAL SYSTEM IMPAIRMENTS FOLLOWING SPORT-RELATED CONCUSSION: UPDATES FROM THE CONSENSUS STATEMENT**  
NG. Murray<sup>1</sup>, R. Moran<sup>2</sup>; <sup>1</sup>Concussion Research Laboratory, Georgia Southern University, School of Health and Kinesiology, Statesboro, GA; <sup>2</sup>The University of Alabama, Athletic Training Program, Tuscaloosa, AL  
**Chair:** Brian Parr, Ph.D., University of South Carolina - Aiken
- 8:00-8:50 T5 TUTORIAL SESSION V (Roberts) AUTOMATING DATA COLLECTION ON THE CHEAP WITH MICROPROCESSOR AND MICROCONTROLLER TECHNOLOGIES**  
R.S. Bowen. Pilgram Marpeck School of STEM, Truett McConnell University, Cleveland, GA  
**Chair:** Matthew Kuennen, Ph.D., High Point University
- 8:00-8:50 T6 TUTORIAL SESSION VI (Amphitheater) CARBOHYDRATE INTAKE DURING ENDURANCE EXERCISE: SCIENTIFIC APPROACHES TO OPTIMIZE ATHLETIC PERFORMANCE**  
Michael J. Saunders, FACSM, James Madison University, Harrisonburg, VA  
**Chair:** Daniel Baur, Ph.D., Elon University
- 9:00-9:50 S7 SYMPOSIUM SESSION VII (Walker) LOW CARBOHYDRATE-HIGH FAT DIETS FOR ENDURANCE ATHLETES: HAVE WE FOCUSED ON THE WRONG POPULATION?**  
EK O'Neal<sup>1</sup> and HS Waldman<sup>2</sup>. <sup>1</sup>University of North Alabama, Florence, AL; <sup>2</sup>Mississippi State University, Starkville, MS  
**Chair:** James Churilla, Ph.D., University of North Florida
- 9:00-9:50 T7 TUTORIAL SESSION VII (Rose) GOT GOLD? EVERYTHING YOU WANTED TO KNOW ABOUT THE UPDATED ACSM CERTIFICATIONS AND MORE**  
R.A. Battista<sup>1</sup>, P. M, Magyari<sup>2</sup>, and M. Magal<sup>3</sup>. <sup>1</sup>Department of Health and Exercise Science, Appalachian State University, Boone, NC; <sup>2</sup>Brooks College of Health, University of North Florida, Jacksonville, FL; <sup>3</sup>School of Mathematics and Sciences, North Carolina Wesleyan University, Rocky Mount, NC  
**Chair:** Kelly Massey, Ph.D., Georgia College and State University
- 9:00-9:50 T8 TUTORIAL SESSION VIII (Roberts) FROM GRADUATE STUDENT TO ASSISTANT PROFESSOR AND EVERYTHING IN BETWEEN**  
L.G. Killen and J.M. Green, FACSM, Dept. of HPER, University of North Alabama, Florence, AL  
**Chair:** Lyndsey Hornbuckle-Lampkin, Ph.D., University of Tennessee - Knoxville



- 9:00-9:50 T9 TUTORIAL SESSION VIII (Amphitheater)**  
**AUTONOMIC ADJUSTMENTS TO PHYSICAL STRESS: INSIGHTS FROM MICRONEUROGRAPHIC RECORDINGS**  
 C.A. Ray, FACSM. Department of Nutrition, Food & Exercise Sciences. Florida State University, Tallahassee, FL  
**Chair:** Heidi Kluess, Ph.D., Auburn University
- 10:00-11:00 ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS 2018 (Chattanooga Ballroom 1,2,3,4)**  
**THE STATE OF THE AMERICAN COLLEGE OF SPORTS MEDICINE**  
 Walter Thompson, Ph.D., FACSM, President ACSM, Georgia State University  
**Presiding:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University  
**Introduction:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University
- 11:10-12:00 CLINICAL CROSSOVER LECTURE (Chattanooga Ballroom 1,2,3,4)**  
**STEPPING BACK TO MOVE FORWARD: DIABETES PREVENTION IN THE 21ST CENTURY**  
 Elizabeth Joy, M.D., M.P.H., ACSM Past-President, Intermountain Healthcare Medical Director, Community Health & Food and Nutrition  
**Presiding:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University  
**Introduction:** Kenneth Barnes, M.D., M.Sc., Clinical Representative, Greensboro Orthopaedics
- 12:00-1:00 PAST PRESIDENT'S LUNCH (Crabtree)**
- 12:30-1:15 BIOMECHANICS SPECIAL INTEREST GROUP (Roberts)**
- 12:00-1:15 MINORITY AND HEALTH SPECIAL INTEREST GROUP (Kelley)**
- 1:15-2:15 BASIC SCIENCE LECTURE 2018 (Chattanooga Ballroom 1,2,3,4)**  
**PHYSIOLOGY OF MOTORSPORT ATHLETES**  
 Michael Reid, Ph.D., Dean and Professor of the College of Health and Human Performance University of Florida  
**Presiding:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University  
**Introduction:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University
- 2:30-4:00 P121-P192 POSTER FREE COMMUNICATIONS III (Ballroom Foyer)**  
**BODY COMPOSITION/ENERGY BALANCE/WEIGHT CONTROL NUTRITION AND EXERCISE/SPORTS PSYCHOLOGY/PSYCHIATRY/BEHAVIOR**  
**Chair:** John Garner, Ph.D., Troy University
- P121 HABITUAL MACRONUTRIENT INTAKE, BODY COMPOSITION, AND METABOLISM: SEX-BASED DIFFERENCES**  
 K.R. Hirsch, M.N.M. Blue, M.G. Mock, E.T. Trexler, A.E. Smith-Ryan, FACSM. Department of Allied Health Science and Exercise and Sport Science. University of North Carolina, Chapel Hill, NC
- P122 ASSOCIATIONS BETWEEN BODY COMPOSITION, BMI, AND PHYSICAL PERFORMANCE IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS**  
 H.C. Davis, M.N. Blue, K.R. Hirsch, B.A. Luc-Harkey, K.C. Anderson, A.E. Smith-Ryan, B. Pietrosimone FACSM. Dept. of Exercise and Sport Science, University of North Carolina, Chapel Hill, NC
- P123 HYPERMETABOLIC EFFECTS OF DIETARY KETONES ARE INDEPENDENT OF CHANGES IN SKELETAL MUSCLE MITOCHONDRIAL RESPIRATION**  
 S.E. Deemer<sup>3</sup>, R.A.H. Davis<sup>2, 3</sup>, J.M. Bergeron<sup>1</sup>, J.T. Little<sup>1</sup>, J.L. Warren<sup>2, 3, 4</sup>, G. Fisher<sup>1, 2, 3, 4</sup>, E.P. Plaisance<sup>1, 2, 3, 4</sup>. <sup>1</sup>Departments of Human Studies; <sup>2</sup>Nutrition Sciences; <sup>3</sup>Nutrition Obesity Research Center; <sup>4</sup>Center for Exercise Medicine. UAB.

- P124**      **BODY COMPOSITION ASSESSMENT IN FEMALE NCAA DIVISION I SOFTBALL PLAYERS AS A FUNCTION OF PLAYING POSITION ACROSS A MULTIYEAR TIMEFRAME**  
A. Peart, J. Washington, D. Wadsworth, and G. Oliver FACSM School of Kinesiology, Auburn University, Auburn, AL
- P125**      **NO RELATIONSHIP BETWEEN DUAL ENERGY X-RAY ABSORPTIOMETRY AND ULTRASOUND ESTIMATES OF VISCERAL ADIPOSE TISSUE IN COLLEGIATE WOMEN WITH NORMAL BMI**  
GL Nuckols, KC Anderson, AM Peterjohn, KR Hirsch, MNM Blue, AA Pihoker, ET Trexler, and AE Smith-Ryan, FACSM. Applied Physiology Laboratory, Dept. of Exercise and Sport Science, UNC Chapel Hill, Chapel Hill, NC
- P126**      **TWO WEEKS OF LOW CALORIE DIET PLUS INTERVAL EXERCISE FAVORABLY INFLUENCES PYY AND APPETITE COMPARED TO DIET ONLY IN OBESE ADULTS**  
E.M. Heiston, N.M. Gilbertson, N.Z.M. Eichner, J.M. Gaitan, M.E. Francois, J.H. Mehaffey, T.E. Hassinger, P.T. Hallowell, A. Weltman (FACSM), S.K. Malin (FACSM), University of Virginia, Charlottesville, VA
- P127**      **RELATIONSHIP BETWEEN SKINFOLD, AIR DISPLACEMENT PLETHYSMOGRAPHY, AND BIOELECTRICAL IMPEDANCE MEASUREMENTS ON FEMALE COLLEGIATE ATHLETES**  
C. Butler, R.L. Snarr, M. Eisenman, S. Wilhoite, B. Szekley, & G.A. Ryan. Human Performance Lab, Georgia Southern University, Statesboro, GA
- P128**      **IS BODY MASS INDEX (BMI) THE BEST FIELD BASED PROCEDURE TO ESTIMATE OBESITY IN PRE- AND POSTMENOPAUSAL WOMEN**  
I Naor-Maxwell, DJ Morris, LJ Brandon, Georgia State Univ., Atlanta, GA
- P129**      **EVALUATION OF RELATIONSHIPS BETWEEN BODY COMPOSITION, MAXIMAL STRENGTH, AND RESTING METABOLISM IN RESISTANCE-TRAINED FEMALES**  
A.A. Pihoker, A.M. Peterjohn, G.L. Nuckols, K.R. Hirsch, M.N.M. Blue, K.C. Anderson, E.T. Trexler, A.E. Smith-Ryan, FACSM. Department of Exercise and Sport Science, University of North Carolina, Chapel Hill, NC
- P130**      **THE ASSOCIATION BETWEEN WAIST TO HIP RATIO AND ANDROID TO GYNOID FAT RATIO IN COLLEGE WOMEN WITH A NORMAL BMI**  
K.C. Anderson<sup>1</sup>, K.R. Hirsch<sup>1,2</sup>, M.N.M. Blue<sup>1,2</sup>, A.M. Peterjohn<sup>1</sup>, G.L. Nuckols<sup>1</sup>, A.P. Pihoker<sup>1</sup>, E.T. Trexler<sup>1,2</sup>, A.E. Smith-Ryan, FACSM <sup>1,2</sup>. <sup>1</sup>Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, NC; <sup>2</sup>Human Movement Science Curriculum, University of North Carolina at Chapel Hill, NC
- P131**      **LEAN MASS AND ITS RELATIONSHIP TO CARDIORESPIRATORY FITNESS IN OBESE YOUNG AFRICAN AMERICAN WOMEN**  
A.M. Davis, I. Naor-Maxwell, L.J. Brandon; Dept. of Kinesiology & Health, Georgia State University, Atlanta, GA
- P132**      **A PREDICTION EQUATION FOR ENERGY EXPENDITURE DURING WALKING OR RUNNING CORRECTED FOR ONE MILE IN NORMAL WEIGHT AND OVERWEIGHT AFRICAN AMERICAN ADULTS AND CROSS-VALIDATION OF THE EQUATION**  
X. Jin<sup>1</sup>, P. D. Loprinzi<sup>1</sup>, M. A. Bass<sup>1</sup>, L. Xin<sup>1</sup>, T. C. Carithers<sup>2</sup>, M. Loftin<sup>1</sup>. <sup>1</sup>Health, Exercise Science and Recreation Management; <sup>2</sup>Nutrition & Hospitality Management, The University of Mississippi, University, MS
- P133**      **BODY COMPOSITION IS NOT RELATED TO FITNESS OR ATHLETIC PERFORMANCE IN A SAMPLE OF FEMALE COLLEGE BASKETBALL PLAYERS**  
SL Smith and AE Rote. Department of Health and Wellness, University of North Carolina at Asheville, Asheville, NC

- P134 EXAMINING THE LIMITATIONS OF USING WEIGH INS AS A MEASURE OF BODY COMPOSITION AMONG FEMALE COLLEGE BASKETBALL PLAYERS**  
AE Rote and SL Smith. Department of Health and Wellness, University of North Carolina at Asheville, Asheville, NC
- P135 EVALUATION OF AN ALTERNATIVE TO BMI PERCENTILE TO CAPTURE WEIGHT CHANGE IN OBESE YOUTH**  
Bethany Harris, T. Zaffore, J. Jack, G. W. Heath and K.L. Peyer, Dept. of Health and Human Performance, University of Tennessee at Chattanooga Chattanooga, TN
- P136 DIFFERENCES AMONG BODY FAT PERCENTAGE PREDICTION EQUATIONS IN A COLLEGE AGE POPULATION**  
Molly N. Melton, Elizabeth A. Easley, Sarah Hunt Sellhorst, William F. Riner, FACSM. Dept. of Exercise Science, USC Lancaster, Lancaster SC
- P137 HOW DOES AIR DISPLACEMENT PLETHYSMOGRAPHY AND DIRECT SEGMENTAL BIOELECTRICAL IMPEDANCE COMPARE IN A UNIVERSITY STUDENT POPULATION?**  
William C. Vantrease, David Bender, Jeremy R. Townsend and Kent D. Johnson, FACSM. Department of Kinesiology, College of Pharmacy and Health Sciences
- P138 ACUTE METABOLIC AND ENJOYMENT RESPONSES OF MODERATE-INTENSITY INTERMITTENT INTERVAL WALKING**  
Jermaine B. Mitchell, Assistant Professor in the Department of Health & Human Sciences at the University of Montevallo, Montevallo, AL; Robert L. Herron, PhD Candidate in the Department of Kinesiology at the University of Alabama, Tuscaloosa, AL; Shawn M. Mitchell, Assistant Professor in the Department of Health & Human Sciences at the University of Montevallo, Montevallo, AL
- P139 CHANGING ENERGY DENSITY OF DIET IN C57BL6/J MICE RESULTS IN ADJUSTING FOOD INTAKE TO BALANCE CALORIC INTAKE**  
K.A. Stiegel, J.Z. Granados, A.L. Letsinger, C. Cerda, J.T. Lightfoot (FACSM). Dept. of Health and Kinesiology, Texas A&M University, College Station, TX
- P140 IMPACT OF BODY COMPOSITION ON GLOBAL ESTEEM IN COLLEGE AGE WOMEN**  
S. Kailey Miller, Sarah H. Sellhorst, Elizabeth A. Easley, William F. Riner, FACSM
- P141 VALIDITY OF NOKIA BODY CARDIO SCALE VERSUS BOD POD IN YOUNG MALES AND FEMALES**  
C.A. McCraw, M. Campany, A. Lubkemann, S.R. Collier(FACSM). Vascular Biology and Autonomic Studies Laboratory, Appalachian State University, Boone, NC.
- P142 INTERRATER RELIABILITY FOR DXA AND BIA FOR MEASURING TOTAL AND REGIONAL LEAN MASS**  
TT Boyett, TA Van Dusseldorp, GM Hester, Y Feito, GT Mangine. Department of Exercise Science and Sport Management, Kennesaw State University, GA
- P143 BODY COMPOSITION CHANGES IN DIII ATHLETES OVER SUMMER BREAK**  
J. Mehrer, C. Vangsnes and J. Kutz, Ph.D., Dept. of Exercise Science, Shenandoah University, Winchester, VA
- P144 INFLUENCE OF RESISTANCE EXERCISE ON INFANT BODY COMPOSITION IN OVERWEIGHT/OBESE WOMEN**  
J.M. Ruemmler<sup>1</sup>, C.M. Isler<sup>2</sup>, L.E. May<sup>1,2</sup>. <sup>1</sup>Human Performance Lab, East Carolina University, Greenville, NC; <sup>2</sup>Vidant Medical Center, Greenville, NC
- P145 BODY COMPOSITION AND INFLAMMATION IN BREAST CANCER SURVIVORS COMPARED TO HEALTHY AGE-MATCHED WOMEN**  
C.D. Deaterly and T.A. Madzima, Department of Exercise Science, Elon University, Elon, NC.

- P146**      **BODY ADIPOSITY INDEX, BODY MASS INDEX, AND BODY FAT IN YOUNG ADULTS**  
B.A. Welborn<sup>1</sup>, B.S. Nickerson<sup>2</sup>, M.V. Fedewa<sup>1</sup>, M.R. Esco<sup>1</sup>. <sup>1</sup>University of Alabama, Tuscaloosa, AL. <sup>2</sup>Texas A&M International University, Laredo, TX.
- P147**      **VARIABILITY IN RESTING ENERGY EXPENDITURE ADAPTATION FOLLOWING SHORT-TERM AEROBIC EXERCISE TRAINING: A PILOT STUDY**  
N.A. Schwarz, A.C. Knapp, S.K. McKinley-Barnard, and S.L. Holden. Department of Health, Kinesiology, and Sport, University of South Alabama, Mobile, AL
- P148**      **AIR DISPLACEMENT PLETHYSMOGRAPHY UNDERESTIMATES PERCENT BODY FAT COMPARED TO DXA**  
GM. Hudson<sup>1</sup>, J. Zabal<sup>2</sup>, AD. Garber<sup>2</sup>, LA. Radman<sup>2</sup>, and JV. Danoff<sup>2</sup>. <sup>1</sup>Dept. Health, Kinesiology, & Sport, University of South Alabama, Mobile, AL; <sup>2</sup>Dept. Exercise & Nutrition Sciences, George Washington University, Washington, D.C
- P149**      **EXERCISE TRAINING, FAT DISTRIBUTION AND WEIGHT LOSS**  
J.H. Borges, S.J. Carter, D.R. Bryan, G.R. Hunter. Departments of Human Studies and Nutrition Sciences, University of Alabama at Birmingham, Birmingham, AL
- P150**      **BODY IMAGE, BODY COMPOSITION, AND WEIGHT CONTROL PRACTICES AMONG COLLEGE STUDENTS**  
M. H. Richardson, T. J. Sorrentino, T. A. Madzima, and S. Nepocatyck. Dept. of Exercise Science, Elon University, Elon, NC
- P151**      **THE EFFECT OF PRE-SLEEP CONSUMPTION OF CASEIN PROTEIN ON RESTING METABOLIC RATE AND APPETITE IN POSTMENOPAUSAL WOMEN**  
C.M. Schattinger, J.R. Leonard, A.L. Artese, M.J. Ormsbee, C.L Pappas and L.B. Panton. Department of Nutrition, Food and Exercise Sciences, Institute of Sport Sciences and Medicine, Florida State University, Tallahassee, FL
- P152**      **CAFFEINE AND CITRATE AURANTIUM COMPLEX ALTERS RESTING CARDIAC AUTONOMIC ACTIVITY BUT NOT DURING RECOVERY**  
E. Bechke, C. Williamson, P. Bailey, W. Hoffstetter, C. McLester, B. Kliszczewicz. Dept. of Exercise Science & Sport Management. Kennesaw State University, Kennesaw, GA
- P153**      **THE EFFECTS OF CAFFEINE AND CITRUS AURANTIUM ON PERFORMANCE DURING REPEATED ANAEROBIC BOUTS IN HABITUAL CAFFEINE USERS**  
C. McLester, B. Kliszczewicz, P. Bailey, E. Bechke, C. Williamson, W. Hoffstetter, J. McLester, Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw GA
- P154**       **$\beta$ -HYDROXY  $\beta$ -METHYL BUTYRATE SUPPLEMENTATION DOES NOT EFFECT CREATINE KINASE AND CORTISOL LEVELS ACROSS A RUGBY SEASON**  
A. Holmes, T. VanDusseldorp, M. Lee, G. Hester, Y. Feito, FACSM, G. Mangine. Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA
- P155**      **EFFECT OF  $\beta$ -HYDROXY  $\beta$ -METHYL BUTYRATE SUPPLEMENTATION ON BODY COMPOSITION AND MUSCLE STRENGTH DURING A RUGBY SEASON**  
M. Stratton, G.T. Mangine, A.A. Olmos, T.A. VanDusseldorp, Y. Feito, FACSM, and G.M. Hester. Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA
- P156**       **$\beta$ -HYDROXY  $\beta$ -METHYL BUTYRATE SUPPLEMENTATION DOES NOT REDUCE SERUM CORTISOL AND CREATINE KINASE FOLLOWING FALL AND SPRING SEASONS OF RUGBY**  
M. Lee, Dr. T. VanDusseldorp, A. Holmes, Dr. G. Hester, Dr. Y. Feito, Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA
- P157**      **COMPARING PHYSICAL ACTIVITY AMONG AMERICAN FOOTBALL OFFICIALS DURING A GAME**  
N.Aqqad, K.C.Hamilton, B. Oglesby, N. Boer, E. Andrews, C. Barker, and J. Harvey, Dept. of Hlth and Human Performance, Univ of TN Chattanooga, Chattanooga, TN

- P158 EFFECTS OF ACUTE GOLDEN ROOT EXTRACT (RHODIOLA ROSEA) SUPPLEMENTATION ON AEROBIC EXERCISE PERFORMANCE**  
Michayla Brown, Alec Hersh , Rebecca R. Rogers, Mallory R. Marshall, John K. Petrella, FACSM, Christopher G. Ballmann. Dept. of Kinesiology, Samford University, Birmingham, AL
- P159 POTENTIAL VITAMIN AND MINERAL DEFICIENCIES IN DIII ATHLETES**  
M. Chang, O. Gouldin and J. Kutz, Ph.D. , Dept. of Exercise Science, Shenandoah University, Winchester, VA
- P160 EXERCISE BARRIERS AND INCENTIVES FOR MUNICIPAL WORKERS IN SOUTHERN GEORGIA**  
Bridget Melton, T. Kent Kessinger, Taytana Dumas, and Greg A Ryan, Georgia Southern University and Ottawa University, Statesboro, GA
- P161 PERCEIVED PARENTAL RISK OF INJURY ACROSS AGE GROUPS FOR YOUTH RECREATIONAL SPORT PROGRAMS**  
Peeler, A., Todd, K., B. Jackson, B.F. Melton, H.W. Lee, C. Gipson, and G.A. Ryan. Georgia Southern University, Statesboro, GA
- P162 EFFECTS OF BRANCHED-CHAIN AMINO ACIDS, PROTEIN, AND CARBOHYDRATES ON RUNNING TIME TO EXHAUSTION AND OXYGEN KINETICS IN FEMALES**  
Anna C. Huff, Jessica R. Lane, Erica J. Roelofs, Department of Nutrition, Health and Human Performance, Meredith College, Raleigh, NC
- P163 THE EFFECTS OF BLUEBERRY SUPPLEMENTATION ON EXERCISE-INDUCED MUSCLE DAMAGE**  
L.J. Lee, P.C. Miller, FACSM, T.A. Madzima. Dept. of Exercise Science, Elon University, Elon, NC
- P164 THE EFFECTS OF BRANCHED-CHAIN AMINO ACIDS, PROTEIN, AND CARBOHYDRATES ON PERCEIVED EXERTION AFTER HIGH INTENSITY EXERCISE IN FEMALES**  
Jessica R. Lane, Anna C. Huff, Erica J. Roelofs, Department of Nutrition, Health and Human Performance, Meredith College, Raleigh, NC
- P165 IMPACT OF HIGH-INTENSITY INTERVAL EXERCISE ON EXECUTIVE FUNCTION AND BRAIN DERIVED NEUROTROPHIC FACTOR**  
Schwartz C.S., Slusher A.L., Patterson V.T., Acevedo E.O., FACSM. Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P167 THE RELATIONSHIP OF COGNITIVE SCORES WITH MUSCLE POWER, STRENGTH, AND 6-MINUTE WALK in BREAST CANCER SURVIVORS**  
R.L. Hunt, A.L. Artese, J-S. Kim, L.B. Panton, Dept of Nutrition, Food and Exercise Sciences, Florida State University, Tallahassee, FL
- P168 EXPERIMENTAL INVESTIGATION OF PRIMING HEDONIC RESPONSES TO ACUTE EXERCISE: PILOT STUDY**  
O. Addoh and P.D. Loprinzi. Dept. of Health, Exercise Science and Recreation Mgmt., University of Mississippi, University, MS
- P169 EXPLORING THE CONCEPT OF READINESS TO EXERCISE IN OBESE ADULTS: A THEMATIC ANALYSIS**  
Kelley Strohacker, Ethan T. Schaltegger, Rebecca A. Zakrajsek. Dept. of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville TN
- P170 IT'S PERSONAL. EXPLORING THE EFFECT OF GENERAL FITNESS COURSES ON THE PERSONAL VALUE STUDENTS PLACE ON FITNESS**  
K.D.Randazzo, K.S. McDonough, W.J.Berdami, and J.S.Hogg: Mississippi College, Clinton Ms.

- P171**      **EFFICACY OF PHYSICAL TRAINING AMONG MILITARY CADETS**  
DB Bornstein, A Overton, CJ Sole, C Duke, K Hucks, I Rodgers, D Boucher, Dept. of Health, Exercise, and Sport Science, The Citadel, Charleston, SC
- P172**      **ARE PARENTS ACCURATELY GAUGING THEIR CHILD'S PHYSICAL ACTIVITY LEVELS?**  
K.J. Hahn, K.C. Hamilton, K.L. Peyer, and G.W. Heath FACSM. Dept. of Health & Human Performance, University of Tennessee Chattanooga, TN
- P173**      **THE IMPACT OF FITNESS ZONES IN LOW-INCOME AREA PARKS**  
C.Partida, G.W. Heath, FACSM, B.Oglesby, and K.C.Hamilton. Dept. of Hlth and Human Performance, Univ of TN Chattanooga, Chattanooga, TN
- P174**      **PARENT AND ADOLESCENT REPORTED PHYSICAL ACTIVITY BARRIERS IN HEALTHY WEIGHT AND OBESE YOUTH**  
Leahy N., Raedeke T.D., Collier D., DuBose K.D., FACSM, Depts. of Kinesiology & Pediatrics, East Carolina University, Greenville, NC
- P175**      **EXPERIMENTAL INVESTIGATION OF EXERCISE-RELATED, PERCEIVED HEDONIC RESPONSES TO PREFERRED VERSUS IMPOSED MEDIA CONTENT**  
Emily Frith, MS, Paul D. Loprinzi, PhD, University of Mississippi, Oxford, Mississippi
- P176**      **EFFECTS OF ACUTE EXERCISE ON STRESS-INDUCED MEMORY FUNCTION**  
Pamela Ponce, Emily Frith, MS, Paul D. Loprinzi, PhD, The University of Mississippi, Oxford, Mississippi
- P177**      **MOTIVATION AND CONFIDENCE AMONG DIVISION III ATHLETES ACROSS THE SUMMER OFFSEASON**  
E Moses, A McCarron, and J Peacock, Ph.D. Department of Exercise Science, Shenandoah University, Winchester, VA
- P178**      **RANDOMIZED CONTROLLED TRIAL EXAMINING THE EFFECTS OF ACUTE EXERCISE ON MEMORY FUNCTION: MEMORY CONSOLIDATION**  
Dylan Delancey, Paul Loprinzi, Physical Activity Epidemiology Laboratory, Exercise Psychology Laboratory, Department of Health, Exercise Science and Recreation Management, The University of Mississippi, University, MS
- P179**      **IMPACT OF UTILIZING SIT-STAND WORKSTATIONS FOR 10 WEEKS IN UNIVERSITY STAFF MEMBERS**  
K. Edens, M. Schafer, J. Crandall, T.S. Lyons, R. Vondy, A. Olenick, L. Blankenship, N. Shaker. School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY
- P180**      **PHYSICAL ACTIVITY ENGAGEMENT IN FIRST YEAR VERSUS SECOND YEAR COLLEGE STUDENTS**  
E.D. Hathaway, C. Oglesby, B. Oglesby, A.H. Durall. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN
- P181**      **ARE STUDENTS THAT ARE INVOLVED IN INTRAMURAL ATHLETICS MORE PHYSICALLY ACTIVE?**  
J.Y. Coker, H.D. Holmes, C. Oglesby, B. Oglesby, A.H. Durall, E.D. Hathaway. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN
- P182**      **FEELINGS OF EXHAUSTION AND PHYSICAL ACTIVITY LEVELS IN COLLEGE STUDENTS**  
A.H. Durall, C. Oglesby, B. Oglesby, E.D. Hathaway. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN

- P183 FRUITS/VEGETABLES CONSUMPTION ASSOCIATED WITH PHYSICAL ACTIVITY ENGAGEMENT IN COLLEGE STUDENTS**  
E.A. Stuart, J.L. Greiner, C. Oglesby, B. Oglesby, A.H. Durall, E.D. Hathaway. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN
- P184 RELATIONSHIP BETWEEN FEELINGS OF BEING OVERWHELMED AND PHYSICAL ACTIVITY LEVELS IN COLLEGE STUDENTS**  
J.L. Greiner, E.A. Stuart, C. Oglesby, B. Oglesby, A.H. Durall, E.D. Hathaway. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN
- P185 RELATIONSHIP BETWEEN AFFECTIVE STATE AND ENJOYMENT FOLLOWING ACUTE EXERCISE**  
Battogtokh Zagdsuren, Colleen L. Geary, Hayley V. MacDonald, Mark T. Richardson, James D. Leeper, Jonathan E. Wingo, FACSM, Phillip A. Bisho<sup>1</sup>, and Frances A. Connors. The University of Alabama, Tuscaloosa, Alabama
- P186 THE ROLE OF LOW-FREQUENCY POWER IN THE RELATIONSHIP BETWEEN EXERCISE AND MEMORY**  
AB Slutsky, JL Etnier, S Arunachalam, L Wideman, University of North Carolina at Greensboro, Greensboro, NC
- P187 THE RELATIONSHIP BETWEEN CELL PHONE USE, SEDENTARY BEHAVIOR, AND PHYSICAL ACTIVITY IN ADULTS**  
C. Fennell<sup>1</sup>, J.E. Barkley<sup>2</sup>, A. Lepp<sup>2</sup>, <sup>1</sup>Exercise and Nutrition Science, University of Montevallo, Montevallo, AL; <sup>2</sup>Exercise Physiology, Kent State University, Kent, OH
- P188 HOW GENERAL ADULTS PERCEIVE AEROBIC EXERCISE DEMAND: A MIXED METHODS EXPLORATORY STUDY**  
Ethan T. Schaltegger, Rebecca A. Zakrajsek, Kelley Strohacker; Dept. of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville TN
- P189 MACHINES VERSUS FREE WEIGHTS: DOES EXERCISE MODE INFLUENCE AFFECT AND PERCEIVED EXERTION?**  
D.J. Cavarretta, W.R. Bixby (FACSM), & E.H. Hall (FACSM). Department of Exercise Science, Elon University, Elon, NC
- P190 THE EFFECTS OF INTERNAL AND PROXIMAL AND DISTAL EXTERNAL FOCUS CUES ON EXERCISE PERFORMANCE**  
Cooper A. Rodriguez and Erica J. Roelofs, Department of Nutrition, Health and Human Performance, Meredith College, Raleigh, NC
- P191 EVALUATING THE EFFECTIVENESS OF APPLYING GRIEF-RESPONSE MODELS TO SPORT INJURY IN COLLEGIATE STUDENT-ATHLETES**  
S. Brown, E.E. Hall. Dept. of Exercise Science, Elon University, Elon, NC
- 2:30-4:00 THEMATIC POSTERS SESSION III (Ochs)**  
**TP13-TP18 BIOMECHANICS/GAIT/BALANCE**  
**Chair:** Gretchen Oliver, Ph.D., Auburn University
- TP13 CORRELATION OF LUMBOPELVIC-HIP COMPLEX KINEMATICS TO HAND ANGULAR VELOCITY IN SOFTBALL HITTING: A PILOT STUDY**  
JK. Washington, MM. Hanks, SS. Gascon, JW. Barfield, P. Williams, K. Friesen, GG. Gilmer, A. Brittain, and G.D. Oliver, FACSM. School of Kinesiology, Auburn University, Auburn, AL
- TP14 BASEBALL PITCHER'S GLOVE ARM INFLUENCE ON ELBOW AND SHOULDER KINETICS**  
J.W. Barfield, J.K. Washington, MM. Hanks, S.S. Gascon, G.G. Gilmer, A.R. Brittain, P.W. Williams, K.B. Friesen, and G.D. Oliver FACSM. School of Kinesiology, Auburn University,

Auburn, AL

- TP15**      **SHOULDER AND ELBOW KINETICS DURING POLO OFFSIDE FORHAND SHOTS**  
A.R. Brittain, G.G. Gilmer, J.W. Barfield, J.K. Washington, G.D. Oliver, FACSM. School of Kinesiology, Auburn University, Auburn, AL
- TP16**      **EXAMINING CHANGES IN BAT ANGLE AT BALL CONTACT IN COLLEGIATE SOFTBALL PLAYERS OVER A FALL SOFTBALL SEASON**  
CC. Williams<sup>1</sup>, JR. Gdovin<sup>2</sup>, SJ. Wilson<sup>1</sup>, CM. Hill<sup>1</sup>, PT Donahue<sup>1</sup>, LA Luginsland<sup>1</sup>, JD. Eason<sup>1</sup>, AL Yarbrough<sup>1</sup>, C. Wade<sup>3</sup> and JC. Garner<sup>4</sup>; <sup>1</sup>Dept. of Health, Exercise Science and Recreation Management, The University of Mississippi, University, MS; <sup>2</sup>Dept. of Kinesiology, Missouri State University, Springfield, MO; <sup>3</sup>Dept. of Industrial & Systems Engineering, Auburn University, Auburn, AL; <sup>4</sup>Dept. of Kinesiology & Health Promotion, Troy University, Troy AL
- TP17**      **ANALYSIS OF THE START TIMES FOR THE SWING PHASES FOR BASEBALL HITTERS OF VARYING SKILL**  
E. Stewart<sup>1,2</sup>, M. Smidebush<sup>2</sup>, J. Simpson<sup>1</sup>, A. Knight<sup>1</sup>, H. Chander<sup>1</sup>, R. Shapiro<sup>2</sup>. <sup>1</sup> Department of Kinesiology, Mississippi State University, Mississippi State, MS; <sup>2</sup> Department of Kinesiology, University of Kentucky, Lexington, KY
- TP18**      **ANALYSIS OF PEAK AND MEAN MUSCLE ACTIVITY FOR BASEBALL HITTERS OF VARYING SKILL**  
M. Smidebush<sup>1</sup>, E. Stewart<sup>1,2</sup> & R. Shapiro<sup>1</sup>. <sup>1</sup>Department of Kinesiology, University of Kentucky, Lexington, KY; <sup>2</sup>Department of Kinesiology, Mississippi State University, Mississippi State, MS
- 2:30-4:30**      **ORAL FREE COMMUNICATION III (Kelley)**  
**017-023**      **ATHLETIC CARE/TRAUMA/REHABILITATION**  
**Chair:** Nicholas Murray, Ph.D., Georgia Southern University
- 017**      **BIOMECHANICAL INFLUENCES OF A POSTURAL COMPRESSION GARMENT ON SCAPULAR POSITIONING**  
S.S. Gascon, G.G. Gilmer, M.M. Hanks, J.K. Washington, G.D. Oliver, FACSM. School of Kinesiology, Auburn University, Auburn, AL
- 018**      **CROSS-OVER EFFECT OF BALANCE TRAINING AFTER KNEE SURGERY: A PILOT STUDY**  
Layci J Harrison, MS, LAT, ATC<sup>1</sup>, Lindsey K. Lepley, PhD, ATC<sup>2</sup>, Jennifer L. Caputo, PhD, CSCS, MX<sup>1</sup>, Dana K. Fuller, PhD<sup>1</sup>. <sup>1</sup>Department of Health and Human Performance, Middle Tennessee State University, Murfreesboro, TN; <sup>2</sup>Department of Kinesiology, University of Connecticut, Storrs, CT
- 019**      **EFFECTS OF COLD WATER IMMERSION METHODS ON SKIN TEMPERATURE AND PERCEPTION OF COLD**  
K. Flickinger, J.A. Steeves. Dept of Education, Maryville College, Maryville, TN.
- 020**      **THE EFFECT OF EXERTION ON KING DEVICK CONCUSSION SCREENING NORMS IN WHEELCHAIR RUGBY ATHLETES**  
JP. Barfield, A. Joyce, L. Newsome, and A. Mickle. Dept. of Health and Human Performance, Radford University, Radford, VA
- 021**      **EFFECTS OF HIP STRENGTHENING ON RUNNING MECHANICS AND CHRONIC LEG PAIN IN RECREATIONAL ATHLETES**  
J Bossi, S Everett, V Rettinger, A Keath Department of Kinesiology, Anderson University, Anderson, SC
- 022**      **IMPACT® ASSESSMENT IN CONCUSSED DIVISION I COLLEGIATE FOOTBALL PLAYERS**  
Jared H. Perlmutter<sup>1</sup>, B. Sue Graves<sup>1</sup>, Sasha Guslyyayev<sup>1</sup>, Michael H. Haischer<sup>3</sup>, John Burnside<sup>4</sup>, and Manish K. Gupta<sup>1, 2</sup>; <sup>1</sup>Exercise Science and Health Promotion Department,



Florida Atlantic University; <sup>2</sup>Sports & Orthopedic Center, Boca Raton, Florida; <sup>3</sup>Department of Kinesiology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin; <sup>4</sup>Anderson Training Center, University of Tennessee, Knoxville, Tennessee

- 023 THE EFFECT OF ANXIETY ON BASELINE NEUROPSYCHOLOGICAL ASSESMENTS IN ADOLESCENT FEMALES**  
Christopher P. Tomczyk, Jody Langdon, George Shaver, Tamerah N. Hunt, FACSM. Georgia Southern University, Statesboro, GA
- 2:30-3:20 S8 SYMPOSIUM SESSION VIII (Walker)**  
**FITNESS ESSENTIAL TO THE MISSION? THE SHIFT IN MILITARY PHYSICAL FITNESS IN THE 21ST CENTURY**  
K. J. Kellera<sup>1</sup>, W. W. Peveler<sup>2</sup>, A. Bosak<sup>2</sup>. <sup>1</sup>Bridgewater College, Bridgewater, VA; <sup>2</sup>Liberty University, Lynchburg, VA  
**Chair:** Christopher Sole, Ph.D., Citadel – The Military College of South Carolina
- 2:30-3:20 S9 SYMPOSIUM SESSION IX (Rose)**  
**VALIDITY AND PRACTICAL UTILITY OF 3D BODY FAT SCANNERS**  
GM Hudson. Dept. of Exercise and Nutrition Sciences. The George Washington University, Washington, D.C.  
**Chair:** Scott Collier, Ph.D., Appalachian State University
- 3:30-4:20 S10 SYMPOSIUM SESSION X (Walker)**  
**THEORY AND PRACTICAL APPLICATION OF THE ISAK PROTOCOL: KINANTHROPOMETRY FROM THE LAB TO THE FIELD**  
Laurel M. Wentz, PhD, RD, CSSD, ISAK Level 2, Department of Nutrition and Healthcare Management, Appalachian State University, Boone, NC; P. Spencer Webb, MS, RDN, CSCS, PES, LDN, ISAK Level 3 Instructor, 325th Fighter Wing, Tyndall Air Force Base, FL  
**Chair:** Michael Ormsbee, Ph.D., Florida State University
- 2:30-3:20 T10 TUTORIAL SESSION X (Roberts)**  
**HEY KID! GO TAKE A HIKE!: STRATEGIES TO GET CHILDREN AND YOUTH OUTSIDE AND ACTIVE**  
D.P. Coe<sup>1</sup>, FACSM and R.A. Battista<sup>2</sup>, FACSM. <sup>1</sup>Department of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville, TN; <sup>2</sup>Department of Health, Leisure and Exercise Science, Appalachian State University, Boone, NC  
**Chair:** Mallory Marshall, Ph.D., Samford University
- 3:30-4:20 T11 TUTORIAL SESSION XI (Rose)**  
**HOW TO INTERPRET NEAR-INFRARED SPECTROSCOPY MEASUREMENTS OF OXYGEN LEVELS FROM SKELETAL MUSCLE**  
AA Sanni, KK McCully, FACSM. Department of Kinesiology, University of Georgia, Athens GA  
**Chair:** Peter Magyari, Ph.D., University of North Florida
- 3:30-4:20 T12 TUTORIAL SESSION XII (Roberts)**  
**EXPERIENTIAL LEARNING CAN HELP THE NEXT GEN WIN**  
Nicole A. Lynch, Ph.D., Department of Kinesiology and Health, Georgia State University Perimeter College, Atlanta, GA  
**Chair:** Amanda Price, Ph.D., Winston-Salem State University
- 4:30-6:00 STUDENT BOWL SPONSORED BY GANNON UNIVERSITY (Chattanooga Ballroom 1,2,3,4)**  
MC: Judith A. Flohr, Ph.D., FACSM  
Professor Emeritus  
James Madison University
- 6:15-7:45 SEACSM GRADUATE STUDENT FAIR SPONSORED BY NOVA SOUTHEASTERN UNIVERSITY (Walker and Rose)**

## **SATURDAY, February 17, 2018**

**6:30-7:30 YOGA (Crabtree) Must Pre-Register at Student Help Desk (Lobby)**

**6:30-7:30 RUN THROUGH DOWNTOWN CHATTANOOGA (Meet in Lobby)**

**8:00-12:00 EXHIBITS (Conference Concierge)**

**8:00-9:25 POSTER FREE COMMUNICATIONS IV (Ballroom Foyer)**

**P193-P264 BIOMECHANICS/GAIT/BALANCE**

**COMPETITIVE ATHLETES**

**CONNECTIVE TISSUE/BONE/SKELETAL MUSCLE**

**Chair:** Emily Simonavice, Ph.D., Georgia College and State University

**P193 VIDEO VALIDATION OF WEARABLE STEP COUNTERS**

L.P. Toth<sup>1</sup>, S. Park<sup>1</sup>, C.M. Springer<sup>2</sup>, M.D. Feyerabend<sup>1</sup>, J.A. Steeves<sup>3</sup>, D.R. Bassett FACSM<sup>1</sup>.

<sup>1</sup>Department of Kinesiology, Recreation, and Sports Studies, The University of Tennessee, Knoxville, TN; <sup>2</sup>Office of Information Technology, Research Computing Support, The University of Tennessee, Knoxville, TN; <sup>3</sup>Division of Education, Maryville College, Maryville, TN

**P194 RELATIONSHIP BETWEEN KNEE VALGUS ASYMMETRY DURING RUNNING AND KNEE LOADING DURING SINGLE LEG LANDING IN FEMALE BASKETBALL ATHLETES**

Bhushan Thakkar<sup>1</sup>, Kathryn Harrison<sup>1</sup>, Jacqueline Morgan<sup>1</sup>, Jenna Kostiuik<sup>2</sup>, Zayd Abdul-Ali<sup>2</sup>, Lauren Beshada<sup>2</sup>, Ali Lodhi<sup>2</sup>, Gregory Crosswell<sup>1</sup>, D.S. Blaise Williams III<sup>1</sup>. <sup>1</sup>Dept. of Physical Therapy; <sup>2</sup>Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA

**P195 THE INFLUENCE OF SELF-SELECTED PROTECTIVE EQUIPMENT ON KINEMATICS IN YOUTH LACROSSE PLAYERS**

MM. Hanks, LE. Brewer, GG. Gilmer, JK. Washington, SS. Gascon, JW. Barfield, PT. Williams, GD. Oliver FACSM. School of Kinesiology, Auburn University, Auburn, AL

**P196 A HISTORY OF SPORT-RELATED CONCUSSIONS DOES NOT INFLUENCE OCULOMOTOR CONTROL**

K. Neitz<sup>1</sup>, B. Szekely<sup>1</sup>, S. Wilhoite<sup>1</sup>, P. Chrysoferidis<sup>1</sup>, B.A. Munkasey<sup>1</sup>, D. Powell<sup>2</sup>, N.G. Murray<sup>1</sup>. <sup>1</sup>Georgia Southern University, Statesboro, GA; <sup>2</sup>University of Memphis, Memphis, TN

**P197 THE EFFECTS OF CONCUSSION HISTORY ON POSTURAL CONTROL**

Szekely B.<sup>1</sup>, Wilhoite S.<sup>1</sup>, Chrysoferidis P.<sup>1</sup>, Neitz K.<sup>1</sup>, Powell D.<sup>2</sup>, Munkasy B.<sup>1</sup>, Murray N.<sup>1</sup>. <sup>1</sup>Georgia Southern University, Biomechanics Laboratory, Statesboro, GA; <sup>2</sup>University of Memphis, Department of Health and Sport Sciences, Memphis, TN

**P198 DOMINANT VS NON-DOMINANT WEAR: A COMPARISON OF STEPS PER DAY**

S. Park, L.P. Toth, P.R. Hibbing, C.M. Springer, A.S. Kaplan, M.D. Feyerabend, S.E. Crouter FACSM, D.R. Bassett FACSM., Department of Kinesiology, Recreation, and Sports Studies, The University of Tennessee, Knoxville, TN

**P199 THE EFFECT OF BAREFOOT RUNNING USING TWO RUNNING STYLES ON LOWER EXTREMITY JOINT REACTION FORCES**

D.A. Titcomb, J.M. Rogers. Dept. of Health Professions, Liberty University, Lynchburg, VA

**P200 THE EFFECT OF TWO JERK TECHNIQUES ON BARBELL KINEMATICS.**

H.M. Lang<sup>1,2</sup>, R. Lund<sup>1</sup>, T.K. Ficklin<sup>3</sup>, C.D. Bazylar<sup>2</sup>. <sup>1</sup>University of Northern Iowa, Cedar Falls, IA; <sup>2</sup>East Tennessee State University, Johnson City, TN; <sup>3</sup>Dixie State University, Saint George, UT

- P201**      **EXAMINATION OF PROXIMAL AND DISTAL MUSCLE ACTIVATION: AN EMG STUDY**  
P.T. Williams, J.K. Washington, M.M. Hanks, J.W. Barfield, G.G. Gilmer, S.S. Gascon, K.B. Friesen, and G.D. Oliver, FACSM. School of Kinesiology, Auburn University, Auburn, AL.
- P202**      **CO-CONTRACTION INDEX OF LOWER EXTREMITY MUSCLES DURING MULTIPLE SLIP EVENTS: ROLE OF FOOTWEAR**  
P.E. Sutton<sup>1</sup>, H. Chander<sup>1</sup>, A.C. Knight<sup>1</sup>, A.J. Turner<sup>1</sup>, J.C. Garner<sup>2</sup>, C. Wade<sup>3</sup>, D.W. Carruth<sup>4</sup>.  
<sup>1</sup>Dept. of Kinesiology, Mississippi State University, Mississippi State, MS; <sup>2</sup>Dept. of Kinesiology & Health Promotion, Troy AL; <sup>3</sup>Industrial Systems Engineering, Auburn University, Auburn AL; <sup>4</sup>Center for Advanced Vehicular Systems, Mississippi State University, Mississippi State, MS
- P203**      **IMPACT OF MILITARY TYPE FOOTWEAR AND WORKLOAD ON PERCENT MUSCLE ACTIVATION IN UNILATERAL STATIC BALANCE**  
A.J. Turner<sup>1</sup>, C.M. Hill<sup>1</sup>, H. DeBusk<sup>2</sup>, H. Chander<sup>1</sup>, A.C. Knight<sup>1</sup>, S.J. Wilson<sup>2</sup>, C.C. Williams<sup>2</sup> & L.L. Luginsland<sup>2</sup>. <sup>1</sup>Dept. of Kinesiology, Mississippi State University, Mississippi State MS; <sup>2</sup>Dept. of Health, Exercise Science & Recreation, University of Mississippi, University MS
- P204**      **CORRELATION OF PELVIS KINEMATICS TO GROUND REACTION FORCE IN SOFTBALL HITTING: A PILOT STUDY**  
J.L. Downs & K.B. Friesen, J.K. Washington, G.G. Gilmer, and G.D. Oliver, FACSM. School of Kinesiology, Auburn University, Auburn, AL
- P205**      **CORRELATION OF TRUNK AND UPPER EXTREMITY KINEMATICS AT BALL CONTACT IN THE SOFTBALL SWING: A PILOT STUDY**  
K.W. Wasserberger, J.K. Washington, G.G. Gilmer, and G.D. Oliver, FACSM. School of Kinesiology, Auburn University Auburn AL
- P207**      **VERTICAL JUMP HEIGHT IN A STATIC COUNTERMOVEMENT JUMP VS A DROP JUMP IN DIVISION I ATHLETES.**  
J.Clark, J. Manor, A. Carnall, J. Bunn, Department of Physical Therapy, Campbell University, Buies Creek, NC
- P208**      **THE EFFECT OF A CURVED NON-MOTORIZED TREADMILL ON RUNNING GAIT LENGTH, IMBALANCE AND STEP ANGLE**  
Kaitlyn Armstrong, Andrew Hatchett, Brian Parr, Mallory Crews; University of South Carolina Aiken, Aiken, SC
- P209**      **EFFECTS OF MANIPULATING STRIDE LENGTH ON GROUND REACTION FORCE AND WRIST VELOCITY DURING BASEBALL PITCHING**  
Garrison Roy<sup>1</sup>, Christopher Wendt<sup>2</sup>, Kurt Kornatz<sup>1</sup>, and Kevin Ritsche<sup>1</sup>. <sup>1</sup>Dept. of Exercise Physiology; <sup>2</sup>Dept. of Physical Therapy, Winston-Salem State University, NC
- P210**      **EFFECT OF PACK LOAD POSITION ON TRUNK FLEXION DURING OBSTACLE TASK**  
L.E. Brewer, B.E. Decoux, C.M. Wilburn, N.H. Moore, R. Fawcett & W.H. Weimar, School of Kinesiology, Auburn University, Auburn, AL
- P211**      **EFFECTS OF MILITARY LOAD CARRIAGE ON VERTICAL GROUND REACTION FORCE PARAMETERS**  
Z.A. Player. Dept. of Health, Exercise, and Sport Science, The Citadel - The Military College of South Carolina, Charleston, SC
- P212**      **EFFECT OF INSTRUCTIONS ON FORCE-TIME CHARACTERISTICS OF THE COUNTERMOVEMENT VERTICAL JUMP**  
K.P. Manceaux, S.J. Winch, I.M. Rodgers, C.J. Sole. Dept. of Health, Exercise, and Sport Science, The Citadel – The Military College of South Carolina, Charleston, SC

- P213 CAN AUTOMATIC POSTURAL RESPONSES BE LEARNED?**  
S.J. Wilson<sup>1</sup>, C.M.Hill<sup>1</sup>, J.G. Mouser<sup>1</sup>, C.C.Williams<sup>1</sup>, L.A. Luginsland<sup>1</sup>, P.T. Donahue<sup>1</sup>, J.C. Garner<sup>2</sup>, & H.Chander<sup>3</sup>. <sup>1</sup>University of Mississippi, University, MS; <sup>2</sup>Troy University, Troy, AL; <sup>3</sup>Mississippi State University, Mississippi State, MS
- P214 MUSCLE FATIGUE IS NOT NECESSARY TO INCREASE KNEE INSTABILITY WITH EXERCISE**  
Collins, G.A., Patel, J.A. Palmetto Health USC Orthopedic Center. Columbia, SC, and Thompson, R.W. Exercise Science Dept, University of South Carolina, Columbia, SC
- P215 ANALYSIS OF VERTICAL GROUND REACTION FORCES DURING THE BASEBALL SWING IN HITTERS OF DIFFERENT SKILL LEVEL**  
J. Simpson<sup>1</sup>, E. Stewart<sup>1,2</sup>, M. Smidebush<sup>2</sup>, A. Knight<sup>1</sup>, H. Chander<sup>1</sup>, & R. Shapiro<sup>2</sup>. <sup>1</sup>Department of Kinesiology, Mississippi State University, Mississippi State, MS; <sup>2</sup>Department of Kinesiology, University of Kentucky, Lexington, KY
- P216 INFLUENCE OF PREPARATORY ARM MOTION ON PEAK VERTICAL FORCE, RESULTANT HORIZONTAL GROUND REACTION FORCE, AND PROPULSION ANGLE**  
N.H. Moore, L. Brewer, B. Decoux, C.M. Wilburn, L.L. Smallwood, P.T. Williams & W.H. Weimar, School of Kinesiology, Auburn University, Auburn, AL
- P217 INFLUENCE OF REPEATED MOTOR CONTROL TESTS ON PROXIMAL LOWER EXTERMITY MUSCULTURE ACTIVATION**  
J.C. Garner<sup>1</sup> C.M.Hill<sup>2</sup>, S.J. Wilson<sup>2</sup>, J.G. Mouser<sup>2</sup>, C.C.Williams<sup>2</sup>, L.A.Luginsland<sup>2</sup>, P.T. Donahue<sup>2</sup>, H.Chander<sup>3</sup>. <sup>1</sup>Troy University, Troy AL; <sup>2</sup>University of Mississippi, University MS; <sup>3</sup>Mississippi State University, Mississippi State, MS
- P218 THE INFLUENCE OF ARCH HEIGHT ON PROPULSION MECHANICS DURING FORWARD HOPPING AND LATERAL JUMPING TASKS**  
C.M. Wilburn, B.E. Decoux, R.T. Fawcett., L.E. Brewer, P. T. Williams, N.H. Moore, L.L. Smallwood, & W.H. Weimar, School of Kinesiology, Auburn University, Auburn, AL
- P219 RELATIONSHIP BETWEEN LOWER EXTREMITY STRENGTH AND GAIT CHARACTERISTICS DURING STAIR DESCENT IN OBESE SUBJECTS**  
A.L. Ransom, R.F. Seay, R. Shapiro, L.M. Bollinger. Department of Kinesiology and Health Promotion, University of Kentucky, Lexington, KY
- P220 EFFECTS OF CANCER RELATED TREATMENT ON VISION AND VARIOUS COMPONENTS OF BALANCE**  
D. Knight, E. Simonavice, K. Hunt, K. Massey, M. Martino, School of Health and Human Performance, Georgia College, Milledgeville, GA
- P222 INTRASESSION ANALYSIS IN POSTURAL CONTROL IN SPORT LIKE DUAL TASK**  
A. Fulbright<sup>1</sup>, B. Szkeley<sup>1</sup>, S. Wilhoite<sup>1</sup>, P. Chyosferidis<sup>1</sup>, B. Munkasy<sup>1</sup>, D. Powell<sup>2</sup>, N. Murray<sup>2</sup>, <sup>1</sup>Georgia Southern University, Biomechanics Lab Statesboro, Ga; <sup>2</sup>University of Memphis, School of Health Studies, Memphis, TN
- P223 DIFFERENCES IN NEUROMUSCULAR STRATEGIES BETWEEN TWO TASKS IN FEMALE LACROSSE ATHLETES**  
Jenna Kostiuk<sup>1</sup>, Bhushan Thakkar<sup>2</sup>, Kathryn Harrison<sup>2</sup>, Jacqueline Morgan<sup>2</sup>, Gregory Crosswell<sup>2</sup>, D.S. Blaise Williams<sup>2</sup>. <sup>1</sup>Dept. of Kinesiology and Health Sciences; <sup>2</sup>Dept. of Physical Therapy, Virginia Commonwealth University, Richmond, VA
- P224 SEX DIFFERENCES IN ANKLE, KNEE, HIP, AND TORSO ANGLES DURING A DROP JUMP TASK**  
Camden Johnston, John Manor, Alex Carnall, Jennifer Bunn, Campbell University, Buies Creek, North Carolina

- P225**      **COMPARISON OF TRAINING PERFORMANCE, RECOVERY, AND PERCEIVED EXERTION AGAINST PLAYING STATUS IN FEMALE COLLEGIATE SOCCER PLAYERS**  
E. Langford, S.J. Rossi, P. Chrysosferidis, M. Eisenman, G. Barker and G.A. Ryan, Human Performance Lab, Georgia Southern University, Statesboro, GA
- P226**      **EXTERNAL AND INTERNAL TRAINING LOAD RESPONSES DURING REGULAR AND RECOVERY TRAINING SESSIONS IN COLLEGIATE SOCCER PLAYERS**  
S. Henry, S.J. Rossi, M. Eisenman, P. Chrysosferidis, and G.A. Ryan. Human Performance Lab, Georgia Southern University, Statesboro, GA
- P227**      **COMPARISON OF TRAINING PERFORMANCE, RECOVERY, AND PERCEIVED EXERTION AGAINST PLAYING STATUS IN COLLEGIATE SOCCER PLAYERS**  
M. Eisenman, S.J. Rossi, P. Chrysosferidis, S. Henry, and G.A. Ryan, Human Performance Lab, Georgia Southern University, Statesboro, GA
- P228**      **POSITIONAL DIFFERENCES IN PHYSIOLOGICAL RESPONSE TO TRAINING SESSIONS IN COLLEGIATE BASKETBALL PLAYERS**  
K. Adams, P. Chrysosferidis, J. S. Cook, S. J. Rossi, M. Eisenman, & G.A. Ryan Human Performance Lab, Georgia Southern University, Statesboro, GA 30458
- P229**      **USING VERT© TO PREDICT GAME PERFORMANCE IN DIVISION I VOLLEYBALL PLAYERS**  
P. Chrysosferidis, E.H. Belson, E. Newby, B.A. Munkasy, B.J. Szekely, G.A. Ryan Human Performance Lab, Georgia Southern University, Statesboro, GA
- P230**      **RELATIONSHIP BETWEEN MECHANICAL AND PHYSIOLOGICAL LOADS ON STRENGTH GAINS IN COLLEGIATE BASKETBALL PLAYERS**  
J. S. Cook, P. Chrysosferidis, K. M. Adams, C. M. Dukquits, & G. A. Ryan Human Performance Lab, Georgia Southern University, Statesboro, GA
- P231**      **WEEKLY CHANGES IN PERFORMANCE, PERCEIVED EXERTION AND RECOVERY IN COLLEGIATE SOCCER PLAYERS**  
S.J. Rossi, M. Eisenman, P. Chrysosferidis, S. Henry, and G.A. Ryan, Human Performance Lab, Georgia Southern University, Statesboro, GA
- P232**      **CHANGES IN BAT ANGLE AT MAXIMAL VELOCITY IN COLLEGIATE SOFTBALL PLAYERS**  
LA. Luginstand<sup>1</sup>, CC. Williams<sup>1</sup>, JR. Gdovin<sup>2,2</sup>, SJ. Wilson<sup>1</sup>, PT. Donahue<sup>1</sup>, CM. Hill<sup>1</sup>, JD. Eason<sup>1</sup>, AL. Yarbrough<sup>1</sup>, C. Wade<sup>3</sup> and JC. Garner<sup>4</sup>; <sup>1</sup>Dept. of Health, Exercise Science and Recreation Management, University of Mississippi, University, MS; <sup>2</sup>Dept. of Kinesiology, Missouri State University, Springfield, MO; <sup>3</sup>Dept. of Industrial & Systems Engineering, Auburn University, Auburn, AL; <sup>4</sup>Dept. of Kinesiology & Health Promotion, Troy University, Troy AL
- P233**      **QUANTIFYING PERFORMANCE CHARACTERISTICS OF AN INTERNATIONAL LEVEL MALE WEIGHTLIFTER**  
S.K. Travis, J.R. Goodin, K.M. Carroll, C.D. Bazylar  
East Tennessee State University, Department of Exercise and Sport Science, Johnson City, TN.
- P234**      **CARDIAC-AUTONOMIC RESPONSES TO IN-SEASON TRAINING AMONG COLLEGE FOOTBALL PLAYERS**  
AA. Flatt,<sup>1,2</sup> and MR. Esco FACSM<sup>2</sup>. <sup>1</sup>Department of Health Sciences and Kinesiology, Georgia Southern University, Savannah, GA; <sup>2</sup>Department of Kinesiology, University of Alabama, Tuscaloosa, AL
- P235**      **POSITIONAL DIFFERENCES IN PEAK POWER DURING COUNTERMOVEMENT VERTICAL JUMP IN PROFESSIONAL BASEBALL PITCHERS**  
Donahue PT<sup>1</sup>, Wilson SJ<sup>1</sup>, Williams CC<sup>1</sup>, Hill CM<sup>1</sup>, Luginstand LA<sup>1</sup>, Garner JC<sup>2</sup>. <sup>1</sup>Department of Health, Exercise Science, and Recreation Management, University of Mississippi, University,

MS; <sup>2</sup>Department of Health and Kinesiology. Troy University, Troy, Alabama

- P236 RELATIONSHIP BETWEEN THE ECCENTRIC UTILIZATION RATIO AND 20-METER SPRINT TIMES IN DIVISION I MEN'S SOCCER PLAYERS**  
K. D. Lewis and C.R. Bellon; Department of Exercise Science, LaGrange College, LaGrange, GA
- P237 RELATIONSHIP BETWEEN MAXIMAL ISOMETRIC STRENGTH AND 20-METER SPRINT TIMES IN DIVISION I MEN'S SOCCER PLAYERS**  
K. N. Jacobsen and C.R. Bellon. Department of Exercise Science, LaGrange College, LaGrange, GA
- P239 RELATIONSHIPS BETWEEN JUMPING AND BASEBALL PERFORMANCE**  
S.C. Rogers, T.C. McInnis, and C.A. Bailey. Sport Performance Enhancement, Education & Development (SPEED) Center, Department of Exercise Science, LaGrange College, LaGrange, GA
- P240 FORCE PRODUCTION ASYMMETRY AND JUMPING PERFORMANCE IN BASEBALL PLAYERS**  
C.E. Joyner and C.A. Bailey. Sport Performance Enhancement, Education & Development (SPEED) Center, Department of Exercise Science, LaGrange College, LaGrange, GA 30240
- P241 THE EFFECTIVENESS OF A COLLEGIATE STRENGTH AND CONDITIONING PROGRAM FOR DIVISION III COLLEGIATE BASEBALL PLAYERS**  
A. Wright, C.A. Bailey and T.C. McInnis. Sport Performance Enhancement, Education & Development (SPEED) Center, Department of Exercise Science, LaGrange College, LaGrange, GA
- P242 THE EFFECTS OF SLEEP TIME ON ULTRA-ENDURANCE TRIATHLON PERFORMANCE**  
J.N. Kisiolk, K.A. Smith, D.A. Baur, B.D. Willingham, M. C. Morrissey, S. M. Leyh, P.G. Saracino, and M.J. Ormsbee, FACSM, Institute of Sports Sciences and Medicine, Department of Nutrition, Food and Exercise Sciences, Florida State University, Tallahassee, FL
- P243 DAILY HRV MONITORING DURING RESISTANCE TRAINING PROGRAM IN A COLLEGIATE ATHLETE**  
Clifton J. Holmes and Michael R. Esco. Dept. of Kinesiology, The University of Alabama, Tuscaloosa, AL
- P245 MOTIVATION OF RURAL PARENTS FOR YOUTH RECREATIONAL SPORTS PROGRAMS**  
M. Lewis, L. Kiskunes, B. F. Melton, H.W. Lee, C. Gipson, and G.A. Ryan. Georgia Southern University, Statesboro, GA
- P246 RELATIONSHIP BETWEEN SUBJECTIVE AND OBJECTIVE MEASURES OF EXERTION IN DIVISION I BASKETBALL PLAYERS**  
J. Brown, P. Chrysosferidis, M.L. Eisenman, S.J. Rossi, & G.A. Ryan. Human Performance Lab, Georgia Southern University, Statesboro, GA
- P247 WEEKLY CHANGES IN PERFORMANCE, PERCEIVED EXERTION AND RECOVERY IN FEMALE COLLEGIATE SOCCER PLAYERS**  
M. Hinson, S.J. Rossi, M. Eisenman, P. Chrysosferidis, G. Barker, and G.A. Ryan Human Performance Lab, Georgia Southern University, Statesboro, GA
- P248 COMPARING UPPERCLASSMEN AND UNDERCLASSMEN MALE COLLEGIATE TENNIS PLAYERS**  
B. Loewen, P. Chrysosferidis, E. Langford, L. Stroud, R. Snarr, M.L. Eisenman, & G.A. Ryan Human Performance Lab, Georgia Southern University, Statesboro, GA
- P249 ATHLETIC PROFILE DIFFERENCES BETWEEN FRONT COURT AND BACK COURT DIVISION I FEMALE BASKETBALL PLAYERS**  
S. Dhaliwal, P. Chrysosferidis, M.L. Eisenman, R. Snarr, & G.A. Ryan, Human Performance Lab, Georgia Southern University, Statesboro, GA

- P250 VARIATIONS IN ATHLETIC PROFILES BETWEEN DIVISION I COMPETITION AND AMATEUR CHEERLEADERS**  
J. Dhaliwal, P. Chrysoferidis, S.V. Wilhoite, B.J. Szekely, B.A. Munkasy, A. Johnson, G.A. Ryan, Human Performance Lab, Georgia Southern University, Statesboro, GA
- P251 COMPARING KINETIC AND KINEMATIC PERFORMANCE BETWEEN CONTRIBUTORS AND NONCONTRIBUTORS IN DIVISION I FEMALE VOLLEYBALL PLAYERS**  
E. Newby, P. Chrysoferidis, E.H. Belson, B. Haupt, B.J. Szekely, B.A. Munkasy, and G.A. Ryan, Human Performance Lab, Georgia Southern University, Statesboro, GA
- P252 VARIATIONS IN HANDGRIP STRENGTH BETWEEN DOMINANT AND NONDOMINANT HANDS IN COLLEGIATE FEMALE ATHLETES**  
S. Schultz, P. Chrysoferidis, S.V. Wilhoite, B.J. Szekely, R. Snarr, E. Langford, & G.A. Ryan, Human Performance Laboratory, Georgia Southern University, Statesboro, GA
- P253 EFFECTS OF COOL-DOWN PROTOCOL UPON EXIT FROM THE FIRST-HALF ON SECOND-HALF PERFORMANCE IN NCAA D-II SOCCER PLAYERS**  
S. Valladao, D. Mendsen, C. Casaru, B. Meador. Exercise Science and Wellness, Georgia Southwestern State University, Americus, GA
- P254 DOES EXERCISE AFFECT EXECUTIVE FUNCTION IMMEDIATELY POST EXERCISE?**  
Nguyen, K, A. Price, T Herter, and R.W. Thompson, Exercise Science, University of South Carolina, Columbia, SC
- P255 DIURNAL REGULATION OF SKELETAL MUSCLE ANABOLIC SIGNALING THROUGH mTORC1**  
Brittany R. Counts, Brandon N. VanderVeen, Justin P. Hardee, Dennis K. Fix and James A. Carson, FACSM. University of South Carolina, Columbia, SC.
- P256 EVALUATING NEAR INFRARED SPECTROSCOPY SIGNALS FROM SKELETAL MUSCLE**  
AA Sanni, KK McCully, FACSM. Department of Kinesiology, University of Georgia, Athens GA
- P258 OSTEOPOROSIS PREVENTION THROUGH STRUCTURED STRENGTH TRAINING**  
David R. Hooper, Ph.D, CSCS, Jacksonville University, Jacksonville, Florida , Kevin R. Coyle, Master Student, Jacksonville University, Jacksonville, Florida
- P259 EFFECTS OF ACUTE SUPINE REST AND HYDRATION STATUS ON MID-THIGH MUSCLE SIZE AND QUALITY AS MEASURED BY ULTRASONOGRAPHY**  
Nicholas W. Shea<sup>1, 2</sup>, Hayden K. Giuliani<sup>1</sup>, Gena R. Gerstner<sup>1</sup>, Jacob A. Mota<sup>1</sup>, Brett S. Pexa<sup>1</sup>, Abbie E Smith-Ryan<sup>1</sup>, and Eric D. Ryan<sup>1</sup>. <sup>1</sup>University of North Carolina-Chapel Hill; <sup>2</sup>Georgia Tech Institute of Technology, Atlanta, GA
- P260 EXAMINING MYOGENESIS IN C2C12 WITH USE OF NOTCH-1 ANTIBODY**  
Charlotte McMullen, B. Thompson, J. Huot, S. Arthur, Laboratory of Systems Physiology, Dept. of Kinesiology, UNC Charlotte, Charlotte, NC
- P261 EFFECTS OF HEEL HEIGHT ON STIFFNESS IN THE GASTRONEMIUS OF YOUNGER WOMEN**  
B Hargett, Z Domire. Dept. of Kinesiology, East Carolina University, Greenville NC
- P262 DIFFERENCES IN THE MITOCHONDRIAL CAPACITY OF THE RIGHT AND LEFT BICEPS BRACHII MUSCLE**  
EK Pryor, AK Luquire, and KK McCully FACSM; Department of Kinesiology University of Georgia, Athens, GA
- P263 CHARACTERIZING THE ENDURANCE OF THE DOMINANT AND NON-DOMINANT BICEPS BRACHII**  
AK. Luquire, EK. Pryor, and KK. McCully FACSM., Department of Kinesiology, University of Georgia. Athens, GA

- P264 EVALUATING A NEW ANALYSIS PROTOCOL FOR MEASURING MUSCLE MITOCHONDRIAL CAPACITY**  
MD Sumner, AA Sanni, RG Lavender, EK Pryor, AK Luquire, and KK McCully FACSM  
Department of Kinesiology University of Georgia, Athens, GA
- 8:00-9:30 THEMATIC POSTERS SESSION IV (Ochs)**  
**TP19-TP24 CELLULAR REGULATORY MECHANISMS**  
**Chair:** Susan Arthur, Ph.D., University of North Carolina - Charlotte
- TP19 ACUTE AND CHRONIC RESISTANCE-TRAINING DOWNREGULATES SELECT LINE-1 RETROTRANSPOSON ACTIVITY MARKERS IN HUMAN SKELETAL MUSCLE**  
Matthew A. Romero, C. Brooks Mobley, Paul A. Roberson, Cody T. Haun, Wesley C. Kephart, Petey W. Mumford, James C. Healy, Darren T. Beck, Kaellin C. Young, Jeffrey S. Martin, Christopher M. Lockwood, Michael D. Roberts. Auburn University, Auburn, AL; Edward Via College of Osteopathic Medicine – Auburn Campus, Auburn, AL; Lockwood Nutrition, Draper, UT
- TP20 ELEVATING PROTEIN SYNTHESIS: TURN IT DOWN A NOTCH**  
J.R. Huot & S.T. Arthur University of North Carolina at Charlotte, Charlotte, NC
- TP21 BIOMARKERS OF GROWTH ARE MINIMALLY INFLUENCED BY TWO VARYING BOUTS OF HIGH-INTENSITY TRAINING PROGRAMMING**  
B.M. Kliszczewicz<sup>1</sup>, C.D. Markert<sup>2</sup>, E.E. Bechke<sup>1</sup>, C. Williamson<sup>1</sup>, M. McKenzie<sup>2</sup>, K.N. Clemons<sup>2</sup>. <sup>1</sup>Dept. of Exercise Science & Sport Management, Kennesaw State University, Kennesaw, GA; <sup>2</sup>Dept. of Exercise Physiology, Winston-Salem State University, Winston-Salem, NC.
- TP22 ASSOCIATION BETWEEN MITOCHONDRIAL DNA SEQUENCE AND DNA DAMAGE WITH THE RESPONSE TO ENDURANCE TRAINING IN MICE**  
Heather L. Vellers<sup>1</sup>, J. Timothy Lightfoot(FACSM)<sup>2</sup>, and Michael P. Massett<sup>2</sup>, Steven R. Kleeberger<sup>1</sup>. <sup>1</sup>National Institute of Environmental Health Sciences, Research Triangle Park, NC; <sup>2</sup>Texas A&M University, Department of Health and Kinesiology, College Station, TX
- TP23 BIOMARKERS ASSOCIATED WITH TYPE II MUSCLE FIBER HYPERTROPHY FOLLOWING 12 WEEKS OF RESISTANCE TRAINING IN YOUNG, UNTRAINED MALES**  
C. Brooks Mobley<sup>1</sup>, Cody T. Haun<sup>1</sup>, Paul A. Roberson<sup>1</sup>, Petey W. Mumford<sup>1</sup>, Wesley C. Kephart<sup>1</sup>, Matthew A. Romero<sup>1</sup>, Shelby C. Osburn<sup>1</sup>, Christopher G. Vann<sup>1</sup>, Christopher M. Lockwood<sup>2</sup>, Michael D. Roberts<sup>1</sup>. <sup>1</sup>School of Kinesiology, Auburn University, Auburn, AL; <sup>2</sup>Lockwood LLC, Draper, UT,.
- TP24 EFFECT OF SATURATED FATTY ACID ON MARKERS OF BCAA-MEDIATED MITOCHONDRIAL BIOGENESIS AND BCAA CATABOLISM IN VITRO**  
Michele A. Johnson<sup>1</sup>, Nicholas P. Gannon<sup>2</sup>, Jamie K. Schnuck<sup>2</sup>, Roger A. Vaughan<sup>1\*</sup>; <sup>1</sup>Department of Exercise Science, High Point University, High Point NC; <sup>2</sup>School of Medicine, Medical College of Wisconsin, Milwaukee WI
- 8:00-10:00 ORAL FREE COMMUNICATION IV (Kelley)**  
**024-031 NUTRITION AND EXERCISE/SPORTS**  
**Chair:** Takudzwa Madzima, Ph.D., Elon University
- 024 BRANCHED-CHAIN AMINO ACID SUPPLEMENTATION MAY PRODUCE MARGINAL REDUCTIONS IN TASK-SPECIFIC MUSCULAR SORENESS IN COLLEGIATE DISTANCE RUNNERS**  
Tara Whiton, Kimitake Sato, Asher Flynn, Caleb Bazylar, Michael H. Stone, Brad DeWeese, East Tennessee State University, Johnson City, TN
- 025 Energy Assessment in Endurance-Trained Male Athletes**  
E.M. Moore<sup>1</sup>, T.M. Torres-McGehee<sup>1</sup>, D.F. Stodden<sup>1</sup>, J.M. Goins<sup>1</sup>, C. Drenowatz<sup>2</sup>, B.T. Williams<sup>1</sup>, T.C. Broderick<sup>1</sup>. <sup>1</sup>University of South Carolina, Columbia, SC; <sup>2</sup>Pädagogische



- 026 EFFECTS OF GINGER ROOT ON SORENESS AND MUSCLE DYSFUNCTION STEMMING FROM A 40-MINUTE DOWNHILL RUN**  
P.B. Wilson, Dept. of Human Movement Sciences, Old Dominion University, Norfolk, VA
- 027 EXAMINATION OF PATHOGENIC BEHAVIORS AND EATING DISORDER RISK AMONG COLLEGIATE FEMALE TRACK & FIELD ATHLETES**  
A. Smith, T.M. Torres-McGehee, E. Monsma, S. Weber University of South Carolina, Columbia, SC
- 028 EXAMINATION OF BODY IMAGE DISSATISFACTION AMONG COLLEGIATE FEMALE TRACK & FIELD ATHLETES**  
Sam Weber, Toni Torres-McGehee, Eva Monsma, Ally Smith, University of South Carolina, Columbia, SC
- 029 EFFECTS OF NATURAL VS MANUFACTURED RECOVERY SNACKS ON REPEATED EXHAUSTIVE EXERCISE PERFORMANCE**  
M DeBardelaben, J Bossi, Department of Kinesiology, Anderson University, Anderson, SC
- 030 THE EFFECTS OF COFFEE INGESTION ON THE ACUTE TESTOSTERONE RESPONSE TO EXERCISE**  
Taylor Landry<sup>1</sup>, Jeremy D Akers<sup>2</sup>, Michael J Saunders FACSM<sup>1</sup>, and Christopher J Womack FACSM<sup>1</sup>. <sup>1</sup>Human Performance Laboratory-Department of Kinesiology; <sup>2</sup>Department of Health Sciences, James Madison University, Harrisonburg VA
- 031 EXERCISE PERFORMANCE AND PERCEPTION OF BREATHLESSNESS AFTER CAFFEINE INGESTION IN CYCLISTS**  
E.M. Larson, J.T. Oliver, J.L. Stickford, K.S. Fasczewski, and R.A. Shanely. Department of Health & Exercise Science, Appalachian State University, Boone, NC
- 9:00-9:50 S11 SYMPOSIUM SESSION XI (Roberts)**  
**THE UTILITY OF HEART RATE VARIABILITY MONITORING IN ATHLETIC SETTINGS: FROM THE LABORATORY TO THE FIELD**  
Michael R Esco, Ward Dobbs, Clifton Holmes, The University of Alabama, Tuscaloosa, AL  
**Chair:** Richard Storie, Ph.D., Cumberland University
- 8:00-8:50 T13 TUTORIAL SESSION XIII (Walker)**  
**TRACKING ATHLETE TRAINING LOAD: IT TAKES A VILLAGE TO MONITOR A TEAM**  
Greg A. Ryan & Stephen J. Rossi, Georgia Southern University, Statesboro, GA  
**Chair:** Martin Carmichael, Ph.D., Lander University
- 8:00-8:50 T14 TUTORIAL SESSION XIV (Rose)**  
**HELLO PROFESSORS: ENGAGING STUDENTS AND TEACHING THROUGH THE GAPS OF KNOWLEDGE**  
Patrice Elder, Tamerah N. Hunt, FACSM, Oak Hill High, Nashville, TN; Georgia Southern University, Statesboro, GA  
**Chair:** Rebecca Battista, Ph.D., Appalachian State University
- 9:00-9:50 T15 TUTORIAL SESSION XV (Walker)**  
**ANIMAL RESEARCH AND TRAINING FOR EXERCISE SCIENCE PROFESSIONS!**  
John C. Quindry, Christopher G. Ballmann, University of Montana, University of Montana, Missoula, MT  
**Chair:** Ray Thompson, Ph.D., University of South Carolina
- 9:00-9:50 T16 TUTORIAL SESSION XVI (Rose)**  
**SOCIOECONOMIC STATUS, CONCUSSION AND ADOLESCENTS: HOW TO WORK WITH A GROWING POPULATION**

Tamerah Hunt, Georgia Southern University, School of Health and Kinesiology, Georgia Southern University, Statesboro, GA

**Chair:** Kelley Strohacker, Ph.D., University of Tennessee – Knoxville

**9:30-11:00 POSTER FREE COMMUNICATIONS V (Ballroom Foyer)**  
**P265-P336 CARDIOVASCULAR PHYSIOLOGY CELLULAR REGULATORY MECHANISMS**  
**CHRONIC DISEASE AND DISABILITY ENVIRONMENTAL PHYSIOLOGY**  
**EXERCISE EVALUATION/CLINICAL HEMATOLOGY/IMMUNOLOGY**  
**METABOLISM/CARBOHYDRATE, LIPID, PROTEIN**

**Chair:** Hyun-Seok Hwang, Ph.D., Florida State University

**P265 PRELIMINARY RESULTS OF VASCULAR FUNCTION AND AEROBIC CAPACITY PROFILE OF BREAST CANCER SURVIVORS WHO ARE WITHIN ONE YEAR OF COMPLETING PRIMARY THERAPY**

J.T. Lee<sup>1</sup>, C.W. Wagoner<sup>1</sup>, L. Stoner<sup>1</sup>, K.A. Nyrop<sup>2</sup>, H.B. Muss<sup>2</sup>, E.D. Hanson<sup>1</sup>, A. Piepmeier<sup>2</sup>, & C.L. Battaglini<sup>1</sup>, FACSM. <sup>1</sup>Exercise Oncology Research Laboratory, Department of Exercise & Sport Science; <sup>2</sup>Department of Hematology Oncology; <sup>3</sup>Department of Physical Medicine & Rehabilitation, University of North Carolina at Chapel Hill, Chapel Hill, NC

**P266 EXAMINING PERIPHERAL HEMODYNAMICS DURING HANDGRIP EXERCISE IN VARSITY ROWERS**

K. Decker, A. Hogwood, J. Weggen, R. Maniyar, A. Darling, A. Michael and R.S. Garten. Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA

**P267 IMPACT OF AEROBIC CAPACITY ON PROLONGED SITTING-INDUCED VASCULAR DYSFUNCTION**

J. Weggen, A. Hogwood, R. Fralin, K. LaRosa, A. Michael, and R. Garten. Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA

**P268 AGE-RELATED AUTONOMIC REGULATION IN CPVT MICE**

YJ. Koh, Z. Oropallo, and HS. Hwang. Department of Nutrition, Food and Exercise Sciences, Florida State University, Tallahassee, FL

**P269 THE ACCURACY OF MULTIPLE HRV METRICS ACQUIRED FROM MOBILE DEVICES: A SYSTEMATIC REVIEW AND META-ANALYSIS**

Ward C. Dobbs, Michael R. Esco, Michael V. Fedewa, Hayley V. MacDonald, University of Alabama, Tuscaloosa, AL

**P270 EXAMINING THE ROLE OF SYMPATHETIC ACTIVATION DURING A PORLONGED SITTING BOUT**

R.C. Fralin, A.C. Hogwood, J. Weggen, D. Lee, M. Scott, and R.S. Garten. Dept of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA.

**P271 PREVALENCE OF CPR TRAINING AND PUBLIC ACCESS AED AVAILABILITY AT THE UNIVERSITY OF SOUTH CAROLINA AIKEN AND OTHER SOUTHEASTERN U.S. UNIVERSITIES**

C.M. DeWitt, T.E. Stacy, K.M. Smith, A.R. Ravenell, and B.P. Parr. Department of Exercise and Sports Science, The University of South Carolina Aiken, Aiken, SC

**P272 VALIDITY OF LOWER LIMB PULSE-WAVE VELOCITY ASSESSMENTS USING AN OSCILLOMETRIC TECHNIQUE**

Elizabeth Kelsch<sup>1</sup>, Gabriel Zieff<sup>1</sup>, Simon Fryer<sup>2</sup>, Keeron Stone<sup>2</sup>, and Lee Stoner<sup>1</sup>;  
<sup>1</sup>Department of Exercise and Sport Science, University of North Carolina, Chapel Hill;  
<sup>2</sup>School of Sport and Exercise, University of Gloucestershire, Gloucestershire, UK

**P273 THE IMPACT OF PERIPHERAL HEMODYNAMICS ON DERIVED CENTRAL PRESSURE WAVEFORMS**

Gabriel Zieff, Simon Fryer, Keeron Stone, James Faulkner, Lee Stoner, UNC Chapel Hill, NC; University of Gloucestershire; University of Winchester, Department of Exercise and Sport Science, The University of North Carolina, Chapel Hill, NC

- P274**      **OXIDANT-ANTIOXIDANT BALANCE AND PERIPHERAL VASCULAR FUNCTION: THE IMPACT OF CHRONIC ANTIOXIDANT SUPPLEMENTATION**  
A. C. Hogwood, J. Weggen, C. Fralin, D. Lee, M. Scott, and R. S. Garten. Dept of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P275**      **ARTERIAL STIFFNESS AND MITOCHONDRIAL OXIDATIVE CAPACITY IN OBESE AFRICAN AMERICANS**  
JE McGee<sup>1</sup>, TE Ryan<sup>2</sup>, GS Dubis<sup>1</sup>, SG Barefoot<sup>1</sup>, PM Brophy<sup>1</sup>, DL Swift<sup>1</sup>. <sup>1</sup>Dept. of Kinesiology, <sup>2</sup>Dept. of Physiology, East Carolina University, Greenville, NC
- P276**      **THE EFFECT OF SEDENTARY BEHAVIOR ON ARTERIAL STIFFNESS IN OBESE AFRICAN AMERICANS**  
Barefoot, Savanna G.; McGee, Joshua E.; Brophy, Patricia M.; Swift, Damon L. Department of Kinesiology. East Carolina University, Greenville, NC
- P277**      **THE IMPACT OF SLEEP QUALITY ON PERIPHERAL VASCULAR FUNCTION IN YOUNG ADULTS**  
M.C. Scott, A. Hogwood, R. Fralin, D. Lee, J. Weggen, T.M. Zúñiga, and R.S. Garten. Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P278**      **EFFECT OF MODERATE-TO-HIGH INTENSITY PHYSICAL ACTIVITY ON ARTERIAL STIFFNESS IN OBESE CHILDREN**  
A.T. Lassiter, G.M. Thompson, K.T. Williford, N.D. Tocci, H. Kim, M. Meucci Department of Health and Exercise Science, Appalachian State University, Boone, NC
- P279**      **COMPREHENSIVE ANALYSIS ON THE VALIDITY OF ULTRA-SHORTEN HRV PARAMETERS**  
Yuan Liu, Bjoern Hornikel, Micheal R. Esco, Department of Kinesiology, The University of Alabama, Tuscaloosa, AL
- P281**      **INTER-DAY RELIABILITY OF ULTRA-SHORTENED HEART RATE VARIABILITY PARAMETERS**  
Bjoern Hornikel, Yuan Liu, Michael R. Esco, Dept. of Kinesiology, The University of Alabama, Tuscaloosa, Alabama
- P282**      **TIME COURSE OF ENOS EXPRESSION AND ENDOTHELIAL FUNCTION IN RAT AORTAS FOLLOWING ACUTE EXERCISE**  
M.C. Bucknor, Y. Guan, T.H. Embry, and M.B. Harris. Dept. of Kinesiology & Health Sciences, William & Mary, Williamsburg, VA
- P283**      **INCREASED LAMINAR SHEAR STRESS REDUCES INFLAMMATION-INDUCED ENDOTHELIAL MICROPARTICLE APOPTOSIS IN HUVECS**  
Adelola O. Adeyemo<sup>1,2</sup>, Chenyi Ling<sup>2</sup>, Heather Grimm<sup>2</sup>, Michael Brown<sup>1,2</sup>. <sup>1</sup>Auburn University, School of Kinesiology, Auburn, AL; <sup>2</sup>University of Illinois at Chicago, Department of Kinesiology & Nutrition, Vascular Health Laboratory, Chicago, IL
- P284**      **EFFECTS OF PHYSICAL ACTIVITY ON SYMPATHETIC, CARDIOVASCULAR, AND PERCEPTUAL RESPONSES TO A PAINFUL STIMULUS**  
Danna V. Rodriguez Escobar, Taylor R. Goodman, Emma K. Taylor, Abigail S.L Stickford. Appalachian State University, Department of Health and Exercise Science, Boone, NC
- P285**      **INVESTIGATION OF SEX DIFFERENCES BETWEEN NOKIA BODY CARDIO AND SPHYGMACOR APPLANATION TONOMETRY**  
M. Company, A. Lubkemann, C. McCraw, P. St.Clair, SR Collier (FACSM). Vascular Biology

and Autonomic Studies Laboratory, Appalachian State University, Boone, NC.

- P286**      **VALIDITY OF NOKIA PULSE WAVE VELOCITY SCALE VERSUS GOLD STANDARD APPLANATION TONOMETRY IN A YOUNG HEALTHY POPULATION**  
A. Lubkemann, M. Company, C. McCraw, P. St. Clair, SR Collier (FACSM). Health and Exercise Science, Vascular Biology and Autonomic Studies Lab, Appalachian State University, Boone, NC.
- P287**      **COMPARISON OF HEART RATE AND BLOOD PRESSURE RESPONSES TO DIFFERENT TASKS**  
Patricia Nixon, Ph.D, Wake Forest University, Winston-Salem, North Carolina, Eleanor McDonald, Wake Forest University, Winston-Salem, North Carolina
- P288**      **THE EFFECTS OF ISOMETRIC EXERCISE ON IMMEDIATE POST-ISOMETRIC EXERCISE GLUCOSE TOLERANCE**  
Spencer A. Green, Benjamin D. Gordon, David E. Verrill Joseph S. Marino, Reuben Howden. Dept. Of Kinesiology, UNC Charlotte, Charlotte NC
- P289**      **AEROBIC TRAINING STATUS AND FATTY ACID-INDUCED HERT MRNA EXPRESSION FOLLOWING MAXIMAL EXERCISE**  
Zúñiga T.M., Slusher A.L., Acevedo E.O., FACSM. Dept. of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P290**      **EXERCISE AT SIMULATED ALTITUDE ALTERS PROTEIN EXPRESSION IN PERIPHERAL BLOOD MONONUCLEAR CELLS**  
Zach Schall, Claire Lauterbach, Ally Hamilton, Harrison Strag, Matthew Kuennen. Department of Exercise Science, High Point University, High Point NC
- P291**      **THE EFFECTS OF HIGH-INTENSITY INTERVAL TRAINING AND MODERATE INTENSITY TRAINING FOR IMPROVING CARDIOMETABOLIC HEALTH IN INDIVIDUALS WITH SPINAL CORD INJURY**  
Christian, E. Behrens<sup>1</sup>, Kyle G. Graham<sup>2</sup>, Ceren Yarar-Fisher<sup>3</sup>, Kevin K. McCully<sup>4</sup>, C. Scott Bickel<sup>5</sup>, and Gordon Fisher<sup>1, 2</sup>. <sup>1</sup>Department of Nutrition Science; <sup>2</sup>Human Studies; <sup>3</sup>Physical Medicine and Rehabilitation Sciences, University of Alabama at Birmingham; <sup>4</sup>Department of Kinesiology, University of Georgia; <sup>5</sup>Department of Physical Therapy, Samford University.
- P292**      **RATING OF PERCEIVED EXERTION IN POWER WHEELCHAIR SOCCER ATHLETES.**  
L.J. Newsome, J.R. Flanagan, and J.P. Barfield. Dept. of Health and Human Performance, Radford University, Radford, VA
- P293**      **PHYSICAL ACTIVITY PREDICTS STRENGTH AND FUNCTION IN WOMEN UNDERGOING BREAST CANCER TREATMENT**  
L. Hanson, J. Fanning, J. Boog, E. Levine, M. Howard-McNatt, S. Mihalko, Wake Forest University and Wake Forest School of Medicine, Winston-Salem, NC
- P294**      **HEMODYNAMIC RESPONSES TO A MAXIMAL EXERCISE TEST IN PARKINSON'S DISEASE PATIENTS**  
K. Roberson, N. Ruta, K. Jacobs, J. Signorile. Department of Kinesiology and Sport Sciences, University of Miami, Coral Gables, FL
- P295**      **EFFECTS OF WHOLE-BODY VIBRATION TRAINING ON STRENGTH, BODY COMPOSITION, AND FUNCTION IN SKILLED NURSING HOME RESIDENTS**  
B.F. Grubbs<sup>1</sup>, A. Figueroa<sup>2</sup>, J-S. Kim<sup>3</sup>, K. Schmitt<sup>3</sup>, L.B. Panton<sup>3</sup>. <sup>1</sup>Middle Tennessee State Univ, TN; <sup>2</sup>Texas Tech Univ, TX; <sup>3</sup>Florida State Univ, FL
- P296**      **BODYWEIGHT CIRCUIT EXERCISE TRAINING IN ADULTS WITH TYPE 2 DIABETES MELLITUS – THREE CASE STUDIES**  
R. Buresh, B. Kliszczewicz, J. Knaga, J. Boone, C. Williamson, and Emily Bechke.

- P297 UNDERSTANDING ARTHRALGIA IN BREAST CANCER SURVIVORS**  
J.A. Boog, L. Hanson, M.M. Howard-McNatt, E. Levine, S.L. Mihalko; Wake Forest University and Wake Forest School of Medicine, Winston-Salem, NC
- P298 INFLAMMATORY MARKERS IN AFRICAN AMERICANS FOLLOWING AN ACUTE BOUT OF EXERCISE: A PILOT STUDY**  
Michael S. Jarrett, Monica Hubal, Vincent Henrich, Laurie Wideman, University of North Carolina at Greensboro, Greensboro, NC, George Washington University, Washington, DC
- P299 NITRATE CONSUMPTION AND PHYSICAL FUNCTION IN ICU PATIENTS**  
T.M. Heinrich, D.C. Files, R.N. Bakhru, K.L. Shields, M.J. Berry. Health and Exercise Science, Wake Forest University, Winston-Salem, NC
- P300 IS ABILITY TO REACH A HIGH KNEE EXTENSOR VELOCITY A MARKER OF PHYSICAL FUNCTION IN OBESE OLDER ADULTS?**  
Powers SA, Chmelo E, Delbono O, Nicklas BJ, Marsh AP, Wake Forest University, Winston-Salem, NC
- P301 EFFECTS OF PANCREATIC CANCER ON SKELETAL MUSCLE**  
B.Wilson, J. Huot, B. Thompson, S. Wu, P. Mukherjee, and S. Arthur, University of North Carolina at Charlotte, Charlotte, NC
- P302 EASY BREATHER EXERCISE TABLE: A FEASIBILITY EVALUATION OF A MEDICAL DEVICE TO FACILITATE GRAVITY POWERED VENTILATION**  
D.J. Giordano, J.G. Kerr, R.W. Boyce, J.J. Reel, L.K. Sprod, S.M. Sinclair, S.L. Knight, and S.N. Spencer. College of Health and Human Services, University of North Carolina Wilmington, Wilmington, NC
- P303 CANCER CACHEXIA ASSOCIATED MUSCLE WEAKENESS: A ROLE FOR FIBROSIS**  
Jonathan L. Blalock<sup>1</sup>, Brandon N. VanderVeen<sup>1</sup>, Dennis K. Fix<sup>1</sup>, and James A. Carson, FACSM<sup>1, 2</sup> <sup>1</sup>Integrative Muscle Biology Laboratory, University of South Carolina, Columbia, SC; <sup>2</sup>Center for Colon Cancer Research, University of South Carolina, Columbia, SC
- P304 FITNESS LEVEL DOES NOT IMPACT CARDIOVASCULAR DRIFT AND DECREASED MAXIMAL OXYGEN UPTAKE DURING HEAT STRESS**  
T.M. Stone, J.E. Wingo, FACSM, Department of Kinesiology, University of Alabama, Tuscaloosa, AL
- P305 Effect of a Simulated Tactical Occupation Stressor on Reaction Time**  
Andrew J. Hussey<sup>1</sup>, Cody E. Morris<sup>1</sup>, Lee J. Winchester<sup>1</sup>, Ariel S. Tomes<sup>1</sup>, Wesley A. Neal<sup>1</sup>, Damon M. Wilcoxon<sup>1</sup>, MiRanda N. Anderson<sup>1</sup>, William J. Bradshaw<sup>1</sup>, Dana N. Lucas<sup>1</sup>, Harish Chander<sup>2</sup>, and Scott W. Arnett<sup>1</sup>. <sup>1</sup>School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY; <sup>2</sup>Neuromechanics Laboratory, Department of Kinesiology, Mississippi State University, Mississippi State, MS
- P306 EFFECT OF A SIMULATED TACTICAL OCCUPATION STRESSOR ON PHYSIOLOGICAL STRAIN INDEX AND BLOOD PRESSURE**  
Damon M. Wilcoxon<sup>1</sup>, Cody E. Morris<sup>1</sup>, Lee J. Winchester<sup>1</sup>, Andrew J. Hussey<sup>1</sup>, Ariel S. Tomes<sup>1</sup>, Wesley A. Neal<sup>1</sup>, MiRanda N. Anderson<sup>1</sup>, William J. Bradshaw<sup>1</sup>, Dana N. Lucas<sup>1</sup>, Harish Chander<sup>2</sup>, and Scott W. Arnett<sup>1</sup>. <sup>1</sup>School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY; <sup>2</sup>Neuromechanics Laboratory, Department of Kinesiology, Mississippi State University, Mississippi State, MS
- P307 Effect of a Simulated Tactical Occupation Stressor on Perceived Exertion and Blood Lactate**  
Wesley A. Neal<sup>1</sup>, Cody E. Morris<sup>1</sup>, Lee J. Winchester<sup>1</sup>, Andrew J. Hussey<sup>1</sup>, Ariel S. Tomes<sup>1</sup>,

Damon M. Wilcoxon<sup>1</sup>, MiRanda N. Anderson<sup>1</sup>, William J. Bradshaw<sup>1</sup>, Dana N. Lucas<sup>1</sup>, Harish Chander<sup>2</sup>, and Scott W. Arnett<sup>1</sup>. <sup>1</sup>School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY; <sup>2</sup>Neuromechanics Laboratory, Department of Kinesiology, Mississippi State University, Mississippi State, MS

- P308 EFFECT OF A SIMULATED TACTICAL OCCUPATION STRESSOR ON IMMUNE SYSTEM MARKERS OF PHYSIOLOGICAL STRESS AND INFLAMMATION**  
Ariel S. Tomes<sup>1</sup>, Cody E. Morris<sup>1</sup>, Lee J. Winchester<sup>1</sup>, Andrew J. Hussey<sup>1</sup>, Wesley A. Neal<sup>1</sup>, Damon M. Wilcoxon<sup>1</sup>, MiRanda N. Anderson<sup>1</sup>, William J. Bradshaw<sup>1</sup>, Dana N. Lucas<sup>1</sup>, Harish Chander<sup>2</sup>, and Scott W. Arnett<sup>1</sup>. <sup>1</sup>School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY; <sup>2</sup>Neuromechanics Laboratory, Dept. of Kinesiology, Mississippi State University, Mississippi State, MS
- P309 RELATIONSHIP BETWEEN PHYSIOLOGICAL AND PERCEPTUAL HEAT STRAIN DURING SIMULATED INDUSTRIAL TASKS IN A HOT AND HUMID ENVIRONMENT**  
C. Kirkendoll and B. Sirikul, Dept. of Kinesiology & Health Studies, Southeastern Louisiana University, Hammond, LA
- P310 BOUT VS. NON-BOUT PHYSICAL ACTIVITY MINUTES ON METABOLIC SYNDROME RISK FACTORS IN COLLEGE STUDENTS**  
Trent A. Hargens FACSM<sup>1</sup>, Valerie C. Olijar<sup>1</sup>, Matthew C. Scott<sup>1,3</sup>, Elizabeth S. Edwards<sup>1,2</sup>. <sup>1</sup>Department of Kinesiology; <sup>2</sup>Morrison Bruce Center, James Madison University, Harrisonburg, VA; <sup>3</sup>Department of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P311 SERUM PROTEIN S100B: A MARKER OF EXERCISE, NOT BRAIN INJURY**  
Matthew J. Rogatzki, Sydney A. Keuler, Abigail E. Harris. Dept. of Health and Human Performance, University of Wisconsin-Platteville, Platteville; WI,
- P312 ASSOCIATION BETWEEN STEP COUNTS AND BLOOD LIPIDS AMONG PEOPLE LIVING WITH HIV/AIDS**  
J.R. Jagers<sup>1</sup>, & G.A. Hand, FACSM<sup>2</sup>. <sup>1</sup>University of Louisville, Louisville, KY; <sup>2</sup>West Virginia University, Morgantown, WV.
- P313 OPTIMAL LOAD FOR HIGH-SPEED EXERCISE.**  
L Bai, EA Selimovic, R Mueller, S Beatty, KA Carter, TB Symons, G Pantalos, JF Caruso. The University of Louisville, Louisville KY.
- P314 VALIDATION OF A STAIR CLIMB TEST FOR CLINICAL USE**  
Greg Wimer, Anthony Parish, Delia Istrate, Sharlene Johnson, David Paek, Ben Wilkening, Kathleen Schaefer, Anne Thompson, Georgia Southern University, Statesboro, Georgia
- P315 EFFECTS OF PROGRESSIVE AEROBIC EXERCISE AND RESISTANCE TRAINING IN OLDER HIV+ ADULTS**  
Madison Heck, Brandon Briggs, Chani Jain, Timothy R. Wamsley, Krisann K. Oursler. Dept. Medicine, Virginia Tech Carilion School of Medicine, Roanoke, VA
- P316 THEORETICAL PREDICTORS OF PHYSICAL ACTIVITY AMONG PEOPLE LIVING WITH HIV/AIDS**  
K.M. King<sup>1</sup>, J.R. Jagers<sup>1</sup>, & G.A. Hand, FACSM<sup>2</sup>. <sup>1</sup>University of Louisville, Louisville, KY. <sup>2</sup>West Virginia University, Morgantown, WV.
- P317 EFFECT OF MODERATE-TO-HIGH INTENSITY PHYSICAL ACTIVITY ON PEAK OXYGEN CONSUMPTION IN CHILDREN**  
K.T. Williford, L.M. White, D.L. Harvey, H.N. Oakley, N.D. Tocci, M. Meucci. Department of Health and Exercise Science, Appalachian State University, Boone, NC
- P318 EFFECT OF MODERATE-TO-HIGH INTENSITY PHYSICAL ACTIVITY ON OXYGEN UPTAKE EFFICIENCY IN OBESE CHILDREN**  
K.T. McShea, H. Kim, J.E. Morgan, T.M. Hill, S.A. Gaynor-Metzinger, M. Meucci. Dpt of

- P319 ANTHROPOMETRIC MEASURES AND PERFORMANCE TESTS IN THE EVALUATION OF PERFORMANCE AND INJURY RISK IN DIVISION I COLLEGIATE ATHLETES**  
A. Carnall<sup>1</sup>, J. Manor<sup>2</sup>, J. Bunn<sup>2</sup>, <sup>1</sup>Sport Performance and Health Consulting Center (SPAHCC), University of Memphis, Memphis, TN; <sup>2</sup>Advanced Interdisciplinary Movement Science (AIMS) Lab, Campbell University, Buies Creek, NC
- P320 THE EFFECTS OF SOCIOECONOMIC STATUS ON HEALTHCARE ACCESS**  
K. Thibault, W. Belt, J. Ash-Shakoor, A. Hinton, A. King, B. Loman, J. Mills, J. Joyner, E. Gibson, C. Munchel, A. Dexter, A. Lavis, T. Palmer, K. Stranburg, S. Gordon, PhD, T. Moore-Harrison, PhD Department of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC
- P321 EFFECT OF CONCURRENT AEROBIC AND RESISTANCE TRAINING ON STRENGTH: HIGH INTENSITY INTERVAL AND RESISTANCE TRAINING**  
Colton Clary, Sidney Roundy, Jayson Gaza, Madeline Zipperer, Melissa Moulton and Peter Magyari. University of North Florida, Department of Clinical and Applied Movement Sciences. Jacksonville FL
- P322 COMPARISON OF GROSS MOTOR FUNCTION AMONG DIFFERENT AGE GROUPS OF THE OLDER ADULT POPULATION RESIDING IN INDEPENDENT LIVING**  
Fang, Q.<sup>1</sup>, Talwar, S. <sup>1</sup>, Swain, J. <sup>1</sup>, Shinn, J. <sup>1</sup>, Lamberth, J. <sup>1</sup>, Liu, K. <sup>2</sup>, Huang, M.<sup>3</sup>, Pan, Z. <sup>1</sup>, <sup>1</sup>Department of Kinesiology, Mississippi State University, MS State, MS; <sup>2</sup>Department of Psychiatry, Yale University School of Medicine, New Haven, CT; <sup>3</sup>Department of Physical Therapy, University of Mississippi Medical Center, Jackson, MS
- P323 DETERMINING INTENSITY CUT-POINTS FOR WRIST-WORN ACTIGRAPH GT9X ACCELEROMETERS DURING TREADMILL WALKING**  
CM Scott, RD Wolf, RK Evans. Department of Kinesiology and Health Sciences, Virginia Commonwealth University, Richmond, VA
- P324 COMPARISON OF SELF-ESTEEM, BODY IMAGE, AND MOTIVES OF PHYSICAL ACTIVITY IN COLLEGE STUDENTS IN GROUP AND SOLO EXERCISE**  
Isabella Axelsson, Dr. Jody Langdon, Georgia Southern University, Statesboro, GA
- P325 MONOCYTE INFLAMMATORY RESPONSE TO ACUTE EXERCISE IN BREAST CANCER SURVIVORS**  
E.D. Hanson, N. Khosravi, V. Farajivafa, W.S. Evans, J.T. Lee, E. Danson, C.W. Wagoner, E.P. Harrell, K.A. Nyrop, H.B. Muss, D.B. Bartlett, C.L. Battaglini, FACSM. Dept of Exercise & Sport Science, Exercise Oncology Research Laboratory, Dept of Hematology Oncology University of North Carolina, Chapel Hill, NC; Dept of Medicine, Duke University, Durham NC
- P326 METABOLIC DIFFERENCES IN AMINO ACID PLASMA CONCENTRATIONS IN HIGH- AND LOW-ACTIVE MICE**  
JZ Granados, AL Letsinger, GAM Ten Have, JD Velasco, VA Garcia, NEP Deutz, and JT Lightfoot (FACSM). Department of Health & Kinesiology, Texas A&M University, College Station, TX
- P327 EFFECTS OF GROUP EXERCISE ON BLOOD PROFILES IN OLDER ADULTS**  
B. Loman, J. Ash-Shakoor, A. Dexter, E. Gibson, A. Hinton, A. King, A. Lavis, C. Munchel, T. Palmer, K. Stranburg, T. Moore-Harrison, PhD Department of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC
- P328 RELIABILITY AND VALIDITY OF NIRS MITOCHONDRIAL CAPACITY PROTOCOL IN SKELETAL MUSCLE**  
A. LaMantia, L.E. Neidert, H.A. Kluess, School of Kinesiology, Auburn University, Auburn, AL

- P329 NO LIPOLYTIC SUPPRESSION WITH PRE-EXERCISE CARBHOYDRATE REGARDLESS OF ITS GLYCEMIC INDEX**  
 Dan Baur<sup>1</sup>, Willingham<sup>2</sup>, BD, Smith<sup>2</sup>, KM, Kisiolek<sup>2</sup>, JN, Morrissey<sup>2</sup>, MC, Ragland<sup>2</sup>, TJ, Saracino<sup>2</sup>, and Ormsbee<sup>2</sup>, MJ; <sup>1</sup>Elon University, Elon, NC and <sup>2</sup>Florida State University, Tallahassee, FL
- P330 TRACKING BLOOD PROFILES FOR REPEAT PARTICIPANTS ACROSS OLDER ADULTS MECKLENBURG COUNTY: A 10-MONTH STUDY**  
 A. Hinton, A. King, J. Ash-Shakoor, W. Belt, A. Dexter, E. Gibson, A. Lavis, B. Loman, C. Munchel, T. Palmer, K. Stranburg, K. Thibault, T. Moore-Harrison, PhD. Dept. of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC
- P331 EFFECTS OF GROUP OR INDIVIDUAL EXERCISE ON TRIGLYCERIDES AND BLOOD GLUCOSE VALUES IN SENIORS**  
 E.Gibson, J, Ash-Shakoor, A. Lavis, C. Munchel, B. Loman, A., Hinton, A. King, A. Dexter, J. Mills, J. Joyner, T. Palmer, K., Stranburg and T. Moore-Harrison PhD, Department of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC
- P332 CHANGES IN BLOOD PH AND AMMONIA FOLLOWING REPEAT SPRINT PERFORMANCE**  
 Gregory R. Davis, Jordan Perett, Danielle Rudesill, David Bellar. University of Louisiana at Lafayette, Lafayette, LA
- P333 DIURNAL METABOLIC FLUX ASSOCIATED WITH WASTING IN FEMALE TUMOR BEARING MICE**  
 Laura Saunders, Brittany R. Counts, Brandon N. VanderVeen, Justin P. Hardee, Dennis K. Fix, Ryan N. Montalvo, and James A. Carson, FACSM. University of South Carolina, Columbia, SC
- P334 EFFECTS OF A KETOGENIC SUPPLEMENT OR A WHEY PROTEIN BREAKFAST MEAL ON METABOLISM, SATIETY AND ENERGY INTAKE**  
 I.L. Smith, E. Bailey, T.Ramos, T.A. Madzima. Dept. of Exercise Science, Dept. of Physician Assistant Studies, Elon University, Elon NC
- P335 CROSS-TOLERANCE: HYPOXIA STRESSES PERIPHERAL BLOOD MONONUCLEAR CELLS (PBMC) MORE THAN HYPERTHERMIA**  
 Claire Lauterbach, Zach Schall, Ally Hamilton, Harrison Strag, Matthew Kuennen. Department of Exercise Science, High Point University, High Point, NC
- P336 ALTITUDE PROMOTES GUT LEAK AND LEUKOCYTE ACTIVATION**  
 Harrison Strag, Zach Schall, Ally Hamilton, Claire Lauterbach, Matthew Kuennen. Department of Exercise Science, High Point University, High Point, NC
- 10:00-10:50 TUTORIAL SESSION XVII (Walker)**  
**T17 LACTATE METABOLISM: HISTORY AND UPDATE**  
 L. Bruce Gladden and Zachary B. Rightmire. School of Kinesiology, Auburn University, Auburn, AL  
**Chair:** Robert Moffatt, Ph.D., Florida State University
- 10:00-10:50 TUTORIAL SESSION XVIII (Rose)**  
**T18 TRAINING SPORTS OFFICIALS: AN EXCITING, YET RELATIVELY NEW OPPORTUNITY IN EXERCISE SCIENCE AND SPORTS PERFORMANCE**  
 A. Bosak. Dept. of Health Professions, Liberty University, Lynchburg, VA  
**Chair:** Cody Morris, Ph.D., Western Kentucky University
- 10:00-10:50 TUTORIAL SESSION XIX (Roberts)**  
**T19 EVALUATING BIOMETRIC WEARABLES: FROM ACADEMICS TO INDUSTRY**



JA Bunn<sup>1</sup> & LC Eschbach<sup>2</sup>; <sup>1</sup> Campbell University, Buies Creek, NC; <sup>2</sup> Valencell Inc., Raleigh, NC

**Chair:** David Rice, Ph.D., Florida Southern College

**11:00-12:00 HENRY J. MONTOYE AWARD LECTURE 2018 (Walker)**

**HEALTH TO HIGHER PERFORMANCE: RESEARCH AT THE INTERSECTION OF NUTRITION & PHYSICAL ACTIVITY**

Janet Walberg Rankin, Ph.D., FACSM, Past President ACSM, Virginia Tech University

**Presiding:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

**Introduction:** John Quindry, Ph.D., SEACSM Past President, University of Montana

**12:00-2:00 SEACSM LUNCHEON AND LECTURE (Chattanooga Ballroom 1,2,3,4)  
(Pre-Register by Feb 5)**

**IT'S NOT ALWAYS SUNNY SIDE UP! LESSONS LEARNED FROM PRESCHOOL PHYSICAL ACTIVITY INTERVENTIONS**

Sofiya Alhassan, Ph.D., Director of the Pediatric Activity Laboratory,  
University of Massachusetts

**Presiding:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

**Introduction:** Michael McKenzie, Ph.D., SEACSM President, Winston-Salem State University

**2:00-4:00 SEACSM EXECUTIVE BOARD MEETING (Kinsey)**

**2/09/18**

**PEELING BACK THE CURTAIN- A PRE-CONFERENCE SYMPOSIUM ON THE FELLOWSHIP APPLICATION FROM A REVIEWER**

M. J. McKenzie, Dept. of Exercise Physiology, Winston Salem State University, Winston-Salem, NC.

Applying for fellowship through ACSM is a source of worry and trepidation for many applicants. Much of this is due to the perceived vagueness of the application itself. This symposium will discuss the basics of the application itself, the various pathways one can apply towards, as well as the parts of the application that are viewed and heavily weighted. The heavily weighted areas will be discussed in great detail, and hints will be given as it pertains to those parts. The session will end with a Q & A period so that all participants will have a chance to have their concerns heard. The presenter of this symposium is currently a member of the ACSM Credentials Committee. This committee reviews all fellowship applications, so the hope is that potential applicants will get tips to strengthen their application from someone with firsthand experience of the Fellowship review process.

**PC1**

**C3**

**RAPID RESEARCH RACE: PRECONFERENCE**

B. Sue Graves<sup>1</sup>, Samuel Buckner<sup>2</sup>, and Ashlyn Schwartz<sup>3</sup>; <sup>1</sup>Florida Atlantic University, Boca Raton, Florida; <sup>2</sup>University of Mississippi, Oxford, Mississippi; <sup>3</sup>University of Tennessee, Nashville, Tennessee

Come join us for a different 3 Rs! The fun Rapid Research Race (RRR) is returning after initial success in 2017. The RRR is a wonderful way to learn about the research diversity within SEACSM. This session will give the attendee the opportunity to hear researchers, PhD students and faculty, from all over the Southeast Region present a variety of quality research. Each of the ten speakers will present their original research in two minutes. Each will have a one-minute question and answer session, following their presentation with one minute for questions. Come and network with the following researchers:

1. Dr. Timothy Lightfoot, Texas A & M
2. Jacob Mota, Ph.D. student, University of North Carolina—Chapel Hill
3. Dr. David Hooper, Jacksonville University
4. Tori Stone, Ph.D. student, University of Alabama
5. Dr. Rebecca Battista, Appalachian State University
6. Dr. Allan Goldfarb, University of NC—Greensboro
7. Dr. Andy Bosak, Liberty University
8. Katie Hirsch, Ph.D. student, University of North Carolina—Chapel Hill
9. Dr. Keith Brazendale, University of South Carolina
10. Nicole Gilbertson, Ph.D. student, University of Virginia

**PC2**

**GOING ANYWHERE STARTS HERE! EVERYTHING YOU NEED TO KNOW BEFORE THE SEACSM ANNUAL MEETING BEGINS**

Tiffany Esmat<sup>1</sup>, Ashlyn Schwartz<sup>2</sup>, Samuel Buckner<sup>3</sup>. <sup>1</sup>Dept. of Exercise Science and Sport Management, Kennesaw State University, Kennesaw, GA; <sup>2</sup>Dept. of Child and Family Studies, University of Tennessee, Knoxville, TN; <sup>3</sup>Dept. of Health, Exercise Science and Recreation Management, University of Mississippi, University, MS

The purpose of this preconference tutorial is to engage new professional and student members in navigating the SEACSM Annual Meeting. Discussion topics will include the value of membership with SEACSM and identification of key events including the Keynote Address, Presidential Address, Mentoring Breakfast, Student Bowl, Chapter Social, Elections, Graduate Student Fair and Luncheon. This session will include an interactive panel discussion from seasoned members, students, and former first-time attendees who will share tips for getting the most out of the SEACSM Annual Meeting. Time for questions and discussion will be included.

### **BONE MINERAL DENSITY AND BODY COMPOSITION RELATIONSHIPS IN MULTICULTURAL NON- AND MENOPAUSAL RUNNERS AND NON-RUNNERS**

Doris J. Morris<sup>1</sup>, L. Jerome Brandon<sup>2</sup>, FACSM; <sup>1</sup>Kennesaw State Univ., Kennesaw, GA; <sup>2</sup>Georgia State University, Atlanta, GA

T1

Menopausal women are predisposed to an increase in body fat as well as loss in bone mass. Weight-bearing exercises, such as running are known to provide osteogenic and aerobic benefits. The literature is mixed as to the benefits of weight bearing activities on osteogenic responses in African and European American, non- (NM) and menopausal (MEN) women. Purpose: Therefore, the focus of this tutorial is to discuss recent literature and data from our lab relative to bone status and body composition in multiple populations of women. Procedure: Differences in body composition and physical activity or running participation of African American (AAW) and European American (EAW) women of different menstrual status will be discussed. Finding: EAW are more active and typically have preferable body composition, but not bone mineral profiles. Activity level and body composition are related to bone health as menopause is known to have an adverse effect on body composition and bone mineral density especially in older EAW. This relationship does not appear to be true for AAW as studies differ on the effect of menopause on chronic running AAW. Conclusion: Bone mineral density has a different relationship with body composition and running history in AAW compared with EAW. Thus, preventing osteoporosis in AAW may require different lifestyle choices than in EAW.

T3

T2

### **THE ADVERSE EFFECTS OF HIGH-FAT MEALS ON METABOLIC AND CARDIOPULMONARY OUTCOMES: WHAT ROLE DOES EXERCISE HAVE?**

Stephanie P. Kurti, PhD, James Madison University, Harrisonburg, VA

The typical Western lifestyle enables many individuals to remain sedentary during the day, and most of this time is spent in the post-prandial (i.e. post-meal) state. The Westernized diet is typically high in saturated fat, calorically dense, and nutrient-poor. Over the past several decades, it has become clear that even a single high-fat meal (HFM) can have adverse metabolic and cardiopulmonary consequences, which include a substantial rise in blood lipids, glucose, and inflammatory markers. Recently, we have shown that a single HFM increased airway inflammation assessed via exhaled nitric oxide and airway neutrophils in healthy, non-asthmatic adults. Considering that cardiovascular, pulmonary and metabolic diseases continue to be a prominent cause of mortality in Western society, methods to modify these adverse post-prandial responses are of great interest. Since exercise is low in cost, and is a natural anti-inflammatory and anti-oxidant, many researchers have investigated using exercise interventions to attenuate post-prandial lipemia and glycemia. Recent research has also investigated using acute post-prandial exercise to lower airway inflammation after a HFM. Ongoing research from our laboratory and many others are focused on determining how intensity and duration influence the efficacy of exercise in lowering these adverse postprandial responses. Additionally, pre-prandial, postprandial and periodic exercises have been employed in healthy adults and clinical populations to modify lipemia and inflammation after a HFM, which will be reviewed in this symposium. This lecture will: a) provide an overview of the integrative metabolic and cardiopulmonary responses to a meal, b) review recent studies utilizing acute and chronic exercise as a method to lower these responses, and c) provide considerations for future research. This lecture is targeted toward students, faculty, professionals and practitioners interested in exercise and nutrition interactions in the post-meal period.

### **DOES ADDING PHARMACOLOGY TO EXERCISE ENHANCE OR ATTENUATE MANAGEMENT OF TYPE 2 DIABETES?**

Steven K. Malin<sup>1,2,3</sup>. <sup>1</sup>Dept. of Kinesiology; <sup>2</sup>Division of Endocrinology & Metabolism; <sup>3</sup>Robert M. Berne Cardiovascular Research Center, University of Virginia, Charlottesville, VA

Insulin resistance is a key etiological factor in the development of type 2 diabetes (T2D). Increasing physical activity is recommended to improve glucose regulation, although the dose required to lower diabetes incidence is unclear. Complicating these matters is the observation that pre-existing hyperglycemia mitigates insulin responsiveness to exercise. Not surprisingly, pharmacological intervention has been proposed as a reasonable approach to improve glycemic control and, in turn, exercise responsiveness. However, evidence is presented suggesting that most of these compounds (e.g. metformin, GLP-1 agonists, or statins) in fact oppose exercise-induced benefits on insulin sensitivity and cardiometabolic health. Herein, evidence will also be presented distinguishing people based on clinical phenotypes that relate to multi-organ insulin resistance (i.e. skeletal muscle, liver and adipose), pancreatic dysfunction and endothelial vessel reactivity before and after exercise intervention in order to discuss precision medical approaches with exercise and/or medication. Identification of such exercise/drug-dose relationships will be necessary as health professionals consider targeting underlying mechanisms of metabolic disease risk related to oxidative stress and inflammation to improve metabolic disease management. Collectively, current work suggests adding two metabolically beneficial treatments does not necessarily equate to additive health based on the outcome of interest, and there is a strong need to reconsider how we approach lowering blood glucose in order to combat T2D and/or cardiovascular disease.

### **DYNAMICS OF PRE-HEALTH SCREENING: APPLICATION OF CURRENT ACSM GUIDELINES**

J.M. Green and L.G. Killen, Dept. of HPER, University of North Alabama, Florence, AL

T4

The ACSM is the leading organization providing guidelines for health screening prior to exercise testing and prescription. ACSM guidelines are continually refined to parallel current knowledge. Recent evidence lead to considerable changes to pre-participation guidelines. Updated recommendations appear in the 2018 edition of ACSM's Guidelines for Exercise Testing and Prescription. Effective screening a) optimizes safety of individual's participation by identifying those who are at elevated risk for adverse events during physical activity/exercise, b) results in a recommendation regarding the necessity of clearance by medically trained professional prior to participation and c) lead to general suggestions regarding the rigor of initial physical activity. Fundamental changes from previous guidelines are a) increased reliance on individual physical activity classification and b) decreased emphasis on identification and assessment of CVD risk factors. Effective pre-screening is critical for scientists in laboratory (research) settings and practitioners working with clients. This tutorial will a) explain the rationale underlying changes to recent guidelines, b) explain implementation of the pre-screening guidelines, and c) identify, and discuss challenges associated with use of the guidelines. The target audience will be scientists and practitioners using ACSM pre-screening to optimize safety in their respective paradigms. The objectives are clear understanding and effective implementation of ACSM pre-screening guidelines.

### **AUTOMATING DATA COLLECTION ON THE CHEAP WITH MICROPROCESSOR AND MICROCONTROLLER TECHNOLOGIES**

R.S. Bowen, Pilgram Marpeck School of STEM, Truett McConnell University, Cleveland, GA

T5

Time in the lab is a premium resource and getting more out of an hour is often a tremendous benefit for students and faculty engaged in research activities. Life in the lab can take some unexpected twists and turns leading to loss of time, delays in progress, and reductions in productivity. Innumerable tools exist to automate the data collection process aiming to improve productivity while maintaining a high level of data accuracy, precision, and fecundity. Unfortunately, these time saving tools are often cost prohibitive, not ideal, or simply do not work. The purpose of this tutorial is to discuss inexpensive, open-source technologies that have recently gained popularity and might be useful in the collection automation process allowing for a higher level of consistency and productivity. Technologies to be discussed will include an array of inexpensive microcontrollers and microcontroller add-ons that average under \$10 per unit. Focus will be placed primarily on the Arduino (Genuino outside US and UK, [www.arduino.cc](http://www.arduino.cc)) microcontroller architecture. The physical attributes, programmable environment, and software interface used with this architecture will be presented to highlight the utility of this technology. Many types of data collected in exercise science-related fields may respond well to the use of microcontroller technology. To highlight the many benefits of this technology, a system now employed in the collection of daily wheel running data from rodents will be described. The time saving benefits and new types of data being generated with this technology will be illustrated.

### **CARBOHYDRATE INTAKE DURING ENDURANCE EXERCISE: SCIENTIFIC APPROACHES TO OPTIMIZE ATHLETIC PERFORMANCE**

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

T6

The effects of carbohydrate ingestion during exercise have been studied extensively over the past few decades. It is known that exogenous carbohydrate from sports drinks and other sources can be oxidized at relatively high rates during exercise. This can preserve the body's endogenous reserves of glycogen in the liver and/or muscle, and provide greater carbohydrate availability throughout prolonged exercise. As a result, carbohydrate ingestion consistently enhances performance in endurance events with high energy demands (i.e. > 2 hr in duration). Furthermore, recent studies indicate a dose-dependent response to carbohydrate during prolonged exercise, which has implications regarding the optimal types and amounts of carbohydrate consumed during exercise. Carbohydrate has also been reported to augment performance in shorter, intense endurance events of ~1 hr duration, where endogenous carbohydrate availability is not limiting to performance. Performance benefits under these conditions appears to be the result of central nervous system stimulation via oral-pharyngeal receptors in the mouth, which likely precludes the need for high doses of ingested carbohydrate. Therefore, modern carbohydrate intake guidelines for endurance athletes are evolving to reflect the specific demands of a particular event, and the individual needs of the athlete. This tutorial will: a) examine the mechanisms by which carbohydrate influences performance under differing exercise conditions, b) address event-specific recommendations for carbohydrate intake, and c) discuss practical considerations and questions to consider for future research. The tutorial is targeted to students, professionals and practitioners who have an interest in the metabolic and performance effects of carbohydrate ingestion for endurance athletes.

### **GOT GOLD? EVERYTHING YOU WANTED TO KNOW ABOUT THE UPDATED ACSM CERTIFICATIONS AND MORE!**

R.A. Battista<sup>1</sup>, P. M. Magyari<sup>2</sup>, and M. Magal<sup>3</sup>. <sup>1</sup>Department of Health and Exercise Science, Appalachian State University, Boone, NC; <sup>2</sup>Brooks College of Health, University of North Florida, Jacksonville, FL; <sup>3</sup>School of Mathematics and Sciences, North Carolina Wesleyan University, Rocky Mount, NC.

T7

Becoming an ACSM certified professional provides a student with a credential that helps them stand out from others in the field. An ACSM certified professional is able to develop and implement appropriate training plans and assessments for clients. With ACSM being a leader in the field, it is of no surprise their certifications are the gold standard in the field. Upon offering certifications, ACSM launched the ACSM's Guidelines for Exercise Testing and Prescription. This text is now in its 10th edition and is scheduled to be revised every 4 years. To further assist in preparation for other ACSM related certifications, ACSM initiated the Certified Personal Trainer and Exercise Physiologist textbooks which provide additional information in preparation for certification. This tutorial will focus on providing information regarding certifications appropriate for students as well as discussing the use of the latest textbooks released. Additionally, the authors will present the key changes made to the 10th edition of the ACSM's Guidelines for Exercise Testing and Prescription.

### **FROM GRADUATE STUDENT TO ASSISTANT PROFESSOR AND EVERYTHING IN BETWEEN**

L.G. Killen and J.M. Green, FACSM, Dept. of HPER, University of North Alabama, Florence, AL

T8

The transition process from graduate student to professor often presents significant challenges; however, understanding expectations of being a new faculty member can ease the transition into an academic position following graduate school. The purpose of this tutorial is to help prospective and new Assistant Professors enhance their understanding of: a) the diversity among jobs at different universities, b) preparation and training for the job, and c) expectations once hired. The major content will include hints for securing an academic position: 1) writing an informative cover letter specific to the job posting, 2) constructing an effective vitae, 3) developing a sound and specific interview presentation, 4) discussing/negotiating a startup package and 5) effectively managing time with regard to research, teaching, and service to ultimately earn tenure. While this interactive tutorial cannot cover all aspects of transitioning into an Assistant Professor position in depth, it is intended to foster discussion with a current department chair and junior faculty member.

### **AUTONOMIC ADJUSTMENTS TO PHYSICAL STRESS: INSIGHTS FROM MICRONEUROGRAPHIC RECORDINGS**

C.A. Ray, FACSM. Department of Nutrition, Food & Exercise Sciences. Florida State University, Tallahassee, FL

**T9**

The autonomic nervous system has a major impact on cardiovascular adaptation to physical stress. Exercise, gravity, and thermal influences are all examples of physical stressors that the human body encounters. This tutorial will focus on our understanding of sympathetic nerve responses to physical stressors as measured from microneurographic recordings in humans. Microneurography permits direct recording of sympathetic nerve activity to skeletal muscle and skin. Reflex mechanisms that regulate sympathetic nerve activity will be addressed. These mechanisms include low- and high-pressure baroreceptors, muscle reflexes, thermal receptors, and vestibular reflexes.

### **HEY KID! GO TAKE A HIKE! STRATEGIES TO GET CHILDREN AND YOUTH OUTSIDE AND ACTIVE**

D.P. Coe<sup>1</sup>, FACSM and R.A. Battista<sup>2</sup>, FACSM. <sup>1</sup>Department of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville, TN; <sup>2</sup>Department of Health, Leisure and Exercise Science, Appalachian State University, Boone, NC

**T10**

While being physically active outside provides numerous health benefits both mentally and physically, the average child spends less than 10 minutes outside daily. Physical activity outdoors has been steadily declining in American youth. In order to combat this issue, along with the concern of childhood obesity, the American Academy of Pediatrics recommends pediatricians to encourage unstructured physical activity for children and discuss with families areas that are conducive to being active outside. As exercise scientists, it is our responsibility to support these recommendations and further provide ideas for youth and their families to be active. This tutorial will discuss strategies to get children and youth outdoors and engaged in physical activity. We will provide evidence regarding how outdoor play spaces can be designed to practice movement skills and encourage positive play behaviors. We will also discuss family-based outdoor interventions. Additionally, we will explore potential relationships between health care providers and parks on ways to encourage children and youth to be active outside.

### **HOW TO INTERPRET NEAR-INFRARED SPECTROSCOPY MEASUREMENTS OF OXYGEN LEVELS FROM SKELETAL MUSCLE**

AA Sanni, KK McCully, FACSM. Department of Kinesiology, University of Georgia, Athens GA

**T11**

Near Infrared Spectroscopy (NIRS) has become a popular method to evaluate oxygen levels in skeletal muscle. Oxygen levels are typically reported as a ratio of the relative signals from two wavelengths of light (typically 760 and 850 nm). Data are usually presented as absolute or relative oxygen saturations, or the tissue oxygenation index; all of which are ratios of the oxygenated and deoxygenated signals (HbO<sub>2</sub>/HHb). The purpose of this tutorial is to discuss the various methods used to analyze NIRS signals, and to present the strengths and limitations to these methods. Specific topics will include how to address changes in blood volume and muscle shape (causing changes in the path-length of light), how to account of differences in adipose tissue above the muscle of interest, and the relative roles of hemoglobin and myoglobin in the NIRS signals. Recommendations will be provided for how to use NIRS to measure oxygen levels during exercise, metabolic rates during rest and exercise, and how to measure muscle mitochondrial capacity.

### **EXPERIENTIAL LEARNING CAN HELP THE NEXT GEN WIN**

Nicole A. Lynch, Ph.D., Department of Kinesiology and Health, Georgia State University Perimeter College, Atlanta, GA

**T12**

Half of the world's population is under age twenty-five. Current and future college students have grown up with smart phones, high speed internet, instant access to knowledge, and constant online contact. Their world consists of a heightened state of fear due to terrorism, school shootings, and racial unrest. This unique combination of constant technology use and underlining fear has produced a multi-tasking generation that is knowledge rich, overprotected, less physically active and often times more anxious and risk adverse. This tutorial will explore experiential learning strategies within the exercise science field to help the next generation to move more, participate in new experiences, take appropriate risks, and make failure an acceptable part of the learning process. Experiential learning and service learning offer opportunities for students to problem solve, create, foster in person interaction, and engage in self-directed physical activity. The presenter will share specific assignments to engage students through volunteering at health promotion events, evaluating outdoor environments designed to promote physical activity, demonstrating skills using video technology, and reflecting on learning in discussions. Experiential learning in the exercise sciences exposes students to perspectives, issues, and places that capture their imagination, equip them to think for themselves, and challenge them with an incentive to learn while promoting physical activity.

**TRACKING ATHLETE TRAINING LOAD: IT TAKES A VILLAGE TO MONITOR A TEAM**

Greg A. Ryan & Stephen J. Rossi, Georgia Southern University, Statesboro, GA

**T13**

A primary goal of sport science is to serve and support athletes and coaches. One service that sport scientists can provide is to measure training load over a season and how an athlete or team responds to the sustained demands of practice and competition. The measurement of both external and internal training loads can be done, in part, with the use of wearable technology that provides global positioning and heart rate data. The aim of this presentation is to discuss our use and distribution of wearable technology to measure and monitor training load. We will discuss the collaborative relationship we have with our athletic programs and how this research serves to bridge the gap between athletics and sport science. The presentation will describe the procedures for daily monitoring of training loads for multiple athletic teams. The presenters will discuss how training load data is processed, analyzed, and presented to coaches, as well as how coaches have used this data to make training/practice decisions. In addition, current and previous team data, as well as other research from around the world, will be presented to facilitate discussion regarding how this research can be used as a service to athletes, strength and conditioning professionals, and coaching staffs.

**HELLO PROFESSORS: ENGAGING STUDENTS AND TEACHING THROUGH THE GAPS OF KNOWLEDGE**

Patrice Elder & Tamerah N. Hunt, FACSM. Georgia Southern University, Statesboro, GA; Oak Hill High, Nashville, TN

**T14**

Developing and creating appropriate learning environments creates challenges for professors to engage every student to enhance learning. This presentation will continue an important conversation regarding engaging pedagogical strategies for faculty to "teach through the gaps" during course development using technology. Engaged pedagogical techniques allow for student-student interaction and instructor-student facilitation. This presentation will provide activities for the participants inclusive of creating interactive lectures, developing student learning outcomes, program assessment tools and utilizing appropriate technology facilitated with discussion.

**ANIMAL RESEARCH AND TRAINING FOR EXERCISE SCIENCE PROFESSIONS**

John C. Quindry, Christopher G. Ballmann, University of Montana, University of Montana, Missoula, MT

**T15**

Modern research in exercise science often includes use of animal models. Advances of animal models have been essential in mechanistic understanding of exercise adaptations, disease prevention, and the interface with clinical applications. Novel experimental models relevant to exercise, disease, and clinical applications have largely overcome limitations in translating scientific conclusions from animals to humans. Accordingly, this tutorial will briefly explore ethical considerations of animal use in understanding cutting edge questions about exercise in health and disease. Animal models of exercise will be discussed in combination with clinically-relevant approaches to morbidity and mortality in humans including in vivo imaging, physiologic performance, biomarker profiles, and post mortem analyses. Exercise models of both endurance and strength training will be delineated. Featured disease models will include ischemic challenges of the heart, brain, and peripheral tissues; heart failure; genetic neuromuscular conditions; acute trauma; metabolic disease; and cancer. Student-centered discussion will highlight animal models of research within the context of training for careers in research, sports sciences, medical, and allied health professions.

**SOCIOECONOMIC STATUS, CONCUSSION AND ADOLESCENTS: HOW TO WORK WITH A GROWING POPULATION**

Tamerah Hunt, Georgia Southern University, School of Health and Kinesiology, Georgia Southern University, Statesboro, GA

**T16**

Socioeconomic status (SES) is an economic and sociological combined term that is characterized by many encompassing factors that may include income level, educational level, and occupation. Low socioeconomic settings pose a problem as a growing population that is historically medically underserved and researched. Yet, this neglected population maintains unique needs for assessment tools, clinical management protocols, interventions and outcomes research. Therefore, clinicians need a more thorough understanding of concussion management strategies and recovery outcomes in various socioeconomic populations. This session will provide evidence of successful clinical care paradigms and research standards for clinicians working in low SES healthcare and community settings.

### **LACTATE METABOLISM: HISTORY AND UPDATE**

L. Bruce Gladden and Zachary B. Rightmire. School of Kinesiology, Auburn University, Auburn, AL

**T17**

Lactate (La-) has long been at the center of controversy in research, clinical, and athletic settings. Since its discovery in 1780, La- has often erroneously been viewed as simply a deadend glycolytic byproduct with multiple deleterious effects. It was not until the 1980s, with the introduction of the Cell-to-Cell Lactate Shuttle that a major paradigm shift began. Since then, the evidence for La- as a major coordinator of intermediary metabolism in different body tissues has grown exponentially. Despite this, many fundamental discoveries about La- are still working their way into mainstream research, clinical care, and practice. While La- production requisitely increases during dysoxia, this is the exception rather than the rule. From its role in coordinating whole body metabolism as a fuel to its role as a signaling molecule in tumors, the study of La- metabolism remains robust and holds potential for multiple clinical applications. This tutorial will a) provide a historical review of lactate metabolism, and b) provide an update on the latest advances and applications of lactate metabolism. This symposium should appeal to a broad audience from students, to basic scientists to anyone with interests in the expansive area of exercise physiology.

### **EVALUATING BIOMETRIC WEARABLES: FROM ACADEMICS TO INDUSTRY**

JA Bunn<sup>1</sup> & LC Eschbach<sup>2</sup>; <sup>1</sup> Campbell University, Buies Creek, NC; <sup>2</sup> Valencell Inc., Raleigh, NC

**T19**

Tracking physical activity through wearable technology has increased in popularity among both researchers and the lay public. The validity, accuracy, and reliability of many of these devices have been tested, but the results are frequently difficult to compare due to employment of different methodologies. Physical activity protocols and data validation techniques should be standardized in order to compare results across studies. This tutorial lecture will provide an overview of current biometrics, review industry standards in evaluating biometric devices, and best practices for working with devices, selecting participants, protocols, and test settings. The Consumer Technology Association (CTA) has recently published standards that outline protocols and validation criteria intended for evaluation of devices. This session will provide information necessary to unify the evaluation of devices for optimal decision-making and dissemination of data on consumer-based wearable devices, especially for typical metrics such as steps and heart rate. Additionally, this session will discuss statistical analyses and provide an understanding of intrinsic complications during the research process with biometric wearable devices.

### **TRAINING SPORTS OFFICIALS: AN EXCITING, YET RELATIVELY NEW OPPORTUNITY IN EXERCISE SCIENCE AND SPORTS PERFORMANCE**

A. Bosak. Dept. of Health Professions, Liberty University, Lynchburg, VA

**T18**

A major variable that has great influence on the outcomes of athletic contests, but has not been extensively studied, is the fitness status of sports officials. In multiple sports, officials (ie. referees, umpires, etc.) can negatively impact a game by making “the wrong call” and these unfortunate incorrect decisions are often a result of the cumulative effects of fatigue, low fitness status, or the referee being out of position. In each case, the official’s training status is a key contributor and improvements in their physical conditioning will help reduce future “wrong calls”. In many sports, the officials need to be at least as fit as, if not more fit, than the athletes they officiate. Thus, it is crucial that officials are trained in a similar manner as athletes, but also with important key training program differences due to the demands of their sport and duties required to successfully officiate their games. The proposed presentation’s purpose will be to 1) emphasize the importance of physical training for sports officials, 2) discuss the unique challenges of training and assessing sports officials, 3) review relevant research and outline future research opportunities, and 4) suggest appropriate training programs for officials with reliance on sports science principles. This tutorial is intended for students and faculty who are interested in various aspects (ie. strength training and conditioning, physiology, nutrition, etc.) associated with the training of sports officials. Since little is known regarding how sports science can improve sports officials’ performance, more research is needed that will aid officials in meeting the unique demands of officiating sports at the professional and amateur levels.

### **ACUTE SEDENTARISM AND CARDIOVASCULAR HEALTH: INTERACTIONS BETWEEN PERIPHERAL AND SYSTEMIC VASCULAR HEALTH**

Lee Stoner<sup>2</sup>, Daniel Credeur<sup>2</sup>, William Evans<sup>1</sup>, Sabina Miller<sup>2</sup>, Quentin Willey<sup>1</sup>; <sup>1</sup>Dept. of Sport & Exercise Science, University of North Carolina, Chapel Hill, NC; <sup>2</sup>Dept. of Kinesiology, University of Southern Mississippi, Hattiesburg, MS

**S1** There has been a great deal of recent interest in the acute effects of sedentary behavior, including sitting, on cardiovascular health. For example, recent evidence indicates that prolonged sitting can acutely impair vascular function in the lower extremities. However, it is currently unknown whether prolonged sitting has systemic vascular health effects. This knowledge is required prior to translation to public health policy, and for guiding future research in this area. This symposium will begin with an overview of the topic, including: (i) discussion of the evidence linking sedentary behavior to reduced cardiovascular health; (ii) the potential mechanisms linking peripheral and systemic health vascular dysfunction; (iii) and an overview of the research currently being conducted in our laboratories. Subsequently, we will briefly discuss research being conducted in our laboratory with healthy, abled-bodied and spinal cord injured individuals. This research is investigating the effects of prolonged sitting on central vascular health, circulating angiogenic factors, autonomic function, and cerebral perfusion and cognition. Lastly, we will summarize: (i) the findings from our ongoing research; (ii) potential mechanistic pathways; (iii) future research direction; and (iv) public health ramifications.

### **STUDENT RUN PROGRAMS PROVIDING COMMUNITY-BASED PHYSICAL ACTIVITY PROGRAMS FOR INDIVIDUALS WITH SPECIAL NEEDS**

Dr. Kathy Carter - University of Louisville, Dr. Kevin McCully - University of Georgia, Dr. Jason Crandall - Western Kentucky University, Megan Osbourn - University of Georgia

**S2** This session will include a brief background of community-based interventions and their success serving individuals with special needs. This will be followed by discussions of three programs which have successfully incorporated University students in various roles to provide hands on guidance for physical activities with individuals with special needs while earning hours for things internships and general patient contact hours for graduate programs. This session will include presentations on a children's adapted physical activity class, a wellness program for adults with disabilities, and a health promotion program for residents of certified nursing facilities. Attendees of this session will learn how to combine the efforts of faculty, students, and community leaders from various backgrounds to promote improved health and well-being of the community.

### **IF YOU BUILD IT, WILL THEY COME? PHYSICAL ACTIVITY AND THE BUILT ENVIRONMENT**

GW Heath, KL Peyer, K Hamilton, A Bailey. Department of Health and Human Performance, University of Tennessee at Chattanooga, Chattanooga, TN

**S3** Purpose and Methods: The Community Preventive Services Task Force recently recommended that combined built environment approaches that improve pedestrian or bicycle transportation systems, with land use and environmental design features, increase physical activity among adults, children, and youth in communities. This symposium will; 1) provide an overview of these built environment strategies along with projected changes in physical activity patterns and selected health outcomes among residents exposed to such strategies; 2) review Chattanooga-specific examples of evaluation methods used to assess the impact of the built environment on physical activity patterns among children/youth, and adults; and 3) discuss recent experimental results on the neuro-perceptive and mental health effects associated with varying environmental settings during physical activity and exercise. (Partial Funding through The Center for Excellence in Applied Computational Science and Engineering sponsored by the Tennessee Higher Education Commission).

### **CHRONIC EXTERNAL LOADING DURING DAILY LIVING: A "LOST" TRAINING STRATEGY TO IMPROVE THE FORCE-VELOCITY CURVE**

JD Simpson<sup>1</sup>, EM Scudamore<sup>2</sup>, & EK O'Neal<sup>3</sup>. <sup>1</sup>Mississippi State University, Mississippi State, MS; <sup>2</sup>Arkansas State University, Jonesboro, AR; <sup>3</sup>University of North Alabama, Florence, AL

**S4** In 1984 exercise physiologist Carmelo Bosco and colleagues published a seminal paper detailing the effects of wearing weighted vests during daily living and training on multiple types of jumping tasks. The researchers reported remarkable improvements in lower body power output in elite athletes with very low ceilings for additional performance enhancement after years of training. Two additional papers from the same group further confirmed these initial observations, and that removal of external loading during daily living (ELDL) stimulus resulted in a return to original performance capacity. Despite these notable findings, few investigators have attempted to further explore this unique, supplemental training tactic. The primary purpose of this presentation will be to describe the origins of ELDL and outcomes of the limited but intriguing investigations over the last 3 decades that have continued to explore ELDL. Multiple topic areas will be explored including the impact of ELDL on both traditional sport and tactical athlete performance, injury potential, and programming/basic application of ELDL training strategies in real world scenarios.



### **MULTIFACETED REGULATION OF SKELETAL MUSCLE GROWTH, REGENERATION, AND METABOLISM**

N.L. Stott and J.R. Huot. Laboratory of Systems Physiology, Department of Kinesiology, University of North Carolina Charlotte, Charlotte, NC

Skeletal muscle requires fine-tuned regulation on a variety of levels including growth, regeneration, and metabolism. This regulation occurs through the orchestration of several signaling cascades involving genes, proteins, and the recently discovered microRNAs (miRNAs). Much is known about the regulation of skeletal muscle growth, regeneration, and metabolism. However, knowledge gaps exist on the ability of some signaling cascades to multi-regulate skeletal muscle. Furthermore, miRNAs have provided a novel avenue for expanding the current understanding of gene regulatory mechanisms. The purpose of this symposium is to discuss the regulation of myogenesis, skeletal muscle metabolism, and the emerging role miRNAs may have on skeletal muscle physiology while acting as potential biomarkers for disease. Specific discussion will focus on mTOR, Notch, and miRNAs influence on skeletal muscle growth and metabolism. Elucidation of signaling cascades and miRNA regulatory mechanisms will foster the current understanding of skeletal muscle growth, regeneration, metabolism, and disease.

S5

### **VISUAL SYSTEM IMPAIRMENTS FOLLOWING SPORT-RELATED CONCUSSION: UPDATES FROM THE CONSENSUS STATEMENT**

NG. Murray<sup>1</sup>, R. Moran<sup>2</sup>; <sup>1</sup>Concussion Research Laboratory, Georgia Southern University, School of Health and Kinesiology, Statesboro, GA; <sup>2</sup>The University of Alabama, Athletic Training Program, Tuscaloosa, AL

Updates to the recent sport-related concussion (SRC) consensus statement recommend that visual system assessments be added to the comprehensive assessment battery of SRC. This is not surprising, considering that 90% of SRC will experience some magnitude of visual system dysfunction, specifically oculomotor control, immediately post-injury. However, visual system dysfunctions post-SRC are not well understood and often confused with impairments of cognition and postural control. In addition, these dysfunctions may not be apparent unless properly provoked using appropriate stimuli. Oculomotor control assessments that provoke the signs and symptoms of SRC range from clinical to laboratory based direct eye measurements. Yet, each assessment tool has varying inherent limitations that will influence the diagnosis of SRC. These issues create a challenge for clinicians who are involved in the assessment of SRC and they may be compounded by the lack of clear recommendations provided by the updated consensus statement on which assessments are the most appropriate to use. As such, it is the purpose of this symposium to review the updated SRC consensus statement guidelines with specific emphasis on commonly used oculomotor control assessments. The aim of this symposium is to compare and contrast prominent clinical and laboratory measures so that clinicians and researchers may gain a broader understanding of these prominent assessment tools.

S6

### **LOW CARBOHYDRATE-HIGH FAT DIETS FOR ENDURANCE ATHLETES: HAVE WE FOCUSED ON THE WRONG POPULATION?**

EK O'Neal<sup>1</sup> and HS Waldman<sup>2</sup>. <sup>1</sup>University of North Alabama, Florence, AL; <sup>2</sup>Mississippi State University, Starkville, MS

Over 35 years ago Stephen Phinney and colleagues reported a very low carbohydrate, high fat (LCHF) or ketogenic diet improved low intensity, endurance exercise performance. However, further inquiry in LCHF diets remained virtually dormant for decades as the scientific community focused on refining and advocating for a high carbohydrate nutritional approach. Mechanistically, LCHF diets significantly increase fat oxidation rates and can result in a sparing of muscle glycogen which may benefit endurance athletes. Anecdotal reports of performance improvements following LCHF are plentiful, and LCHF diets have become increasingly popular in the competitive but non-elite endurance athlete (CNE) population despite a lack of strong evidence for LCHF efficacy. A limitation of the few LCHF studies that have been conducted is a lack of CNE representation. Nearly all published studies have included elite athletes with optimal body composition. Body mass loss following LCHF has been well documented, and CNE are likely to compete at a lower relative percentage of VO<sub>2</sub> max where fat oxidation is a greater contributor to ATP production. The purpose of this presentation will be to help non-elite endurance athletes make more informed decisions if implementation of a LCHF nutritional approach is being considered. Topics will include: 1) a brief overview of the LCHF diet and review of literature with regards to interpreting this information for CNE; 2) highlight recent findings from the presenters' laboratory in regard to running performance, body composition, and cardiovascular disease risk and inflammation markers in CNE eating LCHF ad libitum; and 3) applicable real world nutritional strategies when an LCHF is implemented.

S7

### **FITNESS ESSENTIAL TO THE MISSION? THE SHIFT IN MILITARY PHYSICAL FITNESS IN THE 21ST CENTURY**

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As with any occupation, the United States Military isn't exempt from the decline in physical fitness and increase in sedentary behaviors seen in the general population. Unfortunately, this can hamper operational readiness and lead to increased musculoskeletal injuries and decreased personnel retention rates. Traditionally, the goal of standard fitness testing in the military has aimed to maintain a minimum level of fitness necessary to perform most occupational specialties. Coupled with the rise in sedentary lifestyles, many occupations in the military are shifting toward highly technical careers with minimal physical requirements of the occupation while others continue to be extremely physically demanding. The question then arises, do we still need physical fitness testing across all military occupations? The U.S. military as a whole is making changes to keep up with the 21st century. Individual branches are also making specific changes to account for the unique nature of each of their missions. Despite an emphasis on "humans before hardware" physical fitness continues to be a major issue for the five branches of the military. The presentation's purpose will be to 1) review the needs analysis for various military positions, 2) identify the unique challenges of training military personnel, 3) discuss injury rates and prevention for incoming recruits and 4) review assessment challenges with military personnel and suggest appropriate training programs for these unique individuals. The intended audience for this presentation is students and faculty who are interested in the topic of strength training and conditioning and fitness assessment of military personnel. We in health and exercise fields have the ability to shape and influence these discussions.

S8

### VALIDITY AND PRACTICAL UTILITY OF 3D BODY FAT SCANNERS

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The rise of commercial 3D scanning systems for assessment of percent body fat presents new opportunities and challenges to researchers and clinicians. For the past three years, I have collaborated with George Washington University computer scientists to develop one of the first validated systems utilizing 3D depth cameras to estimate percent body fat. We have developed a surface capture system that creates a 3D virtual image where body circumferences, volume and surface area can be calculated. Using a sample of 140 subjects, we then created an algorithm to accurately calculate percent body fat consistent with DXA measurements. Some newer commercial systems lack such rigorous validation or have algorithms built from bioelectrical impedance data. As a result, it is important for exercise scientists and clinicians to learn from our development process and understand both the practical potential and possible limitations of utilizing this type of technology for accurate body composition assessment.

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S9

S11

### THEORY AND PRACTICAL APPLICATION OF THE ISAK PROTOCOL: KINANTHROPOMETRY FROM THE LAB TO THE FIELD

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S10

Kinanthropometry is the study of body structure and function. The International Society for the Advancement of Kinanthropometry (ISAK) protocol has been used worldwide to track body composition of elite athletes, and it has been gaining attention for use in American sport and military programs. In addition to measuring the amount and percentage of adipose tissue in the human body, the ISAK full profile provides sport specific anthropometric measurements to consider when assessing physical performance. These measurements include muscle and bone proportionality, muscle to bone ratio, ideal performance body mass, somatotype comparisons, maturation tracking for long term athlete development, and monitoring rehabilitation from injury. In this symposium, we aim to 1) Present a historical context of kinanthropometry and how the ISAK profile addresses challenges associated with assessing and monitoring body composition; 2) Describe how muscle and bone proportionality affect physical performance; and 3) Demonstrate optimal practices to longitudinally track body composition. We will conclude by detailing how a kinanthropometry profile can be incorporated into nutrition and exercise science research. The ISAK profile provides a safe, practical, and inexpensive method of assessing and monitoring body composition in athletes across sport and military settings.

TP1

### THE UTILITY OF HEART RATE VARIABILITY MONITORING IN ATHLETIC SETTINGS: FROM THE LABORATORY TO THE FIELD

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Heart rate variability (HRV) refers to the variation in time of consecutive normal-to-normal heart beat intervals. HRV is noninvasive and therefore commonly used in research to understand the physiological mechanisms involving cardiovascular-autonomic modulation. Recent research has demonstrated its usefulness for monitoring responses to physical training, however interpretation in field settings is poorly understood. The numerous HRV parameters and the inconvenience of traditional recommendations have made data acquisition difficult and confusing. The purpose of this symposium is to discuss the emergence of HRV and how it may be conveniently utilized among athletic populations. The presentation will be divided into three portions. First, background, physiology, and some parameters for laboratory assessment of HRV will be presented. Second, recent evidence showing the validity of unobtrusive measures of HRV following non-traditional recording procedures will be reviewed. Third, evidence supporting the utility of HRV monitoring and suggestions for its assessment in field settings will be discussed.

### EFFECT OF BETA-HYDROXY BETA-METHYLBUTYRATE SUPPLEMENTATION ON SPRINT KINETICS ACROSS A COLLEGIATE RUGBY SEASON

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PURPOSE: To determine the effect of  $\beta$ -Hydroxy  $\beta$ -Methylbutyrate (HMB) supplementation on sprinting kinetics throughout a rugby season. METHODS: In this cross-over design investigation, 13 collegiate male rugby players were assigned to consume one of two supplementation regimens: 5 g HMB + 5 g creatine per day (HMB) or 5 g creatine + 5 g placebo per day (PLB) for six weeks. During the fall season, players were matched for lean body mass and randomly assigned to HMB (n = 7; 21.1 1.1 y; 88.2 16.5 kg; 176.3 7.9 cm) or PLB (n = 6; 21.5 2.4 y; 88.8 15.4 kg; 179.3 5.2 cm). The supplementation regimen was switched for athletes who returned and completed the spring season (n = 7; 22.5 1.3 y; 96.4 14.7 kg; 179.6 4.5 cm). Prior to and following each supplementation period (i.e., fall or spring), 40-m sprinting kinetics were assessed in all athletes while tethered to a robotic sprinting device. Peak (PK) and mean sprinting power (P), force (F), and velocity were assessed against minimal (1kg) and heavy (15kg) resistance. Since only 7 of the original 13 athletes returned and completed the spring season, separate 2  $\times$  2 repeated measures analyses of variance (RMANOVA) with Bonferroni adjustments were used to assess group differences in each variable during the fall, while a 2  $\times$  4 RMANOVA was used to assess the cross-over sub-sample throughout the fall and spring. RESULTS: While no group differences were observed in sprint kinetics during the fall, a significant group  $\times$  time interaction was observed for PPK at 1kg (F = 4.85, p = 0.020,  $\eta^2$ p = 0.55) across the fall and spring seasons, where during the spring, PPK at 1kg decreased for PLBSPRING (-6.9  $\pm$  1.2%, p = 0.020) but not for HMBSPRING (+7.5  $\pm$  10.7%). CONCLUSION: Our data suggest a potential benefit from HMB supplementation for maintaining sprinting power in rugby players.

**PRELIMINARY ANALYSIS: MODERATING THE STRESS PERCEPTION OF COLLEGIATE DISTANCE RUNNERS USING BRANCHED-CHAIN AMINO ACIDS**

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**PURPOSE:** To examine the response of BCAA on stress perception of trained collegiate distance runners using DALDA. **METHODS:** 8 collegiate distance runners (men n=4, women n=4) took BCAA supplement (SUP) (0.08g/kg) or placebo (PLA) daily for 6 weeks, alternating conditions per week. Each morning athletes filled out the 34-item DALDA prior to training, selecting one of 3 answers corresponding to stress symptoms: A = “feel worse than normal”, B= “feel normal”, C= “feel better than normal”. Response ratios were generated for each of the 3 answers for each condition (SUP or PLA) by taking total number of responses for each answer over number of answers overall. Response ratios were calculated as weekly mean  $\pm$  SD and MANOVA was used for analysis. The alpha criterion was set to  $p < 0.05$ . **RESULTS:** Statistical significance was found ( $p < 0.01$ ), and further analyses were done to examine changes from week to week. On average, athletes reported fewer ‘A’ responses in SUP weeks than PLA weeks (SUP:  $9.27\% \pm 2.21\%$ ; PLA:  $13.46\% \pm 7.29\%$ ), while response percentage for ‘C’ was the same between conditions (SUP:  $11.78 \pm 2.12\%$ ; PLA:  $11.24\% \pm 2.32\%$ ). Changes from SUP weeks to PLA weeks produced noticeable changes in ‘A’ responses (e.g.:  $14.36\%$  SUP to PLA;  $-9.95\%$  from PLA to SUP). **CONCLUSIONS:** Results from DALDA revealed a noticeable change in the stress response of the athletes between conditions. The athletes reported higher instances of feeling “worse than normal” during PLA weeks and fewer instances of feeling “worse than normal” during SUP weeks. These results indicate that BCAA supplementation seems to be an effective means of reducing the stress perception in these collegiate distance runners

TP2

**NITRATE SUPPLEMENTATION DOES NOT INFLUENCE SUPRAMAXIMAL CYCLING PERFORMANCE OR LACTATE CLEARANCE**

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**PURPOSE:** The influence of nitrate supplementation on supramaximal cycling performance and post-exercise blood lactate was investigated in nine subjects. **METHODS:** Using a double-blind, cross-over design, subjects completed two cycling trials 90-min after consuming 140 mL of either beetroot juice (BR) containing 800 mg of nitrate or 140 mL of a nitrate free beetroot juice placebo (PL) (Beet It, Heartbeet Ltd). Trials consisted of one 30-sec maximal sprint followed by 6, 6-sec sprints. Resistance for each sprint was set at 0.085g/kg with a 90-sec active recovery after each sprint. Upon completion of the last sprint, subjects completed a 15-min active recovery during which blood [lactate] was assessed at 1, 3, 5, 7, 10 and 15 min. **RESULTS:** Performance measures included mean peak power (MPP), mean minimum power (MMP), mean work (MW) during each bout, and total work (TW) for all sprints. BR and PL trials did not demonstrate between group significant differences in MPP (BR:  $833 \pm 258$ , PL:  $838 \pm 267$  watts), MMP (BR:  $656 \pm 190$ , PL:  $660 \pm 188$  watts), MW (BR:  $6049 \pm 5375$ , PL:  $5997 \pm 5072$  joules) or TW (BR:  $47112 \pm 13408$ , PL:  $47083 \pm 13647$  joules). Likewise, no significant between group differences were observed for 15-min post-exercise [lactate]. **CONCLUSION:** These results suggest that nitrate supplementation does not influence performance of repeated bouts of supramaximal intensity cycling or post-exercise blood lactate.

Supported by a VSU Faculty Research Seed Grant

TP3

**EFFECTS OF ACUTE GOLDEN ROOT EXTRACT (RHODIOLA ROSEA) SUPPLEMENTATION ON ANAEROBIC EXERCISE CAPACITY**

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**PURPOSE:** The purpose of this study was to examine the effects of acute golden root extract (GRE) supplementation on repeated Wingate exercise performance. **METHODS:** College aged female participants (age =  $19.0 \text{ yrs} \pm 0.63$ , height =  $66.3 \text{ in} \pm 1.8$ , weight =  $152.8 \text{ lbs} \pm 19.9$ ) were recruited for this study. In a within groups counterbalanced study design, participants were supplemented with either 1,500 mg/day of GRE or placebo (gluten-free cornstarch) for 3 days. Participants also took an additional 500 mg dose of corresponding treatment 30 minutes prior to testing of each trial. During each exercise trial, participants completed 3x 15 second Wingate cycle tests separated by 2-minute recovery periods. Each exercise trial was separated by a 1-week washout period. **RESULTS:** Over the 3x 15 second Wingate cycle tests, mean watts ( $p = 0.01$ ), mean anaerobic capacity ( $p = 0.025$ ), and total work ( $p = 0.018$ ) were higher in the GRE treatment trial versus placebo. However, mean anaerobic power ( $p = 0.185$ ), mean peak watts ( $p = 0.078$ ), and fatigue index ( $p = 0.186$ ) were unaffected regardless of treatment. **CONCLUSION:** This study suggests that acute GRE supplementation improves repeated Wingate performance suggesting a role for GRE as an ergogenic aid.

TP4

**SUB-CHRONIC PHYSIOLOGICAL EFFECTS OF BETALAIN SUPPLEMENTATION ON CYCLING PERFORMANCE**

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**Purpose:** We examined if sub-chronic betalain supplementation in trained cyclists affected cycling performance, hemodynamics and blood parameters. **Methods:** Twenty-eight well-trained male cyclists ( $28.79 \pm 9.81$  years,  $77.27 \pm 13.25$  kg and  $3.03 \pm 0.62$  watts/kg) performed a counterbalanced crossover study whereby betalain (100 mg/day) or placebo supplementation occurred over a one-week period. Thereafter, participants engaged in 30-minute cycling time trials whereby several physiological variables and blood measures were assessed. **Results:** Overall exercise performance (e.g. watts, distance,  $\dot{V}O_2$ ), blood parameters (e.g. pH, lactate, glucose, NOx) and cytokines (e.g. IL-6, IL-8, IL-10, TNF $\alpha$ ) were not significantly different between betalains and placebo, albeit betalain supplementation did elicit a 7-Watt increase over the time trial which approached significance relative to the placebo condition ( $p = 0.093$ ). Additionally, betalain supplementation did improve exercise efficiency (watts/(ml/kg/min)) at 30 minutes compared to placebo. Blood flow was significantly different between conditions over time, but there were no differences between betalains and placebo at any time point. **Conclusions:** Sub-chronic supplementation of betalains days prior to and immediately before a 30-minute TT improves exercise efficiency without altering blood markers of inflammation, oxidative stress, and/or hematopoiesis.

TP5

### EFFECTS OF EXOGENOUS KETONE SUPPLEMENTATION ON ANAEROBIC AND AEROBIC PHYSICAL PERFORMANCE

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**TP6** Purpose: The effects of a single dose of exogenous ketone supplementation on anaerobic and aerobic physical performance was investigated in 19 healthy male and female subjects. Methods: In a double-blind cross-over experiment, participants received one serving of exogenous ketone salts (K) and one isocaloric serving of Gatorade G2 (G2) in a randomized order with a one-week washout period between supplements. Anaerobic performance was determined by a 30-second Wingate test and aerobic performance was determined by a VO<sub>2</sub>max test. In a time-sensitive order, blood measures to assess glucose, ketone, and lactate levels were taken at 4 time points including baseline, 30-minutes post-consumption of the supplement, post-Wingate test, and post-VO<sub>2</sub>max test. Results: Blood glucose and ketone levels both demonstrated a significant main effect for time ( $p < 0.00$ ) and significant time by condition interaction ( $p < 0.00$ ) whereas lactate levels only demonstrated a main effect for time ( $p < 0.00$ ). There were no significant differences between supplements for Wingate test variables including anaerobic peak power (W) (K:  $671.58 \pm 210.01$  vs G2:  $674.68 \pm 202.94$ ), mean power (W) (K:  $490.21 \pm 139.02$  vs G2:  $500.74 \pm 146.00$ ), relative peak power (W\*kg<sup>-1</sup>) (K:  $9.15 \pm 1.80$  vs G2:  $9.17 \pm 2.17$ ), or fatigue (W\*s<sup>-1</sup>) (K:  $12.00 \pm 5.35$  vs G2:  $11.47 \pm 5.20$ ). Also, there were no significant differences between supplements for relative VO<sub>2</sub>max (ml\*kg<sup>-1</sup>\*min<sup>-1</sup>) (K:  $40.91 \pm 8.14$  vs G2:  $40.07 \pm 7.01$ ). Conclusion: Although blood substrate levels varied between supplemental conditions, an acute dose of exogenous ketones had a similar effect on anaerobic and aerobic performance as the sports drink G2.

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### IMPACT OF HIGH-INTENSITY INTERVAL TRAINING ON DIVISION I COLLEGE 800M/1500M RUNNER'S PERFORMANCE

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**TP7** Purpose: Coaches are constantly seeking new training methods to improve athletic performance. High-intensity interval training (HIIT) has become a popular training method shown to increase performance in both recreational and sedentary populations. However, little has been done to examine the impact of HIIT on competitive athletes. Therefore, the purpose of this study was to examine the effects of HIIT on running performance in Division I collegiate middle distance (800/1500m) runners. Methods: Participants (3 males and 3 females) completed 4-weeks of HIIT, twice per week in addition to their regular training. The HIIT sessions consisted of four 20-sec Wingate tests separated by 4 min recovery periods. Pre- and post-training performance testing variables included HR, RPE, and time to volitional fatigue during an incremental treadmill test. Additionally, each participant completed a 1500m track time-trial, in which time to completion, stride length, and stride frequency were measured. Results: No significant changes were detected between time to exhaustion (pre-intervention:  $20.1 \pm 1.2$  min; post-intervention:  $19.7 \pm 1.3$  min;  $p = 0.14$ ), maximal HR ( $p = 0.45$ ), maximal RPE ( $p = 0.64$ ), stride length ( $p = 0.09$ ), stride frequency ( $p = 0.78$ ), nor time to complete the 1500m time-trial (pre-intervention:  $5.0 \pm 0.7$  min; post-intervention:  $4.8 \pm 0.5$  min;  $p = 0.23$ ). Conclusions: While some research has demonstrated improvement in performance with HIIT in recreational and sedentary populations, HIIT does not appear to significantly influence well-trained middle-distance runners' performance.

### AN ELECTROMYOGRAPHY COMPAIRSON OF BENCH PRESS VOLUME FOLLOWING VARIED WARM-UPS.

K. Mehls, J. Coons Dept. of Health and Human Performance, Middle Tennessee State University.

**TP8** Purpose: This study was conducted to assess the effects of a plyometric warm-up and post activation potentiation on higher volume-load training. Methods: Thirteen resistance trained males participated in two bench press sessions, one using a plyometric warm-up, the other using a standard warm-up. Volume-load data was collected for each testing session. Muscle activity data was collected in the dominant pectoralis major and triceps brachii. Results: Analysis showed a significantly lower volume-load (11.6% decrease) first set of bench press following a plyometric warm-up. EMG data revealed a 26% higher mean peak starting point in muscle activity during the first set when a plyometric warm-up was used. Conclusions: These results suggest that a plyometric warm-up may be detrimental to training that requires a high volume-load and should be avoided during warm-ups.

### PHYSIOLOGICAL, PERCEPTUAL, AND PERFORMANCE METRICS OF A UPPER-BODY HIGH INTENSITY FUNCTIONAL TRAINING WORKOUT

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**TP9** PURPOSE: The purpose of this study was to evaluate the physiological, perceptual, and performance metrics of an upper-body high intensity functional training workout (HIFT). METHODS: Nine HIFT experienced ( $3.4 \pm 1.4$  yrs) male participants (age =  $23 \pm 4$  yrs, height =  $176.5 \pm 5.7$  cm, weight =  $83.3 \pm 4.3$  kg, BF% =  $10.6 \pm 2.9\%$ ) completed this study. Each participant completed two trials of the same HIFT with at least 48 hours between trials. The HIFT was a time-to-completion effort of handstand push-ups, ring dips, and push-ups with 21, 15, and 9 repetitions of each movement. Continuous HR, session RPE [SRPE (0-100mm)], and total time to completion were monitored for the HIFT. Additionally, workload was calculated [SRPE (0-10 scale) x time x repetitions]. RESULTS: Trial 1 vs trial 2 metrics for the HIFT were as follows: mean HR ( $166 \pm 8$ ,  $168 \pm 5$  bpm;  $p = 0.31$ ), SRPE ( $78 \pm 10$ ,  $82 \pm 10$  mm;  $p = 0.17$ ), total time ( $10.8 \pm 2.1$ min,  $9.8 \pm 2.3$ ;  $p = 0.02$ ), and workload ( $10,616 \pm 2,030$ ,  $10,400 \pm 2,168$  AU;  $p = 0.59$ ). CONCLUSION: Participants completed the HIFT significantly faster during trial 2 ( $p = 0.02$ ) compared to trial 1 with no statistical differences in mean HR, SRPE, or workload. The results of this study indicate a potential psychological or learning aspect to repeating this type of HIFT workout which results in improved results without a significantly greater physiological impact. This information could be valuable to those working with HIFT competitors as an indication that repeating this form of HIFT may result in improved performance without additional strain.

### PHYSIOLOGICAL, PERCEPTUAL, AND PERFORMANCE METRICS OF A FULL-BODY HIGH INTENSITY FUNCTIONAL TRAINING WORKOUT

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TP10

**PURPOSE:** The purpose of this study was to evaluate the physiological, perceptual, and performance metrics of a full-body high intensity functional training workout (HIFT). **METHODS:** Nine HIFT experienced ( $2.4 \pm 1.0$  yr) male participants (age =  $22 \pm 4$  yrs, height =  $176.9 \pm 7.7$  cm, weight =  $82.6 \pm 7.4$  kg, BF% =  $10.8 \pm 2.5\%$ ) completed this study. Each participant completed two trials of the same HIFT with at least 48 hours between trials. The HIFT had a 20-minute work duration to complete as many repetitions as possible of 5 pull-ups, 10 push-ups, and 15 bodyweight squats in that order. Continuous HR, session RPE [SRPE (0-100mm)], and total repetitions were monitored for the HIFT. Also, workload calculated [SRPE (0-10 scale) x time x repetitions]. **RESULTS:** Trial 1 vs trial 2 metrics for the HIFT were as follows: mean HR ( $178 \pm 5$ ,  $178 \pm 5$  bpm;  $p = 0.73$ ), SRPE ( $88 \pm 8$ ,  $94 \pm 5$  mm;  $p = 0.052$ ), total repetitions ( $586 \pm 127$ ,  $631 \pm 129$ ;  $p < 0.001$ ), and workload ( $106,527 \pm 24,919$ ,  $115,344 \pm 27,135$  AU;  $p = 0.1$ ). **CONCLUSION:** Participants completed significantly more repetitions on trial 2 ( $p < 0.001$ ) compared to trial 1. However, there was no statistical difference in mean HR, SRPE, or workload. Although, there was a trend toward a higher SPRE ( $p = 0.052$ ). It appears there may be a psychological or learning effect when repeating this type of HIFT workout resulting in improved performance without additional physiological strain when assessed via traditional monitoring techniques.

### SKELETAL MUSCLE SIZE AND PERFORMANCE: MUSCLE BIOPSY OR ULTRASONOGRAPHY?

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TP11

**PURPOSE:** The purpose of the study was to examine the relationships between muscle cross-sectional area (CSA) measured by either ultrasonography or biopsy and measures of isometric peak force (IPF) and rate of force development (RFD). **METHODS:** Fifteen well-trained males (IPF= $4445.467 + 613.690$  N) participated in the study. Prior to testing and following an overnight fast, each subject's vastus lateralis (VL) was measured for anatomical CSA (ACSA) using ultrasonography. A muscle biopsy was also sampled from the VL of each subject immediately after the ACSA measurement and at the same site on the VL. Fiber CSA (FCSA) was assessed using immunofluorescent techniques. IPF and RFD at 0-50ms, 0-100ms, 0-150ms, and 0-200ms were assessed during an isometric mid-thigh pull test on force platforms sampling at 1000Hz. Pearson product-moment correlations were calculated between muscle sizes and performance. Statistical significance was set as  $p \leq 0.050$ . **RESULTS:** Statistically significant correlations were observed between Type II FCSA and IPF ( $r=0.774$ ,  $p < 0.001$ ), RFD150 ( $r=0.661$ ,  $p=0.007$ ), and RFD200 ( $r=0.725$ ,  $p=0.002$ ). ACSA was only significantly associated with IPF ( $r=0.596$ ,  $p=0.019$ ). Type I FCSA did not relate to any performance measures. **CONCLUSIONS:** It is clear from our results and previous literature that ultrasonography and muscle biopsy data provide relevant information regarding muscle size and performance. However, the discrepancies observed in the current study between the two suggest each is providing slightly different information to researchers. Specifically, Type II FCSA might be superior when considering more sensitive performance measurements such as RFD.

### COMPARING NATIONAL FOOTBALL LEAGUE (NFL) COMBINE PERFORMANCE TO DRAFT POSITION FOR THE 2017 NFL DRAFT

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TP12

The National Football League (NFL) conducts an annual combine to assess athletic ability in a variety of tests in preparation for the draft. **PURPOSE:** The purpose was to normalize performance results of the athletes invited to the 2017 NFL Combine and compare to Draft Round to determine if a correlation existed between combine performance and draft status. **METHODS:** Data from six tests of 326 athletes were analyzed. Data were normalized (Z-scores) and averaged to calculate an average Z-score value for each athlete. A Spearman-rho correlation was run between average Z-scores and 2017 Draft Round. **RESULTS:** A weak negative correlation ( $r = -.240$ ,  $p < .001$ ) existed between average Z-score in the Combine and Draft Round. The correlation was stronger among Linebacker ( $r = -.477$ ,  $p = .039$ ), Wide Receiver ( $r = -.478$ ,  $p < .001$ ), Tight End ( $r = -.477$ ,  $p = .039$ ), and Offensive Line ( $r = -.418$ ,  $p = .004$ ). No significant correlation existed with other positions (all  $p > .05$ ). **CONCLUSION:** The findings suggest that normalized Z-Score combine performance is related to NFL Draft order, especially among specific positions. However, due to the weak overall correlation, it is possible the NFL and teams should reconsider what is measured at the Combine.

### CORRELATION OF LUMBOPELVIC-HIP COMPLEX KINEMATICS TO HAND ANGULAR VELOCITY IN SOFTBALL HITTING: A PILOT STUDY.

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TP13

**PURPOSE:** The purpose of this pilot study was to determine the influence of the lumbopelvic-hip complex on softball hitting, specifically examining position and angular velocity of the bilateral hip, pelvis, and trunk in NCAA Division-I fast-pitch softball athletes. **METHODS:** Seven, right-handed participants ( $169.8 \pm 7.2$  cm;  $65.5 \pm 7.4$  kg;  $20.6 \pm 1.9$  years) executed five maximal effort swings from a stationary hitting tee. The tee was placed in a specific position as determined by the hitter, and all participants swung with their personal bat typically used in competition. All kinematic data were collected using an electromagnetic tracking system, synced with The MotionMonitor sampling at 100 Hz. Data were averaged across five trials and analyzed at the hitting events of load, foot contact, and ball contact, as these events represent significant moments in the active swing phase. **RESULTS:** A bivariate, Pearson product-moment correlation coefficient was computed to determine the relationship between bilateral hip, pelvis, and trunk rotation at each hitting event to angular velocity of the hand at ball contact. There was a statistically significant negative correlation of trunk rotation at ball contact and hand angular velocity at ball contact ( $R = -0.788$ ,  $p = 0.035$ ). Post-hoc regression analysis revealed that 62.1% of the variance in angular hand velocity at ball contact can be attributed to trunk rotation at ball contact ( $R = 0.788$ ,  $R^2 = 0.621$ ,  $p = 0.035$ ). **CONCLUSIONS:** Based on the current data, greater trunk rotation to the back side (i.e. greater rotational separation between the trunk and pelvis) at the instance of ball contact will lead to increased hand velocity during the softball swing. As hand velocity increases, bat velocity will also increase thereby improving overall performance in hitting.

#### BASEBALL PITCHER'S GLOVE ARM INFLUENCE ON ELBOW AND SHOULDER KINETICS.

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**PURPOSE:** Biomechanical research in baseball pitching has described the overhead throwing motion as a kinetic chain activity. However, research investigating effects of a pitcher's non-throwing arm is sparse, with no research linking the position of the non-throwing arm to forces about the throwing shoulder and elbow. Thus, the purpose of this study was to assess the relationship between non-throwing arm elbow flexion and shoulder horizontal abduction with throwing shoulder and elbow forces at ball release during a baseball pitch. **METHODS:** Thirty-one right-handed baseball pitchers ( $13.48 \pm 2.08$  yrs.;  $168.47 \pm 14.37$  cm;  $62.03 \pm 13.16$  kg) participated. Kinematic data were gathered at 100 Hz using an electromagnetic system synced with The MotionMonitor™. Participants threw three maximal effort fastballs to a catcher at regulation distance. Data from the fastest fastballs were analyzed at the event of ball release. Forces for the shoulder and elbow were normalized to the participant's body weight. **RESULTS:** A multivariate regression found significance for non-throwing arm elbow flexion ( $F(3, 26 = 4.54, p = 0.011)$ ). To follow up, an independent samples t-test found significance with non-throwing arm elbow flexion and normalized shoulder force in the anterior/posterior direction ( $t(28 = -3.76, p = 0.001, \eta p = 0.34)$ ) **CONCLUSION:** These findings suggest there is a relationship between non-throwing arm elbow flexion and anterior/posterior shoulder force at ball release for pitchers. Future research should investigate other time points within the pitching motion, such as maximum external rotation of the shoulder, to determine the true extent of the non-throwing arm's influence on throwing shoulder and elbow forces.

TP14

#### SHOULDER AND ELBOW KINETICS DURING POLO OFFSIDE FORHAND SHOTS

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**PURPOSE:** The offside forehand strike is the most common swing in polo, which requires the mallet to be raised above the head and swung down, as a pendulum, for ball contact. The mallet increases the lever of the swing which can be beneficial but can lead to injury if performed improperly. In similar motions, such as the windmill softball pitch, shoulder horizontal abduction has shown to be a function of shoulder and elbow kinetics, however, the current literature lacks descriptive kinetics of the polo swing. Therefore, the purpose of this study was to examine shoulder horizontal abduction and shoulder and elbow kinetics during the offside forehand polo swing. **METHODS:** Seventeen professional male polo athletes ( $35.8 \pm 11.1$  yrs.;  $81.0 \pm 9.2$  kg;  $116.0 \pm 17.1$  cm) executed three match speed offside forehand shots from a mock wooden horse. Mallet and ball placement were specific to each participant's preference. All kinematic data were sampled at 100 Hz using an electromagnetic tracking system synced with The MotionMonitor™. Data from each shot were analyzed at each of the swing events of initiation of back swing (IBS), top of backswing (TOB), and ball contact (BC); as well as within the phases between events. Shoulder horizontal abduction at IBS, TOB, and BC were analyzed in relation to maximum shoulder and elbow kinetics between events. All forces were normalized to the mass of the participant. **RESULTS:** A bivariate, Pearson product-moment correlation coefficient and post-hoc linear regression analysis revealed that 29.1% of the variance in shoulder horizontal abduction at TOB can be attributed the elbow valgus force between TOB and BC ( $R = 0.539, R^2 = 0.291, p = 0.031$ ). **CONCLUSION:** These results suggest that greater shoulder horizontal abduction during the swing leads to the greater elbow valgus force. It is known that excessive elbow valgus force is an injury risk factor, thus leading the authors to suggest further investigation into the polo swing in attempt to curtail injury mechanisms.

TP15

#### EXAMINING CHANGES IN BAT ANGLE AT BALL CONTACT IN COLLEGIATE SOFTBALL PLAYERS OVER A FALL SOFTBALL SEASON

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Few studies have examined changes in three-dimensional kinematics in collegiate softball players. **PURPOSE:** The purpose of this study was to examine changes in bat angle at ball contact (BABC) over the course of a fall season in collegiate softball players. **METHODS:** Nine healthy female participants [Age:  $19.4 \pm 1.2$  years; Height:  $166.7 \pm 8.8$ cm; Mass:  $66.6 \pm 8.3$ kg] completed three testing sessions over their fall season. Participants completed both a general and on-deck warm-up (WU) prior to testing. After the on-deck WU, a one-minute rest period took place. Each participant chose their preferred batting stance and was asked to hit a softball on a tee in a position of their choosing with a standard softball bat (33in/23oz or 34in/24oz) of their choice. A total of five maximal swing trials were collected at each time point and separated by 20 seconds to mimic time between pitches. A Vicon Nexus motion capture system was used to collect kinematic data regarding BABC at each time point in all three planes of motion utilizing three, one-way repeated measures ANOVA at an alpha level ( $p = .05$ ). **RESULTS:** The results revealed no significant differences in BABC for x, y, and z directions. **CONCLUSION:** Having non-significant differences in BABC, future endeavors should be taken to examine BABC at various regions of an individual's strike zone to see possible differences.

TP16

#### ANALYSIS OF THE START TIMES FOR THE SWING PHASES FOR BASEBALL HITTERS OF VARYING SKILL

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**PURPOSE:** Only 5.6% of high school varsity baseball players will continue competing at a NCAA member institution. Despite this low percentage of athletes making it to the next level, limited research exists that examines potential differences between players of varying skill. Therefore, this study examined the difference between start times for swing phases during baseball hitting between two different skill groups. **METHODS:** Male participants were placed into recreational ( $n = 6$ ) or skilled ( $n = 6$ ) groups based on if they had competed at the NCAA level. Retroreflective markers, surface electromyography (EMG) and two force platforms were utilized to complete a swing analysis. Five phases of the swing were analyzed: shifting (back leg rectus femoris onset), stepping (front foot leaves force platform), landing (front foot contacts force platform), swinging (hands start to move toward ball) and contact. All swing phases were related to contact in milliseconds and compared between groups using an independent samples t-test ( $p < 0.05$ ). **RESULTS:** The skill group demonstrated significantly earlier timing for shifting ( $p = 0.006$ ) and stepping ( $p = 0.006$ ) phases, while also starting the swinging phase significantly later ( $p = 0.034$ ). **CONCLUSION:** Earlier shifting phase for the skilled group may result in more time to prepare for the swing, which could potentially explain an earlier stepping phase. The ability to start these phases earlier, while also starting the swinging phase later may be advantageous for skilled hitters to regulate spatial parameters of their swing and more time to generate power.

TP17

#### ANALYSIS OF PEAK AND MEAN MUSCLE ACTIVITY FOR BASEBALL HITTERS OF VARYING SKILL

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TP18

**PURPOSE:** Baseball batting has been defined as the most difficult skill in sports with a thirty percent success rate considered elite performance. Previous research has shown that there are differences in peak muscle activity in the lower extremity between novices and skilled baseball hitters, but no study has investigated mean muscle activity between groups. Therefore, this study aimed to investigate the differences between mean and peak muscle activity for baseball hitters of varying skill. **METHODS:** Six skilled (competed at the NCAA level) and six recreational (never competed at the NCAA level) baseball players volunteered for this study. All participants were fitted with six surface electromyography EMG electrodes on the front leg tibialis anterior (TA), gastrocnemius, and biceps femoris (BF) as well as the back leg gastrocnemius, biceps femoris (BF), and rectus femoris (RF). Each participant underwent maximum voluntary isometric contraction (MVIC) testing and then performed a swing analysis. All variables of interest were normalized using MVIC data and then compared between groups using independent samples t-test ( $p \leq 0.05$ ). **RESULTS:** The mean muscle activity for the front leg gastrocnemius ( $p = 0.041$ ) and back leg BF ( $p = 0.028$ ), as well as peak muscle activity for the front leg gastrocnemius ( $p = 0.030$ ), back leg gastrocnemius ( $p = 0.033$ ) and back leg BF ( $p = 0.045$ ) were all significant with the recreational group having greater muscle activity. **CONCLUSION:** Lower mean and peak muscle activation in the skilled group compared to the recreational group suggests that lower muscle activity could be associated with higher skilled hitting athletes.

#### ACUTE AND CHRONIC RESISTANCE-TRAINING DOWNREGULATES SELECT LINE-1 RETROTRANSPOSON ACTIVITY MARKERS IN HUMAN SKELETAL MUSCLE

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TP19

**PURPOSE:** Retrotransposons are genetic elements with the ability to amplify themselves within the human genome, possibly leading to mutagenic effects. We examined if acute and/or chronic resistance exercise affected skeletal muscle LINE-1 retrotransposon activity. **METHODS:** In study 1, 10 resistance-trained males performed three consecutive daily squat sessions. VL biopsies were taken Pre, 2 h post, and 3 days following session 3. In study 2, 13 untrained males performed a full-body resistance-training program. VL biopsies were taken at weeks 0 and 12. **RESULTS:** Study 1: LINE-1 mRNA decreased at Post1/2 ( $p < 0.05$ ), and RT activity trended down at Post2 ( $p = 0.067$ ). Study 2: LINE-1 mRNA trended down by week 12 ( $p = 0.056$ ) while LINE-1 promoter methylation increased ( $p = 0.041$ ). ORF2p content ( $p = 0.059$ ) and RT activity ( $p = 0.063$ ) also trended down by week 12, and changes in RT activity versus satellite cell number were inversely associated ( $r^2 = -0.725$ ). *in vitro* experiments confirmed that reduced RT activity (via RT inhibitor) increased C2C12 myoblast proliferation 2.6-2.9-fold compared to vehicle ( $p < 0.05$ ). **CONCLUSION:** Resistance exercise downregulates skeletal muscle LINE-1 activity and this may be partially responsible for increased satellite cell proliferation. Supported by J.S.M. through NormaTec (Newton Center, MA, USA), gift monies donated to M.D.R. through Hilmar Ingredients (Hilmar, CA, USA) and Bionutritional Research Group (Irvine, CA, USA).

#### ELEVATING PROTEIN SYNTHESIS: TURN IT DOWN A NOTCH

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TP20

**PURPOSE:** Notch signaling is thought to be crucial in regulating skeletal muscle regeneration, however, the impact Notch signaling has on other skeletal muscle processes (e.g. protein synthesis) remains unclear. The purpose of this project was to determine the effects of Notch inhibition on protein synthesis during the myogenic program. **METHODS:** C2C12 cells were treated with or without a  $\lambda$ -secretase inhibitor (GSI) to determine the effect of Notch inhibition on anabolic signaling and protein synthesis during myoblast proliferation and differentiation. Samples were collected and analyzed for components of Notch (c-myc and Hes1), anabolic signaling (PTEN/AKT/mTOR pathway), and protein synthesis (via puromycin incorporation). **RESULTS:** GSI treatment reduced Notch signaling as seen by c-myc ( $P < 0.05$ ) and Hes1 ( $P < 0.01$ ). GSI treatment elevated pmTOR Ser2448 ( $P < 0.05$ ), pmTOR Ser2481 ( $P < 0.05$ ), pTSC2 Thr1462 ( $P < 0.05$ ), and protein synthesis ( $P < 0.05$ ) in C2C12 myoblasts. GSI-treated C2C12 myotubes demonstrated increases in pAKT Thr308 ( $P < 0.01$ ), pAKT Ser473 ( $P < 0.05$ ), pTSC2 Thr1462 ( $P < 0.001$ ), pmTOR Ser2448 ( $P < 0.05$ ), and protein synthesis ( $P < 0.01$ ). GSI treatment lowered PTEN expression in myotubes ( $P < 0.05$ ). **CONCLUSIONS:** These results demonstrate that Notch signaling may regulate protein synthesis via the PTEN/AKT/mTOR pathway. Supported by: Sigma Xi

#### BIOMARKERS OF GROWTH ARE MINIMALLY INFLUENCED BY TWO VARYING BOUTS OF HIGH-INTENSITY TRAINING PROGRAMMING

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TP21

Biomarkers of skeletal muscle growth are influenced by the modality, duration, and intensity of exercise bouts. High-Intensity Training Programs (HITP) are prescribed using various modalities, orders, weights, and repetition schemes. The duration of these bouts varies greatly, from shorter bouts of less than 5 minutes to longer bouts of 15 minutes or more. **Purpose:** To examine the effects of short- (< 5min) and long- (15min) duration bouts of HITP on markers of skeletal muscle growth. **Methods:** Ten apparently healthy males (28.1±5.0yrs) participated. Two HITP sessions (SHORT and LONG) were performed in a crossover fashion. Blood plasma was collected at five time points: PRE, POST, 1HR, 3HR, and 6HR in order to examine growth hormone (GH), insulin-like growth factor (IGF-1), insulin-like growth factor binding protein 1&2 (IGFBP-1,IGFBP-2). **Results:** Repeated measures ANOVA revealed no trial differences among any of the markers (IGF-1, IGFBP-1 & IGFBP-2) except GH at POST, where the LONG bout produced a greater effect ( $p = 0.005$ ). A repeated measures ANOVA revealed a main time effect in GH ( $p = 0.037$ ). Subsequently, a posthoc t-test demonstrated elevated GH at 1HR ( $p = 0.018$ ) when compared to PRE, while no time-dependent change ( $p > 0.05$ ) was observed in IGF-1, IGFBP-1, or IGFBP-2. **Conclusions:** The findings suggest that there are no differences in markers of skeletal growth other than GH between the SHORT and LONG bouts of HITP.

### ASSOCIATION BETWEEN MITOCHONDRIAL DNA SEQUENCE AND DNA DAMAGE WITH THE RESPONSE TO ENDURANCE TRAINING IN MICE

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**TP22**

**PURPOSE:** The purpose of this study was to characterize elements of the mitochondrial genome, including mitochondrial DNA (mtDNA) sequence, heteroplasmy, copy number and damage, in four inbred male mouse strains previously characterized as high responders (FVB/NJ), moderate responders (SJL/J), no responders (NZW/LacJ), or negative responders (BALB/cByJ) to endurance training. **METHODS:** DNA was isolated from the Plantaris skeletal muscle of mice (n=37) and mtDNA was amplified by long range polymerase chain reaction (PCR), then tagged with Nextera libraries and sequenced on a Miseq instrument. A gene-specific quantitative PCR-based assay was used for the measurement of DNA damage and mtDNA copy number. **RESULTS:** Exercise endurance training did not change within strain mtDNA sequence or total number of heteroplasmies, however the high- and negative-responders each displayed unique nonsynonymous single nucleotide polymorphisms (SNPs) on mt-Co3 (position 9348) and mt-Atp8 (position 7778) genes, respectively. There were significant differences in mtDNA copy number (p=0.0003) with the high responders displaying significantly higher mtDNA copy number than all other strains regardless of exercise (Sedentary vs. exercise mtDNA copy number: FVB/NJ= 104,564 ±5448 vs. 95216 ±8334; SJL/J=81,816 ±2693 vs. 60,431 ±6784; NZW/LacJ= 76,155 ±4847 vs. 55,219 ±1313; BALB/cByJ=74,474 ±9889 vs. 65,015 ±6442). Exercise training did not induce significant nuclear or mtDNA damage. **CONCLUSIONS:** Our results suggest that strain-dependent mtDNA SNPs and copy number may associate with the inherent ability to respond to endurance training.

### BIOMARKERS ASSOCIATED WITH TYPE II MUSCLE FIBER HYPERTROPHY FOLLOWING 12 WEEKS OF RESISTANCE TRAINING IN YOUNG, UNTRAINED MALES

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**TP23**

**PURPOSE:** Resistance training (RT) causes alterations in skeletal muscle physiology (i.e., increases in fiber cross-sectional area (fCSA), muscle protein synthesis (MPS), total ribonucleic acid (RNA), etc.). The purpose of this study was to examine biomarkers which delineated individual hypertrophic responses to RT in young, untrained males. **METHODS:** Untrained, college-aged males (n=67) performed RT sessions 3 d/wk. Blood and muscle biopsies were obtained at baseline (PRE) and following the last training bout (POST). K-means cluster analysis based on changes in type II fCSA identified NON [n=17; change in type II fCSA (mean±SE) = -732±162 μm<sup>2</sup>], MOD (n=29, +844±74 μm<sup>2</sup>), and XTR (n=21, +2382±251 μm<sup>2</sup>) responders. Biological specimens were analyzed for biomarkers related to satellite cell physiology, ribosome biogenesis, proteolysis, inflammation, and androgen signaling. C2C12-derived myotubes were stimulated with serum from select NON and XTR subjects to examine if unidentified circulating factors promoted hypertrophy. **RESULTS:** All clusters experienced similar increases in satellite cell counts (+53%, time effect p<0.001) and total RNA (22%, time effect p<0.001) following RT. PRE myostatin (MSTN) mRNA was ~40% greater in NON vs MOD and XTR responders. Serum total testosterone (TEST) significantly increased in XTR responders following RT (+21%, p=0.011). 20S proteasome activity trended higher in XTR vs NON responders (group p=0.089). **CONCLUSION:** Skeletal muscle MSTN expression, increased protein turnover, and increased TEST levels may delineate type II fiber hypertrophic responses to RT in young, untrained males.

### EFFECT OF SATURATED FATTY ACID ON MARKERS OF BCAA-MEDIATED MITOCHONDRIAL BIOGENESIS AND BCAA CATABOLISM IN VITRO

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**TP24**

**PURPOSE:** Branched chain amino acids (BCAA) such as leucine, stimulate favorable metabolic processes involved in lean tissue preservation and skeletal muscle metabolism. However, higher levels of circulating BCAAs correlate with severity of metabolic disease (including diabetes/insulin resistance), and may result from deregulated BCAA catabolism. This study investigated the relationship(s) between BCAA concentration and expression of regulators of metabolism and BCAA catabolism in cultured skeletal muscle cells. **METHODS:** C2C12 myotubes were treated with or without varying concentrations of either leucine or valine for 24 hours, both with and without concurrent palmitate. Data were analyzed via Spearman correlation. **RESULTS:** Increasing leucine treatment significantly correlated with elevated mRNA expression of metabolic targets including peroxisome proliferator-activated receptor-gamma coactivator-1alpha (PGC-1α) (rs=0.73, p<0.01), mitochondrial transcription factor A (rs=0.58, p<0.05), sirtuin 3 (rs=0.58, p<0.05), citrate synthase (rs=0.56, p<0.05), and forkhead box protein O1 (rs=0.66, p<0.05). However, increasing valine treatment only correlated with PGC-1α expression. Interestingly, leucine-induced metabolic gene expression was abolished by concurrent palmitate. Additionally, branched-chain amino transferase 2 expression positively correlated with increasing leucine treatment, which was not observed for branched-chain α-ketoacid dehydrogenase. BCAA catabolic enzyme expression did not significantly correlate with leucine-palmitate co-treatments, or valine treatment concentrations. **CONCLUSION:** These data suggest leucine possesses unique metabolic effects compared with other BCAAs. Moreover, the presence of palmitate diminished the metabolic effects of leucine, suggesting lipids may suppress leucine-mediated cell adaptations.

### BASELINE CHARACTERISTICS OF MIDDLE SCHOOL EMPLOYEES PARTICIPATING IN A WORKPLACE PHYSICAL ACTIVITY INTERVENTION

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**O1**

**PURPOSE:** Desire2Move (D2M-S) was an 8-week program that encouraged moderate-to-vigorous physical activity (MVPA) among middle school employees. The purpose of this study was to describe the baseline characteristics of the sample. **METHODS:** Employees from four matched middle schools were assigned to three groups: competitive (COMP; team-based), noncompetitive (NONCOMP; individual), and control (CON). Participants from COMP and NONCOMP schools recorded minutes of MVPA using MapMyRun. At baseline, employees completed a demographic questionnaire, a theory of planned behavior questionnaire, the perceived stress scale (PSS), one general health question, and the Godin Leisure-Time Exercise Questionnaire (GLTEQ). **RESULTS:** Participants were 54 employees (COMP = 32, NONCOMP = 8, CON = 14) with an average age of 42.0 years (SD = 11.9). Most participants were overweight (MBMI = 29.6, SD = 6.8), African American (75.0%) women (78.6%). They reported moderate levels of stress (MPSS = 19.2, SD = 2.9) and below average health (41.1% = fair/poor health). Although they possessed positive cognitions about (MATT = 6.0, SD = 0.9; MSN = 5.4, SD = 1.0; MPBC = 5.9, SD = 1.0) and motivation (MINT = 5.9, SD = 1.1) for MVPA, participants were relatively inactive (MGLTEQ = 33.7 METS/week, SD = 34.4). **CONCLUSIONS:** D2M-S successfully targeted a traditionally underrepresented group of employees in need of a PA intervention. Specifically, employees were inactive, overweight, had below average health, and experienced moderate levels of stress.



## O2-BARRIERS TO A WORKPLACE PHYSICAL ACTIVITY PROGRAM

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**PURPOSE:** Desire2Move (D2M) was an 8-week program that encouraged moderate-to-vigorous physical activity (MVPA) among university employees. The purpose of this study was to investigate the barriers to participation. **METHODS:** Nine departments competed as teams to accumulate the greatest average mins of MVPA. Each team selected a captain who sent weekly emails with reminders, motivational tips, and team standings. Each team member recorded minutes of MVPA using MapMyRun. After D2M, a link to a survey was emailed to team captains who disseminated it to department employees. Non-D2M participants completed a demographics questionnaire, the Godin Leisure-Time Exercise Questionnaire (GLTEQ), one general health question, and four questions about barriers. **RESULTS:** Participants were 27 employees (Mage = 36.1 years, SD = 11.5) who did not participate in D2M. Most were females (51.9%), White (70.4%), and staff (59.3%). They were also healthy (55.6% = very good) and physically active (MGLTEQ = 46.0 METS/wk, SD = 20.4). The most frequently cited barriers were “lack of time” because of (a) work (33.3%), (b) household (22.2%), and (c) family (14.8%), and “did not know about D2M” (14.8%). Despite these barriers, 74.1% were interested in future programs. They indicated “more reminders about enrollment” (22.2%), “more information about D2M” (18.5%), “a different way to track PA” (14.8%), and “more incentives” (7.4%) would increase future participation. **CONCLUSIONS:** Lack of time and program awareness were primarily responsible for employees not participating in D2M. Participation may be improved by (a) increasing awareness and understanding of D2M; (b) tracking PA differently; and (c) providing incentives.

O2

## EFFECT OF MOTIVATIONAL SIGNAGE ON STAIR USAGE IN MUNICIPAL BUILDING

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**03** Purpose. Stair climbing is considered a good physical activity with proven health benefits. It is attributed to enhanced leg power, aerobic capacity and overall improvement in the well-being. Motivational signage has been successful in promoting stair usage in various settings. The purpose of this study was to investigate the effects of motivational signs on the stair usage in a primarily African American community. **Methods.** Stair usage was monitored for six weeks at two phases (baseline and intervention) in a five stories of municipal building. During the intervention, motivational signs were placed in several places in the building. Stair usage was monitored by gender and race. **Results.** Out of 7,408 participants 45.4% were males, 64.1% African American, 34.3% White, and 1.5% other races. Only 10.3% were stair users. Participants' stair usage at baseline was 89.5%. There was no significant change in stair usage during the intervention regardless of the gender and races. **Conclusion.** Motivational signage could not effectively encourage stair usage in the five stories of municipal building. Relatively high stories and old age of participants might be the factors to hinder the promotional effects of motivational signages on stair use.

O3

## RACE, AGE, AND TYPES OF MOTIVATION IN INDOOR GROUP CYCLING

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As health disparities persist among non-Hispanic Blacks (NHB), motivating this population to be more physically active is a means of diminishing those health disparities. **PURPOSE:** To identify differences in the type of motivation (autonomous, controlled, and amotivation) that influence regular participation in indoor group cycling. **METHODS:** Twenty-one adult (female=78%) indoor group cyclists currently participating in classes  $\geq 1$  day/week for  $\geq 3$  consecutive months (age: 43.6 $\pm$ 14.5 yrs; body mass index: 26 $\pm$ 3.8 kg/m<sup>2</sup>). Participants completed the Treatment Self-Regulation Questionnaire (TSRQ) to indicate why they continue to take indoor group cycling classes. Average TSRQ scores of autonomous and controlled motivation, and amotivation were examined by race and age. One-way ANOVA was used to determine between-group differences. Pearson correlations were conducted for the three motivation categories, race, and age. Significance was accepted at  $p < 0.05$ . **RESULTS:** There were no differences in autonomous ( $p = 0.44$ ) or controlled motivation ( $p = 0.84$ ) by race, but there was a significant difference in amotivation ( $p = 0.02$ ). Tukey post hoc analyses showed that NHB had higher amotivation compared to non-Hispanic Whites and mixed-race individuals. There was a positive correlation between age and autonomous motivation ( $r = 0.466$ ;  $p = 0.03$ ). **CONCLUSION:** Compared to other race groups, NHB have higher amotivation despite continued participation in indoor group cycling. This suggests that non-motivational factors may also be driving NHB to continue participation, and that long-term adherence may be in jeopardy without these additional factors. These data also indicate a positive relationship between age and autonomous motivation. Further research is needed to examine factors related to long-term motivation for participation in indoor group cycling among various race and age groups.

O4

## TURN STRESS INTO SWEAT: THE EFFECTS OF PHYSICAL ACTIVITY CLASSES ON STRESS IN COLLEGE STUDENTS

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**PURPOSE:** While stress is unavoidable, many college students face overwhelming levels of stress and lack proper stress management skills. Increased levels of stress can lead to poor mental and physical health as well as poor academic performance. The purpose of this study is to examine the effects of physical activity classes on stress levels in college students. **METHODS:** Four male students and forty-four female students ( $n = 51$ ) over the age of 18 participated in this study. Surveys were distributed to participants in “for-credit” and recreational physical activity classes offered by Winthrop University. This study employed a modified version of the Physical Activity and Stress Survey (PASS) (Barney, Benham, & Haslem, 2014). The survey was modified to include the short-version International Physical Activity Questionnaires (IPAQ) and questions asking participants identifying race/ethnicity, whether the class was for-credit or recreational, and the name of the class. **RESULTS:** Students in recreational classes reported higher levels of stress coming into the class compared to students in for-credit classes ( $M = 2.5 \pm 0.7$  vs.  $1.9 \pm 0.9$ ;  $p = 0.011$ ). There was no difference in student stress levels upon leaving class or other variables. Students participating in recreational classes took a higher number of physical activity classes than students enrolled in for-credit classes. There were no differences by race. IPAQ data showed that students participated in 3.1  $\pm$  1.6 days of PA per week. **CONCLUSIONS:** Students who participate in recreational PA classes may do so to manage stress. Students in for-credit classes may feel less stress upon arriving to class. Supported by Winthrop McNair Scholars Program

O5

**ACUTE EXERCISE TO LIFT AFFECTIVE STATES IN INDIVIDUALS WITH PTSD**

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06

While a relatively new area of study, current literature shows exercise interventions to have a high degree of potential for successfully reducing symptoms of Post-Traumatic Stress Disorder (PTSD) and comorbid psychological conditions. Purpose: Examine the feasibility and acute psychological effects of a bout of moderate intensity continuous aerobic exercise (MICE) and a bout of high-intensity interval exercise (HIIE), relative to a no-exercise sedentary control (SED), in participants with subsyndromal PTSD (i.e., one symptom in each of the major DSM-5 clusters). Methods: Participants [N= 24, 15 females; age (M ± SD); 25.9 ± 9.2 yrs; Estimated VO<sub>2</sub>peak (M ± SD); 34.6 ± 10.2 ml·kg<sup>-1</sup>·min<sup>-1</sup>] completed each of three randomly ordered 35-min conditions (HIIE, MICE, SED), followed by a 40-minute recovery period. Affect (Energy, Tiredness, Tension, Calmness) was assessed before, immediately, 20-minutes and 40-minutes post each condition. Exercise enjoyment was also assessed immediately after each condition. Results: No adverse events were experienced during VO<sub>2</sub> assessment, HIIE, MICE, or SED conditions. Further, all participants were able to maintain the appropriate intensity during all exercise sessions (based on HR & RPE data). Enjoyment was not different between HIIE and MICE, but both were enjoyed significantly more relative to SED. Energy was significantly increased post HIIE and MICE, while Energy significantly decreased post SED. Additionally, Tension and Tiredness were significantly decreased while Calmness was significantly increased by 40-minutes post all conditions. Conclusion: This study is the first to assess the acute changes in psychological outcomes to various modes of exercise in individuals living with subsyndromal PTSD. Overall, both exercise conditions were well tolerated and significantly reduced tiredness, while also significantly increasing Energy. This study provides evidence of the short-term psychological benefits of exercise within a sample of adults living with PTSD.

**REDUCING THE DISPLEASURE OF A PAINFUL EXERCISE: INDUCING BENIGN MASOCHISM**

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PURPOSE: Benign masochism is the counterintuitive enjoyment of unpleasant but nonthreatening stimuli. The purpose of this experiment was to determine if benign masochism could be induced during resistance training exercise. METHODS: Participants (N = 79, mean age: 28 ± 10, 55 women) completed a baseline YMCA bench press protocol prior to listening to a brief audio clip. The randomly assigned audio clip told participants that pain and discomfort during resistance training indicated either increased injury risk and decreased physical functioning (HARM) or improved strength and physical functioning (HELP). Participants then repeated the YMCA bench press protocol before responding to measures of affective valence, arousal, pain intensity, pain valence, and anxiety. RESULTS: There were no significant differences in the number of repetitions after reappraisal (p = .858), affective valence (p = .732), arousal (p = .272), pain intensity (p = .293), or anxiety (p = .256). However, the groups differed significantly in the pleasure associated with the pain (p = .027). The HELP group felt less displeasure associated with pain than the HARM group (d = .53). Fewer HELP than HARM participants perceived the pain to be unpleasant (64.9% vs. 82.9%). CONCLUSIONS: These preliminary data indicate that a brief audio clip designed to induce reappraisal may reduce the displeasure associated with pain and discomfort during resistance training efforts. Future research should consider long-term impacts on exercise behavior.

**IMPACT OF A MOTHER-DAUGHTER PHYSICAL ACTIVITY INTERVENTION ON MATERNAL ENJOYMENT AND SUPPORT**

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PURPOSE: To examine the impact of a physical activity intervention on maternal enjoyment of shared physical activity and physical activity support. METHODS: Mothers and their 2-5 year old daughters were recruited in pairs and self-selected into the intervention (n=21 dyads) or control (n=10 dyads) group. Before and after the intervention, participants wore an accelerometer for 1-week and mothers completed physical activity enjoyment and support questionnaires. Intervention group dyads participated in 12 weekly sessions designed to promote shared physical activity (i.e., engaging in physical activity together). Mothers received a manual with physical activity information and daughters received active gear to facilitate home activities. A series of group x time ANOVAs were used to examine the impact of the intervention. RESULTS: There was a statistically significant interaction effect for maternal enjoyment of shared physical activity (F(1,25)=13.25, p=.001) with an increase in enjoyment for intervention group mothers and a decrease in enjoyment among control group mothers. There were no statistically significant interaction (F(1,25) =.33, p=.57) or main (F(1,25)=4.0, p=.06) effects for maternal physical activity support. CONCLUSIONS: The results provide initial evidence of the efficacy of this intervention for increasing maternal enjoyment of shared physical activity but not maternal physical activity support. Future studies should examine the long-term impact of increasing maternal enjoyment of shared physical activity on child physical activity participation.

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**IMPACT OF REPEATED BALANCE PERTURBATIONS ON LOWER EXTERMITY MEAN MUSCLE ACTIVITY**

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09

PURPOSE: Lower extremity muscle activity (LEMA) has been shown to scale with the magnitude of external supporting surface perturbations. A common method for assessing postural responses to external perturbations is the Motor Control Test (MCT) on the Neurocom Equitest. Postural control has demonstrated adaptability to rapidly changing environmental conditions after repeated exposure. The adaption of postural response to repeated MCT perturbations has yet to be evaluated. Thus, the purpose of this study is to evaluate LEMA across multiple MCT exposures. METHODS: Eighteen healthy participants completed the study. Following familiarization, participants performed five fully randomized MCTs over six testing sessions. The first five sessions occurred on consecutive days, with the sixth occurring two days after the fifth. Muscle activity was recorded using a Noraxon EMG system from the right vastus medialis (Q) and semitendinosus (H). Mean muscle activity (MMA) during the first backward large perturbation (BWL) was analyzed using a 1x6 [Condition x Time] RMANOVA at p ≤ 0.05. RESULTS A significant main effect for time was found with H exhibiting higher MMA on Day 1 (7.967 ± 9.67 mV) than Days 2, 3, 4, and 5. H MMA on Day 1 was not different from Day 6 (4.152 ± 5.51 mV). CONCLUSION: Previous literature has demonstrated that LEMA decreases after repeated perturbations. The current study evaluated LEMA after repeated exposure to the widely used MCT. H activation is necessary to maintain balance during backward translations, and this is altered after repeated exposure to a perturbation, an effect that is not retained suggesting the MCT may be subject to learning effects if used on consecutive days.

### EFFECT OF ARCH FLEXIBILITY ON PROPULSIVE PARAMETER OF HOPPING

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**010** PURPOSE: The purpose of this study was to examine the influence of flexibility on three parameters associated with stationary hopping. METHODS: Sixteen NCAA Division I male athletes volunteered to serve as participants in this project. The mass of the participant as well as the dorsum height of the foot at fifty percent of the foot length was measured while the participant was standing and sitting. Arch flexibility was calculated as the quotient of the change in arch height (mm) and 40% of body weight (N) x100. The participants were then identified as either having a flexible arch (FLEX) or a very flexible arch (VFlex) according to the distribution noted in Zifchock et al., 2017. The participants were then asked to hop, in place, nine times upon an AMTI force platform. Data associated with the propulsion portion of the middle three hops are considered in this paper. RESULTS: The arch flexibility groups were compared using a one way ANOVA. Between subject factors indicated that the only significant finding was for time to peak propulsion ( $p=0.042$ ). Therefore, time of flight, height of hop, normalized peak vertical propulsion force, and duration of propulsion phase all failed to reach significance. CONCLUSION: These findings suggest that FLEX and VFLEX arches utilize different propulsion mechanisms to achieve the same task. The lack of a significant finding in hop height but for time to peak propulsive force suggests that though the participants are achieving the same hop height, normalized to center of mass height, the differences in arch flexibility is causing them to use the passive and active properties of the system differently.

### EFFECT OF TEXTURED INSOLES ON ONSET OF LOWER EXTREMITY MUSCULAR ACTIVITY DURING NORMAL WALKING

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**011** Purpose: The influence of altered afferent feedback, through the form of a textured insole, in altering the onset of lower extremity muscular activity during walking was investigated during normal walking (25 males, 25 females). Methods: Participants walked across an instrumented walkway at a normal, self-selected pace during four footwear conditions: barefoot (BF), insole-only (IN), a minimalist running shoe (SH), and a minimalist running shoe with the textured insole (INSH). Three-dimensional kinematics and muscle activity were simultaneously collected at 200 Hz and 1500 Hz, respectively. Bipolar Ag-AgCL surface electrodes were placed on the soleus, biceps femoris, and peroneus longus of the right leg and bilateral gluteus medius. Three successful trials were required for the completion of each condition. Muscular onset was determined utilizing the double threshold technique, which utilizes magnitude and temporal requirements to determine onset at right footstrike. Results: Separate 2 (gender) x 4 (footwear) repeated measures MANOVA was completed with dependence on the time to muscular onset for each of the muscular groups as well as walking velocity. No significant gender differences were observed for any of the dependent variables nor walking velocity. A significant footwear effect ( $F = 8.643, p < 0.001$ ) was observed for time to peak onset for the right gluteus medius only. Follow up analyses indicated a significantly shorter time to onset ( $p = 0.001$ ) during BF as compared to SH only. Conclusions: The present study suggest that footwear may alter time to onset of lumbopelvic-hip musculature, but augmented textural feedback does not have an effect.

### ARCH STIFFNESS, VERTICAL STIFFNESS, AND HOPPING FREQUENCY DURING UNILATERAL STATIONARY HOPPING AMONG MALE COLLEGIATE ATHLETES

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**012** PURPOSE: While vertical stiffness has received considerable attention in the literature, the role of the arch stiffness has been left out. Therefore, the purpose of this project was to determine the extent to which arch stiffness, vertical stiffness, and hopping frequency during unilateral stationary hopping are correlated with one another. METHODS: Twenty-two NCAA Division I male athletes volunteered to participate in the project. Foot anthropometrics as well as kinematic and kinetic data were collected to calculate arch stiffness, vertical stiffness, and hopping frequency. Kendall rank correlation coefficients were used to statistically analyze the magnitude of association between pairs of the stated variables of interest. RESULTS: Both arch stiffness ( $\tau_b = 0.307, p = 0.045$ ) and vertical stiffness ( $\tau_b = 0.680, p < 0.01$ ) were found to be significantly correlated with hopping frequency, but arch stiffness and vertical stiffness were not found to be significantly correlated with each other. CONCLUSION: The results of this study support the findings of previous research regarding the relationship between vertical stiffness and hopping frequency. Furthermore, the lack of a significant relationship between arch stiffness and vertical stiffness suggests that arch rigidity measures taken static loading may not properly characterize the full breadth and complexity of the arch's role in ballistic motions.

### GROUND REACTION FORCE FROM THE HIP, KNEE, AND ANKLE IN ISOMETRIC LEG EXTENSION

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**013** PURPOSE: To compare the contribution of the hip, knee, and ankle to the ground reaction force in a maximal effort isometric leg extension. METHODS: 17 females and 16 males were recruited to perform 8 maximal effort isometric squats at 4 different lower extremity postures. Postures were determined from kinematic data taken during countermovement jumps. 4 postures taken at equal intervals of the range of motion used in the concentric phase of the jump were selected. Participants were placed in these postures while standing over two force plates. Kinematic and kinetic data were collected using a ten camera VICON optical motion capture system. Joint torques and joint angles were computed using Visual 3D (C-motion, Inc.). The joint torque and angle data were used to derive a geometric model for computing the component of ground reaction force due to the hip, knee, and ankle of the right leg, respectively. RESULTS: Repeated measures ANOVAs were used to determine differences in contributions of each joint at the 4 different isometric leg extension postures. Statistically significant differences were found between posture conditions for the hip ( $F = 85.315, p < .001$ ), for the knee ( $F = 21.316, p < .001$ ), and for the ankle ( $F = 130.613, p < .001$ ). CONCLUSIONS: The contribution of the hip and knee to force tended to decrease as the leg postures were more extended. Conversely, the ankle tended to contribute more to the force as the legs extended. This demonstrates that optimal torques distributions for leg extension may be computed to improve performance.

#### COMPARISON OF POSTURAL CHANGES BETWEEN TRIALS USING NINTENDO WII FIT SOCCER

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**O14** PURPOSE: To examine differences in postural metrics between trials of play in a healthy, collegiate athlete population. METHODS: 102 healthy, Division I student-athletes (20 years±2; 84 males, 18 females) completed a total of three trials of a sport-like antisaccade task (ST). The first trial went unrecorded to familiarize the athlete with the game, while the last two were recorded using a force platform (1000Hz). Postural metrics including, Root Mean Square (RMS), Peak Excursion Velocity (PV), and Sample Entropy (SampEn) were calculated in the anterior-posterior (AP) and mediolateral (ML) directions. Six paired t-tests were run with an adjusted alpha level of  $p < 0.008$ . RESULTS: There were no significant differences between trials for all postural metrics; SampEn ML ( $p=0.78$ ; T1= $0.90 \pm 0.16$  m, T2= $0.90 \pm 0.17$  meters), SampEn AP ( $p=0.52$ ; T1= $0.68 \pm 0.15$  meters, T2= $0.68 \pm 0.13$  m), PV ML ( $p=0.16$ ; T1= $1.57 \pm 0.78$  m, T2= $1.65 \pm 0.73$  meters), PV AP ( $p=0.48$ ; T1= $0.49 \pm 0.46$  m, T2= $0.52 \pm 0.38$  m), RMS ML ( $p=0.02$ ; T1= $0.06 \pm 0.02$  m, T2= $0.06 \pm 0.01$  m), RMS AP ( $p=0.01$ ; T1= $0.01 \pm 0.002$  m, T2= $0.01 \pm 0.002$  meters). CONCLUSION: The results suggest that a ST does not have a significant learning effect within a healthy, collegiate athlete population across two trials.

#### RELATIONSHIP BETWEEN BODY COMPOSITION AND POSTURAL MEASURES OF COLLEGIATE ATHLETES

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**O15** Purpose: To evaluate the relationship between body composition and postural control metrics between gender in Division I collegiate athletes. Methods: 48 (34 females; 14 males; age=19 years) healthy collegiate athletes percent body fat mass (FM) and lean mass (LM) were measure using the air displacement plethysmography in a fasted state. In addition, the athletes were assessed on two 30-second trials of eye open (EO) and eyes closed (EC) quiet upright stance (1000 Hz, AMTI). Center of pressure Sample Entropy (SampEn), Peak Excursion Velocity (PEV), and Root Mean Square (RMS) in the mediolateral (ML) and anteroposterior (AP) directions were calculated and further analyzed. Pearson's product correlations evaluated the relationship between the body composition measurements and the postural measures, separated by gender. Results: In the female population, significant weak correlations were noted between conditions: EC SampEn AP and FM ( $r=-.358$ ,  $p=.037$ ); EC PEV ML and LM ( $r=.471$ ,  $p=.005$ ); EC RMS ML and LM ( $r=.417$ ,  $p=.014$ ); and EC RMS AP and LM ( $r=.372$ ,  $p=.030$ ). In the male population, significant moderate correlations were observed between conditions: EO SampEn ML and LM ( $r=.658$ ,  $p=.010$ ); and EO RMS AP with LM ( $r=-.605$ ,  $p=.022$ ). Conclusion: Males and females postural sway may be related to the distribution of FM and LM. The suggested relationship may be attributed to the musculatures ability to control the body.

#### COMPARISONS OF HIP BIOMECHANICS DURING WALKING USING FOUR ANATOMICAL HIP JOINT CENTER PREDICTION METHODS

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**O16** PURPOSE: The purpose of this study was to determine differences in sagittal and frontal plane hip joint mechanics utilizing 4 common hip joint prediction methods from anatomical landmarks. METHODS: Three-dimensional kinematics and kinetics of 13 participants were recorded during level walking at self-selected speeds. Visual3d was utilized for data reductions. Kinematic and ground reaction force data were filtered using 4th order butterworth filters at 8 Hz. Hip joint centers were predicted utilizing the Bell (B), Greater Trochanter (T) Harrington (HR), and Hara (HA) prediction methods. An x-y-z cardan sequence and the right hand rule were used for angular computations. Internal moments were expressed in the distal segment and normalized to mass (Nm/kg). Correlations determined agreement between methods in hip angles and moments. One-way ANOVAs compared peak angle and moments between methods. RESULTS: All methods produced similar angle and moment patterns (all  $r > 0.90$ ), despite projecting from different landmarks/segments. However, HA had the largest differences in peak flx/ext angles (range: 47-403%) from all other methods and peak ad/ab-duction angles (range: 81-234%) from HR and T methods (all  $p < 0.008$ ). Peak flexion moments differed between all methods ( $p < 0.008$ ), except B-T ( $p=0.2$ ). The largest differences in peak ad/ab-duction moments were found using the Trochanter method (range: 31-113%; all  $p < 0.008$ ). CONCLUSIONS: Depending on the chosen method of hip joint center, large variabilities between datasets can be expected in sagittal and frontal plane angles and moments. Therefore, choice of hip joint method should always be noted.

### BIOMECHANICAL INFLUENCES OF A POSTURAL COMPRESSION GARMENT ON SCAPULAR POSITIONING

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**PURPOSE:** The scapula is a critical link utilized in the kinetic chain to achieve efficient overhead movement and transfer energy from the lower extremity to the upper extremity. However, specific daily activities may negatively influence an individual's ability to maintain proper body posture and therefore compromise those movements. To reduce these negative influences, posture garments have been designed to cue the individual in maintaining and improving posture and alignment, specifically targeting scapular positioning. Thus, the purpose of this study to determine the effectiveness of an Intelliskin posture-cueing garment compared to a generic performance garment on scapular kinematics (retraction, upward rotation, and posterior tilt) during standing. **METHODS:** Forty females (20.7 1.33 yr; 1.68 0.07 m; 67.29 11.25 kg) were recruited to participate. All kinematic data were collected at 100 Hz using an electromagnetic tracking system synced with The MotionMonitor™. Each participant was instructed to stand in a natural position while data were collected. **RESULTS:** Repeated measures ANOVAs revealed a statistically significant Shirt by Side interaction of scapular protraction/retraction ( $F(1,39) = 52.91, p \leq 0.05, r^2 = 0.58$ ) and main-effect of Shirt for scapula anterior/posterior tilt ( $F(1,39) = 96.45, p \leq 0.05, r^2 = 0.71$ ). Individuals showed increased retraction and posterior tilt while wearing the Intelliskin posture-cueing garment. **CONCLUSION:** The current study revealed that the Intelliskin posture-cueing garment improved scapular positioning and therefore could provide individuals with biofeedback and improve shoulder function to perform daily tasks without pain or discomfort. The Intelliskin posture-cueing garment may also provide clinicians an alternative for rehabilitative protocols.

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### CROSS-OVER EFFECT OF BALANCE TRAINING AFTER KNEE SURGERY: A PILOT STUDY

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**Purpose:** To determine the preliminary effect of a cross-over balance training protocol on the non-surgical limb post knee surgery. **Methods:** Individuals with a history of knee surgery ( $N = 10$ ) were randomly assigned to a balance training or control group. The training group completed balance training on the non-surgical leg, 3 times a week for 6 weeks. Stability was measured using the overall stability index collected via the Biodex Balance System. Dynamic postural control was quantified using the Y-Balance Test. All measures were collected on the surgical and non-surgical limb pre-, mid-, and post-intervention. **Results:** Increased stability and dynamic postural control in the untrained, surgical leg was found after 6 weeks of balance training the non-surgical leg (BBSEO:  $F_{2,16} = 4.18, MSE = 1.85, H-F p = .023, n_2p = .376$ ; YBT:  $F_{2,16} = 4.40, MSE = 2.51, H-F p = .030, n_2p = .355$ ). The trained leg was not significantly differently than the trained leg of the control group, but did show a trend towards balance improvement (BBSEO: Cohen's  $d_{t1-t3} = 1.66$  strong; YBT: Cohen's  $d_{t1-t3} = 1.73$  strong). **Conclusions:** Balance training the non-surgical leg lead to increased stability and dynamic postural control for the untrained surgical leg. Enhanced balance may have occurred due to improvements in neural activity. Large effect sizes showed a trend toward increased balance ability on the trained, non-surgical limb. These initial findings support the possibility of using cross-over training as a means of rehabilitation after knee surgery and future investigation with a larger sample.

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### EFFECTS OF COLD WATER IMMERSION METHODS ON SKIN TEMPERATURE AND PERCEPTION OF COLD

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**Purpose:** Many versions of cold therapy are used by athletes as a recovery method. This study evaluated the impact of two treatment conditions: 1) cold tub immersion with water circulation (ACTIVE COLD), and 2) cold tub immersion without water circulation (PASSIVE COLD) on lower body skin temperature and perception of coldness of the water. **Methods:** Between August and September 2017, ten participants were randomly assigned to the order in which they would receive ACTIVE COLD and PASSIVE COLD, which occurred within 7 days, but at least 4 days apart. Participants sat in the cold tub (50F water) on a stool with the water level above the hip bones for 15 minutes. Skin temperature measurements were taken on the lateral side of the right thigh using a SantaMedical Infrared Thermometer before and after (immediately and five minutes after) immersion. Perception of cold was assessed while in the tub every 5 minutes on a scale of 0 (not cold at all) to 10 (extremely cold). Wilcoxon Signed Rank Tests were used to compare variables between the two conditions. **Results:** 5 males and 5 females participated (mean age:  $20.1 \pm 1.0$ ). Immediately following immersion, skin temperature for ACTIVE COLD was significantly less than for PASSIVE COLD ( $56.3 \pm 1.4$  deg. vs.  $58.3 \pm 1.5$  deg., respectively;  $p=0.009$ ). Five-minutes post-immersion, there was no significant difference in skin temperature between ACTIVE and PASSIVE COLD ( $66.2 \pm 1.2$  vs.  $67.5 \pm 1.7$ , respectively;  $p=0.059$ ). There was no significant difference between perceived coldness of the water at any time point or overall ( $6.3 \pm 2.1$  (ACTIVE) vs  $5.4 \pm 2.6$  (PASSIVE);  $p=0.168$ ). 70% of the participants reported preferring the ACTIVE condition. **Conclusions:** Active cold may result in initially greater cooling of extremities despite no difference in actual, or perceived water temperature; however, 5 minutes after exiting the tub, there were no differences in skin temperature. Supported by: Senior Study Grant, Maryville College

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### THE EFFECT OF EXERTION ON KING DEVICK CONCUSSION SCREENING NORMS IN WHEELCHAIR RUGBY ATHLETES

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**Background.** The King-Devick (KD) test is a valid and efficient sideline screening tool for concussion that does not require standing balance, making it appropriate for wheelchair sport. KD norms for wheelchair athletes are missing from the literature despite the inherent contact in team sports (rugby). **Purpose.** To determine baseline KD norms for wheelchair rugby athletes and, because exertion and fatigue have been shown to effect scores in able-bodied athletes, examine the effect of repeated effort on KD baseline scores in this population. **Methods.** Seventeen competitive male wheelchair rugby athletes (Age =3411 yrs, Experience = 76 yrs) completed two computerized tablet-administered KD tests followed by general and sport-specific warm-ups. Athletes then completed six 30-meter sprints, starting every 30 s (King et al. 2015). Because exertion varies over a 6-sprint protocol, we selected a second subset of participants to complete sprints until an RPE of 18 was reached (separate test day). **Results.** KD scores decreased 3% from 54.10 s (baseline) to 52.56 s (post-sprint) following 6 sprints (RPE = 12.88) but this mean change was not significant ( $p = 0.32$ ). KD scores increased 9% from 48.18 s (baseline) to 52.68 s (post-sprint) in a subset of 6 participants following sprints to an RPE of 18 and this mean change was not significant ( $p = 0.12$ ). **Conclusions.** KD scores were 5-10 s slower than those reported across varied able-bodied sports. Similar to previous research (King et al., 2015; 2016), some exertion (RPE=13) resulted in faster KD scores (indicator of better neural response). However, very hard exertion (RPE=18) slowed KD scores which is important to the interpretation of KD changes relative to follow-up referrals.

021

### EFFECTS OF HIP STRENGTHENING ON RUNNING MECHANICS AND CHRONIC LEG PAIN IN RECREATIONAL ATHLETES

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**PURPOSE:** The effects of a hip strengthening protocol on posterior hip running mechanics and Functional Movement Screen scores were examined in recreational athletes with chronic leg pain. **METHODS:** Subjects (n = 12) were instructed to run at a self-selected pace on a treadmill, while a two-dimensional video was recorded to assess posterior hip drop. Posterior hip drop angle was defined as the alignment of the PSIS during the stance phase as indicated by reflective markers. Subjects were also assessed using the Functional Movement Screen. A treatment group (n =7) was then instructed to complete an 8 week hip abductor strengthening protocol in addition to their normal training routine, while a control group (n=5) resumed normal training without a hip abductor strengthening protocol. Both groups were reassessed after 8 weeks to determine changes in posterior hip drop angles and FMS scores. Chronic leg pain was assessed using a 10 point visual analogue scale pre and post treatment. **RESULTS:** A two-way mixed ANOVA revealed a significant interaction between the treatment group and time on hip drop measurement,  $F(1, 10) = 6.383, p = .03$ , partial  $\eta^2 = .390$ . Hip drop showed a statistically significant improvement in the treatment group ( $M = 0.43, SE = 0.17, p = .03$ ) compared to the control group. No statistically significant interaction effects were observed for pain ( $F(1, 10) = .278, p = .60$ , partial  $\eta^2 = .027$ ) or FMS ( $F(1, 10) = .310, p = .59$ , partial  $\eta^2 = .03$ ). Follow-up within subjects univariate analysis showed significant mean improvements for the treatment group in pre and post ratings for hip drop ( $m = -.89, p = .04$ ) and FMS ( $m = -1.28, p = .03$ ) and no significant differences in pain. **CONCLUSION:** Reducing hip drop angles and increasing FMS scores through hip abductor strength training may lead to better posterior hip mechanics, but alone may not reduce pain in recreational runners with chronic leg pain.

022

### IMPACT® ASSESSMENT IN CONCUSSION DIVISION I COLLEGIATE FOOTBALL PLAYERS

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**PURPOSE:** The prevalence of concussion-related injuries indicates a growing health concern. Baseline assessments were conducted using a computerized neurocognitive assessment. Symptoms and recovery were evaluated after an identified concussion in Division I collegiate football athletes. **METHODS:** For the past four years, Division I collegiate football athletes, from 18-24 years (n=261; 19.1±1.4y; 184±11.9 cm; 101.4±23.3 kg), prior to initial fall practice, underwent a baseline neurocognitive ImPACT® assessment. If an athlete displayed concussion-like symptoms, such as headache, dizziness, fatigue, confusion, and/or loss of consciousness (n=16; 19.5±1.3y; 181.1±19.5 cm; 111.3±20.1 kg), were reevaluated at 24-hour post-concussion in comparison to age and weight-matched controls (n=16; 21.5±2.7y; 165.5±31.7 cm; 122.3.4±39.5 kg). When an athlete was asymptomatic, the ImPACT® assessment was administered. **RESULTS:** The concussed group's verbal memory ImPACT® score was significant ( $p = 0.021$ ) from their baseline score. In addition, the concussed group's visual memory and visual motor speed composite scores were significant (respectively,  $p=0.005$ ;  $p=0.002$ ) from their baseline score. **CONCLUSIONS:** The ImPACT® may be used, if available, when evaluating athletes with concussion like-symptoms. This study utilized only one of the many concussion protocol assessments when evaluating the football athletes return to play.

023

### THE EFFECT OF ANXIETY ON BASELINE NEUROPSYCHOLOGICAL ASSESSMENTS IN ADOLESCENT FEMALES

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Anxiety which is commonly divided into two components: trait and state occurs in approximately 15-20% of adolescent females and can significantly affect performance on cognitive tasks. Cognitive deficits in attention, memory, information processing, concentration and reaction time are common following concussion and the potential link between anxiety and baseline testing should be examined. **PURPOSE:** Examine the effects of state and trait anxiety on ImPACT in adolescent females. **METHODS:** 35 adolescent female athletes were administered ImPACT, and the State Trait Anxiety Inventory during baseline testing. Participants were split into groups, based on trait (low n=18, high n=17) and state (low n=26, high n=9) levels. One-way ANOVAs were calculated with a Bonferroni correction ( $p < .008$ ) to examine group differences. **RESULTS:** Significant differences were found between state groups for total symptom score ( $F(1, 33) = 9.01, p = .005$ ), where those with high state anxiety exhibited more symptoms. While differences in trait groups included total symptom score ( $F(1, 33) = 9.58, p = .004$ ), and visual motor composite ( $F(1, 33) = 10.11, p = .003$ ), where athletes with high trait anxiety had more symptoms and lower visual motor speed. **CONCLUSION:** Although, much of the literature focuses on state anxiety, these findings provides initial support for trait anxiety effecting commonly used concussion assessment tools. Screening for anxiety may benefit clinician's ability to monitor injury recovery and manage concussion in female athletes.

024

### BRANCHED-CHAIN AMINO ACID SUPPLEMENTATION MAY PRODUCE MARGINAL REDUCTIONS IN TASK-SPECIFIC MUSCULAR SORENESS IN COLLEGIATE DISTANCE RUNNERS

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**PURPOSE:** The purpose of this study is to investigate the influence of BCAA on perception of muscular soreness in collegiate distance runners. **METHODS:** 8 collegiate distance runners (men n=4, women n=4) took BCAA supplement (SUP) (0.08g/kg) or placebo (PLA) daily for 6 weeks, alternating conditions week to week. Each morning prior to their training session, athletes filled out a 10-point scale Soreness Chart in which they rated soreness levels for each major lower extremity muscle group on both anterior (ANT) and posterior (POST) body segments where 1= no pain at all and 10= excruciating pain. Responses were totaled for each condition (SUP or PLA) and body segment (ANT or POST). Data were analyzed using paired-samples T-tests to compare soreness levels between PLA and SUP weeks. The alpha criterion was set to  $p < 0.05$ . **RESULTS:** The p-values ranged from .09 to .89 depending on lower extremity segments. Based on descriptive analyses, athletes reported higher ratings of soreness in the ANT segment of the lower body. Overall soreness ratings were lower in SUP weeks vs PLA weeks in both ANT and POST lower extremity (SUP: ANT= 98.01% ± 34.86%; POST= 97.18% ± 39.72% and PLA: ANT= 108.52% ± 38.41%; POST = 110.32% ± 38.60%) but did not reach statistical significance. **DISCUSSION:** Although statistical significance was not met, some note-worthy changes were captured from PLA to SUP weeks in the athlete's perceptions of muscular soreness. For instance, the leg muscles, the primary task-specific movers involved in running, had a greater tendency to be less sore while on the supplement. Since gains in athletic performance can often be marginal, it is possible that marginal reductions of symptoms of delayed onset muscle soreness (DOMS) can eventually lead to an improvement in day to day training experiences.

025

### ENERGY ASSESSMENT IN ENDURANCE-TRAINED MALE ATHLETES

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**026** A plethora of literature examining deficits in energy availability (EA) for female athletes exists, however literature examining male athletes is sparse. Purpose: To examine the EA of male endurance-trained athletes during two separate training weeks (high and low volume). Methods: We utilized a cross-sectional design on 12 endurance-trained male athletes (age: 26+4; weight: 72.3+4.6kg; height 180.5+3.3cm; PBF: 7.22+2%; V02max: 63.9+ 6.9 ml/kg/min). Two separate weeks consisting of collecting: dietary logs, exercise logs, and exercise energy expenditure (EEE). Anthropometric measurements and inclusion criterion, consisted of participants present with <12% body fat and a V02max >41 ml/kg/min. Results: A two-way 2X7 ANOVA tested the 2 training weeks in relation to energy intake (EI), EEE, and EA. The average EI (3005.7+277.6 kcals) and EEE (760.5+178.5 kcals) yielded an average EA 33.18+3 kcals/kg/FFM over the two weeks. Due to the lack of empirical literature for males, the cut off for LEA was set at 25 kcals/kg/FFM. Across the two weeks, 37.5% (n=9) of the males presented with LEA. The main effect between the EI training weeks was statistically significant (p=0.00). The main effect was statistically significant for EI (p=0.001) EEE (p=0.009) and EA (p=0.00). A significant difference between EA and training weeks (p=0.047) was elicited. Conclusion: Due to sparse knowledge of the negative consequences of LEA in males and the differences illustrated across the 2 training weeks; Male athletes should be examined during training to help facilitate healthy EI and EA in male endurance athletes

### EFFECTS OF GINGER ROOT ON SORENESS AND MUSCLE DYSFUNCTION STEMMING FROM A 40-MINUTE DOWNHILL RUN

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**027** PURPOSE: Previous studies indicate that ginger root has pain-relieving properties, but these effects have not been thoroughly examined in the context of endurance running. The purpose of this randomized, parallel-group, placebo-controlled trial was to determine whether ginger root supplementation reduces muscle soreness and dysfunction stemming from downhill running. METHODS: Thirty-two experienced runners (10 women, 22 men; age = 37.6 ± 10.5 years) were pair-matched based on running ability and subsequently randomized to either 1.425 g/day ginger root or placebo for five days. To induce soreness, a 40-minute downhill (-7.5%) run was completed on day 3. Before supplementation and at various points throughout the 5-day protocol, muscle soreness, pain-pressure threshold, vertical jump height, and 1.5-mile run performance were evaluated. Differences between treatments were assessed using magnitude-based inferential statistics. RESULTS: Soreness while jogging likely increased to a lesser degree immediately after the 40-minute run (Cohen's d = -0.69; 90% confidence limit [CL] = -1.50, 0.12) as well as at day 5 (d = -0.72; 90% CL = -1.61, 0.16) with ginger root supplementation. Ginger root had a possible small beneficial effect on vertical jump height at day 5 (d = 0.24; 90% CL = 0.05, 0.44) but likely no meaningful effect on 1.5-mile run performance. No significant differences in adverse events were observed between the treatments. CONCLUSIONS: Ginger root likely moderately relieves pain stemming from downhill running but has small-to-no effects on recovery of physical performance. Given these findings, it appears that runners may consider using ginger root to reduce temporary pain, although more studies are needed to clarify its safety profile and its effects on long-term training adaptation.

### EXAMINATION OF PATHOGENIC BEHAVIORS AND EATING DISORDER RISK AMONG COLLEGIATE FEMALE TRACK & FIELD ATHLETES

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**028** Revealing uniforms and intense training may predispose track and field athletes to eating disorders (ED) and pathogenic behaviors. PURPOSE: Estimate prevalence of ED risk and pathogenic behaviors (e.g., binge eating, use of diet pills, etc.) in track and field athletes by position (sprinters-S, middle distance-MD, distance-D, lean field events-LFE, non-lean field events-NLFE, multi-event-ME). METHODS: Volunteer female track and field athletes (n=449; 19.8±1.5yrs, 167.1±7.1cm, 61.6±11.7kg) representing 5 track and field disciplines (S: n=77; MD: n=71; D: n=164; LFE: n=78; NLFE: n=38; ME: n=21). Participants self-reported height and weight and completed the Eating Attitudes Test (EAT-26) and 5 supplemental pathogenic behavior questions. SUMMARY OF RESULTS: Basic descriptive statistics and Chi-square analysis were used. Prevalence for ED risk for all participants was estimated at 25.6% (n=115) and then separated within position: S=19.5%, MD=22.5%, D=26.2%, LFE=30.8%, NLFE=39.5% and ME=9.5%. Overall pathogenic behaviors risk revealed: 13.6% (61) engaged in binge eating, 4.7% (n=21) vomited to control weight, 6.5% (n=29) used laxatives, diet pills, or diuretics to control weight, 4.2% (n=19) engaged in excessive exercise, 1.8% (n=8) lost more than 20 pounds in less than 6 months, and 4.2 (n=19) reported having a previous eating disorder. CONCLUSION: Regardless of position, track and field athletes in general reported to be at risk for eating disorders and engage in pathogenic behaviors. Education about at risk eating disorder and pathogenic behaviors should be included as a preventative measure for all competitive track and field athletes. Awareness for those working with the population of competitive track and field should be knowledgeable in at risk behaviors for eating disorders.

### EXAMINATION OF BODY IMAGE DISSATISFACTION AMONG COLLEGIATE FEMALE TRACK & FIELD ATHLETES

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**029** Revealing uniforms and perceptions of body image (BI) from peers (P), parents (PA) and coaches (CO) may predispose track and field athletes to body image (BI) dissatisfaction. PURPOSE: To examine track and field athletes by position (sprinters-S, middle distance-MD, distance-D, lean field events-LFE, non-lean field events-NLFE, multi-event-ME) and BI dissatisfaction by clothing type (daily clothing-DC, competitive uniform-CU) and by external people (peers-P, parents-PA, coaches-CO). METHODS: Volunteer female track and field athletes (n=449; 19.8±1.5yrs, 167.1±7.1cm, 61.6±11.7kg) representing 5 track and field disciplines (S: n=77; MD: n=71; D: n=164; LFE: n=78; NLFE: n=38; ME: n=21). This was part of a larger study, however ten questions regarding PBI and DBI in DC vs CU and athletes' perceptions of their P, PA, and COs' PBI and DBI in DC were answered using a gender-base BMI silhouette. RESULTS: A 2 (clothing: DC, CU) x 2 (perception: PBI, DBI) repeated measures ANOVA indicated a main effect (p ≤0.01) with interactions for perceptions (PBIvs.DBI; p<.01) and perceptions and CU (p<0.01) were found. A 3 (external: P, PA, CO) x 2 (perception: PBI, DBI) repeated measures ANOVA indicated a main effect (p ≤0.01) with interactions for perceptions (PBIvs.DBI; p<.01) and perceptions and external people (P vs. PA vs. CO; p<.01) and perceptions and CU (p<0.01) were found. CONCLUSION: Regardless of position, the athletes perceived themselves larger in their CU, and further perceived that their coaches had the largest discrepancy of their body image. The perception of coaches was significantly larger than their peers and family perceptions. Maladaptive thoughts and behaviors are identified in this population and further examination is warranted.

### EFFECTS OF NATURAL VS MANUFACTURED RECOVERY SNACKS ON REPEATED EXHAUSTIVE EXERCISE PERFORMANCE

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**O30** PURPOSE: The effects of different low glycemic index recovery snacks (Clif Bar vs a medium sized banana) on performance in repeated exercise to exhaustion running tests were compared in in male recreational athletes. METHODS: Twenty subjects reported for three exercise sessions on separate days. During these testing sessions, subjects completed two running tests to exhaustion on a treadmill using the Modified McConnell incremental protocol with a 30 min recovery period in between. During the recovery period, subjects either consumed no snack, a banana, or a Clif Bar. Differences in time to exhaustion between pre and post recovery snack tests were compared between sessions. RESULTS: A repeated measures ANOVA revealed no statistical difference between the difference in performance times of the banana and Clif Bar trials ( $p < .05$ ). Both recovery snacks did reduce differences in time to exhaustion compared to no snack, with a 58.12 s mean difference between tests in the control trial vs 1.3 s mean difference for the banana trial and 1.5 s mean difference for the Clif Bar trial. CONCLUSION: Recovery snacks can reduce differences in performance in repeated exhaustive exercise, however, both natural and manufactured low glycemic index snacks have similar effects.

### EXERCISE PERFORMANCE AND PERCEPTION OF BREATHLESSNESS AFTER CAFFEINE INGESTION IN CYCLISTS

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**O32** Caffeine (CAF) is consistently ingested as an ergogenic aid among cyclists, in part, due to its effect on pain perception. Relatedly, CAF may also improve exercise performance by altering the perceptions related to ventilatory work and dyspnea. Purpose: The purpose of this study was to evaluate exercise performance and the rating of perceived breathlessness (RPB; Likert Scale) after the ingestion of a moderate dose of CAF in trained cyclists. Methods: Two trained cyclists completed pulmonary function testing and a peak aerobic capacity test. During the second visit, cyclists completed a fixed-work familiarization time trial (TT) equivalent to a distance of 20km. Subsequently, and on separate days, subjects completed TTs with ingestion of a placebo (TTPLA) or caffeine (TTCAF; 5 mg·kg<sup>-1</sup>) 60 min prior. Elapsed time, power output, perceptual responses, and ventilatory parameters were measured at 10% intervals during each TT. Results: Subjects displayed normal pulmonary function. Elapsed time was lower in the TTCAF compared with TTPLA (35.9±0.9 min vs. 37.0±0.5 min). Subjects operated at a slightly higher percentage of their peak power during the TTCAF (62.2±1.67 % vs. 60.9±.916%) when compared to the TTPLA. RPB was reduced at 80% (4.0±4.2 vs. 5.5±3.5) and 100% (5.0±2.8 vs. 6.5±3.5) of TTCAF compared with TTPLA. Ventilation was similar at 80% (113.6±34.5 L·min<sup>-1</sup> vs. 118.1±42.5 L·min<sup>-1</sup>) and 100% (132.1±45.0 L·min<sup>-1</sup> vs. 135.6±65.7 L·min<sup>-1</sup>) of TTCAF compared with TTPLA. Conclusions: Our preliminary data suggest that CAF ingestion may improve exercise performance via reductions in the perceptions related to ventilatory work and dyspnea.

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### THE EFFECTS OF COFFEE INGESTION ON THE ACUTE TESTOSTERONE RESPONSE TO EXERCISE

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**O31** Purpose: This study investigated the effects of coffee ingestion (COF) on serum testosterone responses to exercise in recreationally weight-trained males. Methods: Subjects ingested either 12 ounces of 6mg/kg caffeinated coffee (COF), decaffeinated coffee (DEC), or water (PLA) one hour prior to exercise in a randomized, within-subject, crossover design. The exercise session consisted of 21 minutes of high intensity interval cycling (alternating intensities corresponding to two minutes at power outputs associated with 2.0 mmol/L lactate and 4.0 mmol/L lactate) followed by resistance exercise (7 exercises, 3 sets of 10 repetitions, 65% 1RM, 1-minute rest periods). Subjects also completed repetitions to fatigue tests and soreness scales to determine muscle recovery 24 hours following the exercise. Results: Testosterone (T) was elevated immediately and 30-minutes post-exercise by 20.5% and 14.3% respectively ( $p < 0.05$ ). There was no main effect for treatment and no exercise x treatment interaction. There were no differences in repetitions to fatigue or soreness between treatments ( $p > 0.05$ ). No relationships were observed between T and any proxy of recovery. Conclusions: The duration of T elevation indicates that this exercise protocol elicits a long-lasting anabolic environment. While past literature suggests caffeine may augment T post-exercise, data from the current study suggest that augmented T response is not evident following caffeine supplementation via coffee.



### SOY PROTEIN SUPPLEMENTATION IS NOT ADIPOGENIC OR ESTROGENIC IN YOUNG MEN WHEN COMBINED WITH RESISTANCE TRAINING

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**D1** Purpose: Sex hormone physiology (e.g., estradiol, testosterone) may be affected by soy and/or whey protein consumption. Alterations in sex hormones due to resistance training (RT) and/or protein supplementation may explain meaningful variation in adipocyte and skeletal myocyte size alterations. Consequential molecular signaling in these cell types remain unclear. Therefore, we examined effects of RT and soy (SPC), whey (WPC), or placebo (PLA) supplementation in young men. Methods: 47 healthy, young men were partitioned into PLA, SPC, or WPC groups and completed 12 weeks of RT. Body composition, serum hormones, androgen signaling markers in myocytes, and estrogen signaling markers in adipocytes were examined using DXA, ELISA, western blotting, PCR, and immunohistochemistry. Results: Testosterone increased over time, but more so in subjects consuming WPC ( $p < 0.05$ ). Adipocyte mRNA expression of the estrogen receptor alpha increased ( $p < 0.05$ ), as did hormone sensitive lipase over time ( $p < 0.05$ ). Skeletal muscle androgen receptor mRNA expression increased while ornithine decarboxylase mRNA decreased over time ( $p < 0.05$ ). Alterations in body composition, adipocyte, and myocyte morphology were not significantly different between groups ( $p > 0.05$ ). Changes in  $17\beta$ -estradiol and testosterone explained  $< 3\%$  of alterations in adipocyte and myocyte size. Conclusion: These data suggest primarily RT-mediated effects with little influence of protein type and hormonal changes. Supported by: Gifts from Hilmar Inc., BNRG, JW Nutritional, Lockwood, LLC.

### HEART RATE COVERAGE OF WEARABLE ACTIVITY MONITORS IN YOUTH WITH DEVELOPMENTAL DISABILITIES

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**D2** PURPOSE: The popularity and low-participant burden of wearable activity monitors (e.g., Fitbit, Garmin) may present an opportunity to integrate such technology as a method to monitor 24 hour activity in special populations. There is a lack of research concerning the amount of time children will wear these devices for activity monitoring via heart rate (i.e., heart rate coverage); therefore, the purpose of this study was to illustrate the level of heart rate (HR) coverage obtained from a wearable activity monitor in a sample of youth with mild developmental disabilities. METHODS: Children attending a specialized summer camp ( $n=20$ , mean age=10 years, 50% female, 90% non-Hispanic White) were given a FitBit Alta HR<sup>®</sup> to wear for 24 hours/day on camp and non-camp days. Heart rate data was downloaded from Fitabase<sup>®</sup> and a valid HR coverage day was identified as the recording of at least one HR every 1-minute. Results were interpreted as the percent of days with 24, 19, 17, 15, and 12 hours/day of minute-by-minute HR coverage. RESULTS: Eighteen children provided at least one minute of HR data on 691 out of a possible 781 observation days (median: 43,  $SD \pm 14$ , range: 13 – 56 days) with a median daily wear time of 1,165 minutes/day ( $SD \pm 278$ , range: 339 – 1,384 minutes/day). The median percent of days with valid minute-by-minute HR coverage for 24, 19, 17, 15, and 12 hours/day was 20% (range: 0 – 50), 67% (range: 7 – 100), 72% (range: 11 – 100), 77% (range: 18 – 100), and 85% (range: 39 – 100), respectively. CONCLUSIONS: Preliminary evidence suggests that wearable activity monitors can provide substantial HR coverage in youth with mild developmental disabilities. Given the high level of compliance and coverage, wearable activity monitors should be considered as an alternative to conventional activity measurement devices for capturing 24-hour activity in youth.

### EXERCISE INTENSITY REDUCES CIRCULATING ANNEXIN V- CD105 MICROPARTICLES IN ADULTS WITH PREDIABETES

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PURPOSE: Microparticles (MPs) derived from platelets, leukocytes and endothelial cells are important players in cardiovascular disease (CVD) risk. Exercise is established to reduce CVD risk, but no study has tested the effect of exercise intensity on various subtypes of MP in people with prediabetes. We tested the hypothesis that short-term interval (INT) training would reduce MP subtypes vs. continuous (CONT) exercise. METHODS: Eighteen obese adults (age:  $63.8 \pm 1.5$  yrs BMI:  $31.0 \pm 1.3$  kg/m<sup>2</sup>) were screened for prediabetes using ADA criteria (75g OGTT and/or HbA1c). Subjects were randomized to INT ( $n=10$ , 3 min intervals at 90% and 50% HRpeak) or CONT ( $n=8$ , 70% HRpeak) training for 12 supervised sessions over 2 wks for 60 min/d. Fitness (VO<sub>2</sub>peak) and weight (kg) were assessed and arterial stiffness (augmentation index; AI) calculated using total AUC during a 75g OGTT. Total MPs, platelet MPs (CD31+/CD41+), endothelial MPs (CD105, CD31-/CD41+) and leukocyte MPs (CD45+/CD41-) were analyzed from fresh plasma via imaging flow cytometry pre-/post- intervention. RESULTS: Our interventions had no effect on weight loss but INT exercise increased VO<sub>2</sub>peak ( $P=0.04$ ) and reduced fasted AI (trend:  $P=0.08$ ) compared with CONT training. While our intervention had no effect on platelet or leukocyte MPs, INT exercise decreased Annexin V-endothelial MP CD105 ( $1.6 \pm 0.2$  vs.  $1.4 \pm 0.2$  count) compared with CONT training ( $1.2 \pm 0.2$  vs.  $1.8 \pm 0.1$  count;  $P=0.04$ ). Increased VO<sub>2</sub>peak correlated with decreased Annexin V+ CD105 endothelial MPs ( $r=-0.60$ ,  $P=0.01$ ). CONCLUSION: Exercise intensity decreases endothelial derived MPs through possibly a cardiovascular fitness related mechanism independent of weight loss.

### COMPARISON OF BONE AND BODY COMPOSITION IN THE AFFECTED AND UNAFFECTED ARMS IN BREAST CANCER SURVIVORS

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Following surgery and treatments, breast cancer survivors (BCS) may experience weakness, pain, and swelling in the arm next to the breast where the cancer was present (affected arm), resulting in decreased use of that arm. Treatments can also cause losses in bone mineral density (BMD), lean mass (LM), and gains in fat mass (FM). There is a lack of research on the effects of cancer treatment on BMD and body composition specifically in the affected compared to the unaffected arm. PURPOSE: To examine BMD, LM, and FM in the affected compared to the unaffected arm in BCS. METHODS: Arm BMD, LM, and FM were assessed on 43 BCS ( $60 \pm 8$  yrs) using dual-energy X-ray absorptiometry. Paired t-tests were used to compare arm BMD, LM, and FM. Significance was accepted at  $p \leq 0.05$ . RESULTS: BCS were  $6.6 \pm 7.3$  yrs post treatment. Mean values of arm BMD, LM, and FM were  $0.681 \pm 0.097$  g·cm<sup>-2</sup>,  $2.23 \pm 0.52$  kg, and  $1.79 \pm 0.75$  kg, respectively. The affected arm had lower BMD ( $0.674 \pm 0.095$  g·cm<sup>-2</sup>) and FM ( $1.70 \pm 0.60$  kg) compared to the unaffected arm (BMD:  $0.689 \pm 0.104$  g·cm<sup>-2</sup>; FM:  $1.89 \pm 0.93$  kg). There was no difference in LM. CONCLUSION: Our findings suggest that breast cancer treatments can result in accelerated changes in BMD and FM in the affected arm, which may place BCS at a higher risk for fractures on the affected side. These findings warrant the need for exercise interventions to improve BMD and body composition in the affected arm following cancer treatments.

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### THE VALIDITY OF AGE-BASED MAXIMAL HEART RATE EQUATIONS IN YOUTH: A SYSTEMATIC REVIEW AND META-ANALYSIS.

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**D5** Maximal heart rate (MHR) is an important physiological reference for prescribing and monitoring exercise in both clinical and sports settings. However, prediction equations developed in adults may have limited accuracy in youth. **PURPOSE:** To examine the validity of age-based MHR prediction equations in children and adolescents using meta-analysis. **METHODS:** Included studies were peer-reviewed, published in English, and compared measured MHR to predicted MHR using the Fox or Tanaka equations in participants <18 yrs. The difference between measured and predicted MHR was assessed using Hedges' d effect size (ES) to adjust for small sample bias, and random-effects models were used to calculate the mean ES. **RESULTS:** Six articles published between 2011 and 2015 met our inclusion criteria. The cumulative results of 18 effects indicated that MHR prediction equations did not accurately reflect measured MHR in children and adolescents (ES=0.73, 95%CI 0.30, 1.17). The Fox equation (MHR = 220 – age) overestimated MHR by ≈12.93 beats per minute (bpm), (k=11, ES=1.41, 95%CI 1.10, 1.72). The Tanaka equation (MHR = 207 – 0.7\*age) underestimated MHR by ≈2.10 bpm (k=7, ES=-0.39, 95%CI -0.76, -0.01). **CONCLUSION:** The Tanaka equation resulted in smaller mean differences between measured and predicted MHR than the Fox equation. However, neither equation accounted for the large variation in measured MHR values among younger populations. Caution should be used when employing these equations for prescribing exercise intensity in children and adolescents.

### ACUTE AND CHRONIC AEROBIC EXERCISE EFFECTS ON NrF2 PROTEIN CONCENTRATION IN MULTIPLE BRAIN REGIONS

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**D6** Nuclear factor erythroid 2 related factor 2 (NrF2), is an essential transcription factor and a master regulator of the antioxidant defense system, which increases antioxidants in response to reactive oxygen and nitrogen species (RONS). However, there are only two studies that have reported changes in NrF2 in response to exercise in a healthy cohort. These studies were also limited to chronic exercise and examination of the striatum brain region and whole brain only. **PURPOSE:** To determine the extent to which NrF2 protein concentration changes with acute and chronic aerobic exercise in the cortex, hippocampus, and cerebellum brain regions. **METHODS:** Male Sprague Dawley rats ran at 75% VO<sub>2</sub>max for a single bout of acute aerobic exercise (AE) or were chronically trained (ET) for 5-7 weeks or were sedentary controls (SD). AE and ET were sacrificed immediately after or five hours post the final bout of exercise, respectively, via Pentobarbital injection. Brain tissues were collected and stored at -80°C until further analysis. NrF2 protein concentration was measured by western blot and normalized to beta-actin. **RESULTS:** NrF2 protein concentration was significantly reduced in both the cortex (AE=0.75±0.03; SD=6.04±0.35) and cerebellum (AE=1.20±0.09; SD=2.77±0.37) brain regions with AE compared to SD. NrF2 protein concentration significantly increased in the hippocampus (ET=3.62±0.02; SD=2.28±0.10) brain region with ET compared to SD. **CONCLUSION:** Brain is a highly protected tissue by the blood brain barrier and endogenous antioxidant factors. Regional brain tissue differences were noted in NrF2 protein concentration with AE and ET. However, only ET demonstrated significant increases in NrF2 protein concentration in the brain.

### CHANGES IN AMINO ACID TRANSPORTERS AND METABOLIC PROTEINS AFTER 12 WEEKS OF RESISTANCE TRAINING WITH VARYING SUPPLEMENTATION

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**PURPOSE:** Amino acid transporters within skeletal muscle have gained attention for their potential role in stimulating muscle protein synthesis (MPS). The purpose of this study was to determine if amino acid transporters and proteins involved in amino acid metabolism are related to skeletal muscle hypertrophy following resistance training with different nutritional supplementation strategies. **METHODS:** 43 untrained, college-aged males were separated into a Maltodextrin Placebo (PLA, n=12), Leucine (LEU, n=14), or Whey Protein Concentrate (WPC, n=17) group and underwent 12 weeks of total-body resistance training performed 3 days per week while supplementing twice daily. Each group's supplement was standardized for total energy, fat, and LEU and WPC groups were standardized for total Leucine (6 g/d). Skeletal muscle biopsies were obtained prior to training (PRE) and ~72 h following subjects' last training session (POST). **RESULTS:** LAT1 protein levels demonstrated a time (p<0.001) and group effect (p=0.043) whereby PLA increased significantly more than LEU and WPC (p<0.05). PAT1 and BCKDHA protein levels displayed time effects (p=0.047 and p<0.001, respectively), while SNAT2, BCAT2, and ATF4 protein levels were unaltered. Changes in muscle fiber cross sectional area (CSA) demonstrated a time effect for Type I fibers (p=0.045) and Type II fibers (p<0.001). No strong, significant correlations existed for changes in assayed proteins with changes in Type I or II fiber CSA, nor were PRE protein values indicative of alterations in muscle CSA. **CONCLUSIONS:** LAT1 protein levels increase in response to resistance training, and LEU and WPC supplementation reduced training-induced increases in this protein. Furthermore, proteins related to amino acid transport and metabolism do not appear to dictate skeletal muscle hypertrophy.

### INFLUENCE OF SEX AND MUSCLE QUALITY ON MOTOR UNIT RECRUITMENT PATTERNS OF THE VASTUS LATERALIS

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**Purpose:** Strong relationships have been reported between increases in muscle cross-sectional area (mCSA) and motor unit action potential sizes (MUAPSIZE) for the vastus lateralis (VL). It is unknown if sex-related differences in mCSA and muscle quality are correlated with the slopes and y-intercepts (Y-Int) for the MUAPSIZE vs. recruitment threshold (RT) relationships. **METHODS:** Ten males and ten females volunteered for this study. Ultrasonography (US) examined mCSA, echo intensity (mEI), subcutaneous fat (sFAT), and muscle quality (mQT [mCSA/mEI]) for the VL. Surface electromyographic decomposition assessed MUAPSIZE vs. RTs of the VL during 40% and 70% submaximal contractions. For all contractions, linear regressions determined Y-Ints and slopes for the MUAPSIZE vs. RT relationships. Separate two-way mixed factorial ANOVAs (sex x intensity) examined differences in Y-Ints and slopes from the MUAPSIZE vs. RT relationships. Independent samples t-tests examined between sex differences in mCSA, mEI, mQT, and sFAT. Pearson's product moment correlation coefficients compared mCSA, sFAT, mEI, and mQT of the VL with slopes and Y-Ints from the contractions. **RESULTS:** Males had greater (P≤0.002) mCSA, mQT, and slopes for the MUAPSIZE vs. RT relationships. Females had greater (P≤0.003) sFAT and mEI for the VL. All relationships between US variables and the slopes for the 40% and 70% MUAPSIZE vs. RT were significant (P≤0.020), with the greatest variance explained by mQT (r=0.707-0.778). **CONCLUSIONS:** Slopes for the MUAPSIZE vs. RT relationships are dependent on the physical properties of the muscle as measured by US. In addition, sex-related differences in mCSA, mQT, and MUAPSIZE in relation to RT suggests greater muscle fiber sizes of the higher-threshold MUs for the males.

### LOW INTENSITY RESISTANCE TRAINING TO FAILURE ON 1RM STRENGTH IN UNTRAINED FEMALES

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**M1**

Purpose: This study examined the effects of resistance training (RT) to failure at 30% one-repetition maximum (1RM) on maximal strength in untrained females. Methods: Eight females (Mean  $\pm$  SD: Age  $21 \pm 1.7$  yrs) completed 9 weeks of RT to failure at 30% 1RM on four exercise machines: leg extension (LE;  $65 \pm 8$  kg), seated military press (SMP;  $22 \pm 4$  kg), leg curl (LC;  $49 \pm 7$  kg), and lat pull down (LPD;  $36 \pm 5$  kg). Pre-, mid-, and post-1RM testing took place at weeks 1, 5, and 12, respectively. No RT sessions were conducted during 1RM testing weeks. The subjects completed two sets to failure during weeks 2-4 and 6-7, and three sets to failure during weeks 8-11. Training weights were adjusted for weeks 6-11 using the 1RMs recorded during week 5. Statistical analyses of 1RM strength at pre-, mid-, and post-included separate one-way repeated measures ANOVAs at an alpha level of  $p \leq 0.05$ , with follow-up pairwise comparisons. Results: There were significant increases in 1RM strength from pre- to mid- testing for only the LE ( $+13 \pm 3$  kg) and LC ( $+8 \pm 1$  kg) and for all exercises from pre- to post-testing (LE  $+18 \pm 5$  kg; SMP  $+3 \pm 1$  kg; LC  $+14 \pm 2$  kg; LPD  $+4 \pm 1$  kg). There were also significant increases in 1RM strength from mid- to post-testing in LC ( $+6 \pm 2$  kg) and LPD ( $+3 \pm 1$  kg). Conclusions: Resistance training at a low-intensity (30% 1RM) resulted in significant improvements in maximal strength in untrained females when repetitions were taken to failure.

### LIFELONG KETOGENIC DIET OR KETONE SALT SUPPLEMENTATION IN RATS INCREASES LONGEVITY WITHOUT ALTERING OXIDATIVE STRESS MARKERS

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**M2**

Purpose: Ketogenic diets have previously been used for weight loss and have also been proposed to increase longevity. Therefore, we determined the effects of a ketogenic diet (KD) or ketone salt (SC+KS) supplementation on life expectancy and oxidative stress. Methods: Ten month-old male rats (n=8 per group) were provided isocaloric amounts of standard chow (SC), KD, or SC+KS (~1.2 g/day of DL-3 sodium hydroxybutyric acid). The gastrocnemius muscle and liver were harvested from all rats and were analyzed for oxidative damage (4-hydroxynonenal; 4HNE) and protein levels of the antioxidants superoxide dismutase 1/2 (SOD1/2), catalase (CAT), and glutathione peroxidase (GPX). Protein levels of PGC-1 $\alpha$  were determined in the gastrocnemius. Results: As illustrated by the survivability log-rank test, the KD and SC+KS rats lived significantly longer compared to SC rats ( $p=0.009$  and  $p=0.023$ , respectively). Body mass across all treatments was not significantly different at the beginning or end of the experiment ( $p>0.05$ ). The gastrocnemius mass was significantly different between groups (SC= $1.32 \pm 0.07$  g, KD= $1.26 \pm 0.05$  g, SC+KS= $1.52 \pm 0.08$  g;  $p=0.028$ ). The liver mass was not significantly different between groups, albeit it approached significance ( $p=0.055$ ). No significant difference was observed for 4HNE levels in the gastrocnemius ( $p=0.741$ ) or liver ( $p=0.445$ ). CAT protein levels were significantly different in the liver (SC= $1.00 \pm 0.07$ , KD= $1.31 \pm 0.14$ , SC+KS= $1.81 \pm 0.25$ ;  $p=0.009$ ). SOD1 protein levels approached significance in the liver ( $p=0.067$ ). No other significant differences in protein levels of antioxidants or PGC-1 $\alpha$  were observed in either the gastrocnemius or the liver. Conclusions: In conclusion, lifelong KD or KS supplementation improves longevity in rats without dramatically altering markers of oxidative stress in the gastrocnemius or liver.

### ACUTE CAFFEINE CONSUMPTION DOES NOT AFFECT BODY COMPOSITION ANALYSIS

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**M3**

Bioelectrical impedance analysis (BIA) is a routine assessment that measures total body water (TBW), intracellular (ICW), extracellular body water (ECW), and percent body fat (PBF). A common restriction for BIA analysis is to abstain from caffeine 12-hours prior to testing. Purpose: To examine the effects of acute caffeine consumption on markers of body composition analysis. Methods: 20 males ( $26.6 \pm 4$  yrs) that were habitual caffeine consumers ( $\geq$  one 95mg serving per day  $\geq$  4 days per week) participated. Testing occurred on three occasions, having abstained from caffeine 12-hours prior to each session. The first visit served as the control (CON), the remaining visits were performed in a randomized double-blind, cross-over fashion. The remaining visits consisted of the consumption of a 200mg of either dextrose (PLA) or caffeine (CAF) capsule. Seven multi-frequency BIA measurements 15-minutes apart were conducted each visit (PRE, 15-M, 30-M, 45-M, 60-M, 75-M, 90-M). Results: A 3x7 (condition x time) repeated measures ANOVA revealed no trial-dependent main effects between the three conditions for TBW, ECW, ICW or PBF ( $p=0.861$ ,  $0.993$ ,  $0.694$ ,  $0.076$ ), respectively. A one-way ANOVA for each trial demonstrated no significant time effects except for ICW and PBF ( $p>0.05$ ). Conclusion: Caffeine consumption in habitual users does not lead to any changes in TBW, ECW, ICW, or PBF. Caffeine restriction for habitual users may not be necessary.

### CHILD DEVELOPMENT MAJORS PHYSICAL ACTIVITY COMPETENCE AND ATTITUDES

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**M4**

PURPOSE: To examine the relationships between personal physical activity competence (PPACQ) and school-related physical activity competence (SPAP-CQ) and attitude (SPAP-AQ) in child development (CD) majors. METHODS: Forty-six CD majors, licensure and non-licensure, attempted an online survey in the Spring 2017 semester. The survey contained 3 different questionnaires (PPACQ, SPAP-CQ, SPAP-AQ) all using Likert scales. Basic demographics included year in school, date of birth, height, and weight. Descriptive statistics were calculated for each survey response and total scores. Comparisons between licensure and non-licensure were made using a Mann-Whitney U test ( $p<0.05$ ). Spearman rank order correlations were performed to determine relationships between PPACQ and SPAP-CQ and SPAP-AQ. RESULTS: SPAP-AQ scores overall were high ( $40.86 \pm 4.8$ ) with a total score of 52. PPACQ ( $27.3 \pm 8.13$ ) and SPAP-CQ ( $76.1 \pm 25.1$ ) were moderately high with total scores of 39 and 112, respectively. Spearman's rho revealed significant correlations ( $p<0.001$ ) in 6 variables between PPACQ and SPAP-CQ and 3 variables between PPACQ and SPAP-AQ. Finally, the total SPAP-AQ was significantly correlated ( $r=0.58$ ,  $p<0.001$ ) to PPACQ. The Mann-Whitney U test showed no significant differences between licensure status. CONCLUSIONS: Overall there was no significant difference between a CD major going for a licensure or non-licensure. SPAP-AQ scores were relatively high and correlated with PPACQ suggesting CD majors believe providing physical activity (PA) in the classroom is important. In addition, positive late experiences influence their competence in providing PA opportunities. More information is warranted regarding CD majors competence and ability in promoting PA in the classroom.

**THE EFFECTS OF MICRO-RNA-26A IN LIPID INDUCED INSULIN RESISTANCE**

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M5

Purpose: The accumulation of lipid in skeletal muscle is thought to be a major contributor to skeletal muscle insulin resistance. The mechanisms by which fatty acids cause insulin resistance are not completely understood. The purpose of this study was to determine the influence of microRNA-26a (miR-26a) in palmitic acid (PA)-induced insulin resistance, using C2C12 mouse muscle cells. Methods: C2C12 myoblasts were grown to about 80% confluence in a 37°C, 5% CO<sub>2</sub> incubator in Dulbecco's Modified Eagle Medium with 10% fetal bovine serum and 1% penicillin-streptomycin. At seeding cells were given 5 nM of miR-26a mimic or inhibitor to modulate miR-26a expression. Cells were then treated with 0.3 mM PA or 0.5 mM PA for 4 hours. Immediately following PA treatment cells were incubated for 20 minutes with 100 nM insulin and analyzed for protein and RNA expression using Western blot analysis and qRT-PCR, respectively. Results: Both concentrations of PA caused a significant decrease in insulin signaling ( $P = 0.0007$ ,  $P = 0.0004$ ). Decreased insulin signaling was associated with significant decreases in miR-26a expression ( $P = 0.0383$ ). We are currently investigating if increasing intracellular miR-26a is able to significantly improve insulin signaling when cells are challenged with PA. Conclusions: These results support the notion that miR-26a is a regulator of insulin signaling and mechanisms should be investigated further to determine potential as a therapeutic target for treatment of insulin resistance and type 2 diabetes mellitus. Supported by a Faculty Research Grant (JSM) from The University of North Carolina at Charlotte

**CONCUSSION SYMPTOM CLUSTERS AND RETURN-TO-PLAY TIME IN COLLEGE ATHLETES WITH SPORTS-RELATED CONCUSSIONS: 2009-2010 AND 2013-2014 DISC**

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M6

PURPOSE: Examine the relationship between Concussion Symptom Clusters (CSCs) and return-to-play time using a representative sample of college athletes with sports-related concussions. METHODS: Data from the 2009-2010 and 2013-2014 academic years (n=1670) were obtained from the Datalys Center for Sports Injury and Prevention Inc. database. Exploratory factor analytic methods were applied, and the resulting factors were used in multinomial regression modeling to identify associations between CSCs and return-to-play time. RESULTS: A 4-factor solution accounted for 48.8% of the variance and included a cognitive-sensory, somatic, amnesic, and affective factor structure. Cognitive-sensory symptoms were associated with increased odds of prevented participation at 7-13 days, 14-29 days, greater than 30 days, and out for remainder of season, respectively ( $p < 0.05$ ). Somatic symptoms were associated with decreased odds of prevented participation at 7-13 days and greater than 30 days, respectively ( $p < 0.05$ ). Amnesic symptoms were associated with decreased odds of prevented participation at 1-6 days, 7-13 days, 14-29 days, and greater than 30 days, respectively ( $p < 0.05$ ). Affective symptoms were associated with decreased odds of prevented participation at 7-13 days, 14-29 days, greater than 30 days, and out for remainder of season, respectively ( $p < 0.05$ ). CONCLUSION: Specific CSCs were significantly associated with return-to-play time in college athletes, ( $p < 0.05$ ).

**THE VALIDATION OF THE INBODY 770 FOR THE ASSESSMENT OF BODY COMPOSITION IN COLLEGE-AGED INDIVIDUALS**

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M7

Multi-frequency bioelectrical impedance analysis (MFBI) is a rapid, non-invasive, and relatively inexpensive method of assessing body composition that has been suggested as an alternative to laboratory methods including dual energy X-ray absorptiometry (DXA) and hydrostatic weighing. Advances in MFBI technology, have led to the development of the InBody 770 (Biospace Co.). Purpose: To determine the accuracy of the InBody 770 for the assessment of body composition in college-aged individuals. Methods: Participants were 216 college-aged individuals (n = 111 women, aged 18 - 29 years), that had their body composition assessed using DXA (GE Lunar Prodigy) and MFBI (InBody 770) on the same day. Paired samples t-tests were used to explore differences in percent body fat (%BF) and fat-free mass (FFM) for DXA and MFBI. Bland-Altman plots were used to assess individual differences in %BF and FFM. Results: MFBI significantly underestimated %BF in both genders (28.7 ± 8.1% women; 17.0 ± 6.4% men) compared to DXA (32.2 ± 8.7% women; 19.3 ± 8.3% men;  $p < 0.05$ ). MFBI significantly overestimated FFM in both genders (45.6 ± 5.8 kg women; 68.8 ± 8.5 kg men) compared to DXA (42.8 ± 5.4 kg women; 66.5 ± 7.9 kg men;  $p < 0.05$ ). Bland-Altman plots revealed a weak, positive bias in the %BF of the total sample ( $r = 0.395$ ,  $p < 0.001$ ), but found no bias for assessing FFM. Conclusion: The variability in body composition values observed between the InBody 770 and DXA in this sample of recreationally active college-aged adults indicated the InBody 770 should be used with caution.

**SEMITENDINOSUS TENDON MATERIAL PROPERTIES DEFICITS PERSIST FOUR YEARS POST-ACL RECONSTRUCTION**

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M8

Purpose: Examine the material properties deficits of the semitendinosus (ST) tendon following ACL reconstruction in individuals ranging from 9 months to 12 years post-surgery compared to healthy individuals. Methods: Ultrasound shear wave elastography (SWE) determined shear modulus on 7 ACL reconstructed individuals with ST grafts (age: 21.9±1.6 years, height: 173.4±9.3cm, mass: 73.6±7.5kg, Tegner scale: 5.9±1.2) and 7 healthy individuals (age: 21.0±2.1 years old, height: 173.7±11.0cm, mass: 70.1±15.6kg, Tegner scale: 5.9±1.7). The time since ST harvest averaged 4 years (range: 0.75-12.6 years). While lying prone with knee at full extension and subjects relaxed, three ultrasound images (AIXPLORER, Supersonic Imagine S.A., France) were acquired of the distal ST tendon. Results: The bilateral shear modulus ratio of reconstructed /non-reconstructed limbs for ACL reconstructed individuals (0.27±0.25, 95% CI: 0.09,0.45) was significantly lower vs. healthy right limb/left limb ratios (0.92±0.22, 95% CI: 0.76,1.09;  $p < 0.01$ ). For absolute shear modulus measures, a 2x2 mixed model ANOVA revealed a group\*limb interaction ( $p = 0.0002$ ) showing no bilateral differences in healthy individuals (467.0±97.5 vs. 511.1±86.2 kPa) but ACL reconstructed individuals had significantly lower shear modulus of reconstructed (152.6±153.1kPa) vs uninjured limbs (570.8±114.1kPa). Conclusions: This data supports that significant material property deficits for previously harvested ST tendons exist on average at 4 years ACL post-reconstruction. The clinical relevance of these persistent deficits is currently under investigation.

### MUSCLE AKT SIGNALING SENSITIVITY TO SHORT-TERM FASTING IN TUMOR BEARING MICE

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U1

Background: Cachexia, muscle mass loss secondary to chronic disease, commonly affects cancer patients and is directly related to reduced life quality, poor treatment outcomes, and reduced survival. While the basal disruption of cachectic skeletal muscle protein turnover is well established, significant gaps remain in our understanding of how cancer influences physiological short-term fasting regulation of protein turnover. Purpose: We examined short-term fasting regulation of skeletal muscle Akt signaling in tumor bearing mice exhibiting cachexia. Methods: Cachectic (>5%BW loss) ApcMin/+ (MIN, n=3) and age matched C57BL/6 (WT, n=3) mice were sacrificed after a 4 hour fast. MIN (n=3) and WT (n=3) mice given food ad libitum served as controls. Analysis was performed on the tibialis anterior (TA) muscle. Results: MIN mice had significant body weight loss (-15% ± 2) and reduced TA weight (29mg ± 1) compared to WT (48mg ± 2). Akt phosphorylation (T308) was reduced after a 4 hour fast (-81% ± 9) in the MIN, while the WT (10% ± 5) did not change. Conclusion: These results demonstrate that cancer increases catabolic signaling caused by short-term fasting in cachectic mouse skeletal muscle. Additional work is needed to determine the effect of a short-term fast on downstream Akt signaling that regulates muscle protein turnover. Supported by NCI R01-CA121249.

### EFFECTS OF LUMBOPELVIC-HIP COMPLEX STABILITY ON OVERHEAD THROWING MECHANICS AMONGST COLLEGIATE SOFTBALL ATHLETES

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U2

PURPOSE: Studies have found that a 20% reduction in energy generation from the lumbopelvic-hip complex (LPHC) during overhead throws leads to a 34% increase in load on the shoulder. Thus, the purpose of this study was to assess the effects of LPHC stability, via the single leg squat (SLS) assessment, on the kinematics of the pelvis, trunk, and throwing shoulder amongst softball athletes. METHODS: Eighteen softball athletes (20.9 ± 1.8 yrs., 165.0 ± 14.0 cm, 69.0 ± 8.0 kg, 20.9 ± 1.8 years) performed three overhead throws and bilateral SLSs. Kinematic data were collected at 100 Hz using an electromagnetic tracking system synced with The MotionMonitor™. Four stability groups were derived from the SLS: (1) stable on both legs (bilateral stability), (2) unstable on the throwing side leg and stable on the non-throwing side leg (TS instability), (3) unstable on the non-throwing side leg and stable on the throwing side leg (NTS instability), and (4) unstable on both legs (bilateral instability). All throws were analyzed across four throwing events: foot contact (FC), maximum external shoulder rotation (MER), ball release (BR), and maximum internal shoulder rotation (MIR). RESULTS: One-way ANOVAs and Bonferroni post-hoc tests revealed the NTS instability group had significantly more trunk flexion at MER when compared to the bilateral instability group (Mean Difference: 14.334.73, p = 0.05). CONCLUSION: Previous studies have noted energy is transferred most efficiently when the trunk moves from relative extension to flexion throughout the throw. The bilateral instability group was the only group that did not display this pattern. This finding suggests that these athletes do not efficiently generate energy from their lower extremity and trunk when throwing which could potentially lead to injury in the upper extremity.

### FITNESS-RELATED BENEFITS: LAND-BASED VERSUS AQUA-BASED

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U3

PURPOSE: To compare fitness-related benefits between land-based (LAND) versus aqua-based (AQUA) courses. METHODS: Informed consent was received from 154 volunteers (N = 76 LAND; N = 78 AQUA) who were asked to exercise within each respective course 2 days per week, 50-min per day, for 15 weeks. Pre- and post-fitness assessments obtained were body composition, muscular endurance, muscular strength, cardiorespiratory endurance, and flexibility. RESULTS: Mixed ANOVA was used to investigate mean differences between pre- and post-fitness assessments and between groups. There was a main effect (p = 0.003) and interaction (p = <0.001) for body composition in which, overall, participants decreased percent body fat, however, paired t-test revealed that LAND (20.4% ± 7.3% to 19.0% ± 7.4%) had a significant reduction in mean percent body fat while AQUA did not (20.1% ± 8.7% to 20.2% ± 8.9%). A main effect for both muscular strength (p = <0.001) and muscular endurance (p = <0.04) was revealed, but no interactions, therefore, both groups improved on aforementioned variables. Lastly, no significant main effect or interaction for neither cardiorespiratory endurance nor flexibility assessments were revealed. CONCLUSIONS: Individuals participating in land-based courses displayed greater decreases in percent body fat when compared to aqua-based courses, whereas both land- and aqua-based displayed improvements in muscular strength and muscular endurance. There were no changes in cardiorespiratory endurance and flexibility within both groups.

### EFFECT OF CROSS-SLOPED SURFACES ON RUNNING KINEMATICS

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U4

PURPOSE: The purpose of this study was to analyze the effect of cross-sloped surfaces on the kinematics of recreational female runners. METHODS: Eleven recreational female runners (20.2 ± 1.2 years, 59.8 ± 8.6 kgs, 1.65 ± 0.04 m) volunteered to run on a treadmill at a moderate pace of 3.35 m/s at three conditions: level (L), 5° lateral elevation (LE), and 5° medial elevation (ME). Each participant ran in the same model of neutral shoes with a window cut out of the heel to allow for 2 calcaneal markers to be placed directly on the skin. Joint angles were recorded for 2 strides in each condition from the rear and the side views using 2 Sentech cameras (100 frames/second) and then digitized manually. A repeated measures ANOVA (p<0.05) was performed to analyze lower extremity kinematics in the sagittal and frontal planes of the pelvis, hip, knee, and ankle joints. RESULTS: In the frontal plane, the maximum medial angle of the calcaneus with respect to the surface of the treadmill was 6.1° greater during the LE condition than during the ME condition. At foot contact, this same angle was 5.6° greater for LE than ME, and 3.4° greater for the L condition than the ME condition. Tibiocalcaneal eversion was 3° greater for LE than ME, but was not significant different. Knee valgus, hip adduction, and pelvic tilt, as well as sagittal plane kinematics were not significantly different between conditions. CONCLUSION: These results help us understand how the body adapts to cross-sloped surfaces, and the implications for potential injuries.

#### ASSESSING THE EFFECT OF YMCA MOVING FOR BETTER BALANCE PROGRAM ON BALANCE, ELECTROMECHANICAL DELAY AND BODY COMPOSITION

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The YMCA Moving for Better Balance Program is a 12-week, supervised, evidence-based falls prevention program that includes eight adapted tai chi forms to improve strength, balance, and coordination. Purpose: The purpose of this study was to examine the effects of the YMCA Moving for Better Balance program on electromechanical delay, proprioception, body composition, balance, and falls risk. Methods: Eleven older adults (65.9±7.3 yrs.) completed this intervention. Electromechanical delay in the hip abductor muscles and proprioception were assessed with custom-made devices. Body composition was assessed using dual-energy x-ray absorptiometry (iDXA). The 4-stage balance test, 30-second chair test, and Brief-BESTest were used to assess balance and falls risk. Finally, the Activities Balance-Specific Confidence (ABC) Scale was used to assess balance confidence and fear of falling. Results: Wilcoxon matched-pairs signed-rank test comparisons of pre- and post-intervention, showed significant improvements on the 4-stage balance test (p=0.008), the 30-second chair test (p=0.002), the timed-up-and-go (p=0.002), and the Brief-BESTest (p=0.003). Participants also showed significant decreases in electromechanical delay of hip muscle contraction speed (p=0.028) and improvements in lower extremity proprioception (p=0.002). Participants showed improvements on the ABC Scale, but the changes did not reach statistical significance. There were no changes in leg lean mass or bone density. Conclusions: These data suggest that balance improved with the YMCA Moving for Better Balance program, and these changes were not due to muscular hypertrophy but rather sensorimotor changes, specifically faster hip abductor muscle contraction speed (i.e., decreased electromechanical delay) and hip proprioception improvements.

U5

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#### THE EFFECTS OF PALMITIC ACID ON MICRO-RNA-23A EXPRESSION AND MYOTUBE FORMATION

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Purpose: The myogenic program is critical for the adaptation of skeletal muscle to exercise and repair from injury. These processes require the coordinated efforts of muscle regulatory factors and metabolic pathways. Insulin resistant skeletal muscle has the reduced capacity for exercise-induced adaptations. The purpose of this study was to determine the effects of palmitic acid (PA) on the expression of microRNA-23a (miR-23a) and its contribution to the myogenic program in C2C12 mouse muscle cells. Methods: C2C12 myoblasts were grown at 37°C with 5% CO<sub>2</sub> in Dulbecco's Modified Eagle Medium (DMEM) containing 10% fetal bovine serum and 1% penicillin-streptomycin (pen-strep). When cells reached 90% confluence, they were treated on day 0 and day 2 of differentiation with 5mM PA diluted to 0.1mM in DMEM with 2% horse serum and 1% pen-strep. Cells were collected at day 2 and 4 of differentiation to determine changes in miR-23a expression and myotube formation was determined in day 4 myotubes using myosin heavy chain staining. Results: The expression of miR-23a was significantly greater at day 4 differentiation than at day 2. PA exposure caused a significant decrease in miR-23a expression. Chronically treating cells with PA caused a significant decrease in total myotubes per field and total nuclei per field. Conclusions: These results indicate that PA impairs the myogenic program and this may be related to changes in miR-23a expression. Future work is ongoing to overexpress miR-23a in an attempt to improve myogenic progression in the presence of PA. miR-23a may be a potential therapeutic target for future research regarding resistance to skeletal muscle atrophy.

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#### DIFFERENCES IN COACH AND ATHLETE PERCEPTIONS OF PHYSICAL AND MENTAL DEMAND DURING A COLLEGIATE SEASON.

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PUPROSE: To assess the congruency between a coach and their athletes for perception of physical (PD) and mental demand (MD) of training, while also examining the congruency of the coach's intention versus their post training perception. METHODS: A DIII women's field hockey team filled out daily sliding scale surveys rating pre- and post-practice PD and MD perceptions. The coach answered questions about intention and post practice perception of PD and MD. RESULTS: There was no significant difference in the coach's intent and the athletes' perceptions of the physical demand of practice for week (wk) 1 or 2 (wk 1: 0.09±1.68, p = 0.61; wk 2: 0.27±1.9, p = 0.21). There was a significant difference in the coach's perception and athletes' perceptions of the PD of practice both weeks (wk 1: 0.89±0.22, p = 0.000; wk 2: 0.47±1.76, p = 0.02). There was no significant difference in the coach's intent and the athletes' perceptions of the MD of practice (wk 1= -0.32±1.43, p = 0.052; wk 2 = 0.20±3.64, p = 0.63). There was a significant difference in the 1st week of practice between the coach's and athletes' perception(s) of the MD of practice but not the 2nd (wk 1= -0.40, SD= 1.38, p = 0.012; wk 2 = 0.73, SD= 3.71, p = 0.082). CONCLUSION: These preliminary data suggest that athletes' perceptions of the physical demands of training during pre-season match the intentions of the coach; however, the coach perceives the physical demand required of the athletes as lower than their intentions and the athletes' perceptions. This could have implications for periodization of a training season in which athletes may be more susceptible to burnout through overtraining via a coach's perceptions. Data collection is ongoing.

#### THE EFFECTS OF NOTCH AND MTOR ON MYOGENESIS

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PURPOSE: The orchestrated role of Notch and Mechanistic Target of Rapamycin (mTOR) during myogenesis is not well studied. The purpose of this experiment is to uncover how Notch Inhibitor, Gamma Secretase Inhibitor (GSI) and mTOR inhibitor, Rapamycin effect Notch and mTOR correlation for myogenesis in C2C12 cells. METHODS: C2C12 cells were seeded, allowed to proliferate and then differentiated for four days. At the onset of differentiation C2C12 cells were treated every 12 hours with one of the following conditions: 4 µmL of GSI, 100 nmoL of Rapamycin, both, or control. 96 hours post differentiation, C2C12 cells were fixed and were quantified for myotube fusion and myotube area. RESULTS: GSI treatment increased fusion index compared to other three treatments (fusing nuclei/total nuclei) (P<0.0001). Rapamycin subsided fusion index relative to control (P<0.0001). GSI and Rapamycin also decreased fusion index compared to control (P<0.0001). CONCLUSIONS: Our data suggests Notch Inhibition is critical for myotube fusion. In contrast, Rapamycin treatment, blunts myotube formation. Notch may act through mTOR to enhance myotube formation.

**ERK1/2 AND CCR2 EXPRESSION IN FIT AND UNFIT MALES**

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C-C chemokine receptor 2 (CCR2) is required for monocyte chemotaxis to inflamed areas. Monocytes undergo diapedesis and differentiate into inflammatory M1 or anti-inflammatory M2 macrophages. Skewing of M1/M2 balance toward M1 may lead to sustained inflammation and disease development, including cardiovascular disease (CVD). CCR2 activation increases phosphorylation of extra-cellular regulated kinase 1 and 2 (pERK) which is necessary for M2 polarization but not M1. **PURPOSE:** To evaluate the differences and time course of CCR2 and pERK in fit (FIT) and unfit (UF) males following acute exercise. **METHODS:** 5 FIT (VO<sub>2peak</sub> ≥45ml O<sub>2</sub>/kg/min) and 5 UF (VO<sub>2peak</sub> <40ml O<sub>2</sub>/kg/min) males performed 30 minutes of cycling. Intensity was adjusted to maintain an average blood lactate concentration of 8mM/L. Blood samples were taken pre-exercise, immediately (POST), 1 hour (1H), and 2 hours (2H) post. Cells were fixed and stained using antibodies against CD14, CD16, CCR2, and pERK. Monocytes were defined by CD14 and CD16 using flow cytometry. **RESULTS:** A main effect for pERK (p=0.017) suggested a difference between groups. pERK increased POST in FIT (3113 vs. 4116, p = 0.031). CCR2 was not significantly altered within groups. However, CCR2 was positively correlated with pERK at POST (R=0.77, p<0.02) and at 1H (R=0.94, p<0.001) with all subjects. **CONCLUSION:** Higher pERK in FIT males may increase monocyte recruitment and differentiation to the M2 macrophage phenotype. This likely helps maintain M1/M2 macrophage balance which may decrease the incidence of CVD.

P1

P3

**AEROBIC TRAINING STATUS AND THE PENTRAXIN (PTX3)-MEDIATED INNATE IMMUNE RESPONSE FOLLOWING MAXIMAL EXERCISE**

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**PURPOSE:** Pentraxin 3 (PTX3) is a vital regulator of innate immune function. Although plasma PTX3 concentrations are enhanced by aerobic exercise, the capacity of aerobic exercise to alter PTX3 functioning at the cellular level in aerobically trained (T) and untrained (UT) subjects remains unknown. **METHODS:** Fifteen T and 15 UT healthy subjects participated in an acute bout of maximal exercise (MAX) to examine how aerobic training status alters PTX3 production from isolated PBMCs exposed to LPS or palmitate, and the capacity of PTX3 to facilitate inflammatory cytokine production. **RESULTS:** Elevated plasma PTX3 concentrations prior to exercise were positively associated with the percent change (pre to post exercise) in plasma PTX3 concentrations following MAX, independent of training status and VO<sub>2max</sub>. In response to MAX, LPS and palmitate-induced ex vivo PTX3 production from isolated PBMCs was suppressed in T, but not UT subjects. While this response was negatively associated with VO<sub>2max</sub> in all subjects, a positive association with plasma PTX3 concentrations prior to and following MAX was observed in T subjects only. In addition, while the PTX3-mediated production of interleukin 6 (IL-6) was unaltered following MAX, the percent change in ex vivo IL-6 production from isolated PBMCs was positively associated with VO<sub>2max</sub> in all subjects, and in T subjects only, positively associated with elevated plasma PTX3 concentrations prior to and following MAX. **CONCLUSION:** Aerobic exercise training may enhance the utility of plasma PTX3 concentrations as a biomarker of the PTX3-mediated IL-6 response, potentially as a mechanism to facilitate innate immunity following acute physical perturbation.

P2

P4

**ENDOGENOUS IGG IN WESTERN BLOTTING: TRASH TO TREASURE?**

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**Purpose:** This exploratory study investigated the use of endogenous IgG heavy chains as a Western blot loading control compared to GAPDH in mice liver tissue. **Methods:** A dilution series (30, 25, 20, and 15 ug) of liver lysates from a C57L/J and C3H/HeJ mice were loaded for SDS-PAGE, tank transferred onto a PVDF membrane, and stained with Ponceau S. The membrane was then washed with TBS, blocked, probed with Mouse GAPDH antibodies (MAB5718, Bio-Techne Corporation, Minneapolis MN) at 0.02 ug/ml, probed with Mouse IgG HRP-conjugated antibodies (HAF007, Bio-Techne Corporation, Minneapolis MN) at 1 ug/ml, and imaged using chemiluminescence. Two IgG heavy chains and GAPDH bands were compared with theoretical densitometry magnitudes for linearity. **Results:** GAPDH was significantly linear in C57L/J mice from 15-25 ug (R<sup>2</sup>=1.00, p<0.05) until a load of 25 ug was reached at which time the signal reached a plateau (R<sup>2</sup>=0.76, p>0.05). GAPDH showed no increase in signal with increased loading in C3H/HeJ mice (R<sup>2</sup>=0.70, p>0.05). IgG heavy chains showed no increase in signal with increased loading in either strain of mice (R<sup>2</sup>≤0.69, p>0.05). **Conclusion:** Loading control proteins such as GAPDH are highly recommended, yet may not be adequate for protein loads greater than 25 ug in C57L/J mice or at all in C3H/HeJ mice. IgG heavy bands were not appropriate to use for either strain. These results support the importance of validating loading controls in Western blots.

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**A TWO WEEK LOW-CALORIE DIET PLUS INTERVAL EXERCISE IMPROVES METABOLIC FLEXIBILITY AND ADIPOSOPATHY IN OBESE WOMEN**

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**PURPOSE:** Adiposopathy is depicted by endocrine dysfunction of fat tissue that impacts energy metabolism. However, the effect of interval exercise on low calorie diet (LCD+Ex) induced changes in metabolic flexibility in concert with adiposopathy is unknown. We tested the hypothesis that LCD+Ex would improve fuel selection in relation to fat-derived hormones versus diet (LCD) alone in obese women. **METHODS:** Subjects (age: 48.7±2.8y, BMI: 37.2±1.4kg/m<sup>2</sup>) were randomized to LCD (n=10; mixed meals of 1000-1200kcal/d) or LCD+Ex (n=11; 60min/d of supervised interval exercise at 90% HR<sub>peak</sub> for 3 min and 50% HR<sub>peak</sub> for 3 min). LCD+Ex subjects received an additional 350kcal post-exercise to equate energy availability between groups. Fitness (VO<sub>2peak</sub>, time to exhaustion), body fat (BodPod), glucose tolerance (120min 75g OGTT), and adiposopathy (adiponectin/leptin) were assessed pre- and post-intervention. Respiratory exchange ratio (RER; indirect calorimetry) was measured at 0, 60, and 120min of the OGTT to assess fasting and post-prandial metabolic flexibility. **RESULTS:** LCD and LCD+Ex had similar reductions in caloric intake (P=0.001), fat mass (P<0.001), leptin (P<0.001), and fasting RER (P=0.003) as well as improved adiponectin to leptin ratio (P=0.003). However, LCD+Ex improved time to exhaustion (P=0.05) and maintained post-prandial RER compared with LCD (P<0.001). This maintenance of post-prandial RER was significantly related to an improved adiponectin to leptin ratio (r=0.53; P=0.02). Increased circulating adiponectin was also linked with lower 120min plasma glucose (r=-0.59; P=0.006). **CONCLUSION:** Adding exercise to a LCD may be key for reducing type 2 diabetes risk through reductions in adiposopathy.

### TESTOSTERONE RESPONSE FOLLOWING FIVE CROSSFIT® OPEN WORKOUTS

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**P5** Purpose: To determine the effect of sex and lean mass (LM) on the testosterone (T) responses to five unique CrossFit® Open (CFO) workouts. Methods: LM was measured via Dual-Energy X-Ray Absorptiometry (DXA) within two weeks of the onset of the 2016 CFO in recreationally-trained adults (males-n=5, 34.4±3.8 yrs, 175.5±5.1cm, 80.31±9.7kg; females-n=5, 35.5±7.0yrs, 159.0±7.1 cm, 76.93±21.4kg). During each week of the 5-week competition, saliva samples were collected prior to (PRE) the competitors' warm-up, immediately (IP), 30- (30P), and 60 min post-exercise (60P) and analyzed for concentrations of T. All workouts were completed at the same gym; mid-day during the first four weeks (WK1-WK4) and on the night of the final challenge's release (WK5). Separate two-way (sex x time) repeated measures analyses of variance were performed to assess the percent change from PRE-values in T during each week. Pearson's correlation coefficients were calculated between all LM measures and T responses, quantified as the area under the curve, of each week. Results: Although no (sex x time) interactions were found, significant (p<0.05) main effects for time were observed on WK2-WK4 where T was elevated from PRE at IP (162.1-191.7%, p≤0.015) and 30P (40.2-59.8%, p≤0.040). T was also elevated at 60P on WK3 (62.8%, p=0.015). Additionally, a trend (p<0.01) was noted for elevated T at IP (p=0.077) and 30P (p=0.033) on WK1. The T response was not related to any LM measure Conclusion: The majority of the CFO events observed in this study elicited an elevation in salivary T from PRE-values. These elevations were not affected by the athlete's sex or quantity of LM.

### CARDIOMETABOLIC RISK ASSESSMENT IN ADOLESCENTS USING LATENT PROFILE ANALYSIS

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**P6** PURPOSE: To investigate cardiometabolic risk using latent profile analysis (LPA) and determine if a unique set of biomarkers may characterize adolescents at high risk for poor metabolic health in adulthood. METHODS: At age 16, subjects [N= 117, 59.8% female, 59.8% White], came to the lab for measures of adiposity [waist circumference; WC], mean arterial pressure (MAP), and biomarkers [fasted serum levels of leptin (L), cholesterol (HDL and non-HDL), glucose (G), and C-reactive protein (CRP)]. LPA was used to identify subgroups of adolescents with similar patterns of metabolic abnormalities. Determination of best model fit was evaluated as follows: Akaike information criterion (AIC), Bayesian information criterion (BIC), estimated Entropy (E) and the adjusted Lo-Mendell-Rubin Likelihood Ratio Test (LMR-LRT; Lo, Mendell, & Rubin, 2001). RESULTS: Given that the lowest BIC value was combined with a significant LMR-LRT for the three-class model (AIC = 6514.25, BIC = 6597.12, E = .92, Adj. p LMR-LRT = 81.65, p=ns), this model was chosen as the best-fitting model. The first profile, the Low Risk Group, included adolescents (n=48) who had low L, G, and non-HDL, but high HDL. The second profile, the Dyslipidemia Risk Group, included adolescents (n=58) who had high G and non-HDL, but low HDL, L, WC, MAP, and CRP. The third profile, the High MetS Risk Group, included adolescents (n=11) who had high L, G, WC, MAP, CRP, and moderate non-HDL. CONCLUSION: Our analyses identified 3 unique clusters of metabolic risk factors in adolescents. Future studies should test these latent profiles in larger datasets and determine their ability to track longitudinal risk into adulthood. Funded by NIH R01HD78346

### POST-STEMI AGE DIFFERENCES IN CD14 RESPONSE TO LPS

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Monocyte-dependent immune responses are critical for post-ST-segment elevation myocardial infarction (STEMI) tissue repair. Classical, intermediate, and non-classical monocyte subsets differentially express lipopolysaccharide (LPS) co-receptor CD14, which interacts with toll-like receptors to induce inflammatory cytokine signaling. The aging process has been shown to impair monocyte function and alter surface marker expression. Purpose: To determine the post-STEMI age-related differences in monocyte subset CD14 expression following in vitro LPS stimulation. Methods: Whole blood was collected from young (YNG < 55, n=16) and old (OLD ≥ 55, n=14) volunteers 72 hrs post-STEMI and cultured for 4 hours with LPS (1 ug/mL). Cultures were stained for flow cytometry analysis and monocyte subsets were determined by CD14 and CD16 expression. Results: Intermediate and classical monocyte CD14 expression significantly decreased (p ≤ 0.003), while non-classical monocyte CD14 expression increased (p = 0.032) in response to LPS in OLD participants. In YNG participants, only intermediate monocyte CD14 expression significantly decreased (p < 0.001) in response to LPS. Conclusions: Results suggest that post-STEMI non-classical monocytes in older adults exhibit dysfunction and classical monocytes CD14 may decrease in a compensatory fashion following LPS stimulation. Acute exercise Post-STEMI in aged individuals should be monitored due to its effects on monocyte-dependent immune responses.

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### STRESS HORMONES INCREASE MONOCYTE CD14 AND CD16 POST-MI

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**P8** Recruitment of classical (CD14++CD16-) and non-classical (CD14LowCD16++) monocytes aid in the initiation and resolution of inflammation following ST segment elevation myocardial infarction (STEMI). Activation of the CD14 receptor elicits an inflammatory response while CD16 activation increases cytotoxicity. The stress hormones epinephrine (EPI) and cortisol (CORT) elevate during exercise, as well as with the severity of MI. PURPOSE: To determine the in-vitro effects of EPI and CORT on monocyte CD14 and CD16 expression post-STEMI. METHODS: Whole blood samples were collected from 30 volunteers 72 hours post-STEMI. Blood was diluted to 1 x 10<sup>6</sup> cells/mL and cultured for 4 hours either unstimulated, stimulated with EPI (10-8 M), or CORT (10-9 M). Cultures were stained for flow cytometry analysis and monocyte subsets were defined by CD14 and CD16. RESULTS: Classical CD14 expression increased in response to EPI [Mean Fluorescent Intensity (MFI): 625.4739 vs. 685.9327, p = 0.015], both EPI and CORT increased non-classical CD16 expression [MFI: EPI, 1870.5991 v. 2237.8726, p=0.001; CORT, 1849.6118 v. 2391.4138, p<0.001]. CONCLUSIONS: Post-STEMI exercise may increase CD14 activation of classical monocytes, prolonging inflammation. Whereas, increased CD16 activation of non-classical monocytes may improve debris clearance. Therefore, further research aimed at post-STEMI exercise prescriptions is warranted to better understand exercise-induced hormonal responses on monocyte activation.

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### CORTISOL RESPONSES TO EXERCISE FOLLOWING SLEEP DEPRIVATION ARE INTENSITY DEPENDENT

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**P9** PURPOSE: To assess the cortisol responses to exercise of varying intensities following a single night of sleep deprivation (SD), and compare high-intensity exercise (HIIT) following both sleep (S) and SD. METHODS: 22 subjects completed SD followed by either 15 min low intensity cycling (LI) or resting control (C). Another 10 subjects completed both S and 24 hours of complete SD, followed by HIIT. For all conditions, blood samples were collected 30 mins (T1), and 15 mins (T2) before exercise, as well as immediately (T3) and 15 mins (T4) post-exercise (or equivalent time-points in C). Samples were analyzed for cortisol via ELISA. Data were analyzed via ANOVA (Bonferroni post-hoc correction). RESULTS: A significant interaction between exercise type and time was observed following SD ( $F_{6,78} = 8.10, p < .001$ ). Cortisol was depressed following LI (T4 vs. T2,  $p = .04$ ) and elevated following HIIT (T4 vs. T1, T2, and T3, all  $p < .01$ ), whereas it was unchanged for C. Further, a significant increase in cortisol was observed with HIIT following both S and SD ( $p < .01$ ) while no difference was observed between S and SD at any time point. DISCUSSION: While HIIT resulted in an increase in cortisol secretion, LI did not, supporting the possibility of an exercise threshold effect following SD. Furthermore, SD did not appear to augment the HIIT-induced cortisol increase, suggesting HIIT may be an appropriate stimulus to reset cortisol rhythmicity following SD.

### THE EFFECT OF SLEEP ON SYSTEMIC INFLAMMATION DURING THE ULTRAMAN TRIATHLON

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**P10** PURPOSE: To examine the influence of total sleep (TS) on circulating plasma concentrations of C-reactive protein (CRP) in trained participants (N = 14; 11 male, 3 female) during the Ultraman triathlon (3 days of non-continuous racing; stage 1: 10 km swim and 144.8 km cycle; stage 2: 275.4 km cycle; stage 3: 84.4 km run). METHODS: Fourteen athletes (age:  $39 \pm 8$  yrs) were evaluated pre-race and post-race for circulating concentrations of CRP. Blood samples were drawn two days prior to stage 1 (1600 h) and one day after stage 3 (1200 h). Wrist-worn actigraphy bands (Readiband; Fatigue Science, Vancouver, BC) were worn by participants after the first blood draw and collected after the final blood draw; bands were worn continuously except while racing. Sleep watches were returned each morning, data were downloaded, and bands were redistributed after each race stage. Data were analyzed with SPSS (SPSS v.22, IBM, Armonk, NY). Significance was set at  $p < 0.05$  and values are reported as means  $\pm$  SD. RESULTS: TS was significantly decreased from pre-race ( $400.2 \pm 88.7$  min) to post-race ( $302.7 \pm 95.4$  min) ( $p = .048$ ). Plasma CRP significantly increased from pre-race ( $266.3 \pm 263.3$  ng/mL) to post-race ( $27013.8 \pm 12340.1$  ng/mL) ( $p < .001$ ). Pearson's correlation between TS and CRP was  $-0.078$  ( $p = .841$ ). CONCLUSIONS: These data suggest that CRP is not influenced by TS during a multi-stage ultra-endurance triathlon. This study was supported by Florida State University and Fatigue Science provided Readibands.

### EFFECT OF ACUTE HIGH-INTENSITY INTERVAL EXERCISE VS. CONTINUOUS MODERATE-INTENSITY EXERCISE ON THE BDNF, LACTATE, AND CORTISOL RESPONSES IN OBESE INDIVIDUALS

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**P11** PURPOSE: Obesity may attenuate the expression of brain-derived neurotrophic factor (BDNF), thereby increasing the risk of cognitive dysfunction. High-intensity interval exercise (HIIE) has been shown to be as or more effective than continuous moderate exercise (CME) in promoting the expression of BDNF in normal weight individuals. Therefore, the purpose of this study was to compare the effect of acute HIIE and CME on BDNF expression in obese individuals. METHODS: Twelve male subjects (6 obese and 6 normal-weight) participated in a randomized and caloric equated experiment: HIIE (30 minutes, 4 intervals of 4 minutes at 80% - 90% of  $VO_{2max}$  with 3 minutes rest between intervals) and CME (38 minutes at 50% - 60%  $VO_{2max}$ ). Blood samples were collected for measurements of serum BDNF, blood lactate, and plasma cortisol prior to and following exercise. RESULTS: The BDNF response to acute HIIE was greater than CME in obese subjects when compared to normal-weight subjects. Similarly, although acute HIIE induced greater lactate and cortisol levels than CME, obese subjects produced less lactate, but no difference in cortisol than normal-weight subjects. CONCLUSIONS: Acute HIIE may be an effective protocol to upregulate BDNF expression in an obese population, independent of increased lactate and cortisol levels.

### DEVELOPMENT OF A TURN-BY-TURN WHEEL RUNNING SYSTEM

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**P12** PURPOSE: Wheel running in rodents has been used to assess basic indices of physical activity. This study describes the development of an inexpensive turn-by-turn wheel running system that confers the ability to visualize wheel running patterns and express in-depth indices of activity behavior. METHODS: An Arduino Uno r3 microcontroller was equipped with switches to monitor running wheel revolutions. Turn-by-turn data were processed in R version 3.2.1 to generate 24-hour distance (km), duration (min), and speed (m/min) from ten male C57BL/6J mice under intact ( $n=5$ ) and hormone disrupted ( $n=5$ ) conditions. These data were compared to data from cycling computer based running wheels that were operated in tandem with the developed system. Running characteristics were compared across procedure (intact vs. hormone disrupted) and system (new vs. old) by a two-way ANOVA with repeated measures. Correlation statistics were calculated to assess level of agreement between systems. RESULTS: Distance was significantly different between the procedure and system ( $F_{(1,8)}=5.41, p=0.049$ ) with both systems measuring lower distances in hormone disrupted mice. Duration and speed did not exhibit significant differences. The wheel running systems exhibited agreement in all indices (distance:  $r=0.998$ , duration:  $r=0.997$ , speed:  $r=0.827$ ). CONCLUSION: This inexpensive system performed well compared to the tradition wheel running system in both intact and hormone disrupted male mice.

### THE EFFECT OF INTENTIONAL WEIGHT LOSS ON THE HEALTHY AGING INDEX IN OLDER ADULTS WITH OBESITY

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**P13** Purpose: To determine the impact of intentional weight loss (WL) on a published composite score, known as the Healthy Aging Index (HAI; range: 0-10; healthiest-unhealthiest), associated with mortality risk in older adults. Methods: 96 older adults (70.3±3.7 yrs) with obesity (35.4±3.3 kg/m<sup>2</sup>) were randomized into a 6-month WL (n=47) or weight stability (WS; n=49) program. Weight, HAI composite score, and component variables [systolic blood pressure, forced vital capacity (FVC), creatinine, fasting plasma glucose (FBG), Montreal Cognitive Assessment] were measured at baseline (BL) and follow-up. Results: Average BL HAI score was 3.2±1.6. WL participants lost an average of 6.6±0.4 kg (8.6±0.4% BL), while weight remained stable in the WS group [(-0.2±0.5 kg); 6-month p<0.01]. Treatment effect estimates, adjusted for gender and BL value, revealed a significant reduction in HAI score in the WL group [WL: -0.80 (-1.18, -0.41) vs WS: -0.17 (-0.57, 0.23); p=0.02], driven by reduced FBG [WL: -4.31 (-8.22, -0.40) mg/dL vs WS: 1.47 (-2.61, 5.55) mg/dL; p=0.03] and marginally increased FVC [WL: 0.11 (-0.02, 0.23) L vs WS: -0.04 (-0.17, 0.09) L; p=0.08]. In groups combined, 1 kg of WL was associated with a 0.07 (0.01, 0.14) reduction in HAI score (p=0.03), conferring a 13% lower mortality risk in observational studies. Conclusion: Intentional WL in older adults reduces HAI-associated mortality risk, largely due to improved metabolic and pulmonary factors.

### PHYSICAL ACTIVITY BY LOCATION OF MARYVILLE COLLEGE ATHLETES, NON-ATHLETES, AND FACULTY/STAFF.

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**P14** Purpose: The aim of this study was to determine where Maryville College non-athlete students, student athletes, and faculty/staff engage in physical activity. Methods: Participants completed a survey where they listed daily physical activity (type and duration), whether activity occurred indoors or outdoors, and on or off campus across one week. Means and frequencies were calculated for indoor and outdoor and on and off campus physical activity. Results: Participants were 759 adults who responded to the survey; 25 faculty, 5 staff, and 729 students (255 athletes, 474 non-athletes). Approximately 44% of the respondents reported 30 or more minutes of physical activity on at least 5 days of the week, while 14% of respondents reported 0 days of at least 30 minutes of physical activity per week. Overall, the majority of physical activity occurred outside (59%). A greater percentage of outside activity occurred on weekends (65%) than on weekdays (57%). Overall, most physical activity throughout the entire week (59%) occurred outside, with faculty accounting for the most time spent outside (67%), followed by student-athletes (65%) and non-athlete students (54%). Most physical activity during the week occurred on campus (64%), while only 47% of physical activity that occurred on Saturday and Sunday was on campus. Among non-athlete students, 50% of their physical activity occurred on campus and 50% off campus. Athletes reported engaging in 83% of their physical activity on campus, while the staff/faculty achieved 95% of their physical activity off campus. Conclusions: Most of the student respondents reported participating in physical activity on campus and outdoors; however, weekend activity tended to be outdoors and off campus. The faculty/staff were the only group that reported doing the majority of physical activity off campus, and were most likely to be active outside. None of the groups used indoor facilities more than outdoor space.

### THE ATHLETIC DIFFERENCE: DIFFERENCES IN PHYSICAL ACTIVITY BETWEEN STUDENT ATHLETES, NON-ATHLETES AND FACULTY/STAFF.

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**P15** Purpose: The goal of this study was to determine whether student athletes, non-athlete students, and faculty/staff members at a small liberal arts college differ in their self-reported physical activity levels. Methods: In October 2016, 729 students and 30 faculty/staff members from Maryville College, Maryville, TN, completed a physical activity survey where they reported their past week physical activity behaviors (time, type and location of activity). Due to the non-normality of the data, Kruskal Wallis tests were used to compare continuous physical activity variables: total minutes per week, days per week, and body mass index (BMI) between student athletes, non-athlete students, and faculty/staff members. Chi-Squared tests compared categorical demographic variables. Results: Despite a significant difference in age between the faculty/staff members, student athletes, and non-athlete students (45.5 ± 12.3 vs 19.4 ± 1.5 vs 20.5 ± 4.1, p<0.01, respectively), there was no significant difference in BMI (25.2 ± 3.8 vs 25.8 ± 4.6 vs 26.1 ± 6.1, p=0.7) between the groups. Student athletes exercised more days per week (6.7 ± 1.3 vs 5.0 ± 1.9 vs 3.8 ± 2.1 days per week, p<0.01, respectively) and more minutes per week (644.6 ± 456.9 vs 223.0 ± 208.7 vs 163.4 ± 266.5, p=0.01, respectively) than faculty/staff members and non-athlete students. Faculty/staff members were also significantly more active (days and minutes per week) than non-athlete students. Conclusions: While it was expected that student athletes would engage in more physical activity than the rest of the campus body, it was surprising that they reported being almost 4 times as active as their non-athlete peers. It was also interesting to find faculty/staff members more active than the younger non-athlete students. Despite the significantly lower levels of activity, 37.6% of the non-athlete students still achieved the recommended 150 minutes per week of physical activity necessary to promote health.

### DEVELOPING A FIT. GREEN. HAPPY™ CAMPUS: A DESCRIPTIVE STUDY OF OUTDOOR ACTIVITY AND SEDENTARY TIME IN FRESHMAN STUDENTS

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**P16** Fit.Green.Happy™ is a wellness initiative at Maryville College to promote campus physical activity (PA), time spent outdoors, green literacy, and happiness. It is necessary to examine outdoor PA and sedentary behaviours (SB) to inform the design of effective programming to increase the proportion of students who are “fit, green, and happy”. Purpose: To describe outdoor PA and sedentary behaviors of freshman students at Maryville College. Methods: This analysis was part of a larger longitudinal cohort study to evaluate PA, time spent outdoors, green literacy, and happiness of students as they progress through college. Participants were 217 freshman (52% male) who completed a single survey in August 2017 and reported their age, height, weight, job status, and whether or not they were a college athlete. Participants reported the days per week and minutes per day spent participating in outdoor PA (running, brisk walking) and outdoor SB (hammock use, reading). Student t-tests were used to examine the differences in outdoor PA and outdoor SB across gender, employment, and athlete status. Results: Approximately 13.3% of the sample was employed and 50.2% were non-athletes. Participants engaged in outdoor PA for 4.36 ± 4.4 days/week and 86.62 ± 68.34 min/day. Participants engaged in outdoor SB for 3.7 ± 4.38 days/week and 70.90 ± 62.82 min/week. Males accumulated more outdoor PA than females (108.5 ± 72.6 vs. 62.6 ± 54.4 min/day, p<0.05), unemployed students were more active outdoors than their employed counterparts (90.6 ± 68.9 vs. 58.5 ± 53.3 min/day, p<0.05), and athletes spent significantly more time being active outdoors than non-athletes (115.3 ± 73.9 vs. 53.2 ± 40.0 min/day, p<0.05). Conclusions: Females, employed students, and non-athletes had the lowest outdoor PA across the incoming freshman class. These findings will inform future programming and campus environmental changes at Maryville College to promote outdoor PA.

**FEASIBILITY OF A COLLABORATIVE INTERVENTION TO IMPROVE HEALTHY BEHAVIORS IN TEACHERS AND SCHOOL STAFF: A PILOT STUDY**

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**P17** BACKGROUND: The purpose of this study was to develop a school-based intervention to improve health behaviors in teachers using a collaborative approach between researchers and participants. METHODS: Nineteen elementary-school teachers (95% female) participated in focus groups that focused on: 1) current and ideal health behaviors; 2) barriers to physical activity (PA) and nutrition; and 3) motivators of health behaviors. Based on participant feedback from the focus groups, FitBit activity trackers were provided for participants to wear over a six-week period. At the conclusion of the six-week trial, follow-up questions and feedback were collected from participating teachers and staff. RESULTS: Focus group discussions revealed that 100% of the sample wanted to increase PA with only four (21%) of the participants reporting that they engaged in any type of activity. Participants felt that a FitBit activity tracker would increase their motivation to be healthy, and after six weeks, all but 1 teacher (95%) were still tracking their health behavior. At the end of the intervention, 18 teachers were still wearing FitBits and tracking their lifestyle habits. 69% of the sample utilized steps to track PA, while 25% reported that they felt their nutrition improved as a result of using the FitBits. The majority of the sample felt that the use of the FitBits improved their PA. CONCLUSIONS: Teachers reported the FitBits positively influenced their health behaviors and may indirectly encourage healthy habits in their students. Future studies should examine the benefits of the intervention on students' health behaviors and teachers' classroom performance.

**SELF-REPORTED SEDENTARY TIME AND CUMULATIVE RISK OF PRESERVED AND REDUCED EJECTION FRACTION HEART FAILURE (FROM THE MULTI-ETHNIC STUDY OF ATHEROSCLEROSIS)**

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**P18** Purpose: Examine the relationship between self-reported sedentary time and cumulative risk of preserved ejection fraction heart failure (HFpEF) and reduced ejection fraction heart failure (HFrEF) using a diverse cohort of U.S. adults 45-84 years of age. Methods: Using data from the Multi-Ethnic Study of Atherosclerosis (MESA), we identified 6,814 subjects (52.9% female). All were free of baseline cardiovascular disease. Cox regression was used to calculate the hazard ratio (HR) associated with baseline sedentary time and risk of HFpEF and HFrEF. Weekly self-reported sedentary time was dichotomized based on the 75th percentile (1,890 min/wk). Results: During ~11.2 years of follow-up there were 178 first incident HF diagnoses; 74 HFpEF, 69 HFrEF and 35 with unknown EF. In the age adjusted model, sedentary time >1,890 min/wk was a significant predictor of HFpEF (HR 1.75, p=0.03), but not HFrEF (HR 1.36, p=0.24). The relationship with HFpEF remained significant in separate fully adjusted models including body mass index (HR 1.87, p=0.02) or waist circumference (HR 1.86, p=0.02) while the relationship with HFrEF did not reach statistical significance. These models were also adjusted for physical activity (MET·min·wk<sup>-1</sup>). Conclusions: Sedentary time >1,890 min/wk (~4.5 h/d) is an independent predictor of HFpEF, but not HFrEF.

**MEAN COMBINED RELATIVE GRIP STRENGTH AND METABOLIC SYNDROME: 2011-2014 NHANES**

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**P19** PURPOSE: Examine mean combined relative grip strength (RGS) in those with metabolic syndrome (MetS) and the individual criterion using a nationally representative sample of U.S. adults. METHODS: Data from the 2011-2014 National Health and Nutrition Examination Survey (NHANES) was used to examine mean combined RGS (kg/BMI) in U.S. adults (≥ 18 years of age) in those with MetS and the individual criterion. Study sample (n=4307) included adults who participated in the muscle strength examination session in the mobile examination center. Cardiometabolic risk factors included elevated waist circumference (WC), elevated blood pressure (BP), elevated triglycerides (TG), impaired fasting glucose (IFG), and reduced high density lipoprotein cholesterol (HDL-C). RESULTS: Compared to those with desirable values, mean combined RGS was significantly lower in men (p<0.05) with elevated WC (3.61 vs. 2.79 kg/BMI), elevated BP (3.36 vs. 2.83 kg/BMI), elevated TG (3.44 vs. 2.97 kg/BMI), IFG (3.48 vs. 3.05 kg/BMI), reduced HDL-C (3.31 vs. 3.06 kg/BMI), and in those with MetS (3.47 vs. 2.79 kg/BMI), respectively. Similarly, compared to those with desirable values, mean combined RGS was significantly lower in women (p<0.05) with elevated WC (2.47 vs.1.81 kg/BMI), elevated BP (2.14 vs. 1.72 kg/BMI), elevated TG (2.15 vs. 1.79 kg/BMI), IFG (2.18 vs.1.80 kg/BMI), reduced HDL-C (2.11 vs. 1.84 kg/BMI), and in those with MetS (2.19 vs. 1.72 kg/BMI), respectively. CONCLUSION: Mean combined RGS was lower in men and women with MetS and the individual criterion.

**DIABETIC RISK PROFILING IN CHARLOTTE HISPANIC COMMUNITY**

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**P20** Purpose- The purpose was to determine an individual's risk for Diabetes and recommend potential lifestyle modifications to reduce that risk. Methods- Using the A1CNow, each participant had their blood Hemoglobin A1C (HbA1C) levels analyzed to see if they were within the recommended levels for health. Each analysis required a small finger prick to collect a blood sample. The finger was first wiped with an alcohol pad to clean the skin and dried with a gauze pad. A lancet pierced the skin of the participant's finger to create a small incision from which to draw blood. The lancet was then discarded in a sharps biohazard container. The first drop of blood was wiped away with the gauze pad. The second and third drops of blood were collected and placed into the A1CNow to analyze HbA1C levels. The participant was given the gauze pad to apply pressure to their finger, and the puncture incision was bandaged before leaving. Upon completion of the test (5 minutes), the participant's numbers were recorded and explained. Results- After conducting three round of assessments in the Charlotte Hispanic community (n=75) it was found that according to the ACSM guideline on HbA1C 53% of the Hispanic community fell into the normal range of <5.7, 33% in the pre-diabetic range of 5.7-6.4, and 13% in the Diabetic range of having an HbA1C of greater than or equal to 6.5. Conclusions-Based on these results, diabetic intervention may be necessary for this population. It is vital to incorporate the two major factors that influence blood glucose levels: consistent exercise and healthy eating habits, in order to postpone/prevent the onset of diabetes. Supported by a grant from Blue Cross and Blue Shield of North Carolina.

### SO YOU THINK YOU ARE BETTER THAN A 12-YEAR-OLD?

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The role of physical literacy in physical competence and self-concept of children is a critical determinate of physical activity and healthy behaviors. It is unclear if this relationship exists in adults, particularly future PE teachers. Purpose: This study examined these relationships to better understand if current physical education teacher education (PETE) provides sufficient knowledge and information to pre-service educators. Methods: Thirty Physical Education Pedagogy undergraduate majors (24 males, 6 females, aged 19-26) participated in the current study. Participants performed physical competence (PC) testing and completed the physical self-concept profile (PSPP) to indicate perceptions of Sports Competence (SC), Physical Condition (PC), Attractiveness of Body (AB), Physical Strength (PS), and Physical Self-Worth (PSW). A multiple linear regression analysis (Stepwise) was used to identify variables that were most highly correlated with physical competence. Results: Our study indicated an inverse relationship between BMI and PC ( $r=-.43$ ,  $p=.02$ ). PC was positively related to SC ( $r=.37$ ,  $p=.04$ ). BMI was positively related to PS ( $r=.48$ ,  $p=.007$ ). Perceived competence among participants was positively related to SC ( $r=.66$ ,  $P<.01$ ), PC ( $r=.80$ ,  $P<.01$ ), AB ( $r=.73$ ,  $P<.01$ ), PS ( $r=.76$ ,  $P<.01$ ), PSW ( $r=.77$ ,  $P<.01$ ) and overall PSPP ( $r=.86$ ,  $p<.01$ ). A total of 36% of variance in physical competence can be explained while considering BMI and SC ( $p=.003$ ). Conclusions: Participants' perceived competence was related to their physical self-concept. However, participants in the current study were overweight. Participants did not perceive themselves to be less strong, healthy or physically active than normal weight adults. Future PETE curriculum could be more effective if it accounted for self-perceptions of pre-service educators.

### THE IMPORTANCE OF HIGH CARDIORESPIRATORY FITNESS AND OVERWEIGHT OBESITY TO CARDIOMETABOLIC HEALTH IN PRE-ADOLESCENT CHILDREN

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Purpose: To determine the importance of high cardiorespiratory fitness and overweight-obesity to cardiometabolic health in pre-adolescent children. Methods: In 392 children (9.5 y, 50% F), overweight-obesity was classified according to 2007 WHO criteria for Body Mass Index. Cardiorespiratory fitness was estimated using a shuttle run test, and high fitness was categorized as a maximum oxygen uptake exceeding 35 ml/kg/min in girls, and 42 ml/kg/min in boys. Eleven traditional and novel cardiometabolic risk factors were measured, from which principal component analysis (PCA) identified the underlying cardiometabolic factors. Results: PCA revealed four underlying factors: blood pressure, cholesterol, vascular, and carbohydrate-metabolism. Using these factors, a cumulative risk score was also calculated. Only high fitness ( $P=0.001$ ,  $\text{Eta}=0.028$ ) was significantly associated with blood pressure. Only overweight-obesity associated with vascular ( $P=0.010$ ,  $\text{Eta}=0.018$ ) and carbohydrate-metabolism ( $P=0.005$ ,  $\text{Eta}=0.021$ ). Neither high fitness nor overweight-obesity significantly associated with cholesterol. For the cumulative risk score, there was an interaction effect ( $P=0.038$ ,  $\text{Eta}=0.012$ ). High fitness lowered cardiometabolic risk in overweight-obese children ( $P=0.006$ ,  $\text{Eta}=0.02$ ), but not in normal weight children. Conversely, being overweight/obese increases cardiometabolic health risk in children with low fat levels ( $P<0.001$ ,  $\text{Eta}=0.039$ ), but not in children who are highly fit. Conclusions: Fitness and fatness associate with different cardiometabolic risk factors, and fitness may protect against fatness.

### THE BENEFITS OF A REQUIRED WELLNESS COURSE IN A LIBERAL ARTS EDUCATION

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Purpose: Students at a small, residential liberal arts college are required to take a 1-credit hour course, Survey of Wellness, which covers wellness topics including physical fitness and healthy behaviors. The purpose of this study was to determine if this course adequately informs students about the benefits of physical activity and encourages them to improve their overall fitness and health. Methods: All students were invited to complete an online Likert scale survey that assessed their physical activity attitudes, beliefs, and practices. Of the 412 students who took the survey, 217 students had either completed or were currently enrolled in the wellness course and 191 students had not taken the course. Results: The data showed students who were enrolled in or had completed the wellness course were aware that 150 min/week of moderate or 60 min/week of vigorous physical activity reduces the risk of heart disease ( $p=.0102$ ). The students who were enrolled in or had completed the wellness course also thought that the effects of low physical fitness were more severe than those students who had never taken the course ( $p=.0062$ ). Further, the students who were enrolled in or had completed the wellness course were more confident in their ability to increase their weekly physical activity ( $p=.0038$ ) and in their ability to improve their physical fitness ( $p=.0190$ ) compared to the students who had not taken the course. However, there was no difference between groups in confidence in their ability to improve overall health ( $p=.0967$ ). Conclusion: This study suggests that a 1-credit hour wellness course can inform students about the benefits of physical activity and encourage them to improve their physical fitness.

### DOMAIN-SPECIFIC CORRELATIONS BETWEEN PHYSICAL ACTIVITY INTENSITY AND CELL-PHONE ADDICTION IN COLLEGE STUDENTS

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Cell-phone use is often associated with physical activity (PA) in young adults. Individuals who report engaging in more vigorous and moderate PA report lower cell-phone usage when compared to individuals who are less physically active. PURPOSE: The purpose of this study was to determine if PA and sedentary behaviors (SED) varied as a function of cell-phone addiction (CPA). METHODS: Participants ( $n=1130$ ,  $19.7\pm 1.6$  yrs,  $66.9\%$  female,  $90.4\%$  Caucasian,  $5.4\%$  African American) were recruited via email and self-reported all responses online. Using the IPAQ-short version, total, vigorous- (VIG), moderate- (MOD), and walking- (WALK) were measured in MET-min; SED was assessed in minutes per day. CPA was assessed using the Cell-phone Addiction Scale, with responses ranging from 0 (lower addiction) to 28 (higher addiction) and stratified in to groups (LOW, MID, HIGH) using a tertile-split. Bivariate correlations between each intensity component of PA, SED, and CPA were assessed using Pearson's  $r$ . ANOVA was used to assess differences between CPA groups. RESULTS: CPA was inversely associated with total-, VIG-, and MOD-PA, and positively associated with SED, ( $r=-.108$ ,  $-.154$ ,  $-.072$ , and  $.067$ , respectively; all  $p<.05$ ). CPA was not associated with WALK-PA ( $r=.011$ ;  $p=.711$ ). The HIGH-CPA group engaged in less total-, VIG-, and MOD-PA than the MID- and LOW-CPA groups (all  $p<.05$ ). No between-group differences were observed in WALK-PA or SED (both  $p>.05$ ). CONCLUSION: Higher CPA appears to be associated with lower VIG- and MOD-PA, but not with lower intensity activities or SED in college students.

### SEX-RELATED DIFFERENCES IN PHYSICAL ACTIVITY, SEDENTARY BEHAVIOR AND CELL-PHONE ADDICTION

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P25 Previous research has indicated that sex-related differences exist in physical activity (PA) and sedentary behaviors (SED) among college students. Additionally, college-age females spend more time using their cell-phones than college-age males. PURPOSE: The purpose of this study was to determine if PA, SED, and cell-phone addiction (CPA) differed between male and female college students. METHODS: Participants (n=1120, 19.7±1.6 yrs, 67.1% female, 90.6% Caucasian, 5.2% African American) were recruited via email and self-reported all responses online. PA (MET-min) and SED (minutes per day) were assessed using the IPAQ-short. Cell-phone addiction (CPA) was assessed using the Cell-phone Addiction Scale, with responses ranging from 0 (lower addiction) to 28 (higher addiction). Sex was classified as female, male, or other. ANOVA was used to assess differences in the independent variables (PA, SED, CPA) between sexes. RESULTS: Female students reported more SED (431.5±188.2 vs. 407.8±169.6 min, respectively; p=.041), and reported higher CPA (18.6±4.9 vs. 16.2±5.1, respectively; p<.001) than male students. In addition, female students reported engaging in less PA (5235.9±3558.8 vs. 5828.5±3578.6 MET-min, respectively, p=.009). CONCLUSION: Female college students reported greater SED, higher CPA, and less PA than male college students. Future research should examine these sex-related differences with objectively measured PA, SED, and cell-phone use.

### SEDENTARY BEHAVIOR IS ASSOCIATED WITH PHYSICAL ACTIVITY AND CELL-PHONE ADDICTION IN YOUNG ADULTS

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P26 Screen time and cell-phone addiction is often associated with sedentary behavior, especially in college students. PURPOSE: The purpose of this study was to determine if physical activity (PA), cell-phone addiction, and sleep was associated with sedentary behavior (SED). METHODS: Participants (n=1114, 19.7±1.6 yrs, 67.1% female, 90.7% Caucasian, 5.1% African American) were recruited via email and self-reported all responses online. PA (MET-min) and SED (minutes per day) were assessed using the IPAQ-short. Cell-phone addiction (CPA) was assessed using the Cell-phone Addiction Scale, with responses ranging from 0 (lower addiction) to 28 (higher addiction). Sleep was reported in average hours per night. Groups of SED (LOW, MOD, HIGH) were created using a tertile-split. Bivariate correlations between PA, CPA, and SED were assessed using Pearson's r. ANOVA was used to assess differences between SED groups. RESULTS: SED was inversely associated with PA (r=-.15, p<.01), positively associated with CPA (r=.07, p=.03), and not associated with sleep (r=-.05, p=.11). The LOW SED group engaged in more PA (6015.7±3795.7 MET-min) than the MOD SED (5493.5±3491.0 MET-min) and HIGH SED (4690.3±3305.3 MET-min) groups (p<.01). In addition, the LOW SED group reported lower CPA (17.3±5.1) than the HIGH SED group (18.2±5.2) (p=.04). CONCLUSION: Young adults reporting greater SED engage in less PA and report higher CPA, providing a link between cell-phone use and PA. Future research should examine these associations with objectively measured PA, SED, and cell-phone use.

### A COMPARISON OF MODERATE TO VIGOROUS PHYSICAL ACTIVITY DURING TRADITIONAL AND NON-TRADITIONAL SCHOOL ACTIVITY OPPORTUNITIES

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PURPOSE: Kidsfit© kinesthetic equipment is designed to enhance learning through movement. This study investigated time children spent in moderate to vigorous physical activity (MVPA) during opportunities to use Kidsfit© equipment versus traditional physical activity opportunities. METHODS: Children attending an elementary school (N=139, mean age= 8.4 years, 47% female, 88% African American) wore accelerometers during school hours for four non-consecutive weeks. Research assistants recorded times with opportunities to use Kidsfit© equipment, recess, physical education (PE), and/or physical activity breaks during classroom time via direct observation. The proportion of time spent in MVPA was calculated for each physical activity opportunity. RESULTS: For girls, PE lasted an average of 43.1 minutes (13.8% in MVPA), activity breaks lasted for 26 minutes (11.2% in MVPA), opportunities to use the Kidsfit© equipment lasted for 35.1 minutes (11.3% in MVPA), and recess lasted 21.5 minutes (20% in MVPA). When provided, boys spent 41.7 minutes in PE (15.1% in MVPA), 39.4 minutes in physical activity breaks (6.4% in MVPA), 39.4 minutes using the Kidsfit© equipment (10.9% in MVPA), and 18.7 minutes in recess (23.5% in MVPA). CONCLUSION: Children spent a lower proportion of time in MVPA while using Kidsfit© equipment when compared to traditional physical activity opportunities. Children achieved the highest percent of time in MVPA during recess. Given the approximate \$50,000 cost of the Kidsfit© equipment and the finding that children spend a greater proportion of time in MVPA during traditional activity opportunities it does not appear that Kidsfit© should be purchased to promote MVPA.

### PHYSICAL ACTIVITY OPPORTUNITIES THROUGHOUT A SEGMENTED SCHOOL DAY

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PURPOSE: This study examined the amount of time girls and boys in a low-income school district spent in moderate to vigorous physical activity, MVPA, during the segmented school day, and the impact of recess and PE on MVPA during the school day. METHODS: Seven hundred and nineteen children (age=7.7 years, 48.0% female, 89.0% African American) wore accelerometers during school hours for at least one school day (i.e., accelerometer data collected on 1063 total school days). The school day was divided into 5 discrete school day segments: class-time, lunch, physical education (PE), recess and specials (e.g., art, music). Children's activity was distilled into time engaged in MVPA during each school day segment and across the entire school day. Mixed effects linear regression models estimated minutes of MVPA and the percentage of children accumulating the recommended 30 minutes of MVPA guideline during the school day on days that children attended physical education and days that children attended recess. RESULTS: Girls and boys accumulated 27.3 and 30.8 minutes of MVPA during the school day, respectively. For girls and boys a total of 12.1 and 13.8 min/day of MVPA were accumulated during class-time, 7.1 and 8.1 min/day during PE, 2.7 min/day and 2.7 min/day during recess, 2.6 and 3.1 min/day during lunch, and 2.7 and 3.1 min/day in specials. On days that children attended PE girls accumulated 7.7 (95CI 4.9, 10.6) min/day more and boys 11.8 (95CI 8.5, 15.0) min/day more MVPA, while recess added 1.5 (95CI -1.3, 4.2) min/day for girls and 1.0 (95CI -2.2, 4.1) min/day of MVPA for boys. A total of 9.0% and 15.9% of girls and boys met the 30 min/day of MVPA guideline. On PE days the guideline was met by an additional 17.6% (95CI 6.3, 28.9%) and 30.5% (95CI 18.6, 42.5%) of girls and boys, while on recess days an additional 6.3% (95CI -3.5, 16.2%) and 2.8% (95CI -8.0, 5.5%) of girls and boys met the recommendation. CONCLUSIONS: The majority of school children are not accumulating the recommended 30 min/day of MVPA guideline. However providing PE can increase the amount of MVPA both boys and girls accumulate during the school day and increase the percent of boys meeting the 30 min/day guideline.

### ASSOCIATION OF PHYSICAL ACTIVITY AND SEDENTARY TIME ON SLEEP QUALITY IN FIRST-YEAR COLLEGE FEMALES

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**P29** PURPOSE: The association of moderate- to vigorous physical activity (MVPA) and sedentary time (SED) on sleep quality (SLP-Q) among college students is not well characterized and is important due to the links between SLP-Q and both physical and mental health. This study aimed to evaluate the impact of PA and SED on SLP-Q in female freshmen. METHODS: First-year college females (n = 268; 65% white; 18-20 yrs) were assessed for MVPA via accelerometry (NL-1000; 4 valid, 10-h days of wear required), SED via the International Physical Activity Questionnaire-Long (IPAQ), and SLP-Q via the Pittsburg Sleep Quality Index (PSQI). Bivariate correlations were used to assess the association of MVPA and SED with SLP-Q. RESULTS: On average, participants engaged in 50±22 min/day of MVPA, reported 332±148 min/day of SED and reported poor SLP-Q (PSQI Global Score 11.4±3.0; scores > 5 indicate poor SLP-Q). Neither MVPA nor SED was associated with SLP-Q (r = -0.047, r = -0.009, respectively; both p>0.05). CONCLUSIONS: Results suggest that objectively measured MVPA and self-reported SED are not associated with SLP-Q among first-year college females. Further study is warranted to determine the factors related to poor SLP-Q in this population toward the end of improving this important health outcome in this cohort.

### PHYSICAL ACTIVITY PARTICIPATION AND CHRONIC DISEASE RISK FACTORS IN AFRICAN AMERICAN COLLEGE STUDENTS

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**P30** Chronic disease risks are increasing among college students. African-American (AA) college students are a vulnerable population given the disproportionate manifestation of chronic diseases in AA adults. PURPOSE: To examine differences in chronic disease risk factors among AA college students by physical activity (PA) participation and gender. METHODS: AA college students (N=63; 43 female, 20 male; aged 18.2 ± 1.3 years) were recruited for a research study examining and intervening on cardiovascular disease risks. Data were collected by performing physical assessments, blood marker investigation, and completion of validated and reliable self-report surveys. Descriptive statistics, frequencies, and independent samples t-tests were run on baseline data. Students were categorized by meeting or failing to meet the PA guidelines of 150 mins/week and separated by gender. RESULTS: Among females, 28% met PA guidelines and had significantly lower waist circumference (p=.05), BMI (p=.03), and LDL cholesterol (p=.04) and higher sleep quality (p=.05) than females who did not meet the guidelines. In contrast, the majority of males met the PA guidelines (85%); however, there were no significant beneficial differences compared to males who did not meet the guidelines. Overall, the majority of students were categorized as overweight and obese (54%) and slept just over 6 hours a night on average. CONCLUSION: AA college students are at risk for chronic diseases. Among females, meeting PA guidelines was associated with improved health risk profiles. Supported by NIMHD 1R15MD010194-01.

### EFFECTS OF EXERCISE AND WINE ON GLYCEMIC CONTROL IN TYPE 2 DIABETES

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**P31** Purpose: Exercise enhances insulin sensitivity and alcohol increases insulin secretion in response to ingested glucose; therefore, we tested the effects of daily exercise and moderate wine intake on glycemic control in type 2 diabetes (T2D). Methods: Participants (n = 3) completed four different 1-week treatment periods consisting of either no exercise or daily exercise (60% heart rate reserve) and no alcohol or daily red wine with dinner (14 g ethanol). During the last three days of each treatment period, participants were instrumented with continuous glucose monitors to continually record blood glucose data. Results: Average blood glucose levels over each 3-day period were 7.8 ± 0.7, 7.6 ± 0.5, 7.1 ± 0.5, and 6.8 ± 0.6 mM for CON, WINE, EX, and EX + WINE treatments, respectively, with EX + WINE tending to be lower than CON (p = 0.06). The percentage of time with blood glucose higher than 7.2 mM was 61 ± 19% for CON, 61 ± 17% for WINE, 42 ± 15% for EX, and 34 ± 15% for WINE + EX, which also tended to be lower (p = 0.13). Overnight (12:00-5:00 AM) blood glucose values were 7.2 ± 0.7, 7.2 ± 0.4, 7.3 ± 0.5, and 6.3 ± 0.3 mM for CON, WINE, EX, and EX + WINE, respectively. Again, EX + WINE tended to be lowest (p = 0.09). Conclusions: These preliminary results suggest that daily exercise combined with wine during the evening meal improves glycemic control in T2D. Supported by Transylvania University and the Kentucky Academy of Science

### PHYSICAL ACTIVITY AND PLAY BEHAVIORS DURING INDOOR AND OUTDOOR FREE PLAY IN TODDLERS

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**P32** Purpose: To determine physical activity levels and cognitive play behaviors in toddlers during indoor and outdoor free play time. Methods: Participants were 25 toddlers (2.9+0.6y) enrolled in an early childhood program at a university laboratory school. Participants were observed for four 20-minute free play segments (2 indoor and 2 outdoor). Physical activity was assessed using the ActiGraph GT3X+ accelerometer worn on the right hip. Each free play assessment was also video recorded for analysis using the Noldus Observer XT system. The Play Observation Scale was used to classify cognitive play behaviors (constructive, dramatic, exploratory, functional, and game). The percentage of time spent in each play behavior was averaged for the indoor and outdoor segments. Paired samples t-tests were used to determine differences in mean vector magnitude (VM; counts/15sec) between environments (indoors and outdoors). A 2X5 repeated measures ANOVA was used to determine the main effects of environment and play behavior and the interaction between these variables. Results: There were no differences in VM counts between indoors and outdoors (541+173 vs. 657+327 counts/15sec, p>0.05). A significant interaction (p<0.05) was found between the environment and play behavior. Compared to outdoors, the participants engaged in 8.5% and 8.9%, more constructive and dramatic play, respectively, indoors (p<0.05). The children engaged in 1.4% more exploratory play (p<0.05) outdoors compared to indoors. There were no differences in functional (6.3%) and game (2.3%) play between environments (p>0.05). Conclusions: While there were no differences in VM counts, it appears that the environment has an impact on the type of play behaviors children engage in. Indoor and outdoor play opportunities may encourage a variety of play behaviors.

**WNT PROTEIN RESPONSE TO ACUTE AND CHRONIC RESISTANCE EXERCISE**

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Purpose: We sought to determine the Wnt mRNA expression response to an acute resistance exercise bout as well as the Wnt protein expression response to chronic resistance exercise in healthy males. Methods: Aim1: thirteen males performed four sets of leg extensions to failure at 80% of their 1-RM. Skeletal muscle biopsies were obtained at baseline, 15 min and 90 min post exercise to determine Wnt mRNA expression. Aim 2: eleven males underwent resistance training three days a week for 12 weeks. Skeletal muscle biopsies were obtained at baseline and 12 weeks post training to determine Wnt protein expression. Muscle tissue was then processed for analysis via real-time PCR and western blotting. Results: Aim 1: Wnt5a mRNA levels were down-regulated 15 min ( $p=0.011$ ) and 90 min ( $p=0.001$ ) post-exercise, and Wnt16 mRNA levels were down-regulated 90 min post-exercise ( $p=0.029$ ). Wnt9a mRNA levels were up-regulated 90 min post-exercise ( $p=0.011$ ), and Wnt10b mRNA levels were up-regulated 15 min ( $p=0.037$ ), but down-regulated 90 min post-exercise ( $p=0.003$ ). Aim2: The expression of all assayed Wnt proteins were not altered with training (i.e., Wnt3a, Wnt5a, Wnt7a, Wnt9a, Wnt11 and Wnt16). However, post-training Wnt9a protein levels exerted strong positive correlations with post-training type I cross sectional area (CSA) ( $r=0.72$ ,  $p=0.013$ ), type II CSA ( $r=0.78$ ,  $p=0.005$ ) and total CSA ( $r=0.88$ ,  $p<0.001$ ). Additionally, post-training Wnt11 exerted strong positive correlations with PT type I CSA ( $r=0.63$ ,  $p=0.038$ ) and PT total CSA ( $r=0.62$ ,  $p=0.04$ ). Conclusions: This study further explores how Wnt ligand gene and protein expression responses to acute and chronic resistance training.

**P33****ENERGY EXPENDITURE IN OUTDOOR PLAY IN YOUNG CHILDREN**

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An emerging trend in outdoor physical activity (PA) in young children is the incorporation of gardens in play spaces. Gardening activity is usually semi-structured, facilitated by an adult, while PA on the playground is typically unstructured, allowing more autonomy for the child. Purpose: To determine the differences in energy expenditure (EE) of two outdoor environments (playground and garden) in preschool children. Methods: Twenty-five children ( $4.4 \pm 0.7$  years) wore an ActiGraph accelerometer on the right hip during four randomly ordered free living conditions (30 min each), including two bouts of PA on the playground and two bouts of PA in the garden. Using accelerometer data, EE was calculated using the Pate et al. equation ( $VO_2=10.0714+(0.02366*\text{count}/15\text{-sec})$ ). Basal metabolic rate (BMR) was calculated using the Schofield equation. Youth MET (METy) values were calculated by dividing EE by BMR. Paired samples t-tests were conducted to look at differences in METy values between the playground and garden. Results: The children had a higher METy value on the playground compared to the garden ( $2.9 \pm 0.6$  vs.  $2.5 \pm 0.5$  METy;  $p=0.01$ ). Conclusions: The nature of the PA, unstructured vs. semi-structured, may contribute to the differences in METy values since children tend to engage in more enjoyable and purposeful PA during unstructured play. Gardens may provide an opportunity to increase children's EE levels, thus contributing to the accumulation of PA to meet Institute of Medicine recommendations (15 min/hour).

**EFFICACY OF BINGOCIZE®: A GAME-CENTERED MOBILE APPLICATION TO IMPROVE PHYSICAL AND COGNITIVE PERFORMANCE IN COMMUNITY-DWELLING OLDER ADULTS**

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PURPOSE: Adherence to health-promoting programs is a significant barrier to improving the health and well-being of older adults. The present study examined whether Bingocize®, a game-centered mobile app that combines exercise, health education, and bingo, could improve community-dwelling older adults' physical and cognitive performance. METHODS: Participants (N=85) used the app for approximately one hour, twice per week, for 10 weeks. Each using a tablet, they played the game in small social groups, and were randomly assigned to either an Experimental (Bingo + Health Education + Exercise;  $n=47$ ) or Control (Bingo + Health Education;  $n = 38$ ) group. Pre and Post-intervention assessments of (a) functional performance, (b) fluid cognition, and (c) knowledge of two health topics (osteoarthritis and fall risks) were administered. RESULTS: Two (Experimental/Control) x Two (Pre/Post) interactions were found for Arm Curls ( $F(1,81)=4.78$ ,  $p=.03$ ,  $\eta_p^2=.06$ ) and Chair Stands ( $F(1,81)=4.44$ ,  $p=.04$ ,  $\eta_p^2=.05$ ) and one domain of cognition (updating, a component of executive functioning) ( $F(1,79)=5.75$ ,  $p=.02$ ,  $\eta_p^2=.07$ ), such that the Experimental group improved more relative to the Control group. Both groups improved their knowledge of the two health topics ( $F(1,83)=275.56$ ,  $p<.001$ ,  $\eta_p^2=.77$ ). Alpha was set at .05. CONCLUSION: Our findings suggest the fun and interactive nature of Bingocize® may serve as an effective way to potentially improve multiple aspects of quality of life for community-dwelling older adults.

**P35****THE IMPACT OF A 1-YEAR PHYSICAL ACTIVITY PROGRAM FOR PRESCHOOLERS ON FUNDAMENTAL MOTOR SKILLS, PERCEIVED COMPETENCE, AND PHYSICAL ACTIVITY**

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PURPOSE: Approximately 50% of preschoolers do not meet physical activity recommendations and activity levels at an early age track through childhood. In addition, fundamental motor skills are important to young children's physical development. Typically, early childhood education utilizes free play to stimulate physical activity and motor skills, however, unplanned free play results in less physical activity compared to structured programs. The purpose of this study was to determine changes in fundamental motor skill, perceived competence and physical activity during a yearlong physical activity program for preschoolers. METHODS: 12 children (M age = 4.6 years) from a subsidized preschool attended the program. The intervention 20 week (1800 minutes of instruction time) intervention was based on mastery motivational climate. Fundamental motor skills (Test of Gross Motor Development II) and perceived competence (Harter and Pike) were measured four times throughout the intervention and physical activity was measured with the Actigraph GT3X during each session. RESULTS: The Fundamental motor skills increased significantly from baseline at each posttest ( $p <.001$ ). There were no changes in perceived competence. Participation in sedentary behavior during the intervention decreased ( $p = .019$ ) over time, while participation in MVPA increased ( $p = .001$ ) over time. There were no changes in light activity. CONCLUSIONS: This intervention was successful in increasing physical activity and fundamental motor skills for preschoolers. Changes in fundamental motor skill, sedentary behavior and physical activity appear to occur at the same time during the intervention, and programs may benefit by incorporating fundamental motor skills and physical activity into programs for preschoolers.

### THE IMPACT OF NOTCH ON MUSCLE INJURY, COLLAGEN FORMATION AND FAT DEPOSITION FOLLOWING DOWNHILL RUNNING

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**PURPOSE:** The purpose of this project is to determine the effects of notch and age on injury, collagen formation and fat deposition in aged muscle exposed to a bout of downhill running (DHR). **METHODS:** CBF1 mice (20-25 mo old) served as controls or performed a bout of DHR (11m/min, -15% grade) until exhaustion. 24h post-DHR and continued every 24h until euthanasia (3D & 4D), a Notch force-activator (FA) at concentrations of 1:3, 1:4 or 1:6 was injected into the left gastrocnemius and PBS (control) was injected into the right gastrocnemius. Hematoxylin and Eosin, Sirius Red and Oil Red O staining was used to quantify muscle injury, collagen formation and fat deposition, respectively. **RESULTS:** Independent of running, the gastrocnemius injected with FA had reduced collagen compared to the right gastrocnemius ( $P=0.025$ ). **CONCLUSIONS:** Following an acute bout of DHR, Notch force activation appears to reduce collagen count. Neither DHR nor FA had an effect on muscle injury.

### SEX MAY INFLUENCE EFFECTS OF AN EXERCISE INTERVENTION ON CHANGE IN PHYSICAL FUNCTION, LONELINESS, AND SOCIAL SUPPORT

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**PURPOSE:** Sex differences in habitual physical activity (PA) and physical function (PFx) in older adults is known; however, if sex impacts the effectiveness of an exercise (EX) intervention to improve PFX and psychosocial outcomes is less established. This study aimed to evaluate how sex influences change in PFX, habitual PA, loneliness (LONELY), and social support (SOC-SUP) in older adults following a 10-week EX (resistance, flexibility, balance training) and behavioral change intervention. **METHODS:** At baseline and post-intervention, older adults ( $n=26$ , 38% male; 63-81 & 71.4 $\pm$ 4.4 yrs) were assessed for PFX via 6-Minute Walk Test (WALK), Timed Up and Go (UPGO), and 30-second Chair Stand (CHAIR); LONELY via Three-Item Loneliness Scale, SOC-SUP via Social Support and Exercise Survey, and PA via accelerometry (NL-1000; 4 valid, 10-h days of wear required). **RESULTS:** At baseline, no sex differences were apparent except men had better WALK performance than women ( $p<.05$ ). Repeated measures ANCOVA revealed an improvement in WALK, UPGO, and PA (all  $p<.01$ ) that did not differ by sex ( $p>.05$ ). LONELY increased in women (trend;  $p=.06$ ), despite an increase in family SOC-SUP ( $p<.01$ ). Conversely, in men, LONELY decreased while family SOC-SUP increased (both  $p<.05$ ) with friend SOC-SUP showing no change ( $p>.05$ ). **CONCLUSIONS:** Our results suggest that sex does not influence EX intervention effects on PFX and PA but effects on LONELY and SOC-SUP are less clear. Research exploring differing program designs and delivery modes to enhance PFX as well as social connection in older men and women may be warranted.

### THE EFFECTS OF TAI CHI INTERVENTION ON HEALTHY ELDERLY BY MEANS OF NEUROIMAGING AND EEG

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**Background:** Aging is a process associated with a decline in cognitive and motor functions, which can be attributed to neurological changes in brain. Tai Chi, a multimodal mind-body exercise, can be practiced by people across all ages. Previous research identified effect of Tai Chi intervention on delaying cognitive and motor degeneration of people with or without perceptual and functional impairment. But neurological changes in human brain after Tai Chi intervention largely remain unknown. **Purpose:** This systematic review summarized current studies using brain imaging techniques and EEG to examine the effects of Tai Chi on older adults. **Methods:** The systematic review is subject to the Preferred Reporting Items for Systematic Reviews (PRISMA) statement. Two review authors worked independently on literature search and data analysis. A third author was responsible to reconcile a disparity between review authors. **Results:** Eleven articles were eligible for final review. Three detection methods including fMRI ( $N=6$ ), EEG ( $N=4$ ), and MRI ( $N=1$ ), were employed for different study interests. Significant changes were reported in subjects' cortical thickness, functional connectivity and homogeneity of brain, and executive network neural function after Tai Chi intervention. **Conclusion:** Included studies of the systematic review provided evidence that Tai Chi intervention gave rise to neurological changes in human brain. Future research should employ brain imaging techniques such as MRI, fMRI, and MEG to detect effects of Tai Chi on central nervous system. It is necessary to extend current research interest from behavioral level to neurological field.

### EFFECTS OF SHORT-TERM RESISTANCE TRAINING ON MAXIMAL AND RAPID TORQUE CHARACTERISTICS IN OLDER MALES

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**Purpose:** To identify the effects of short-term resistance training (RT) on maximal and rapid torque characteristics in older males. **Methods:** Eighteen untrained older males were randomly assigned to a training (TG;  $n = 9$ , age = 64.70  $\pm$  6.91 yrs) or control (CG;  $n = 9$ , age = 65.56  $\pm$  11.56 yrs) group. The TG performed 3 sessions per week of isokinetic RT for 4 weeks. RT sessions consisted of maximal concentric knee extensions at 45°·s<sup>-1</sup> with an emphasis on ballistic intent for 4 sets of 10 repetitions. Maximal voluntary isometric contractions (MVICs) of the knee extensors were performed before (PRE) and after week 4 (POST) of RT on a dynamometer. Peak torque (PT), rate of torque development from onset to 30 ms and 100-200 ms, impulse from onset to 30 ms and 100-200 ms were recorded for analysis. Muscle activation via surface electromyography of the vastus lateralis was also recorded during the MVICs. Two-way (group  $\times$  time) repeated measures ANOVAs were used to examine changes between groups across time. **Results:** No differences were present between groups for any of the dependent variables at PRE ( $p > 0.05$ ). PT increased in the TG compared to the CG (17%;  $p = 0.034$ ) at POST, while no other dependent variables changed. **Conclusion:** Four weeks of RT increased strength, but not rapid torque characteristics in older men.



### THE INFLUENCE OF RACE ON GESTATIONAL EXERCISE AND BIRTH OUTCOMES

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Purpose: African Americans have a significantly higher rate of preterm birth in the US compared to Caucasians and other minority populations. Current research demonstrates the benefits of maternal exercise on birth outcomes such as birth weight and preterm birth, but fails to investigate the influence of maternal exercise on attenuating adverse birth outcomes in African Americans (AA). The purpose of this study was to evaluate if AA and Caucasian infants exposed to supervised exercise training during gestation have similar birth outcome measures. Methods: Participants completed 3 sessions weekly of moderate intensity exercise from 16 weeks gestational age to delivery. At birth, measures were assessed, including gestational age, birth weight, birth length and APGAR scores at 1 and 5 minutes. Standard t-tests were performed to detect differences in measures between populations. Results: Maternal exercise intervention had similar outcome measures between African Americans and Caucasians for birth outcome metrics. Caucasian and African American infants exposed to maternal exercise had similar measures of gestational age at birth (p=0.333), birth weight (p=0.316), birth length (p=0.816), 1-minute APGAR scores (p=0.432), and 5-minute APGAR scores (p=0.426). 20% (2/10) of AA had preterm births relative to 10% (8/77) of Caucasians. Of those compliant with exercise intervention, no (0/10) AA and only 6% (5/77) of Caucasians had preterm births. Conclusions: These results suggest that maternal exercise has a similar maternal physiological response that benefits African American and Caucasian infants alike. Thus, maternal exercise may be a low cost non-pharmacological way to attenuate adverse birth outcomes in AA women. Further research is required to understand this influence on birth outcomes. Supported in part by AHA.

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### PHYSICIAN-PROVIDED PHYSICAL ACTIVITY ADVICE DURING PREGNANCY AND ADVICE ADHERENCE

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PURPOSE: The purpose of this study was to examine the association between physical activity (PA) advice received by pregnant women from their healthcare providers and their reported adherence to that advice. METHODS: 86 pregnant women (age=27.7±4.9 years, gestation=23.8±8.5 weeks) participated in this study. Participants completed a 38-item survey detailing demographic characteristics and pregnancy history, nutrition and PA advice received from their healthcare provider during pregnancy, and self-reported nutrition and PA behavior during pregnancy. RESULTS: 81.6% of respondents reported discussing exercise or PA with their healthcare provider; of these, 33.8% indicated that they brought up the topic to their provider. Mean MVPA reported was 135.2±196.1 min/week, while 25.3% of the sample met PA recommendations of 150 min/wk or more. Women who discussed PA with their providers had higher but not statistically significant odds of meeting PA recommendations (OR=3.25, CI=0.7-15.8) while those who were advised to avoid vigorous activity during pregnancy no matter what were less likely to meet recommendations (OR=0.52, CI=0.17-1.64). CONCLUSION: The majority of pregnant women receive advice related to physical activity during pregnancy from their healthcare provider, but this does not increase odds of adherence to that advice.

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### WEARABLES FOR KIDS – VALIDATION OF CONSUMER-WEARABLE HEART RATE IN CHILDREN

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PURPOSE: The validity of consumer wearable monitors that measure heart rate (HR) has been examined with adults, but no studies have been conducted with children (ages 5-12). The purpose of this study was to examine the validity of the FitBit Charge HR (FitBit) as a measure of HR in children, when compared to a criterion measure (Polar H7). METHODS: Children attending a holiday camp (N= 20, mean age = 8.0 years, 46% female) wore a FitBit and Polar H7 chest strap (Polar) for an average of two hours per day, over five observation days. Research assistants logged the child's activity and behaviors throughout the duration of the program. Pearson correlations were calculated to determine the magnitude of the relationship between FitBit and Polar HR estimates. Bland-Altman plots were used to assess the percent agreement between HR readings from the FitBit compared to the Polar device. RESULTS: A total of 38,000 individual HR data points were assessed for percent difference. The correlation between FitBit and Polar was  $r = 0.84$ . A Bland-Altman plot showed 75% of the HR calculations from the Fitbit were within ±10% of the Polar device, and 51% of the FitBit HR calculations were within <5% of the Polar. CONCLUSIONS: The FitBit can provide comparable HR estimates to a criterion field-based assessment of HR in children.

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### EXAMINING THE DIFFERENCES IN BMI CHANGES OVER THE SUMMER AMONG CHILDREN ATTENDING YEAR-ROUND VERSUS TRADITIONAL SCHOOLS

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PURPOSE: Unhealthy weight gain accelerates during the summer (i.e., June-August) compared to the school year (i.e., August-May). However, preliminary evidence suggests that enrolling in a structured program during summer, mitigates unhealthy weight gain. We hypothesized that children attending a year-round elementary school, which take an abbreviated summer vacation (5 weeks), would gain less weight during the summer than children attending a traditional school (10 week summer vacation). Methods: Children's (n= 285, 42.8% female, 68.3% African American) height, seated height, and weight were measured in three elementary schools (two traditional and one year-round) that were matched on school enrollment, ethnicity of children, and socio-economic status. Measurements were conducted prior to summer (May) and immediately following summer (August). Change in BMI z-score (zBMI) was calculated. Regression models with change in zBMI as the dependent variable and school calendar (traditional vs. year-round) as the independent variable estimated the difference in zBMI change between children attending the traditional and year-round schools. All models included race, gender, and peak height velocity as covariates. Results: Children attending the traditional school experienced an increase in zBMI of +0.16 while children attending the year-round school experienced an increase of +0.07 during the summer, a statistically significant difference in favor of the year-round school of -0.08 (95CI -0.16, -0.01). Conclusion: Year-round school calendars are promising for decreasing unhealthy weight gain during the summer, while these findings are preliminary this study supports the premise that structured programming during the summer can mitigate unhealthy weight gain.

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#### **MODIFYING ACCELEROMETER CUT-POINTS AFFECTS CRITERION VALIDITY IN FREE-LIVING YOUTH AND ADULTS**

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It is often assumed that using shorter epochs with accelerometer data will result in more time spent in moderate-to-vigorous physical activity (MVPA), compared to long epochs. This assumption has rarely been tested against a criterion measure (CM). Thus, the validity of this approach is unknown. **PURPOSE:** To assess the validity of accelerometer estimates when using cut-points (CPs) as intended (i.e. the epoch length for which they were originally developed), versus modifying them for use with a different epoch length. **METHODS:** Free-living data were collected in 53 youth (2-hrs each) and 29 adults (6-hrs each) wearing a hip-worn accelerometer and a portable indirect calorimeter. Measured oxygen consumption was converted to metabolic equivalents (METS) and coded as sedentary behavior (SB, METs  $\leq$  1.5), light physical activity (LPA, 1.6-2.9 METs), and MVPA (METs  $\geq$  3.0). Accelerometer data were processed using 3 youth and 3 adult CPs as intended, plus 5 other epoch lengths, totaling 6 estimates (1, 5, 10, 15, 30, and 60-s epochs). SB, LPA, and MVPA times were compared to the CM using one-way repeated measures ANOVAs. **RESULTS:** For youth MVPA, shorter epochs resulted in greater mean errors compared to using CPs as intended, with 1- and 5-s epochs being significantly different from the CM for all CPs (mean error 23.7%-62.7%,  $p \leq 0.04$ ). In contrast, for adults, using shorter epochs resulted in lower mean errors for MVPA, compared to using CPs as intended. However, no epoch length was significantly different from the CM (mean error 6.6%-50.9%,  $p = 0.10-0.99$ ). For both groups, SB and LPA were not different from the CM when using CPs as intended (mean error 7.3%-41.0%,  $p > 0.05$ ), while shorter epochs did in some cases. **CONCLUSIONS:** Accelerometer CPs should be used as intended to ensure validity.

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#### **QUALITY OF REPORTING FOR SINGLE-CASE EXPERIMENTAL DESIGNS TARGETING PHYSICAL ACTIVITY BEHAVIOR: A SYSTEMATIC REVIEW**

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Effective behavior change interventions require substantial pilot and efficacy testing prior to dissemination at the community level. During initial feasibility stages, the use of single-case experimental designs (SCEDs; experiments where 1-6 participants serve as their own controls) holds promise to gather relevant, in-depth quantitative and qualitative information. **Purpose:** To evaluate the quality of SCED research used to test physical activity (PA) promotion strategies. **Methods:** Combinations of key words related to SCED design (e.g. single case design, multiple baseline) and relevant dependent variables (e.g. exercise, fitness, physical activity) were used to search PubMed and Web of Science. 40 individual searches yielded 1195 titles. Nine studies, ranging from 1979 to 2017, met inclusion criteria by reporting behavioral outcomes related to PA in adults (e.g. steps per day, minutes per week). A 14-item scale was used to score and classify SCED quality as weak (<7), moderate (7-10), and strong (11-14). **Results:** The average quality score was 10.2 out of 14 (range 7-12). Reductions in scores were often due to lack the following features: a) inter-rater reliability, b) appropriate statistical analysis, c) rater blinding. While not specifically addressed in the quality assessment tool, it is important to note that only three studies reported the PA prescription with replicable precision (i.e. specific reporting of exercise frequency, intensity, time, type, volume, and progression). **Conclusions:** The current body of PA-related SCED research is relatively minimal. While quality scores related to SCED reporting were in an acceptable range, poor reporting of prescribed PA significantly limits this work in terms of replicability. Researchers focusing on PA outcomes should consider additional reporting standards to address this limitation.

#### **VALIDITY OF ADHESIVE WORN ACTIGRAPH GT3X+ ACCELEROMETER**

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**PURPOSE:** The ActiGraph GT3x+ activity monitor (ActiGraph, Pensacola, FL) is typically worn with a belt around the waist, ankle, or wrist. Due to low compliance and observations of discomfort with belt-worn accelerometers, this study examines the validity of wearing the ActiGraph directly on the hip using an adhesive patch. **METHODS:** Eleven participants (Age:  $22 \pm 1$ , BMI:  $24.2 \pm 4.2$ ) wore two ActiGraphs for four days; one on a waist belt and the other attached using a Tegaderm-Film adhesive (3M Medical, Maplewood, MN). Data gathered from accelerometers were uploaded to the ActiLife software. Wear-time of both devices was validated with participants' daily activity logs. Tri-axial motion data were then analyzed using a paired samples t-test. **RESULTS:** Strong correlations were found on motion axes 1, 2, and 3 ( $r = 0.946, 0.955, \text{ and } 0.905$ , respectively,  $p < .001$  for all). **CONCLUSION:** When using ActiGraph GT3x+ accelerometer, adhesive worn devices may be a valid alternative to traditional belt-worn devices.

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#### **CAN A PARTICIPANT-TAILORED PHYSICAL ACTIVITY INTERVENTION IMPACT MVPA IN LOW-SES, URBAN SCHOOL ADOLESCENTS?**

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Physical activity (PA) interventions not tailored to a specific population can be ineffective due to not being culturally relevant to participants. **PURPOSE:** This study examined if improvements in moderate-to-vigorous physical activity (MVPA) occurred in low SES, urban adolescents following a participant-tailored intervention. **METHODS:** 26 adolescents ( $12.6 \pm 0.7$  yrs) at a low SES, urban school in Chattanooga, TN participated in an after-school 9 wk dance intervention. PA (Actigraph accelerometer wGT3X) was assessed prior to and immediately following the intervention. Only valid accelerometer data (wear time  $\geq 10$  hrs, min. of 3 weekdays & 1 weekend day) were included in analysis ( $n=10$ ). Psycho-social constructs (PS) related with increased PA (self-efficacy, knowledge, beliefs, skills) were collected using a Likert scale. Paired-samples t-tests were used to assess pre/post differences. **RESULTS:** Post-intervention MVPA ( $17.01 \pm 8.91$  min/day) was significantly higher than baseline ( $11.34 \pm 4.47$  min/day) ( $p=0.044$ ). While an increasing mean trend was evident among PS, none were significant following the intervention. **CONCLUSION:** Although average daily MVPA improved following the intervention, it still below the 60 minutes/day MVPA recommendation. Future interventions should target increasing MVPA for this age and population.

**WHO'S USING IT: UTILIZATION OF STRENGTH AND CONDITIONING FACILITIES AND STAFF BY HIGH SCHOOL ATHLETIC TEAMS**

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Purpose: The purpose of this study was to describe the usage of high school strength and conditioning (S&C) facilities and involvement of S&C coaches in team warm up activities by boys and girls sports teams. Methods: A link to an online survey was distributed via e-mail with a brief description to the Athletic Directors at 316 public and private high schools across the Commonwealth of Virginia. The survey consisted of 23 multiple choice questions concerning demographic school information, as well as information on the S&C facility, staffing, and usage by teams. The questions in the survey were reviewed by individuals with expertise in S&C prior to being utilized. Results: 135 surveys were completed through the online survey tool (response rate: 42.7%). Compilation of the surveys resulted in 3,564 high school athletic teams being examined. 36.11% (1,287) of the teams utilized a S&C facility. When examined by gender, this usage was 39.15% (687) of male teams and 33.17% (600) of female teams. Only 7.49% (267) teams utilized a S&C coach during warm ups for games or practices. When examined by gender, this utilization was 8.55% (150) of male teams and 6.19% (117) of female teams. The team sport with the greatest usage of the S&C facility was football (82.20%, 112 teams) and they were also the greatest users of S&C coaches to assist with warm ups (40%, 54 teams). Conclusion: These results suggest that roughly a third of high school athletic teams utilize a S&C facility and less than 10% of teams utilize a S&C coach for warm ups for either games or practices. Football was the most common team to utilize the S&C facility as well as the S&C coach for warm up activities. These findings also suggest that female athletic teams as a whole are less likely to utilize a school's S&C facility and S&C coach than male athletic teams.

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**EXAMINATION OF SCHOOL TYPE, ENROLLMENT, AND LOCATION ON THE SQUARE FOOTAGE OF HIGH SCHOOL STRENGTH AND CONDITIONING FACILITIES**

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Purpose: The purpose of this study was to examine the square footage of high school strength and conditioning (S&C) facilities in relation to type of school (Public and Private), school enrollment (XS, S, M, L, XL, XXL), and school location (Urban, Suburban, and Rural). Methods: A link to an online survey was sent out via e-mail with a brief description to the Athletic Directors for 316 public and private high schools across the Commonwealth of Virginia concerning the S&C staff and facilities at their school. The survey consisted of 23 multiple choice questions concerning demographic school information, as well as information concerning the S&C facility, staffing, and usage by student athletes. The questions in the survey were reviewed by individuals with expertise in S&C prior to being utilized. Results: 135 surveys were completed through the online survey tool (response rate of 42.7%). Of the 135 responding schools, 105 were self-identified as Public and 30 as Private. Schools self-identified as Urban (13), Suburban (62), and Rural (59). 132 schools responded with the approximate square footage of their S&C facility based on specific size categories, <500 sqft. (16), 500-750 sqft. (36), 751-1000 sqft. (25), 1001-1250 sqft. (17), 1251-1500 sqft. (10), and >1500 sqft. (28). Based on a Chi Square analysis, the distributions for the S&C facility sizes were not significantly different for school Type ( $p=0.33$ ), Location ( $p=0.10$ ), or Size ( $p=0.26$ ). Conclusion: These results suggest that school type, location, and enrollment size are not significantly related to square footage of high school S&C facilities. It should be noted that none of the urban schools, which typically have larger enrollments, had a S&C facility greater than 1500 sqft. This may be related to the small number of responses from Urban schools (13) compared to Suburban (62) and Rural (59).

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**CONCUSSION EDUCATION AWARENESS AMONG DIVISION III COLLEGE ATHLETES AND COACHES**

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INTRODUCTION. The purpose of this study was to examine the awareness of concussions and determine the difference, if any, in the true knowledge of the two groups. The goal of the study was to find statistical data in the true knowledge college athletes and coaches possess on concussions. METHODS. A questionnaire was distributed to 178 participants to test their knowledge of concussions. Once true knowledge was established, an independent samples t-test was run to determine the difference, if any, between the athletes and players. RESULTS. All participants were a part of a sports team on Huntingdon College's campus. The results suggest there is no significant difference between the true knowledge of concussions between athletes and coaches ( $72.43 + 7.1$  vs  $76.68 + 5.35$ ;  $t=-1.89$ , 168,  $p>0.05$ ). CONCLUSION. Based on the data collected, there was no significant difference between the true knowledge the players and coaches had on concussions. Therefore, this test failed to reject the null hypothesis of an independent samples t-test of measuring the true knowledge players and coaches had on the subject of concussions ( $72.43 + 7.1$  vs  $76.68 + 5.35$ ;  $t=-1.89$ , 168,  $p>0.06$ ). The results indicated athletes and coaches have learned the major risks and concerns regarding concussions and that there was no significant difference in the education they have received.

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**EXAMINING THE IMPACT OF A SUMMER LEARNING PROGRAM ON CHILDREN'S WEIGHT STATUS, CARDIORESPIRATORY FITNESS**

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PURPOSE: Studies demonstrate that children (5-12yrs) experience greater weight gain and cardiorespiratory fitness (CRF) loss during the summer when compared to the school year. The absence of school's structured and regulatory environment may play a role in these adverse outcomes. Attending structured programs (i.e., summer school) over the summer may slow or even stop unhealthy weight gains and fitness losses. This study examined the impact of a 7-week summer learning program on children's weight status and CRF. We hypothesized that this structured summer program would mitigate unhealthy weight gains and fitness loss of the children that attended. Methods: Using an observational repeated measures within-subjects design, children's ( $N=20$  mean age= 6.35; 45% female; 80% African American) height, weight, and CRF (i.e., Fitnessgram PACER), were measured during the first and final week of the seven week program. Descriptive statistics were calculated for all variables. Kruskal-Wallis nonparametric ANOVAs estimated the difference in BMI zscore, overweight and obesity prevalence, and CRF during the first week (baseline) compared to the final week (outcome). Results/findings: No statistically significant changes were observed for, median zBMI (pre: 0.12, post: 0.11) or CRF (pre: 10, post: 13.5 PACER laps). All children except for one maintained the same weight status (e.g. normal weight, overweight) from baseline to outcome. A total of 12 participants increased or maintained the number of PACER laps completed, while 8 participants' PACER laps decreased. Conclusions: The majority of participants attending this summer learning program maintained their fitness levels and weight status. This study provides preliminary evidence that participation in a structured summer program, no matter the focus, can mitigate unhealthy weight gains and fitness loss over the summer for some children. However, because of the small sample size, future studies with larger more representative samples are needed to establish the impact of structured summer programming on children's CRF and weight status.

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### GENDER COMPARISONS FOR VERY SHORT-TERM DYNAMIC CONSTANT EXTERNAL RESISTANCE TRAINING

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**P53** Purpose: This study compared gender responses for strength and barbell velocity from very short-term (VST) upper body dynamic constant external resistance (DCER) training (bench press [BP]). Methods: Ten female (mean  $\pm$  SD age: 21.3 $\pm$ 3 yrs, height: 166.2 $\pm$ 6 cm, body mass: 71.4 $\pm$ 10.7 kg) and 10 male (mean  $\pm$  SD age: 24.6 $\pm$ 4 yrs, height: 179.5 $\pm$ 8 cm, body mass: 88.6 $\pm$ 11 kg) subjects with no resistance training experience within the last three months completed two pre-test visits (pre-test 1 and pre-test 2), three training visits, and one post-test visit. For pre-test 1 and pre-test 2, the subject's 1 repetition maximum (1RM) for the BP was measured as well as the mean (BPMV) and peak (BPPV) barbell velocities from the BP 1RM. The three training visits consisted of 5 sets of 6 repetitions (concentric phase at max velocity), at 65% of the subject's 1RM. The post-test followed the same procedures as the two pre-test visits. Statistical analyses included 2x3 mixed model ANOVAs with appropriate follow-up procedures (alpha level of  $p \leq 0.05$ ). Results: The 2-way ANOVA ( $p=0.001$ ) and follow-up analyses indicated males increased 1RM strength by 5.1% and females by 2.6% between pre-test 2 and post-test as a result of the VST. There were no significance differences for BPMV and BPPV between genders, however, there was a 38.5% increase in BPMV and a 31.1% increase in BPPV within the DCER exercise for VST. Conclusion: These findings indicated an increase in strength and barbell velocity for both males and females as a result of VST upper body DCER exercise in untrained subjects.

### COMPARISON OF ELECTROMYOGRAPHICAL SIGNAL ANALYSES FOR ESTIMATING LACTATE THRESHOLD

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**P54** Currently, no published literature exists comparing the most appropriate and efficient filtering methods of electromyographical (EMG) analyses to estimate the workload at which lactate threshold (LT) occurs. Purpose: The purpose of this investigation was to evaluate and compare EMG transformations and time windows to predict LT. Methods: Participants (n=14) completed a maximal exercise test on a cycle ergometer until exhaustion. Blood lactate was measured every minute, while EMG was recorded continuously at the vastus lateralis. EMG signaling was then transformed and filtered using two time-segment windows (i.e., 10 and 60 seconds), as well as three signal conversions (i.e., root mean square, smoothing, and peak amplitude averaging). Results: Results indicated no mean differences between the EMG thresholds, for any of the filtering methods or time-segment windows, when compared to the LT criterion. Moderate correlations were seen when comparing the lactate and EMG time-curves ranging from 0.69 – 0.79. Conclusions: EMG may be a useful tool to estimate the work rate associated with LT. Averaging EMG over a minute of time and continual 10-second recordings demonstrate comparable readings and allow an easier application of EMG threshold in the field.

### EXERCISE ENJOYMENT ASSOCIATED WITH HIIT AND RESISTANCE TRAINING IN WOMEN

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**P55** PURPOSE: HIIT and resistance training are associated with positive health outcomes in females. However, high intensity exercise is often associated with an adverse affective response and may decrease exercise adherence. The purpose of this study was to examine factors associated with exercise enjoyment following an exercise intervention. METHODS: 46 women (M Age = 24.95 $\pm$ 4.3 yrs) participated in a 10-week exercise intervention consisting of a HIIT treadmill protocol and resistance training three times a week for a total of 30 sessions. After the exercise program, participants completed a brief semi-structured interview. The interviews focused on enjoyment of HIIT training, enjoyment of resistance training, confidence for future exercise and intention to be active in the future. Each interview lasted 5-15 minutes, was tape recorded, transcribed verbatim and analyzed utilizing the Framework approach. RESULTS: The higher order themes within the data included factors related to enjoyment for HIIT and resistance training, intention to be active in the future, intention to perform HIIT and intention to perform resistance training. In terms of enjoyment, competence emerged as the subordinate theme. All of the participants intended to be active in the future, and changes in knowledge, confidence and physiological changes (e.g. increased energy, positive changes in physical appearance) associated with increased exercise participation emerged as themes. In terms of utilizing HIIT training in the future as an exercise modality, 86% of the participants stated they would continue based on their past performance accomplishments. For resistance training, 75% stated they would utilize resistance training based on changes in knowledge and confidence. All women discussed a lack of knowledge concerning HIIT and resistance training prior to the start of the study. CONCLUSIONS: The results from this study showed that this group of young recreational women enjoyed the HIIT and resistance protocol over the course of the 10-week intervention. Educational efforts should be directed for women within the interventions themselves to encourage changes competence, confidence and the ability to engage in HIIT and resistance training after the intervention.

### THE IMPACT OF OBESITY ON PENTRAXIN 3 AND ENDOTHELIAL FUNCTION FOLLOWING ACUTE HIGH-INTENSITY INTERVAL EXERCISE VS. CONTINUOUS MODERATE-INTENSITY EXERCISE

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**P56** PURPOSE: Pentraxin 3 (PTX3) is a predictor of endothelial dysfunction, specifically in patients with increased risk of cardiovascular disease (CVD) (e.g., obesity). Circulating PTX3 concentrations are dysregulated in obese individuals and are elevated following acute aerobic exercise. High-intensity interval exercise (HIIE) has been shown to be as or more effective than continuous moderate-intensity exercise (CME) in improving endothelial function in patients with CVD. Therefore, the purpose of this study was to examine the effect of acute HIIE vs. CME on plasma PTX3 and FMD responses in obese individuals. METHODS: Fourteen young male subjects (8 obese and 6 normal-weight) participated in a counterbalanced and caloric equated experiment: HIIE (30 minutes, 4 intervals of 4 minutes at 80-90% of VO<sub>2</sub>max with 3 minutes rest between intervals) and CME (38 minutes at 50-60% VO<sub>2</sub>max). Plasma PTX3 and endothelial function, via brachial artery flow mediated dilation (BAFMD), were measured prior to, immediately following exercise, and 1 hour and 2 hours into recovery. RESULTS: Plasma PTX3 concentration was significantly increased following both acute HIIE and CME across all time points, with a blunted response in obese subjects compared to normal-weight subjects. The analysis of BAFMD demonstrated significant treatment by time and group by time interactions following both exercise protocols, with a greater CME-induced BAFMD response at 2 hours into recovery in obese subjects compared to normal-weight subjects. However, the level of plasma PTX3 was not correlated with BAFMD following either exercise protocol in both groups. CONCLUSIONS: Acute HIIE is as effective as CME to upregulate PTX3 expression in obese individuals, although this exercise-induced PTX3 may not contribute to the improvement of endothelial function. Further investigation is warranted to understand the clinical benefits of PTX3 to potentially predict the effectiveness of exercise interventions in obesity.

### PREDICTABILITY OF MAXIMAL OXYGEN CONSUMPTION USING SUBMAXIMAL RATING OF PERCEIVED EXERTION IN CHILDREN.

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Rating of perceived exertion (RPE) has been shown to accurately predict maximal oxygen consumption (VO<sub>2</sub>max) in active and sedentary adults. While RPE has shown to be valid in these populations, findings appear to be incongruent with children. Therefore, future research is needed in this underserved population. Purpose: The purpose of this study was to determine the agreement between measured VO<sub>2</sub>max and RPE estimated VO<sub>2</sub>max in children. Methods: Nineteen healthy, asymptomatic children performed a graded exercise test (GXT) to exhaustion. Before the test, researchers explained the testing protocol and RPE. Speed was held constant throughout the test with grade being increased 2% every two minutes until exhaustion. Individual regression lines were fitted for each subject using RPE (6-20) and VO<sub>2</sub> from the first three stages. An RPE of 20 was entered into the equation to calculate a projected VO<sub>2</sub>max. Results: A Spearman's Rho correlation revealed a strong, positive correlation between estimated VO<sub>2</sub>max based on RPE projection and measured VO<sub>2</sub>max (rs = .539; p = .017). However, a Wilcoxon-signed rank test found that estimated VO<sub>2</sub>max (74.94 ± 22.75 ml.kg<sup>-1</sup>.min<sup>-1</sup>) significantly over-predicted measured VO<sub>2</sub>max (54.04 ± 3.65 ml.kg<sup>-1</sup>.min<sup>-1</sup>; p < .001). Conclusion: The results suggest that submaximal RPE values using the Borg RPE (6-20) scale cannot be used to predict VO<sub>2</sub>max in children

### LOWER FOOD SECURITY IS ASSOCIATED WITH LESS PHYSICAL ACTIVITY IN RURAL APPALACHIA

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Physical activity (PA) and nutrition are two interrelated areas that impact public health in the U.S. However, little is known about the relationship between food insecurity, which is the "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways", and PA. Purpose: To examine the association between food security and PA and general health status. Methods: A convenience sample of 344 adults (>18 years) were recruited from 4 rural county fairs in the Appalachian region of the Southeastern U.S. Participants completed a questionnaire that assessed the USDA food security module, health history, and weekly PA. Kruskal-Wallis Tests with post hoc analyses were used to compare general health status (excellent (5) to poor (1)), days/week (0-7) with ≥30 min PA, and times/week (0, 1-2, 3-4, 5+) with ≥20 min of vigorous-intensity PA, and ≥30 min of moderate-intensity PA between food security categories (high, marginal, low, and very low food security). Results: Adults with high food security reported significantly higher general health status (3.4 ± 0.9 vs 3.1 ± 0.8 vs 2.8 ± 0.9 vs 2.6 ± 0.9, p<0.01), had more days/week with ≥30 min of PA (4.1 ± 2.4 vs 3.3 ± 2.3 vs 3.5 ± 2.4 vs 3.5 ± 2.4, p=0.03), engaged in ≥20 min of vigorous-intensity PA (2.0 ± 1.1 vs 1.5 ± 0.9 vs 1.8 ± 1.0 vs 1.6 ± 0.8, p<0.01), and ≥30 min of moderate-intensity PA (2.5 ± 1.1 vs 2.3 ± 1.1 vs 2.1 ± 1.1 vs 2.1 ± 1.1, p=0.04) more times/week than those who reported marginal, low, and very low food security. Conclusions: Adults living in Appalachia with marginal, low, and very low food security did less total PA, less moderate to vigorous PA, and had lower general health status than those with high food security.

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### PREDICTING ENERGY EXPENDITURE WITH THE ACTIGRAPH GT9X IMU USING ARTIFICIAL NEURAL NETWORKS

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Purpose: To examine if the ActiGraph (AG) inertial measurement unit (IMU) improves energy expenditure (EE) prediction, compared to using only acceleration data when using artificial neural networks (ANN). Methods: Thirty Participants (age, 23±2.3 years; BMI, 25.2±3.9 kg/m<sup>2</sup>) completed 10 activities of various intensities, for 7-min each. EE was measured using a Cosmed K4b2 and AG monitors were worn on the right hip, both wrists, and both ankles. Primary accelerometer data (80 Hz) and IMU data (100 Hz) were averaged over 1-s for each axis. Accelerometer data were expressed as the Euclidean Norm Minus One (ENMO). Gyroscope data (35 Hz filtered) were expressed as a vector magnitude (GVM). Magnetometer data were expressed as the number of direction changes per minute. A 30% holdout sample was used for cross-validation. Three ANNs were trained for each location: 1) ENMO only; 2) model 1 plus GVM; 3) model 2 plus direction changes. Model performance was evaluated using root mean square error (RMSE) and mean absolute percent error (MAPE). Results: For model 1, RMSE and MAPE were 2.05 METs and 29.7%, respectively for the hip, 1.34-1.53 METs and 29.0-29.25%, respectively, for the right and left wrists, and 1.27-1.49 METs; 22.55-35.84%, respectively, for the right and left ankles. For the hip, RMSE and MAPE were reduced by -0.38 METs and -2.7% after adding GVM (model 2) and were further reduced by -0.36 METs and -0.8% after adding direction change data (model 3). The other attachment sites had more inconsistent results with models 2 and 3 improving some cases and worsening others. Conclusions: The addition of the IMU sensors shows promise for improving both group- and individual-level estimates of EE with the greatest contribution coming from the gyroscope.

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### USING THE WRIST-WORN ATLAS MONITOR TO OBJECTIVELY MEASURE STRENGTH TRAINING EXERCISES

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Devices for monitoring physical activity have focused mainly on measuring aerobic activity. The Physical Activity Guidelines for Americans, in addition to 150 mins of aerobic activity, also recommend that adults perform muscle-strengthening exercises twice per week. Recently, devices have been developed to recognize strength training exercises (type and number of repetitions). Purpose: To assess the ability of a wrist-worn activity monitor to correctly identify specific strength training exercises, and the number of repetitions of each exercise, during a circuit training workout. Methods: While wearing the Atlas monitor on the left wrist, 39 male and female participants (ages 19-43 yrs.) completed a workout consisting of 14 different strength training exercises (10 upper body and 4 lower body, 2 sets of 12 repetitions). Research assistants were present to count repetitions and monitor the form for each exercise. From the Atlas data, classification accuracies were computed for correct exercise type and number of repetitions. Mean Absolute Percent Error (MAPE) and Mean Absolute Error (MAE) were calculated for repetitions of each exercise, and the average repetitions for each exercise were calculated. Results: The Atlas monitor classification accuracy for exercise type ranged from 43.6 (dumbbell (DB) upright row) to 100% (DB bicep curls) for upper body exercises, and from 74.4 (DB goblet squat) to 94.9% (DB calf raises) for lower body exercises. Eight of the 10 upper body exercises were correctly classified > 70% of the time. Repetition identification accuracy ranged from 5.1% (DB lunges) to 96.2% (bicep curls). Six exercises had > 70% of all repetitions identified. For all exercises, MAPE for repetitions ranged from 0.3-38.6% and MAE was 0.0-4.6 repetitions. Conclusion: The Atlas device had higher exercise-type accuracy for lower body exercises and higher repetition accuracy for upper body exercises. Further research should evaluate whether the amount of weight lifted or previous strength training experience has any effect on classification accuracy.

### EVALUATING THE POTENTIAL IMPACT OF FATIGUE ON ULTIMATE FRISBEE PLAYERS DURING TOURNAMENT PLAY

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Previous research has evaluated the quality of recovery from bouts of athletic events. Various measures have been used to assess recovery, yet most methods were somewhat problematic for rapid data collection. When costs are a limitation, it may be best to seek less expensive alternative methods of evaluating recovery. **PURPOSE:** To evaluate potential fatigue of collegiate ultimate frisbee athletes over two days of tournament play (TP) utilizing the perceived recovery status scale (PRSS) and ratings of perceived exertion (RPE). **METHODS:** Nineteen college-aged males participated in the study. Occurring over two days of TP, PRSS and RPE were recorded during 5 frisbee matches with each match separated by 30min. Two minutes prior to the first and second half, PRSS was recorded for each athlete and 2 minutes after each half, RPE was recorded. **RESULTS:** Significant differences occurred in PRSS with a decrease in values from the 2nd to the 5th matches ( $p = 0.006$ ) and within the 2nd half of comparable matches ( $p = 0.031$ ). No RPE recordings were significant. **CONCLUSION:** The results suggest that much of the variance in fatigue and fatigue-related measures occur between the 2nd and 5th matches of TP. The cumulative effects of fatigue during TP may have been a result of several potentially uncontrollable factors. Note, decreased perceived recovery could be related to the increased stress levels that occurred because of the amplified significance of the final match. Future research may evaluate other quantifiable recovery data (i.e. HRV and GPS) during tournament play.

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### RELIABILITY AND VALIDITY OF THE RUNNING READINESS SCALE™

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**PURPOSE:** One of the most consistent factors related to running injury is previous injury. This is partially due to the fact that the criteria used to return to activity is largely subjective. The purpose of this study was to establish the reliability and validity of a functional, objective running test: the Running Readiness Scale™ (RRS). **METHODS:** The RRS consists of 6 tests, each 1 minute in length (hops, double leg squats, single leg squats, ball sit, step ups and plank). Each test has specific criteria set for pass or fail. Eight raters (5 physical therapists and 3 athletic trainers) evaluated videos. The testers were presented with videos with explicit examples of pass and fail for each test in random order. Each rater saw each video 3 separate times on 3 separate days. Reliability was established within and between raters using Cohen's Kappa and validity was established between raters and standard videos using Cohen's Kappa. **RESULTS:** Intertester reliability values were overall excellent ( $K=0.792$ ; range=0.647-0.925) and intratester reliability values were excellent ( $K=0.884$ ; range=0.689-1.000). Raters demonstrated good validity ( $\rho=0.744$ ; range=0.560-1.000). Across the individual tests, plank demonstrated the best overall reliability ( $K=1.000$ ) and validity ( $K=1.000$ ) while double leg squat exhibited the lowest reliability ( $K=0.573$ ) and validity ( $K=0.622$ ). **CONCLUSIONS:** The RRS provides a unique, objective and functional assessment that can be reliably and accurately used in the field to screen runners. The test is easy to administer, requires little to no equipment and is time based, which makes sense to runners.

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### ASSESSING THE IMPACT OF BODY FAT PERCENTAGE AND LEAN MASS, ON WINGATE PERFORMANCE

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The Wingate (WG) test is a popular anaerobic power test, yet prior studies have not evaluated the relationship between body fat percentage (BF%), lean leg mass (LLM), and trunk lean mass (TLM) on WG performance. **PURPOSE:** To investigate the relationship between BF%, LLM, and TLM on WG performance in college-age males. **METHODS:** Thirty-eight averagely fit college-age males had their BF%, LLM, and TLM assessed via a bioelectrical impedance analyzer. Subjects participated in an 8 min dynamic warm-up on a leg cycle ergometer, followed by the completion of a maximal effort 30s sprint. Pearson Correlations were performed between BF%, LLM, TLM, peak power (PP), and mean power (MP) with significance difference occurring at  $p < 0.05$ . **RESULTS:** High to moderately high positive correlations existed between PP and TLM ( $r = .834$ ,  $p = .000$ ) and LLM ( $r = .773$ ,  $p = .000$ ), as well as between MP and TLM ( $r = .904$ ,  $p = .000$ ) and LLM ( $r = .880$ ,  $p = .000$ ). However, no relationship occurred between BF% and PP ( $r = -.064$ ,  $p = .123$ ) while a low negative relationship occurred between MP ( $r = -.234$ ,  $p = .049$ ) and BF%. **CONCLUSIONS:** LLM and TLM appear to have a strong positive relationship with WG performance in no less than averagely fit males, while BF% appears to have little to no relationship with WG performance. Further research may assess if fitness level, sport specificity, or a different type of body fat percentage measurement technique may impact the relationship between BF%, LLM, TLM, and WG performance.

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### AN ASSESSMENT OF A 15 VS. 30 SECOND RECOVERY PERIOD ON VERTICAL JUMP PERFORMANCE

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The vertical jump (VJ) test is frequently used to test lower body peak power. The standard recovery time is usually 30 seconds (secs) between jumps. It may be possible that a shorter passive recovery (PR) period may contribute to maintaining or improving jumping performance versus the standard recovery time. **PURPOSE:** To explore potential differences between a 15 vs. 30 secs PR period on VJ performance in college-age males. **METHODS:** After measuring descriptive data (Ht., Wt., BF%, age), 31 averagely fit college-age males completed an 8 minute (min) dynamic warm-up. Subjects were allowed a 4 min PR during which their reach height was measured. Following the PR, four familiarization jumps were completed using a VJ measurement device. After another 4 min PR, the subjects completed 2 series of jumps, with 6 trials each, in a counterbalanced order with either 15 (FIF) or 30 (THI) secs of recovery between each jump. The FIF and THI jump series were separated by 6 min of PR. Apart from the first jump, the highest jump for FIF and THI were compared using Paired-Samples t-Tests with significant differences occurring at  $p < 0.05$ . **RESULTS:** Significant differences ( $p=0.016$ ) occurred between FIF (69.64 + 8.61 cm) and THI (70.35 + 8.99 cm). **CONCLUSION:** The current results suggest that 30 secs of PR between jumps is optimal recovery for performance during the VJ test, while 15 secs of PR may negatively affect peak VJ performance in averagely fit college-age males. Future research may assess the impact of 15 vs. 30 secs PR on VJ performance using highly fit collegiate athletes.

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#### PHYSIOLOGICAL PROFILING OF COLLEGIATE CLUB MALE ULTIMATE FRISBEE ATHLETES

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**P65** Ultimate Frisbee is a fairly new alternative hybrid sport that combines many movement patterns from other team sports. However, there is very limited research associated with Ultimate Frisbee and the physiological characteristics of Ultimate athletes. **PURPOSE:** To analyze and create a physiological profile for male collegiate club Ultimate Frisbee athletes. **METHODS:** Eighteen males voluntarily participated in this study. Each participant participated in three days of testing, which included fitness tests such as: flexibility, vertical and broad jump, speed and agility, and maximal oxygen consumption. Each day was separated by 48 hours to ensure adequate recovery between sessions. A Paired Sample T-test was used to compare the results between the two different offensive positions (handler & cutter), with significance set at  $p < .05$ . **RESULTS:** There were no significant differences in the anthropometric measurements between the two positions. Of the fitness tests, only the broad jump reported a significant difference between the two positions ( $p = .006$ ). The physiological characteristics of the ultimate Frisbee athletes were similar to those reported from other team sport athletes. **CONCLUSION:** The results of the current study seem to suggest that a physiological profile can be made for a collegiate Ultimate Frisbee team as a unit and not be separated into respective positions. However, future studies should seek to determine differences in movement patterns and required training programs of different positions during an ultimate Frisbee game.

#### AN EVALUATION OF DIFFERENT PASSIVE RECOVERY PERIODS ON VERTICAL JUMP PERFORMANCE IN COLLEGIATE FEMALES

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**P66** The vertical jump (VJ) test is used in exercise science and performance settings to assess a person's lower body power. The normal time between subsequent jumps is 30 seconds, but if a person is not recovered before their next jump, that specific jump may be lower than prior jumps. Previous research has analyzed the impact of a 30 vs. 60 secs passive recovery (PR) period on VJ performance using males, yet this has not been evaluated with females. **PURPOSE:** To investigate the potential differences between a 30 vs. 60 secs PR period on VJ performance in no less than averagely fit females. **METHODS:** Thirty-four averagely fit college-age females had their descriptive data and reach height recorded and then participated in an 8 min dynamic warm-up, followed by a 4 minute PR period. Subjects then completed 4 familiarization jumps using a VJ measurement device. After another 4 min PR period, subjects completed 2 series of 4 jumps a piece, separated by 4 min of PR, in a counterbalanced order with either 30 (THIR) or 60 (SIXT) secs of PR between each jump. Excluding the first jump for each series, the highest jump for THIR vs SIXT were compared using a Paired-Samples t-Test with significant differences occurring at  $p < 0.05$ . **RESULTS:** Significant differences ( $p = 0.001$ ) occurred between SIXT ( $48.86 + 6.35$  cm) and THIR ( $47.84 + 6.20$  cm). **CONCLUSION:** The results suggest that 60 secs of PR between jumps may yield the highest vertical jumps in averagely fit college-age females. Future studies may examine the effects of a 30 second PR period on VJ performance in collegiate or professional female athletes.

#### COMPARATIVE RESPONSES TO SQUATS DONE WITH FREE WEIGHTS AND AN EXOSKELETON.

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**P67** Purpose: To compare physiological, performance and perceptual responses to the squat exercise done with a barbell, to those using an exoskeleton (Institute of Human and Machine Cognition; Pensacola FL) designed for use during manned space flight. Methods: Subjects ( $n = 15$ ) made four laboratory visits, which began with two familiarization sessions on the exoskeleton, followed by two squat workouts in which the exercise mode (exoskeleton, barbell) was administered in a randomized sequence. Per workout they performed four repetitions each against progressively heavier (23, 34, 45.5 and 57 kg) loads separated by 90-second rests. A series of physiological, performance and perceptual data from the final two laboratory visits were collected before, during and after workouts. Per workout, we collected the same dependent variables. Z-scores were used to identify outliers, which along with its paired value from the other workout, were eliminated from further analyses. To assess data validity, dependent physiological, performance and perceptual variables from each workout were compared with paired t-tests and Cohen's d. Results: All subjects completed each workout (100% compliance). Z-scores results show less than 0.5% of our total data were deemed outliers. Average t-test and Cohen's d values were 0.68 and 0.25 respectively. Conclusions: Prior research suggests t-test and Cohen's d values less than 1.0 and 0.4 respectively denote acceptable degrees of data similarity. Based upon these guidelines, current results denote an acceptable degree of data validity derived from exoskeleton squats. We conclude exoskeleton squats yield physiological, performance and perceptual responses like those done with a barbell, and warrant continued inquiry involving microgravity simulation in human subjects.

#### EFFECTS OF 12-WEEKS OF AEROBIC EXERCISE TRAINING ON INSULIN SENSITIVITY UNDER ENERGY BALANCED CONDITIONS IN WOMEN

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**P68** Background: Exercise training is well known to improve insulin sensitivity (SI). However, the duration in which exercise-induced improvements in SI persists varies significantly between studies, ranging from 0- to 72-hrs following the last bout of exercise. One caveat that may explain the variability between studies is the magnitude of energy deficit following exercise. Purpose: To assess the chronic effects of 12-weeks of aerobic exercise training and the acute effects of exercise intensity for improving SI when measured under energy balanced (EB) conditions. Methods: Thirty three untrained premenopausal women were evaluated at baseline, after 12-weeks of training, 22 hrs after either an acute- bout of moderate-intensity continuous (MIC) aerobic exercise (50% peak VO<sub>2</sub>) or high intensity interval (HII) exercise (84% peak VO<sub>2</sub>). Participants stayed in a room calorimeter during and after the exercise sessions. Food intake was adjusted to obtain EB across 24-hrs. SI was measured 22hrs after all conditions using the hyperinsulinemia euglycemic clamp. Muscle biopsies were obtained in a subset of 15 participants to examine mitochondrial oxidative capacity using high resolution respirometry. Results: A significant increase in SI was observed only following the HII condition ( $P < 0.05$ ). There were no significant improvements in SI following 12-weeks of training or the MIC session. A significant improvement in mitochondrial respiratory capacity occurred following all post-training conditions ( $P < 0.05$ ). No significant differences between energy consumed and energy expended were found between all conditions. Discussion: The primary finding from this study was that SI only improved following a bout of HII exercise when measured under EB, which suggests that energy deficit following exercise plays a role in exercise-induced improvements in SI. While we were unable to measure muscle glycogen, it is possible that glycogen deficit is important in determining the magnitude of these exercise-induced improvements in SI. Last, improvements in mitochondrial respiratory capacity occurred even when SI did not change, suggesting that these two responses are independent of one another.

### ARTERIAL STIFFNESS IS REDUCED IN AN EXERCISE DOSE DEPENDENT MANNER IN ADULTS WITH PREDIABETES

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**P69** PURPOSE: Although prior work highlights an exercise dose-response relationship for glucose regulation, no study has assessed the exercise dose needed for reducing arterial stiffness. We tested the hypothesis that increased exercise dose would correlate with reduced arterial stiffness in obese adults with prediabetes. METHODS: In this prospective study, 14 subjects (Age: 61.2±2.5 y, BMI: 32.5±1.4 kg/m<sup>2</sup>) were screened for prediabetes using American Diabetes Association criteria (75g OGTT and/or HbA1c). Aerobic fitness (VO<sub>2</sub>peak) was measured on a cycle ergometer by indirect calorimetry, and subjects performed supervised continuous aerobic exercise at 70% of HRpeak for 60min/d over 2-weeks. Arterial stiffness (augmentation index; AI), mean arterial pressure (MAP), and glucose tolerance during a 75g OGTT were analyzed by total area under the curve (tAUC) before and after training. Exercise dose was assessed using VO<sub>2</sub>-heart rate derived linear regression equations. RESULTS: Mean energy expenditure was 312.5±12.0 kcal/session. Exercise training improved VO<sub>2</sub>peak by 4.8% (trend: p=0.10), with no change in body weight. Continuous training also reduced AI (p=0.03) and MAP (p=0.05) tAUC180min by 20.9% and 5.4%, respectively. This reduced arterial stiffness tended to correlate with increased exercise energy expenditure (r=-0.53, p=0.06). Improved VO<sub>2</sub>peak was also related to reduced AI tAUC180min (r=-0.63, p=0.02), whereas decreased fasting plasma glucose was significantly related to lower MAP tAUC180min (r=0.70, p=0.005). CONCLUSION: Short-term exercise training reduces arterial stiffness in a dose-dependent manner. These findings suggest that increasing exercise energy expenditure may be important for enhancing vascular function in adults with prediabetes.

### THE EFFECT OF DIETARY MANIPULATIONS ON ULTRASONOGRAPHY DERIVED MEASURES OF MUSCLE ARCHITECTURE

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**P70** Purpose: To examine the effects of carbohydrate loading (CHO) and oral creatine monohydrate loading (Cr) on ultrasound derived measurements of the lower limbs. Methods: Ten recreationally-active males completed baseline (BL) bioelectrical impedance analysis (BIA) and muscle ultrasound imaging of the rectus femoris (RF) and vastus lateralis (VL). Following baseline measurements, participants completed two different treatments: One day of CHO loading (10g CHO/kg), and five days of Cr loading (20g/day). Following each treatment, participants reported to the lab after an overnight fast for BIA and ultrasound testing in which muscle thickness (MT), cross-sectional area (CSA) and echo intensity (EI) were assessed on the RF and VL. BIA assessment was used to measure intracellular (ICW), extracellular (ECW), total body water (TBW), and body mass. Separate repeated measures analyses of variance were used for each variable to assess differences between dietary conditions. Results: Significant main effects (p<0.05) were observed for RF and VL MT, RF CSA, body mass, ICW, ECW, and TBW. RF MT increased from BL-CHO (p=0.029, 3.03%) and BL-Cr (p<0.000, 7.94%). VL MT increased from BL-Cr (p<0.000, 7.19%). RF CSA increased between CHO-Cr (p=0.04, 4.24%). No significant differences were seen for EI for either treatment. TBW increased from BL-CHO (p=0.022) and BL-Cr (p=0.002). Additionally, ICW and ECW significantly increased (p<0.05) from BL-CHO and BL-Cr. Conclusion: Dietary CHO and Cr manipulations influence ultrasound derived measurements of muscle thickness for both the RF and VL muscles, and CSA of the RF. These changes are likely due to observed changes in measures of body water.

### DIFFERENCES BY PHYSICAL EDUCATION CLASS AND RECESS TIME AMONG CHILDREN IN PUERTO RICO

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**P71** PURPOSE: To evaluate the differences in moderate-vigorous physical activity (MVPA), sedentary time (ST), and use of facilities that promote physical activity (PA) by recess time and physical education class among elementary children. METHODS: Sixty-eight girls and 63 boys (mean age of the sample = 7.8 ± 0.7 years) wore a GT3X+ accelerometer during 5 consecutive school days to determine MVPA and ST during school time. MVPA and ST data was included if participant wore accelerometer at least 3 school days for ≥ 3 hr/day. Time in physical education and recess was provided by the school's administration. Participants time in physical education class was classified into 3 groups: students that received 40-45 min/wk, 85-90 min/wk, and 135 min/wk. Similarly, time in recess was classified into 2 groups: students that had 30 min/day and 45 min/day. To determine the use of the facilities, a score was generated based on self-reported activities and the time spent in each. Mann-Whitney U-test and Kruskal Wallis test were conducted to test differences in the use of facilities, MVPA, and ST by recess time and time in physical education, respectively. RESULTS: Participants accumulated 110.9 ± 21.8 min/day in MVPA and 3.48 ± 0.5 hr/day in sedentary time. No significant differences were observed in, MVPA (U = 1657.00, p = 0.39), ST (U = 1619.50, p = 0.30), and the use of facilities (U = 1021.50, p = 0.20) by recess time. Neither were observed differences in MVPA (H(2) = 2.22, p = 0.33), ST (H(2) = 0.76, p = 0.69), and use of facilities (H(2) = 2.12, p = 0.35) by time in physical education. CONCLUSION: Findings suggest that shorter periods of physical education class (40 – 45 min/wk) and recess time (30 min/day) can provide opportunities for children to comply with the PA recommendations of 60 min/day.

### THE EFFECTS OF REPEATED BOUTS OF FOAM ROLLING ON HIP RANGE OF MOTION, PAIN AND PERFORMANCE ACROSS DIFFERENT TISSUES

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**P72** Foam rolling (FR) is purported to break down fascial adhesions, which would allow for a more efficient movement. Studies evaluating FR have only used this modality over muscle that contains fascia and not over fascia without muscle. Purpose: To determine the acute effect of FR over fascia that contains muscle (gluteal muscle group) compared to fascia that does not contain muscle (iliotibial band (ITB)) on hip adduction range of motion (ROM). Methods: 70 university students completed five weeks of FR, twice per week. After a 5 minute warm-up, participants were tested for hip adduction ROM using the Ober test and a functional step test. Subjects either FR over the gluteal muscle group (active session), or FR over ITB (passive session). Following the five week of FR, Ober and step measurements were reassessed. RESULTS: No significant difference between AFR and PRF existed in Ober measurements, however, both showed improvement in Ober range. However, there was a difference in the reduction of pain between groups, with PFR showing greater pain reduction compared to AFR. Further, there was a weak negative correlation between Ober changes and performance in the step test.



### FAMILIARIZATION PROTOCOLS PROVE USEFUL WITH MAXIMAL EXERCISE TESTING IN SEDENTARY MIDDLE-AGED FEMALES

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**P73** **PURPOSE:** The aim of this study was to examine the effectiveness of a familiarization session in preventing learning effects for both a cardiopulmonary exercise test (CPET) and isokinetic strength test for assessment of maximal oxygen uptake (VO<sub>2</sub>peak) and peak torque (PT) in sedentary middle-aged females. **METHODS:** Ten subjects were familiarized with a maximal CPET as well as an isokinetic strength test prior to performing both assessments on two subsequent visits. Familiarization for the CPET procedure involved completing a progressive intensity cycling protocol up to 75-85% of heart rate reserve (HRR), and with the maximal isokinetic strength testing procedure via a submaximal lower body effort on a HUMAC dynamometer on Day 1. Subjects completed maximal tests on Day 2 (within 1 week of familiarization) and Day 3, two weeks apart with no change in physical activity. **RESULTS:** Paired samples t-tests revealed that change scores for VO<sub>2</sub>peak (-1.8 mlO<sub>2</sub>-1\*kg-1\*min-1; p=0.08), maximal minute ventilation (-2.9 L\*min-1; p=0.37), and PT (-2.2 Nm; p=0.80) were not significantly different between maximal exercise testing sessions. **CONCLUSIONS:** Results suggest that a familiarization session in sedentary middle-aged females preceding maximal CPET's and maximal isokinetic strength testing was effective in minimizing a learning effect that often occurs between different testing time points, as performance remained unchanged.

### PHYSICAL ACTIVITY BEHAVIORS AND SMARTPHONE USE IN COLLEGE AGED STUDENTS

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**P74** **PURPOSE:** The purpose of this study was to evaluate and determine the relationship between physical activity (PA) participation and smartphone (SP) use in college students in health-related majors. **METHODS:** Undergraduates in health-related majors were recruited to complete an online survey provided by faculty during the Fall 2016. The survey consisted of 26 questions regarding physical characteristics, SP use, and PA participation. **RESULTS:** Males (N=48) and females (N=192) were of Normal BMI (55%) and had no chronic health problems/congenital diseases (85%). A total of 43% reported using a SP for over 5 years while 99% reported using SP 1-5 hours/day. SP use included: Facebook (87%), Instagram (85%), music (84%), photos (76%), and step counting (49%). 91% were PA within the past month with 47% active 3-4 days/week, for 46-60 minutes (41%), in vigorous PA (53%). Males had significantly more active days/week. No differences were detected among age groups. Finally, Kendall's Tau revealed no significant correlations between age and days PA, years SP use and days/week PA, hours of SP use and days/week PA. **CONCLUSION:** Overall, there was no relationship between SP use and PA in students in health-related majors. These findings are consistent with existing results and suggest health related majors may be more cognizant of their SP use

### CONCURRENT VALIDITY OF THE MYMO PHYSICAL ACTIVITY MONITOR

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**P75** **Purpose:** Community-based physical activity programs may use commercial activity monitors to quantify the amount of activity they provide. Operation Get Active, a youth soccer program in Chattanooga, uses the Mymo; however, the validity of this device for capturing activity levels has not been evaluated. The purpose of this project was to compare Active Minutes as captured by the Mymo to Moderate to Vigorous Activity (MVPA) captured by the Actigraph GT1+. **Methods:** Students were recruited from 5th grade classroom at two local elementary schools (CH and CD). Students were instructed to wear the elastic belt with the Actigraph with the monitor over their right hip and to clip the Mymo to the elastic belt over their left hip. They were told to wear the monitors at all times for the next eight days (Monday to following Tuesday) except when sleeping or when the monitor could get wet (bathing, swimming, etc.). Twenty students had complete monitor data. Of these children, eight were male and twelve were female. Paired t-tests were used to examine differences in the number of Steps and Active Minutes reported between the two monitors. **Results:** Pearson correlation showed a strong linear relationship between monitors for daily Step count (r = 0.88) and a moderate correlation for Active Minutes (r = 0.41). Despite the linear relationship between the two monitors, paired t-test showed significant differences in the actual number of steps (p = 0.01) and Active Minutes (p < .0001) captured by the two monitors. On average, the Mymo overestimated steps per day by 918 steps and drastically underestimated Active Minutes. **Conclusions:** Based on this modest sample, it appears that the Mymo monitors do have some ability to capture Steps, however, it appears that the current threshold of 120 steps per minute to define an Active Minute is much too high and is leading to a dramatic underestimation in child physical activity levels.

### EVALUATION OF A GOALKEEPER-SPECIFIC ADAPTATION TO THE YO-YO INTERMITTENT RECOVERY TEST LEVEL 1: RELIABILITY AND VARIABILITY

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**P76** The Yo-Yo Intermittent Recovery Test Level 1 (YYIR1) has been shown to be a reliable test with strong correlations to match performance in field soccer players. However, the YYIR1 has little relevance to goalkeeper actions. **PURPOSE:** Therefore, the purpose of this study was to evaluate the test-retest reliability of a goalkeeper-specific adaptation of the YYIR1 (YYIR1-GK). **METHODS:** Sixteen NCAA collegiate goalkeepers (8 men, 8 women) performed YYIR1-GK test twice within 5-7 days to determine its reliability. Subjects were tested at the same time of day and with similar environmental conditions. Heart rate (HR) via polar monitors and rating of perceived exertion (RPE), were obtained at the end of each stage of the YYIR1-GK. Test-retest reliability for each test was assessed by Pearson Correlations, Intraclass Correlation Coefficient (ICC), and Coefficient of Variance (CV) using SPSS 22. Significance was set at an alpha priori of p<0.05. **RESULTS:** The YYIR1-GK was shown to have a strong test-retest reliability (r = 0.985, ICC=0.985, CV=7.07%). Peak HR was 188.9 ± 7.8 bpm and 188.1 ± 7.7, for men and women respectively, with no differences between gender or visits. Peak RPE was 16.3 ± 1.7 and 14.9 ± 2.7 for men and women respectively and did not reach significance for gender or visit. However, males performed significantly more stages which converted to greater distance covered on the YYIR1-GK than the women (P = 0.01). **CONCLUSION:** The YYIR1-GK was found to have a high test-retest reliability as well as low variability from day to day in this small cohort group of male and female NCAA collegiate goalkeepers. It is suggested that this YYIR1-GK test be examined further in goalkeepers at all levels.

#### EFFECTS OF CONTINUOUS AND NON-CONTINUOUS TREADMILL DESK WALKING ON FREE-LIVING PHYSICAL ACTIVITY

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**PURPOSE:** The purpose of this study was to examine the effects of a continuous versus non-continuous treadmill desk walking session on healthy individual's daily physical activity patterns. **METHODS:** 18-65 year old male and female (age =35.0 yrs  $\pm$  9.9, weight= 184.5 lbs  $\pm$  55.7) participants were recruited for this study. To characterize baseline physical activity patterns, all participants wore an Actigraph GT9X link accelerometer for one week. Participants were then randomly assigned to a continuous or non-continuous treadmill protocol in which they walked at 2 mph on a treadmill desk for 3 hours continuously or 3 hours total that was separated by 3 different 10 minutes sitting breaks. Physical activity patterns were then recorded via accelerometer for 2 additional days following the treadmill bout. **RESULTS:** At baseline, there was no significant differences between step counts ( $p=0.406$ ) or activity counts ( $p=0.452$ ) indicating that baseline physical activity patterns between participants were similar. After the treadmill desk session was completed, there were no differences observed for continuous versus non-continuous step counts ( $p=0.160$ ) or activity counts ( $p=0.169$ ) indicating that participation did not influence physical activity patterns in the days following the treadmill desk bout. **CONCLUSION:** This study suggests treadmill desk walking does not appear to influence free-living physical activity regardless of whether the bouts are continuous or non-continuous in nature.

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#### THE MEASURE OF FUNCTIONAL MOVEMENT IN RECREATIONAL CYCLISTS AND CLIMBERS

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**PURPOSE:** The Functional Movement Screen™ consists of seven tests that expose weaknesses, imbalances, asymmetries, and limitations in individual components of movement such as strength, flexibility, balance, coordination, and motor control. The primary objective of this study was to establish and compare FMS™ scores in a group of recreational cyclists and climbers. Differences in scores between groups could illuminate potential risks and benefits of training primarily in the sagittal plane versus multi-planar training. **METHODS:** A total of 19 cyclists (6 males, 13 females; mean age= 31  $\pm$  11 yrs) and 13 climbers (7 M; 6 F mean age 24 $\pm$  4 yrs) volunteered and were screened via the FMS for the study. **RESULTS:** Climbers scored significantly higher in the deep squat (climbers= 2.46  $\pm$  0.52, cyclists= 1.95  $\pm$  0.52;  $p < 0.05$ ), inline lunge (climbers= 2.85  $\pm$  0.38, cyclists=2.47 $\pm$  0.51;  $p < 0.05$ ), hurdle step (climbers= 2.46  $\pm$  0.52, cyclists=1.84  $\pm$  0.38;  $p < 0.001$ ), and total composite scores (climbers= 17.15  $\pm$  1.95, cyclists=15.16  $\pm$  1.83;  $p < 0.01$ ) in comparison to the cyclists. **CONCLUSIONS:** The rock climbers scored significantly higher than the cyclists in each of the higher-level movement patterns (overhead squat, hurdle step, inline lunge), indicating that the demands of rock climbing require higher levels of neuromuscular control, coordination, and stability. The results could serve as a standard for physical therapists, strength and conditioning specialists, and sport-specific trainers when evaluating the functional movement ability of individuals who participate in each sport. Future research should be conducted to better understand the FMS™ as a screening tool and the potential benefits of multi-planar training for individuals trained primarily in the sagittal plane. No funding was received.

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#### CHANGES IN BENCH PRESS VELOCITY FOLLOWING OVERLOAD AND TAPER MICROCYCLES

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**Purpose:** The purpose of this study was to determine the effect of an overload microcycle and taper on bench press velocity and strength. **Methods:** Trained powerlifters (n=15) participated in resistance training structured into a preparatory microcycle, overload microcycle, and taper. At the end of each microcycle, subjects reported a perceived recovery score (0-10 scale; 10=full recovery) and completed a 1RM assessment consisting of warmup sets at 40%, 55%, 70%, and 85% of a previously established 1RM. The average concentric velocity (ACV) was recorded during each repetition using a linear position transducer. **Results:** Perceived recovery compared to baseline (BL) (7.2  $\pm$  1.2) was significantly lower ( $p < 0.01$ ) following the overload (PostOL) (5.3  $\pm$  1.2) and significantly higher following the taper (PostTP) (8.4  $\pm$  1.1). Compared to BL, the ACV of the warmup sets were significantly lower at PostOL (ES = -0.58 to -0.81,  $p < 0.05$ ). At PostTP, ACV was significantly higher than PostOL (ES = 0.46 to 0.70,  $p < 0.05$ ), but was not different than BL (ES = -0.14 to 0.15,  $p = 1.0$ ). At PostTP, 1RM (136.5  $\pm$  44.8 kg) was significantly higher ( $p < 0.01$ ) than BL (131.7  $\pm$  44.7 kg) and PostOL (128.4  $\pm$  42.0 kg). There was no difference in 1RM at BL and PostOL. **Conclusions:** A brief period of overload reduced bench press velocity during repetitions with submaximal loads, while bench press maximal strength remained unchanged under these conditions.

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#### VENTILATORY AND BREATHLESSNESS ALTER SELF-SELECTED POWER OUTPUT DURING A CYCLING TIME TRIAL

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**Purpose:** The purpose of this study was to examine mechanical power, ventilatory dynamics, and perceptual responses during a cycling time trial (TT) in trained male cyclists under a condition of increased ventilatory stress. **Methods:** Eleven trained cyclists completed pulmonary function testing and a peak aerobic capacity test. During the second visit, resting hypercapnic ventilatory response (HCVR) was measured before completing a fixed-work familiarization TT representative to a distance of 5km. Subsequently, subjects completed TTs with (TTDS) and without (TTC) the addition of external dead space on separate days. Elapsed time, power output, ventilatory parameters, and perceptual responses were measured throughout each TT. Statistical comparisons between TTDS and TTC were tested at 20% intervals using paired t-tests. **Results:** All subjects displayed normal pulmonary function. Elapsed time was greater during TTDS compared with TTC (536 $\pm$ 34 vs. 489 $\pm$ 34 s,  $P < 0.05$ ). No difference in power output was observed between TTDS and TTC over the initial 20% (76 $\pm$ 13 vs. 81 $\pm$ 14 %peak, respectively), but it was significantly lower during each remaining interval of the TTDS compared with TTC. Conversely, minute ventilation was greater at 20% (143 $\pm$ 25 vs. 129  $\pm$ 24 L $\cdot$ min<sup>-1</sup>,  $P < 0.05$ ), but not at the remaining intervals, of TTDS compared with TTC. Additionally, rating of perceived breathlessness was significantly greater at 20% (5 $\pm$ 1 vs. 4 $\pm$ 1,  $P < 0.05$ ) and 40% (6 $\pm$ 1 vs. 5 $\pm$ 1,  $P < 0.05$ ) of TTDS compared with TTC, but was not different during the remaining intervals. No relationship was observed between HCVR slopes and the differences in elapsed time between TTDS and TTC ( $r=0.08$ ). **Conclusion:** These data suggest that cyclists regulate their power output to minimize increases in ventilatory work and breathlessness from what they are accustomed.

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### PREDICTING OXYGEN UPTAKE RESPONSES DURING CYCLING USING AN ARTIFICIAL NEURAL NETWORK

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**P81** PURPOSE: Oxygen Uptake (VO<sub>2</sub>) is a valuable metric for the prescription of exercise intensity and the monitoring of training progress. However, VO<sub>2</sub> is difficult to measure in a non-laboratory setting. Conversely, heart rate (HR), which is intrinsically linked to VO<sub>2</sub>, is an easily obtained measure. Recently, VO<sub>2</sub> predictions have been made during steady-state exercise using an artificial neural network (ANN). However, these previous models incorporated protocol-specific variables, making them unable to accurately estimate VO<sub>2</sub> during arbitrary exercise intensities. Therefore, the purpose of this study was to predict VO<sub>2</sub> during different exercise intensities with an ANN using HR and exercise intensity data. METHODS: 12 moderately-active adult males performed a 50-minute bout of cycling at a variety of exercise intensities. VO<sub>2</sub>, HR, power output, and cadence were recorded throughout the test. An ANN was trained, validated and tested using the following inputs: HR, time derivative of HR, power output, cadence, and body mass. RESULTS: The ANN accurately predicted the experimental VO<sub>2</sub> time series values throughout the test (R<sup>2</sup> = 0.95, SEE = 1.7 mL/kg/min). CONCLUSIONS: The predictive accuracy of this ANN is promising considering the large range of intensities and long duration of exercise. Future applications of this method could allow athletes to have accurate real-time VO<sub>2</sub> predictions during exercise. Supported by funding from the National Aeronautics and Space Administration, the North Carolina Space Grant Consortium, and the Army Research Office.

### ASSESSING THE IMPACT OF A GOVERNED FOCAL POINT ON BROAD JUMP PERFORMANCE IN COLLEGIATE FEMALES

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**P82** The broad jump (BJ) test is utilized to evaluate jumping distance and lower body power. Hence, it is important that the BJ test be administered correctly. The standard BJ test has no set focal point. However, prior research with vertical jump performance suggests a set focal point contributes to higher jumps. It is logical to assume that a set focal point may assist in greater BJ performance, but the impact of a focal point (FP) vs. no focal point (NFP) on BJ performance has not been assessed. PURPOSE: To investigate potential differences between a FP vs. NFP on BJ performance in college-age females. METHODS: After having descriptive data (Ht., Wt., BF%, age) recorded, 33 college-age females participated in an 8 min dynamic warm-up. Subjects were then given a four minute passive recovery (PR) period after the warm up and then completed four familiarization jumps (ie. trials). After another 4 min PR period, subjects completed two series of jumps (ie. four trials apiece) in a counterbalanced order with either a FP or NFP for each jump. The FP and NFP jump series were separated by 4 min of PR. The farthest jump for FP vs. NFP was compared using Paired-Samples t-Tests with significant differences occurring at  $p < 0.05$ . RESULTS: No significant differences ( $p = 0.291$ ) occurred between FP (180.70 + 3.47 cm) and NFP (179.64 + 3.47 cm). CONCLUSION: The results suggest that FP has no significant impact on BJ performance using college-age females. Future research may assess the impact of FP vs. NFP on BJ performance using college-age males as well as athletes who perform horizontal jumping actions.

### COMPARING INTENSITY LEVELS OF EXERCISE ACHIEVED BETWEEN AN OUTDOOR FITNESS PARK AND A STANDARD INDOOR FITNESS FACILITY

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**P83** PURPOSE: This study determined whether similar intensity levels of exercise can be achieved through the use of the equipment in a fitness park (FP) when compared to equipment typically found in an indoor fitness facility (IFF) in order to assess the potential for favorable health-related fitness outcomes through the use of FPs. METHODS: A crossover study design was used to examine intensity levels (rate of perceived exertion (RPE) and heart rate (HR)) achieved by college-aged participants (n=106) using FP's equipment (leg press (LP), shoulder press (SP), chest press (CP), captain's chair (CC), hyperextension chair, sit-up bench, hand ergometer, recumbent bike, and elliptical) as compared to an IFF. Paired Samples T-tests were used to compare the intensity levels achieved during the exercises at each site. RESULTS: The FP LP and CP intensity levels achieved were similar to those at the IFF ( $P > 0.05$ ), while SP RPE was significantly higher at the FP (FP=14.8±2.7, IFF=12.9±2.3,  $p=0.005$ ). When evaluating HR, all body weight and cardiovascular exercises were similar ( $P > 0.05$ ), except for the hand ergometer (FP=97±28bpm, SG=80±51bpm,  $p < 0.046$ ). CONCLUSIONS: Maximum intensity levels can be achieved using either standard equipment found in an FP or IFF with respect to the following exercises: leg press, chest press, leg raises, recumbent bicycle, and elliptical. In order to achieve maximum intensity when using FP equipment, more repetitions should be performed on the following FP equipment relative to standard indoor fitness facility equipment: leg press, shoulder press, chest press, and back extension.

### HYPERTROPHIC RESPONSES DO NOT COMPLETELY EXPLAIN INCREASES IN STRENGTH AFTER 12 WEEKS OF RESISTANCE TRAINING IN PREVIOUSLY UNTRAINED YOUNG MEN

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**P84** Purpose: It has been suggested that increases in lean mass are related to increases in strength metrics. We aimed to examine if increased lean mass was related to increased strength in untrained young men after 12 weeks of resistance training. Methods: 72 young male subjects performed 12 weeks of supervised resistance training (RT). Ultrasound, DXA, 3 repetition maximum (RM), isometric mid-thigh pull (IMTP), and isometric dynamometry testing were performed before and after the intervention. Training was completed 3 days weekly and consisted of squat, bench press, trap bar deadlift, and barbell rows within an undulated program design. Results: Subjects (n=72) increased lean mass by 4.7%, however squat 3RM increased by 48.2% and IMTP increased by 11.7%, on average. Changes in lean mass and 3RM squat were moderately correlated ( $r^2=0.102$ ,  $p=0.005$ ) while changes in lean mass and IMTP were largely unrelated ( $r^2=0.04$ ,  $p=0.08$ ). Conclusion: While studies have shown that increases in lean mass in trained individuals may be related to increases in strength, increases in lean mass in previously untrained young men do not seem to sufficiently explain changes in strength. Supported by: Gifts from Hilmar Inc., BNRG, Lockwood, LLC.

### EFFECTS OF GRIP DIAMETER ON MUSCLE ACTIVITY AND PERFORMANCE DURING DEADLIFT AND BENT-OVER ROW EXERCISES

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Purpose: There is limited research examining the effects of grip diameter on muscular activity and performance during dynamic RT, despite anecdotal evidence suggesting that resistance training (RT) with larger diameter barbells increases muscle activation. This study examined the effects of using a fat grip attachment (FG) during deadlift (DL) and bent-over row (BR) exercises. Methods: Healthy trained males (n = 14) completed two sets of 12 repetitions and a third set to failure on DL and BR with 67% of their Olympic barbell (OB) and OB+FG one-repetition maxes. Performance was measured by the amount of repetitions completed during the final set along with electromyographic muscle activity (EMG) from trapezius (TP), biceps brachii (BB), triceps brachii (TB), middle deltoid (MD), flexor carpi radialis (FCR), flexor carpi ulnaris (FCU), extensor carpi radialis (ECR), and extensor carpi ulnaris (ECU). All statistical analyses were performed at an alpha level set at 0.05. Results: There were no differences in the amount of repetitions between OB and OB+FG for DL and BR. However, significant differences existed in EMG mean and peak muscle activity for MD, BB, ECR, ECU during BR and for TB and ECR during DL. Pairwise comparisons revealed significantly greater muscle activity in FG from the shoulder and forearm musculature (MD, ECR, & ECU) and significantly lower muscle activity in FG from the upper arm musculature (BB & TB) during BR and DL exercises. Conclusions: The use of FG suggests that the larger grip size aids in optimal muscle length orientation for the forearm musculature, but inhibits upper arm muscle activity, which may be compensated by shoulder musculature.

Supported by: Fat Gripz

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### THE EFFECT OF PERSONAL PROTECTIVE EQUIPMENT ON FIREFIGHTER OCCUPATIONAL PERFORMANCE

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Purpose: To determine the effect of load carriage (LC) and the self-contained breathing apparatus (SCBA) on occupational performance of structural firefighters. Methods: 21 career firefighter recruits (Age: 28.6±4.3yr; Height:178.6±7.2 cm; Body mass: 94.1±15.4kg; Body fat: 18.1±6.1%) participated in the study. Occupational physical ability was assessed by time to complete a simulated fire ground test (SFGT). The SFGT was composed of a stair climb, charged hose drag, equipment carry, ladder raise, forcible entry, search, and victim rescue. Subjects performed 2 familiarization trials and 3 trials of a SFGT in different conditions: physical training clothes only (PT), wearing turnout gear and an SCBA (but not breathing through the SCBA (LC)), and wearing turnout gear and breathing through the SCBA (SCBA). RPE was also measured. Repeated measures ANOVAs were used to identify differences among trials. To describe within group changes, relative difference scores were calculated as follows: % difference =  $\left(\frac{[\text{experimental trial outcome} - \text{PT outcome}]}{\text{PT outcome}}\right) \times 100$ . Results: The SCBA trial took 44.5±15.5% longer (348.0±43.8s; p<.001) and the LC trial took 38.3 ± 12.6% longer (333.4±39.7s; p<.001) than the PT trial (241.1±32.6s). The SCBA trial took longer than the LC trial (p=.046). RPE was higher in the SCBA trial (6.7±1.7) and LC (6.3±1.5) compared to the PT trial (4.6±1.8;p<.001). Conclusions: Load carriage and the respirator elicit a large decrement in occupational performance and firefighters should engage in an appropriate training program to prepare for these physical demands.

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### STRIDE TIME CONSISTENCY MAY IMPROVE DISTANCE RUNNING PERFORMANCE

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Purpose: Stride time variability may be a factor that contributes to efficiency during running, especially when fatigued (Danion, et al., 2003). The purpose of this study was to identify the extent to which stride time variability influences performance during a graded exercise running protocol. Methods: Twenty-three (10 male, 13 female) healthy participants (21.7±1.9 yrs) completed a 3-minute warmup at 4.5 mph on a level treadmill after which, the treadmill increased to a 3% slope for the duration of the experiment. Speed increased by 0.5 mph after each 90-second stage. The study was complete when participants voluntarily stopped at exhaustion or completed the tenth stage. The timing of consecutive footfalls were identified to calculate the mean and standard deviation of stride time for each stage. Independent variables of sex, age, BMI, mean stride time, and stride time standard deviation (SD) were entered into stepwise multiple regression models to predict total running time during the test. Results: The final regression model was  $\text{TIME(s)} = 1212.3 + 156.6 \cdot \text{SEX}(F=1, M=2) - 21.5 \cdot \text{SD(ms)} - 18.1 \cdot \text{BMI}(\text{kg/m}^2)$  ( $R^2=0.741$ ,  $p<0.001$ ). Conclusion: These findings suggest that individuals with more consistency in their stride time were able to run longer, while mean stride time was not a significant predictor of running performance. This may have implications in training endurance athletes, and future research should explore if this can be learned.

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### VALIDITY OF FOUR HEART RATE MEASUREMENT METHODS AT REST AND DIFFERENT EXERCISE INTENSITIES

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Purpose: The purpose of this study was to compare measured heart rate during incremental exercise as determined by three devices and assessed manually by radial pulse. Methods: Twenty-six college-age students (n=17 males, n=9 females) participated in five 3-minute stages at 2.0 mph, 3.5 mph, 5.0 mph, 6.5 mph and 8.0 mph along with a 5-minute pre-exercise rest and post-exercise recovery period. Heart rate was measured for 45-seconds after rest and each stage using the FitBit Alta HR, Polar H1 heart rate monitor, ADC digital wrist blood pressure/heart rate monitor and manual pulse of the radial artery. Results: Heart rate measurements obtained through all four methods were moderately correlated at rest (ICC: 0.65), 2.0 mph (ICC: 0.66) and recovery (ICC: 0.64). The four methods had a weaker correlation at 3.5 mph (ICC: 0.46), 5.0 mph (ICC: 0.49), 6.5 mph (0.33) and 8.0 mph (ICC: 0.33). Conclusion: These results suggests that these three devices and manual heart rate correspond increasingly poorly at increasing exercise intensity. Caution should be used when tracking heart rate during exercise.

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### ARMY ROTC CADET PERFORMANCE ON A MODIFIED RANGER PHYSICAL ASSESSMENT TEST- A DESCRIPTIVE STUDY

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Purpose: This study investigated Army ROTC (AROTC) Cadet time to completion (TTC) on a modified version of the Ranger Physical Assessment Test (RPAT). Methods: AROT Cadets (8 males and 1 female) volunteered for this study. Group mean±SD were: age (19.7±1.3yrs), height (180.6±6.8cm), and weight (74.8±5.0kg). Cadets donned an Army Combat Uniform, Army Combat Helmet, combat boots, and plate carrier (with ballistic armor weighing 10kg). Cadets performed the following tasks in sequential order: 2-mile run, 20-ft Fast Rope climb, 100 yd SKEDCO drag (84 kg), 20-ft caving ladder climb, 200-yd sprint, 8-foot wall climb, and 1-mile run. TTC was calculated via a digital timer that ran continuously while the Cadets negotiated each task. Results: Group, TTC was 42 min 55 sec + 5min 44sec. Three Cadets failed the rope climb. One Cadet failed the ladder climb. Conclusions: AROT Cadets performed the RPAT slower than the publicly released 40-min TTC standard set for active-duty military personnel. More frequent field training under external load by a larger sample could improve performance on field assessments such as the modified RPAT.

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### ACTIVITY CLASSIFICATION WITH THE ACTIGRAPH GT9X IMU USING ARTIFICIAL NEURAL NETWORKS

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Purpose: To examine if the ActiGraph GT9X (AG) inertial measurement unit (IMU) improves activity classification, compared to using only acceleration data. Methods: Thirty participants (mean age, 23y) completed 10 activities for 7-min each. AG monitors were worn on the hip, both wrists, and both ankles. Primary accelerometer data (80 Hz), expressed as Euclidean Norm Minus One (ENMO), and IMU data (100 Hz) were averaged over 1-s for each axis. 35 Hz filtered gyroscope data were expressed as a vector magnitude (GVM). Magnetometer data were expressed as the number of direction changes per minute. Features in the artificial neural networks (ANNs) were, lag-one autocorrelation and the 10th, 25th, 50th, 75th, and 90th percentiles of 60-s ENMO and GVM. For each attachment site six ANNs were trained and cross-validated (30% holdout) using the following models: 1) ENMO; 2) ENMO+GVM; 3) ENMO+GVM+direction changes. Models were used to classify individual activities or a 5-class scheme (sedentary, ambulation, chores, sports, and stair walking). Model performance was summarized using percent accuracy and kappa statistics (low = ≤0.4, moderate = 0.41-0.60, high = ≥0.61). Results: For all attachment sites, prediction of individual activities, percent accuracy and kappa ranged from 67.0-73.3% and κ = 0.63-0.70 for model 1, 65.4-77.7% and κ = 0.62-0.75 for model 2, and 64.4-77.3% and κ = 0.60-0.77 for model 3, respectively. The 5-class scheme ranged from 87.3-96.6% and κ = 0.84-0.96 for model 1, 92.1-98.6% and κ = 0.90-0.98 for model 2, and 93.6-98.4% and κ = 0.92-0.98 for model 3, respectively. Conclusion: In general, the addition of the IMU data improved classification with greater contribution coming from the gyroscope.

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### THE EFFECTS OF VARIOUS INTERVALS OF PASSIVE RECOVERY ON PEAK POWER OUTPUT DURING BOUTS OF HIGH-INTENSITY INTERMITTENT CYCLING EXERCISE

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Purpose: Studies have shown high intensity interval training to be an excellent modality for increasing various dynamics associated with performance. If too little time is given to recover, performance will decrease. Methods: Testing protocols were performed on a cycle ergometer by 20 healthy, active males and separated by one week's time. Protocol order was randomly assigned to each participant. After familiarization, participants performed a standardized warm-up, followed by three 30-second high-intensity tests against a resistance relative to body weight, with each separated by a specific recovery interval (protocol 1 = 10 minutes, protocol 2 = 15 minutes, protocol 3 = 20 minutes). Following each exercise bout, participants were instructed to refrain from movement and sit passively. Results: A repeated measures ANOVA showed no significant difference (p = .12) in mean peak power output (PPO) between the three-recovery time protocols. However, there was a trend towards an increase in mean PPO production as the time of recovery increased from protocol 1 through protocol 3. The mean value for protocol 1 was 624.8 ± 86.5 Watts. Protocol 2 had a value of 643.1 ± 79.0 Watts, and Protocol 3 had a mean value of 651.1 ± 93.2 Watts. Conclusion: These results suggest 10 minutes of passive recovery between bouts of high-intensity intermittent cycling exercise may be adequate time for peak power output to be maintained.

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### EFFECTS OF TRANSDERMAL MAGNESIUM CHLORIDE ON MUSCLE STRENGTH AND SORENESS FOLLOWING ECCENTRIC EXERCISE: PRELIMINARY FINDINGS

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PURPOSE: To examine the effects of transdermal magnesium chloride (MgCl<sub>2</sub>) on peak torque (PT) and muscle soreness after acute eccentric exercise in recreationally active men. METHODS: Using a randomized, double blind crossover design, 9 men (22 (1yr)) were familiarized with maximal isometric strength testing and the eccentric exercise procedures. After ~3d, resting PT and soreness were assessed and participants completed 6 sets of 12 eccentric isokinetic leg extensions (60deg/sec). PT and soreness were reevaluated at 0h, 24h, 48h, and 96h. MgCl<sub>2</sub> or placebo was applied 3 times daily through the 96h visit. After 2 weeks, participants repeated the trial using the opposite leg and the opposite supplement condition. RESULTS: There were no significant interactions for PT or soreness. Relative to baseline, PT decreased by 16.4% (p=0.001) and 7.5% (p=0.033) at 0h and 24h and was 8.7% (p=0.018) higher at 96h. There was no difference between conditions. Soreness was significantly elevated at 0h, 24h, 48h (+40mm, all p<0.01) and approached baseline values by 96h (p=0.04) with no difference between conditions. CONCLUSIONS: In this initial study, it does not appear that transdermal MgCl<sub>2</sub> application positively impacts the recovery of PT following eccentric exercise or attenuates muscle soreness. Supported by a grant from Mg12, Inc.

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### INCREASED RESISTED SPRINTING LOAD DECREASES BILATERAL ASYMMETRY IN SPRINTING KINETICS

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Purpose: To investigate the effect of resisted sprinting load on bilateral sprinting kinetics. Methods: Sixteen male, collegiate rugby players (21.2±1.7yrs; 89.5±16.4kg; 178.4±6.7cm) completed 3 maximal, 40m resisted sprint trials tethered to a robotic resisted sprinting device. The first two sprints (S1&S2) were performed against minimal resistance (1kg) with S1 classified as familiarization. The final sprint (S3) used 15kg of resistance. During S2 and S3, peak and average power (PPK and PAVG), velocity (VPK&VAVG) force (FPK&FAVG), and peak rate of force development (RFD) were recorded for each leg and used to calculate bilateral percent differences (%DIFF). Paired-samples t-tests were performed to compare S2 and S3 during the first 5 sprinting strides (SPR5), from start to peak velocity (SPR-VPK), and the total sprint (SPRTOT) for each sprinting kinetic variable. Results: A greater ( $p < 0.05$ ) number of strides to reach VPK (4.2±4.1 strides) and complete SPRTOT (13.2±3.2 strides) were observed during S3. Additionally, S3 reduced %DIFF in FPK and RFD during SPR5 (FPK: -8.1±10.3%; RFD: -8.9±10.9%), SPR-VPK (FPK: -6.6±5.9%; RFD: -7.2±8.6%), and SPRTOT (FPK: -6.6±5.4%; RFD: -6.9±8.4%). Significant ( $p < 0.05$ ) reductions in %DIFF during S3 were not observed for PAVG until after SPR5 (SPR-VPK: -2.7±3.7%; SPRTOT: -3.4±4.9%) and not until SPRTOT for PPK (-13.1±19.1%). In contrast, S3 only produced a reduction in %DIFF for PAVG at SPR5 (-7.0±9.2%,  $p = 0.014$ ). Conclusion: Applying resistance during a 40m sprint reduces the acute bilateral asymmetries observed in sprinting kinetic measures.

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### COMPARISON OF HR AND RPE DURING SELF-SELECTED AND PRESCRIBED EXERCISE BOUTS IN COLLEGE STUDENTS

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PURPOSE: The purpose of this study was to determine if there were differences in heart rate (HR) and ratings of perceived exertion (RPE) between self-selected and calculated exercise intensities. METHODS: Subjects ( $n = 47$ ) were instructed to complete a bout exercise at a moderate (M) and vigorous (V) intensity for 20 minutes on a treadmill ergometer. Subjects selected a M and V speed and grade, and kept this intensity constant throughout each bout. Subjects next completed a graded maximal exercise test using one of five Boer treadmill protocols. Finally, subjects were instructed to complete exercise bouts at 60% and 80% of their calculated VO<sub>2</sub> reserve for 20 minutes. HR (Polar FT1) and RPE (OMNI scale) were collected at minute 2 and minute 20 of each bout. A repeated measures ANOVA was completed with Bonferroni post hoc comparisons to evaluate differences between corresponding intensities (Mx60% and Vx80%) by time and between minute 2 and minute 20 for each bout. RESULTS: There were no statistically significant differences ( $p > 0.05$ ) for HR between M and 60% (2min: 126 ± 25.8 and 134 ± 27.8; 20min: 142 ± 31 and 161 ± 25.8, respectively) or between V and 80% (2min: 154 ± 28.1 and 153 ± 28.6; 20min: 179 ± 26.9 and 184 ± 24.6, respectively) There were no statistically significant differences ( $p > 0.05$ ) for RPE between M and 60% (2min: 2.9 ± 2.7 and 1.9 ± 1.1; 20min: 4.3 ± 2.8 and 4.8 ± 1.8, respectively) or between V and 80% (2min: 4.3 ± 2.1 and 3.1 ± 1.6; 20min: 7.2 ± 1.8 and 7.8 ± 1.5, respectively). HR and RPE increased significantly from minute 2 to minute 20 during each bout ( $p < 0.0001$ ). CONCLUSION: HR and RPE did not differ between self-selected and calculated exercise bouts, but drifted significantly within all sessions. While individuals showed aptitude at selecting appropriate intensities, caution should be used when prescribing exercise based on HR or RPE due to the drifting of these values that can occur during a bout of exercise.

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### GESTURE ANALYSIS OF YOGA POSES FOR EXERGAME USING MACHINE INTELLIGENCE

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PURPOSE: Many innovative information technology applications use gestures as input that span a variety of platforms, from touch screen of a smart phone to natural input. Visual Gesture Builder (VGB) for Kinect, a data-driven machine learning solution for gesture detection, was used to capture poses with high accuracy. This gesture analysis technology is explored for incorporation into exergames for personalized medical interventions using yoga as therapy (YT). Research goal was to test whether machine learning algorithm in basic computer video exergame could assess skill acquisition in targeted populations to promote healthy physical activity. METHODS: Convenience sample of 20 adult students, male and female, were briefly instructed and shown poses to perform, while recorded by a Kinect attached to a PC. The capture resulted in raw files 10-20 GB in size. RESULTS: For comparison, we recorded 6 instructors in a series of postures using Kinect Studio. Recorded clips were tagged in all of the frames that defined a gesture by consensus of two researchers. Default settings in Kinect VGB produced solutions with high True Positives (99.5%) and low False Positives (0.03%) for most postures sampled. We measured posture alignment over the course of a 10-week period in an IRB approved study. Depth stream and skeleton coordinates for the 20 participants were acquired and analyzed against the previous trained solution. Analysis of summary statistics was done for the mountain pose comparing initial, mid-session, and final session captures with Sensitivity and Informedness showing the most significant t-test between initial and final. Sensitivity went from 0.79 to 0.90, while the expert test clip scored 0.94. CONCLUSION: Gesture analysis for alignment training may be a useful tool for the development of home and clinical YT for hard to reach populations. The experimental exergame developed here provides a tool that scores performance of postures and provides improvement metrics. Prior research by others has shown that even short-term yoga based lifestyle interventions were efficacious in weight loss, inflammation and stress and positively influenced cardiovascular risk factors. Our plans are to target special populations with YT, and study the potential effects of body mass and age on posture alignment and limb stretch.

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### COMPARISON OF PLETHYSMOGRAPHY AND BMI-BASED EQUATIONS FOR ESTIMATING BODY FAT IN FEMALE COLLEGIATE GYMNASTS

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PURPOSE: The purpose of this study was to determine the agreement between three BMI-based equations (BEQ) and BODPOD (BP) for estimating BF% in female collegiate gymnasts. METHODS: Twenty-two female, collegiate gymnasts (age = 18.9 ± 1.0 yr, height = 158.2 ± 1.9 cm, weight = 57. ± 5.6 kg, BMI = 22.9 ± 1.8 kg.m<sup>-2</sup>) participated in this study. At each visit, BF% was assessed with a calibrated BP, body weight with a calibrated digital scale, and height with a stadiometer. BF% was predicted by using three previously developed BEQ as follows: Jackson et al (2002) (JBMI) = (4.35 x BMI) - (0.05 x BMI<sup>2</sup>) - 46.24; Deurenberg et al (1991) (DBMI) = (1.20 x BMI) + (0.23 x age) - 5.4; Womersley & Durnin (1977) (WBMI) = (1.37 x BMI) - 3.47. RESULTS: The measures of BF% produced the following results: 20.3 ± 3.6%, BP; 26.9 ± 3.9%, JBMI; 26.4 ± 2.2%, DBMI; and 27.9 ± 2.5%, WBMI. BF% estimated via BP was significantly lower ( $p < 0.05$ ) than each BEQ. Weak correlations were found between BP and the BEQs ( $r = 0.12$ , JBMI;  $r = 0.07$ , DBMI;  $r = 0.12$ , WBMI). The 95% limits of agreement for each BEQ compared to BP were 9.5%, JBMI; 7.8%, DBMI; and 8.0%, WBMI. CONCLUSION: Inaccurate predictions of BF% in athletes may exacerbate pre-existing psychological issues. BP demonstrated a statistically significant lower prediction of BF% than any of the BEQ with weak correlations and large limits of agreement. Therefore, practitioners may need to consider methods other than BEQ as a means of predicting BF% in female collegiate gymnasts.

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### VALIDITY AND RELIABILITY OF FLYWHEEL-BASED MUSCLE PERFORMANCE TESTING

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Flywheel training has become a popular mode of resistance training due, in part, to quantifiable data including force, power, and total work. Purpose: to determine the validity and test-retest reliability of flywheel-based muscle performance testing. Methods: Subjects (N = 8) completed 3-4 sets of 5 maximal effort squats with varying moments of inertia (0.050 to 0.125 kgm) using a flywheel device (Exxentric kbox 4 Pro) on two separate occasions ( $\geq 1$  week apart). Data were obtained via a mobile app. Peak values for force (N), average power (W), concentric power, and eccentric power for each set was recorded. Validity was determined by performing squats with a known number of revolutions per repetition to the beat of a metronome (40-60 bpm) with varying moments of inertia. Predicted force, power, and work were calculated assuming the flywheel behaves like an ideal wheel. Results: There was a high degree of agreement between predicted and observed force ( $y = 0.9994x + 27.748$ ;  $R^2 = 0.9753$ ), average power ( $y = 0.9396x + 0.0877$ ;  $R^2 = 0.9787$ ), and total work ( $y = 0.9663x - 0.1036$ ;  $R^2 = 0.9528$ ). Test-retest reliability testing showed moderate to strong agreement between the two testing sessions for average power per repetition ( $y = 0.8905x + 40.236$ ;  $R^2 = 0.9306$ ), concentric peak power ( $y = 0.7954x + 108.28$ ;  $R^2 = 0.8317$ ), and eccentric peak power ( $y = 0.741x + 172.27$ ;  $R^2 = 0.7703$ ). However, agreement for average force between trials was substantially weaker ( $y = 0.4884x + 413.85$ ;  $R^2 = 0.4089$ ). Conclusions: Flywheel-based muscle performance testing offers a valid and repeatable method for assessing muscle performance, especially average power, during squat exercise.

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### THE RELATIONSHIP AMONG MANUAL DEXTERITY, UPPER AND LOWER EXTREMITY STRENGTH IN OLDER ADULTS RESIDING IN INDEPENDENT LIVING

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Purpose: The purpose of this study was to investigate the relationship among fine manual dexterity, manual dexterity, fingers pinch force, hand grips strength, and leg strength in older adults. Methods: Thirty-one right-handed older adults (females: N = 30, males: N = 1, ages 61-90 years) with minimal neurological deficits or cognitive impairments (assessed with Mini Mental State Examination score  $\leq 20$ ) and no restrictive cardiovascular or respiratory ailments were included in the study. We measured fine manual dexterity with the Purdue Pegboard Test including four subtests (right hand, left hand, both hand, and assembly), manual dexterity with Jebsen Hand Function Test, fingers pinch force with Jamar hydraulic pinch gauge and hand grips strength with Jamar hydraulic hand dynamometer, and balance and locomotion with Timed Up and Go (TUG) test. The data were analyzed using Pearson's correlation and significant correlation level was set at 0.05. Results: Purdue pegboard test score had statistically significant correlations ( $p < .05$ ) with TUG tests and Jebsen Hand Function test. While Purdue pegboard right hand subtest score were not significantly related to pinch force or hand grips score ( $p > .05$ ), Purdue pegboard left hand subtest score had statistically significant relationships with hand grips and several fingers pinch force variables ( $p > .05$ ). Conclusions: For right handed older adults, fine manual dexterity was related to manual dexterity and gross motor skills. Fine manual dexterity of the dominant hand was not related to force production ability of hand and fingers, while the fine manual dexterity of the non-dominant hand was related to force production ability of hand and fingers.

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### COMPARISON OF UPPER EXTREMITY STRENGTH AMONG DIFFERENT AGE GROUPS OF THE OLDER ADULT POPULATION

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Purpose: Muscular strength on upper extremities are essential for manual performance which may affect activities in daily living. Therefore, the purpose of this study was to compare the muscular strength on upper extremities across different age groups of older adults residing in independent living. Methods: Thirty-one right-handed older adults with ages 61 to 90 years ( $76 \pm 8.8$ ), with minimal neurological deficits or cognitive impairments (assessed with Mini Mental State Examination score  $\leq 20$ ), participated in this study. The participants were divided into four groups based on their age; young-old: 60 to 69 years, middle-old: 70 to 79 years, old-old: 80 to 85, very-old: 86 to 90 years. Each participant completed three trials of the Jamar handgrip strength and pinch force production using dominant and non-dominant hand respectively. Pinch force production test consists of three subtests: lateral, chuck, and palmer pinch. Pearson's Correlation test and One-way ANOVA were applied for data analysis. Results: Age was negatively correlated with the non-dominant hand's palmer pinch force ( $r(1, 30) = -.494$ ,  $p = .005$ ) and hand grip strength on the non-dominant side ( $r(1, 30) = -.385$ ,  $p = .032$ ). However, age was not significantly correlated with variables on the dominant side. Also, age group significantly differed in palmar pinch force in non-dominant side ( $F(3, 30) = 4.313$ ,  $p = .013$ ). Between-group differences were shown between young-old and middle old group ( $p = .039$ ), and young-old and old-old group ( $p = .026$ ), but no difference among the other groups. Conclusions: Dominant hand showed no significant difference among age groups. However, pinch force and hand grip strength in non-dominant side declined with age. Also, non-dominant hand's palmar pinch force decreased before middle-old (70 to 79 years), but stay relatively stable in the three later stages. Supported by Mississippi State University College of Education

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### PHYSIOLOGICAL MEASURES OF STRESS CAN PREDICT MARKSMANSHIP SUCCESS IN BASIC TRAINING SOLDIERS

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Purpose: Determine if physiological measures of stress can predict success during basic rifle marksmanship practice and qualification. Methods: Basic Training Soldiers completed multiple trials of the Army Rifle Marksmanship Qualification Course during a non-stressful practice course and multiple trials during a stressful final qualification round that serves as a basic training graduation requirement. Heart rate variability (HRV) and breathing rate were captured using zephyr bioharnesses during rest, preparation, task and recovery phases. Results: HRV during the shooting task was not significantly different between the two days ( $p = .06$ ) of the marksmanship course. There was a significant difference in breathing rate during the task, between practice and qualification trials ( $p < .007$ ). During the non-stressful practice marksmanship day there was a significant difference between each phase (resting, preparation, task and recovery) for breathing rate ( $p < .001$ ), but no differences in HRV ( $p = .23$ ) between phases. During the stressful final qualification round there was a significant difference in HRV ( $p < .001$ ) between each phase and breathing rate ( $p < .001$ ) between each phase. However, individually resting and task HRV and breathing rate did not predict outcome performance for the non-stressful or stressful qualification rounds. Conclusions: Results suggest that HRV and breathing rate control during stressful rifle marksmanship qualification may impact performance. HRV and breathing rate during practice did not predict performance during qualification.

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**HEART RATE VALIDITY OF CONSUMER WRIST-BASED MONITORS**

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Purpose: The concurrent validity of wrist-based optical heart rate (HR) monitoring from consumer fitness devices was assessed using chest strap HR in young adults. Methods: HR data from four wrist-based optical HR products (Fitbit Charge HR, Garmin Vivosmart HR, Apple Watch s.1, Mio Fuse), and a Polar H7 chest strap & RS800cx receiver (criterion) were collected during nine activities. Two researchers visually observed HR readings from resting to maximum effort from a protocol incorporating resting, a standing task, a grocery bag carry, and a 6-stage cycle ergometer protocol. Results: Forty-five 18 to 30-year-old college students were recruited. Wrist-based HR was detected 92.2% of the time. Pearson correlations resulted in the following: Mio  $r=.93$ , Apple  $r=.91$ , Fitbit  $r=.83$  and Garmin  $r=.74$ . Highest to lowest mean absolute % error resulted in the following: Mio=4.09%, Apple=4.39%, Fibit=8.56% and lastly Garmin=12.07%. Bland-Altman plots showed the lowest bias (in bpm) for the Mio (-.55), followed by the Apple Watch (-2.82), Garmin (-2.99), and Fitbit having the highest bias (-8.13). After excluding values +/-20 bpm compared to the Polar, bias was reduced: Mio (-.16), Garmin (-.28), Apple Watch (-.43) and Fitbit (-1.71). 95% Limits of agreement showed Garmin had the widest (93.85) with Mio having the tightest distribution (49.34). Conclusions: Findings indicate wrist-worn HR outputs were similar but not as valid as the HR chest strap. Varying levels of error reduces confidence for use in clinical scenarios.

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**BIOMARKERS OF INFLAMMATION AND ANGIOGENESIS FOLLOWING SHORT VS. LONG BOUTS OF HIGH-INTENSITY TRAINING**

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Effects of varying types of high-intensity training (HIT) on the appearance and time course of circulating biomarkers have not been adequately characterized. Purpose: The purpose of this study was to examine the effects of HIT on biomarkers of inflammation and angiogenesis, over time, in HIT bouts of varying duration (short bout, 5 min, and long bout, 15 min). Methods: Ten males, 18-45 years old, who had participated in CrossFit for at least 6 months, were recruited from local affiliates. The participants completed a total of 3 lab visits [Visit 1: collection of descriptive data; the next 2 visits were randomized between the short bout and long bout]. All subjects completed the same exercises. Blood was drawn pre and post-exercise, and 1 hour, 3 hours, and 6 hours post-exercise, centrifuged, and plasma frozen for analysis. A multiplex assay (Millipore MagPix) was used to determine concentrations of the biomarkers of interest [interleukin 6 (IL-6), interleukin 10 (IL-10), tumor necrosis factor alpha (TNF-alpha), and vascular endothelial growth factor (VEGF)]. Results: The short bout produced results similar to those of the long bout. Repeated measures ANOVA revealed no trial-dependent differences ( $p \leq 0.05$ ) in any of the biomarkers. Both temporal responses and concentrations were similar in the short and long bout. Conclusions: The biomarkers IL-6, IL-10, TNF-alpha, and VEGF all follow a similar pattern of peaking post-exercise, and returning to baseline within 6 hours, regardless of the duration of the HIT. A practical implication is that a 5 min bout of HIT may be just as effective as a 15 min bout in terms of eliciting certain specific physiologic responses.

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**ASSESSMENT OF STEP ACCURACY DURING WALKING USING THE CONSUMER TECHNOLOGY ASSOCIATION STANDARD**

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PURPOSE: To validate the accuracy of eight commercially available physical activity trackers during walking utilizing the Consumer Technology Association (CTA) standard. METHODS: Twenty participants (10 male, 10 female,  $26.5 \pm 11.5$  years,  $1.63 \pm .34$  m,  $75.6 \pm 19.3$  kg) walked for four, five minute trials on a treadmill set to 1% grade at self-selected speeds (4.03-6.44 km-hr<sup>-1</sup>). Participants were randomly assigned to wear two of the eight devices (Apple iWatch, Fitbit Surge, Garmin, Moto 360, Polar, Suunto Sport, Suunto Trainer, and TomTom), one per arm, during each trial. The devices were placed proximal to the distal radioulnar joint. All trials were video-recorded and a manual step count was taken by two independent researchers. The mean absolute percent error (MAPE) was used as a comparison to the manual count. RESULTS: The MAPE for each device were: Apple iWatch (3.72%), Fitbit Surge (11.20%), Garmin (2.34%), Moto 360 (1.07%), Polar (4.60%), Suunto Sport (22.93%), Suunto Trainer (4.99%), TomTom (10.11%). The Fitbit Surge, Suunto Sport, and TomTom were above the CTA standard of a MAPE <10%. CONCLUSIONS: The CTA standard allows for comparison across devices and to a verified standard. The accuracy of the devices were analyzed in a controlled setting under "textbook" conditions, thus if a device does not perform well in controlled conditions, then performance in free-living conditions would likely be subpar as well.

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**ASSESSMENT OF STEP ACCURACY DURING RUNNING USING THE CONSUMER TECHNOLOGY ASSOCIATION STANDARD**

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PURPOSE: To validate the accuracy of eight commercially available physical activity devices during running using the Consumer Technology Association (CTA) standard. METHODS: Twenty participants (10 male, 10 female,  $26.5 \pm 11.5$  years,  $1.63 \pm .34$  m,  $75.6 \pm 19.3$  kg) ran for five minutes at self-selected speeds (8.06-19.30 km-h<sup>-1</sup>) on a treadmill at a 1% grade for four separate trials. For each trial, two of the eight devices (Apple iWatch, Fitbit Surge, Garmin, Moto 360, Polar HR monitor, Suunto Spartan Sport, Suunto Spartan Trainer, and TomTom,) were randomly chosen, one on each arm proximal to the distal radioulnar joint. All trials were video recorded and a manual count was taken by two separate researchers. The mean absolute percent error (MAPE) was calculated for all devices in comparison to the manual count. RESULTS: The MAPE per device were: Apple iWatch (3.67%), Fitbit Surge (5.16%), Garmin (0.59%), Moto 360 (0.32%), Polar (10.66%), Suunto Sport (2.04%), Suunto Trainer (1.14%), and TomTom (2.98%). The Polar was the only device to be above the CTA requirement of a MAPE <10%. CONCLUSIONS: The CTA standard provides a method for direct comparison of commercially available wearables to a verified standard and to one another. These results represent the accuracy of the devices in a controlled research setting and do not account for how devices would perform in everyday living. However, it is feasible that better laboratory performance would also result in better performance during free-living conditions.

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**MUSCLE QUALITY IS A PREDICTOR OF A SINGLE TASK AND A COMPOSITE MEASURE OF PHYSICAL FUNCTION IN OLDER ADULTS**

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**P108** PURPOSE: Relationships among waist circumference (WC), physical activity (PA), muscle quality (MQ) and physical function (PF) were explored in older adults. The contribution of WC and MQ to a single task and a composite measure of PF was examined. METHODS: Participants (n = 46, 82.1 ± 6.0 y, BMI= 26.4 ± 4.4) reported weekly PA and were assessed for height, weight, WC, hand grip strength (HGS) and MQ, calculated by dividing HGS by body mass index (BMI). PF was assessed two ways: 1) transfer task (TT), a single measure of PF; 2) performance on the 8 foot-up-and-go, 30 s chair rise, and 6-minute walk, converted to Z-scores and summed to obtain a composite measure of lower-extremity PF (LEPF). RESULTS: Controlling for age and sex, TT and LEPF were correlated with MQ (r = -0.44, p < 0.01; r = 0.54, p < 0.01), neither correlated with BMI or PA, and only LEPF was correlated with WC (r = -0.39, p = .01). Age and MQ were independent predictors of TT (standardized β = 0.39, p < 0.01 and standardized β = -0.45, p = 0.02), explaining 16.3% and 13.6% of the variance, respectively. MQ was the only independent predictor of LEPF (standardized β = 0.55, p < 0.01) explaining 19.4% of the variance. CONCLUSION: MQ is correlated with and is a significant predictor of PF, in a single task and a composite measure of PF. Findings suggest that in older adults, improving or maintaining MQ may be critical to prevent decline in PF.

**COMPARING THE GARMIN VIVOSMART HR VS THE COSMED K4B2 METABOLIC BACKPACK IN MEASURING ENERGY EXPENDITURE**

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**P109** Wearable fitness trackers are relatively cheap and convenient tools that track an individual's physical activity. Such qualities have led to an emergence of various fitness trackers available on the market for consumers, but does convenience and relatively low cost compromise accuracy? For this study, we compared Garmin Vivosmart HR (G) watch and the Cosmed K4b2 Metabolic backpack (C) to determine if the cheaper and more user friendly, G is as accurate as the laboratory "gold standard" C. PURPOSE: The purpose of this study is to compare G and C's accuracy in determining energy expenditure via kcals (EE). METHODS: 11 recreationally active students and professors volunteered to participate. Prior to the start of the study, participants had their height, weight, BP and resting HR recorded. The participants were asked to wear both G and C while walking at a low to moderate intensity on a treadmill for 10 minutes. RESULTS: The mean EE for C was 52.72 ± 5.2 and G was 48.36 ± 20.32. CONCLUSION: Our data indicate that there was no correlation between G and C with an r-value = -0.153; p = 0.674. Further research is warranted with a more extensive population to determine the accuracy of the Garmin Vivosmart HR, and by how many more calories.

**COMPARING THE GARMIN VIVOSMART HR VS THE ACTIGRAPH GT3X ACCELEROMETER IN MEASURING ENERGY EXPENDITURE**

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**P110** In the field of exercise science, the Actigraph GT3X (A) accelerometer is regarded as one of the most accurate field measurement devices for physical activity (PA). Many PA devices have recently been added to the market to measure PA for individuals. The Garmin Vivosmart HR (G) watch is currently among the top devices on the market to measure PA. The underlying question that needs to be answered is; how accurate is the G watch? In this study, we compared the accuracy of the G to A in regards to measuring energy expenditure in kcals (EE). Purpose: To compare the accuracy of G to A in measuring EE. Methods: Individuals were recruited via word of mouth to participate in this study. The study required individuals to attach the G to the left wrist and A placed around the waist with the measuring device on the left side of the subject. The duration of the study consisted of a ten minute low-moderate intensity walk on a treadmill. Prior to exercise, weight, height, RBP, and RHR were obtained. We recruited 11 men and women, 18 years and older, of varying activity levels. Results: The mean EE from A was 88.64 ± 23.85, while G was 48.36 ± 20.32. Conclusion: The data showed no correlation between the two devices in regards to EE (r-value = -0.537; p-value = 0.136). Our data suggests further research is needed in order to determine which device is more accurate when measuring energy expenditure.

**COMPARING THE GARMIN VIVOSMART HR ACTIVITY MONITOR TO THE COSMED K4b2 METABOLIC BACKPACK IN MEASURING HEART RATE**

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**P111** Background: In today's fitness society, the growth of activity monitors is becoming more notable. The Cosmed K4b2 (K4) is one of the most highly accurate systems used to measure heart rate (HR), while the Garmin Vivosmart HR (GV) is one of the newest and more advanced activity monitors on the market. The GV has yet to be tested to prove its accuracy of its heart rate monitor in comparison to the K4. With a growing number of people relying on these activity monitors to give them accurate data on their activity levels, it should be known how accurate is the data being given. Purpose: To determine the accuracy of the heart rate monitor of the GV to that of the K4. Methods: 10 individuals wore both the GV and the K4 while walking on a treadmill for 10 minutes. The measures taken were HR on both devices. Prior to exercise, participants had their weight, height, BP, and HR measured. Participants were asked to walk normally and not hold on with GV hand. Results: The mean HR for the K4 was 96.7 ± 12.85, while GV was 99.8 ± 12.97. Conclusion: Our data indicated a positive correlation found between the K4 and GV with an r-value = 0.797; p-value = 0.006. Thus, the data suggests that the GV is as accurate as the K4 in measuring heart rate. The data also suggests that the GV may be a cheaper alternative to the K4 for tracking HR with researchers. Further testing with a larger population is warranted to help determine the accuracy between both pieces of equipment.

**EXERCISE INTENSITY AFFECTS THE KINEMATIC APPROACH USED TO IMPROVE PERFORMANCE OF A 3-DIMENSIONAL TARGET TASK**

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Purpose: Acute exercise paired with practice of a motor task has been shown to enhance task performance compared to task practice alone. However, it is unknown how exercise intensity affects the kinematic variables of movement to improve performance. Methods: 48 participants (23.3±3.2 years) practiced a 3-dimensional motor learning task, which involved reach movements made to sequentially presented targets. Before task practice, 16 participants exercised on a cycle ergometer at a high intensity, 16 exercised at a low intensity, and 16 rested. Exercise intensity was determined as a percentage of max resistance obtained on a cycle-based graded exercise test, and duration was individually modified so that each participant expended 200 kcals of energy. Results: All participants significantly improved performance, indicated by a reduction in time to complete the task. Similar to previous work with this task, the Rest group improved by reducing the distance travelled between the targets, a spatial component of performance. In contrast, the exercise groups improved by altering temporal components of performance. The high-intensity group had the highest reach speed (peak velocity) when reaching to targets, and the low-intensity group had the earliest time of peak velocity, an important characteristic of motor learning ( $p < 0.001$  for all group differences). Conclusion: An acute bout of exercise facilitates a temporally driven approach to improving performance of a sequential target task. Future rehabilitative techniques may utilize this exercise-related benefit to enhance learning of specific motor tasks.

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**RELATIONSHIP BETWEEN NEUROCOGNITIVE TESTING AND SACCADIC EYE MOVEMENTS IN SYMPTOM FREE DIVISION I ATHLETES**

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Purpose: Sparse research has examined the relationship between a sport-like antisaccade task and standard neurocognitive exams. Purpose: To evaluate the relationship between the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) cognitive domains and a sport-like antisaccade task (SLT). Methods: 10 concussed individuals (8 males; 2 females; age: 20 ± 2 yrs) were assessed on the ImPACT test and the SLT on a symptom free day post-concussion. A monocular eye tracker was employed to track the athlete's resultant distance (RD), mean horizontal velocity (MHV), and prosaccade errors (PE) during the athlete's participation in the SLT. ImPACT variables included verbal and visual memory composite, visual motor speed, reaction time (RT), and impulse control. Spearman rho correlations were used to assess the relationship between ImPACT variables and eye tracking metrics. Results: Significant negative moderate relationships between MHV and reaction time ( $r = -0.70$ ,  $p = 0.02$ ) along with RD and Impulse control ( $r = -0.65$ ,  $p = 0.03$ ) were observed. No other significant relationships were noted. Conclusion: These significant relationships suggest that as eye velocities become faster, RT is faster which is possibly due to a decrease in accuracy. As the control of impulse improves, the oculomotor distances are minimal.

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**ASSOCIATIONS OF PHYSICAL SELF-WORTH & GLOBAL SELF-ESTEEM WITH PHYSICAL ACTIVITY & MOTOR SKILLS IN CHILDREN**

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Purpose: The purposes of this study were to determine: (1) if physical activity (PA) levels were related to motor skills, (2) if physical self-worth (PSW) and global self-esteem (GSE) were related to motor skills, and (3) if PSW and GSE were related to PA levels in children. Methods: Fifty-five children (8.3 ± 1.2 years) participated in data collection over two visits to assess PSW and GSE, motor skills, and PA. Children wore an accelerometer for 7 days to measure time spent in moderate-to-vigorous physical activity (MVPA) and completed the Movement ABC-2 to assess motor skills. Total and subscales (balance, aiming and catching, manual dexterity) for motor skill percentiles were calculated. Children also completed a questionnaire to measure PSW and GSE. Results: Overall, 63% did not meet PA recommendations and the average time spent in MVPA was 47.9 ± 28.4 minutes/day. MVPA and motor skills were not related ( $p > .05$ ). GSE and motor skills (total, aiming and catching, balance and manual dexterity;  $p > .05$ ) were unrelated. Further, PSW was unrelated with motor skills, except PSW was positively related to the aiming and catching motor skill subscale ( $p = .02$ ). PSW and GSE were unrelated to MVPA. In addition, neither global self-esteem nor physical self-worth was related to MVPA ( $p > .05$ ). Conclusion: The majority of children did not meet PA recommendations. Results also suggest that PSW, GSE and MVPA are unrelated to motor skills in children. Higher PSW was related to a higher percentile for aiming and catching. Given the high percentage of children not meeting PA recommendations, further study is warranted in a sample that has a wider range of time spent in MVPA.

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**EFFECTS OF SHORT-TERM RESISTANCE TRAINING ON MOTOR UNIT-SPECIFIC PROPERTIES IN OLDER MALES**

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Purpose: To examine the effects of resistance training (RT) on motor unit-specific properties in older males. Methods: Seventeen older males were randomly assigned to a training (TG;  $n = 10$ , age = 64.1 ± 7.4 yrs) or control (CG;  $n = 7$ , age = 64 ± 9.3 yrs) group. RT consisted of knee extensions for 4 sets of 10 repetitions for 2 weeks. Before and after RT subjects performed 2 maximal isometric contractions (MVCs) of the knee extensors while surface electromyography (sEMG) signals were recorded from the vastus lateralis and decomposed into their constituent motor unit (MU) action potential trains. Recruitment threshold (RECT) and maximum firing rate (MAXFR) were determined for each MU. Linear regression was used on the pooled and individual data for TG and CG to examine the relationship between RECT and MAXFR. Paired-samples t-tests were used to compare the individual slope coefficients (SLPc) before and after RT. Results: Strength (+8.4%;  $p = 0.037$ ) and SLPc (+50.3%;  $p = 0.003$ ) increased in the TG but did not change in the CG ( $p > 0.05$ ). Visual inspection of the regression lines indicates that lower-threshold MUs ( $\leq 30$  %MVC) increased MAXFR, while MUs recruited between 40-70 %MVC demonstrated a decrease in MAXFR after RT. Conclusion: The results suggest that MU-specific changes in MAXFR accompany short-term RT.

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### RELATIONSHIP OF FINE MOTOR FUNCTIONS AND FUNDAMENTAL MEMORY AND COGNITIVE FUNCTIONS IN OLDER ADULTS

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Purpose: The purpose of this study was to investigate how fundamental memory and cognitive function are related to fine motor control of older adults. Methods: Thirty-one right-handed older adults (females: N = 30, males: N = 1), ages 61 to 90 years ( $77 \pm 8.5$ ) with no restrictive cardiovascular or respiratory ailments per Physical Activity Readiness – Questionnaire were medically cleared for this study. Participants were assessed using the Mini Mental State Examination (MMSE) to determine minimal no cognitive or neurological impairments with scores  $\geq 20$ . Each participant completed three trials of the seven timed (s) subtests included in the Jebsen Hand Function Test (JHFT), which includes tasks applicable to daily living activities done for an optimal quality of life: (1) writing, (2) simulated page turning, (3) picking up small objects, (4) simulated feeding, (5) stacking checkers, (6) lifting large, light objects, and (7) lifting large, heavy objects. Pearson's correlation test and significant correlation level was set at 0.05. Results: MMSE was not related to age ( $p > 0.05^*$ ). However, MMSE was significantly related to right-handed tasks (1) ( $R(1,30) = -0.413, p = 0.021^*$ ), (2) ( $R(1,30) = -0.418, p = 0.019^*$ ), and (3) ( $R(1,30) = -0.394, p = 0.028^*$ ), and left-handed task (2) ( $R(1,30) = -0.396, p = 0.027^*$ ), but no other JHFT subtests. Conclusions: Right-handed writing skill and skill of picking up small objects, in addition to right and left-handed simulated page turning are associated with older adults' cognitive ability. However, the skills of simulated feeding, stacking checkers, and lifting large light or heavy objects do not seem to be affected by older adults' cognitive function.

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### LOCOMOTOR-RESPIRATORY COUPLING IS NOT RELATED TO ATTENTIONAL STRATEGIES IN TRAINED RUNNERS

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Several studies have indicated a need for locomotor-respiratory coupling (LRC) throughout the duration of aerobic activity. Trained runners typically have higher measurements of LRC and exhibit associative attentional strategies. Purpose: To determine whether attentional strategies were related to a) the degree in which LRC is exhibited under baseline and stressed conditions, and b) subjective measures of muscular and breathing efforts in highly trained endurance runners. Methods: On 2 (randomized) visits, male distance runners ( $n=12$ ) ran on a treadmill for 5 minutes at 4 different submaximal speeds while LRC was recorded. One visit served as a control trial, while the other took place following induction of respiratory muscle fatigue via isocapnic voluntary hyperventilation. Ventilation was continuously recorded, and timing of foot strikes was determined with lightweight, plastic event switches taped to the bottom of each foot. During the final minute of each running bout, subjects rated their perceived dyspnea (DYS). Subjects completed an Attentional Focusing Questionnaire at the end of the visit to rate the extent that they engaged in a variety of attentional activities. Results: Attentional focus scores were not different between the 2 trials. Association scores were positively correlated with distress ( $r=0.70$ ) and inversely related to submaximal VO<sub>2</sub> ( $r=-0.64$ ). Dissociation was positively related to  $DYS$  ( $r=0.52 - 0.65$ ). Both associative and dissociative strategies had no significant correlation with LRC ( $r=-0.06 - 0.37$ ). Conclusion: Subjects scored high on associative characteristics, but attentional strategies did not appear to be related to any measure of LRC.

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### EFFECT OF CADENCE ON VENTILATORY KINETICS AT THE ONSET OF EXERCISE

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Introduction: Ventilation (VE), the movement of air by the respiratory system, increases from rest to exercise proportional to work rate at low to moderate intensities. VE is further augmented during exercise at faster cadences. Though primarily regulated by blood CO<sub>2</sub> concentrations, the rapid rise in VE at the onset of exercise is thought to be neural. Purpose: The purpose of this study was to determine the effect of cadence on the ventilatory kinetic at the onset of exercise. Methods: 12 subjects completed VO<sub>2</sub>peak tests on an electrically braked cycle ergometer to volitional fatigue with gas exchange. The work rate to elicit 50% and 70% of VO<sub>2</sub>peak was calculated. For each intensity, subjects cycled at 60rpm and 90rpm for 10 minutes with gas exchange. VO<sub>2</sub>, VCO<sub>2</sub>, and VE were measured breath by breath. Kinetics were modeled ( $Abs = C + A(1 - e^{-t/k})$ ) to determine the rate constant at the onset of exercise ( $\tau$ ). The average for each variable was assessed during the last 2 minutes of exercise. Results: The average VO<sub>2</sub> ( $1.7 \pm 0.1$  vs  $2.3 \pm 0.2$  L/min), VCO<sub>2</sub> ( $1.6 \pm 0.1$  vs  $2.23 \pm 0.2$  L/min) and VE ( $46.2 \pm 3.5$  vs  $68.8 \pm 6.0$  L/min) was significantly lower at 50% and 70% VO<sub>2</sub>peak ( $p \leq 0.05$ ). Cadence also significantly augmented the average VO<sub>2</sub> ( $1.8 \pm 0.16$  vs  $2.2 \pm 0.2$  L/min), VCO<sub>2</sub> ( $1.7 \pm 0.2$  vs  $2.1 \pm 0.2$  L/min) and VE ( $49.9 \pm 4.2$  vs  $65.1 \pm 5.7$  L/min) at 60 compared to 90rpm ( $p \leq 0.05$ ). The time constant  $\tau$  (time to reach 2/3 asymptote) was greater at 70% VO<sub>2</sub>peak for VO<sub>2</sub> ( $32.4 \pm 2.6$  vs  $42.6 \pm 3.9$  L/min,  $p \leq 0.05$ ) and VE ( $35.8 \pm 5.3$  vs  $57.4 \pm 10.3$  L/min,  $p \leq 0.05$ ) though  $\tau$  was not different for VCO<sub>2</sub> by intensity. Cadence did not affect  $\tau$  for any variable. Conclusion: These data are consistent with prior research that VO<sub>2</sub>, VCO<sub>2</sub> and VE are affected by both exercise intensity and cadence on a cycle ergometer. The data also supports the evidence that VE at the onset of exercise is not dependent upon CO<sub>2</sub> concentrations, but is a function of afferent neural feedback.

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### QUANTIFYING THE SHAPE OF THE MAXIMAL EXPIRATORY FLOW-VOLUME CURVE FOLLOWING ACUTE ELECTRONIC CIGARETTE USE

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Introduction: Electronic cigarette (EC) use is increasing in popularity, especially among teens and young adults. Yet, the effects of EC use on pulmonary and airway function, especially the smaller airways, are understudied. Purpose: The purpose of this study was to examine the shape of the maximal expiratory flow-volume curve following acute EC use. Methods: Male subjects ( $N=11$ ) visited the laboratory on three occasions. Subjects completed pulmonary function testing (PFT) for screening and familiarization purposes during their initial visit. During the subsequent two visits, subjects inhaled from an EC with (EC+) or without (EC-) the nicotine cartridge (i.e., placebo) in random order. Subsequently, subjects completed standardized PFT. The angle beta ( $\beta^\circ$ ), flow ratio (FR), and slope ratio (SR), measurements not common to standardized PFT, were used to quantify the shape of the best maximal expiratory flow-volume curves obtained following EC+ and EC-. Results: Most spirometric indicators were similar between EC+ and EC-. However, peak expiratory flow was reduced following EC+ ( $10.3 \pm 1.1$  L/s) compared with EC- ( $10.6 \pm 0.95$  L/s-1,  $P < 0.05$ ). The  $\beta^\circ$  (EC+ =  $178.6 \pm 9.1^\circ$ , EC- =  $178.3 \pm 7.3^\circ$ ) and FR (EC+ =  $0.23 \pm 0.19$ , EC- =  $0.29 \pm 0.23$ ) were not different between EC+ and EC-. The SR was similar between EC+ and EC- over most of the forced vital capacity (FVC), but the SR was different at 20% (EC+ =  $1.40 \pm 0.45$ , EC- =  $1.26 \pm 0.39$ ,  $P < 0.05$ ) and 30% (EC+ =  $1.22 \pm 0.31$ , EC- =  $1.38 \pm 0.37$ ,  $P < 0.05$ ) of FVC. Conclusion: These data suggest that acute EC use may impact small airway function. Additionally, common pulmonary function measures are not sensitive to the changes that may occur in small airway function following acute EC use in young adults. Support provided by the Office of Student Research and University Research Council at Appalachian State University.

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### PREDICTED LUNG ELASTIC RECOIL PRESSURE DOES NOT ACCURATELY ESTIMATE THE DYSPANAPIS RATIO

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Introduction: The relationship between airway size and lung size can be estimated using the dysanapsis ratio (DR). Recent investigations have used a predicted, but unvalidated, lung elastic recoil pressure (Pst) in their estimates of DR. Purpose: The purpose of this study was to examine DR estimated using predicted Pst compared with DR estimated using measured Pst. Methods: Individual subject data was collected from three previously published investigations. Pst at 50% of forced vital capacity (FVC; Pst50(l)) was estimated from age using four regression equations. Subsequently, DR was estimated using two methods: 1) measured values for forced expiratory flow at 50% of FVC (FEF50%), FVC, and Pst50(l), and 2) measured values for FEF50%, FVC, but predicted Pst50(l) from the four regression equations. The resulting DR were compared using repeated measures analysis of variance. Results: In total, data from 122 subjects were included in our analyses. Subjects were aged 40.1±16.9 y (13-75 y). Measured Pst50(l) was 7.8±1.8 cmH<sub>2</sub>O. Regression equations for Pst50(l) resulted in values of 7.1±1.2, 6.3±2.4, 5.9±1.5, and 7.0±1.4 cmH<sub>2</sub>O. Each predicted Pst50(l) was significantly different compared with measured Pst50(l) (P<0.01). FEF50% and FVC were 4.6±1.5 L·s<sup>-1</sup> and 4.6±1.2 L, respectively. DR estimated using measured Pst50(l) was 0.135±0.047. DR estimated using predicted Pst50(l) resulted in values of 0.153±0.044, 0.239±0.178, 0.204±0.065, and 0.159±0.050. DR estimated using predicted Pst50(l) values were all significantly different compared with DR estimated using measured Pst50(l) (P<0.01). Conclusion: These data demonstrate that lung elastic recoil pressure and the dysanapsis ratio cannot be predicted using regression equations. Subsequent investigations of the dysanapsis ratio should use measured lung elastic recoil pressure.

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### HABITUAL MACRONUTRIENT INTAKE, BODY COMPOSITION, AND METABOLISM: SEX-BASED DIFFERENCES

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Purpose: To evaluate sex differences in the relationship between habitual macronutrient intake, body composition, resting metabolic rate (RMR), and substrate utilization (RER). Methods: Macronutrient intake (carbohydrate [CHO; g], protein [PRO; g], fat [g], relative protein intake [ $r_{\text{PRO}}$ ; g·kg<sup>-1</sup>]) was evaluated from self-reported 3-day diet logs completed by forty-nine overweight and obese men (n=23) and women (n=26) (Mean±SD; Age=35.0 ± 8.9 yrs; Body mass index=33.6 ± 5.2 kg/m<sup>2</sup>). Body composition was assessed using a 4-compartment model (fat mass [FM], lean mass [LM], percent body fat [%fat]) and dual-energy x-ray absorptiometry (visceral adipose tissue [VAT]). Indirect calorimetry was used to determine RMR and RER. Results: When controlling for caloric intake and age in partial correlations,  $r_{\text{PRO}}$  was negatively associated with FM and %fat in men (p<0.05). In women, CHO was positively associated with FM, LM, and RMR (p<0.05), while  $r_{\text{PRO}}$  was negatively correlated with FM, LM, VAT, and RMR and PRO was negatively associated with RER (p<0.05). Conclusions: In both men and women, greater  $r_{\text{PRO}}$  intake was associated with a more favorable body composition. In women only, CHO was associated with a less favorable body composition, while PRO was associated with greater fat utilization. In otherwise healthy, overweight and obese adults, macronutrient composition may be an important consideration for maintaining health, especially for women, who are known to be less efficient at CHO metabolism.

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### ASSOCIATIONS BETWEEN BODY COMPOSITION, BMI, AND PHYSICAL PERFORMANCE IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS

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Purpose: To determine associations between body composition and BMI with self-reported disability (Western Ontario and McMaster Universities Osteoarthritis Index [WOMAC] function) and physical performance (20-m fast-paced walk, chair-stand, stair-climb) in individuals with knee osteoarthritis (KOA). Methods: Percent fat mass (%FM) and lean mass (%LM) were measured using dual energy x-ray absorptiometry on 47 adults with radiographically defined KOA (30% male, 60.2±8.3 yrs, BMI = 29.5±3.8 kg/m<sup>2</sup>). WOMAC, 20-m fast-paced walk (WALK), chair-stand (CHAIR), and stair-climb (STAIR) were collected on the same day. Separate stepwise linear regressions were conducted to determine the unique variance in WOMAC and physical performance outcomes explained by %FM, %LM, and BMI. Results: Individually %FM and %LM significantly associated with all physical performance outcomes (%FM: WALK: R<sup>2</sup> = 0.14, p = 0.01; CHAIR: R<sup>2</sup> = 0.11, p = 0.02; STAIR: R<sup>2</sup> = 0.15, p = 0.01; %LM: WALK: R<sup>2</sup> = 0.09, p = 0.04; CHAIR: R<sup>2</sup> = 0.09, p = 0.05; STAIR: R<sup>2</sup> = 0.12, p = 0.02) but not in WOMAC function (%FM: R<sup>2</sup> = 0.01, p = 0.43; %LM: R<sup>2</sup> = 0.003, p = 0.72). BMI did not significantly associate with WOMAC (R<sup>2</sup> = 0.001, p = 0.84) or physical performance measures (R<sup>2</sup> range = 0.02 – 0.06, p-range = 0.10 – 0.41). Conclusions: Lower %FM and higher %LM associated with better physical performance but not WOMAC. BMI did not significantly associate with WOMAC or physical performance. It may be more important to increase %LM rather than focusing on an overall change in BMI to improve physical performance in those with KOA. Supported by: NIH NIAMS 1R21AR067560-01.

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### HYPERMETABOLIC EFFECTS OF DIETARY KETONES ARE INDEPENDENT OF CHANGES IN SKELETAL MUSCLE MITOCHONDRIAL RESPIRATION

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Dietary ketone-mediated increases in energy expenditure (EE) have been attributed to increased adipose thermogenesis; however, little is known regarding the contribution of skeletal muscle to the hypermetabolic phenotype. Purpose: Determine if dietary ketone esters increase mitochondrial respiration in skeletal muscle. Methods: Thirty 5-wk old male C57BL/6J mice were placed on an ad libitum high fat diet (HFD) for 10 weeks. Mice were then randomized to one of three groups (n = 10 per group) for an additional 12 weeks: 1) Control (CON, remain on HFD); 2) Ketone Ester (KE, 22% kcal from KE); 3) Pair-fed (PF, pair-fed to KE group). Body composition was measured during the final week of the study by Quantitative Magnetic Resonance (QMR) and EE was examined by indirect calorimetry. Skeletal muscle mitochondrial respiration was measured by high-resolution respirometry in permeabilized muscle fiber bundles. Results: Body weight in the KE group was 27% lower and total adiposity 54% lower than the PF group (p < 0.05 for both) despite comparable energy intake. Differences in body weight and adiposity was attributed to higher resting (REE) and total (TEE) energy expenditure in the KE group (p<0.05). Markers of mitochondrial biogenesis and thermogenesis were increased in brown adipose and a browning phenotype was observed in inguinal white adipose tissue. However, there were no differences in skeletal muscle mitochondrial respiratory capacity between groups. Conclusions: These results provide further support that dietary ketone esters increase brown and white adipose thermogenesis but do not appear to have effects on mitochondrial respiration in skeletal muscle.

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**BODY COMPOSITION ASSESSMENT IN FEMALE NCAA DIVISION I SOFTBALL PLAYERS AS A FUNCTION OF PLAYING POSITION ACROSS A MULTIYEAR TIMEFRAME**

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Purpose: The purpose of this study was to determine changes in body mass, fat-free mass (FFM), fat mass (FM), and body fat percentage (BF%) in Division I female collegiate softball athletes over the course of two years. A secondary purpose was to determine if changes differed by playing position. Methods: Forty-one collegiate softball athletes (20.4 ± 1.6 years) currently competing at the National Collegiate Athletic Association (NCAA) Division I level volunteered. Total and regional FFM, FM, and BF% were measured by the dual-energy X-ray absorptiometry at the beginning of pre-season, end of pre-season, and end of post-season for two years. A mixed design ANOVA was performed to examine FFM, FM, BF%, and player position interaction over time. When a significant main effect (i.e.  $p < 0.05$ ) was observed, a Post-Hoc test was performed using Bonferroni correction for multiple comparisons. Results: FFM showed a significant main effect of time ( $F_{2,36} = 3.752$ ,  $p = 0.033$ ). FFM decreased significantly from mid-season to post season ( $p = 0.048$ ). FM showed a main effect of time ( $F_{2,37} = 4.164$ ,  $p = 0.048$ ) and a time by player position interaction ( $F_{2,37} = 2.45$ ,  $p = 0.032$ ). BF% showed a main effect of time ( $F_{2,37} = 7.254$ ,  $p = 0.001$ ) and a time by player position interaction ( $F_{2,37} = 2.45$ ,  $p = 0.033$ ). Post-hoc analysis revealed that pitchers had significantly higher levels of FM and BF% than catchers ( $p < 0.000$ ), infielders ( $p < 0.000$ ) and outfielders ( $p < 0.000$ ). Conclusion: The current study revealed that all athletes decreased in FFM during the competitive season. Pitchers from this study consistently maintain a higher FM and BF% than the catchers, infielders and outfielders. These data reveal that further investigation into training demands of different positions is recommended.

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**NO RELATIONSHIP BETWEEN DUAL ENERGY X-RAY ABSORPTIOMETRY AND ULTRASOUND ESTIMATES OF VISCERAL ADIPOSE TISSUE IN COLLEGIATE WOMEN WITH NORMAL BMI**

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PURPOSE: To determine the relationship between estimates of visceral adipose tissue (VAT) quantity derived from dual-energy X-ray absorptiometry (DXA) and B-mode ultrasound (US) in college-aged females ( $n = 47$ ; age = years) with a normal body mass index (BMI). METHODS: Forty-seven female subjects (Age = 20.0 ± 1.2 yrs; Height = 164.6 ± 7.0 cm; Weight = 58.5 ± 6.2 kg) were enrolled in this study. Exclusion criteria included age (<18 or >25 years old) and BMI (<18.5 kg/m<sup>2</sup> and >24.9 kg/m<sup>2</sup>). The analysis was restricted to women, as regional fat distribution patterns differ between the sexes. The participants reported to the lab 12 hrs fasted, and were required to have abstained from alcohol consumption and vigorous physical activity for at least 24 hours prior to testing. DXA scans were completed, and estimates of VAT volume (cm<sup>3</sup>) were reported. US scans of the abdomen were completed 2 cm above the umbilicus, and VAT depth (cm) was estimated by measuring the distance between the posterior surfaces of the linea alba and the descending aorta. RESULTS: There was no significant correlation between VAT estimates derived from DXA and US ( $R = 0.04$ ,  $p > 0.05$ ). CONCLUSIONS: There was no relationship between the estimates of VAT quantity derived from DXA and US in this sample. As the females in this study had normal BMIs, the lack of relationship may be attributable to low variability in both measures. Future studies including a larger range of BMIs may be required to determine if there is truly no relationship between DXA and US derived estimates of VAT.

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**TWO WEEKS OF LOW CALORIE DIET PLUS INTERVAL EXERCISE FAVORABLY INFLUENCES PYY AND APPETITE COMPARED TO DIET ONLY IN OBESE ADULTS**

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Purpose: Appetite is influenced by gut-derived hormones and behavioral factors. Caloric restriction is suggested to reduce satiation and increase hunger, thereby contributing to challenges in long-term weight loss. Although intense exercise is suggested to attenuate appetite, no data exist testing the effects of interval exercise (Ex) during a low-calorie diet (LCD) on appetite regulation. We hypothesized that LCD+Ex would favorably influence satiety when compared with LCD in obese adults. Methods: Seventeen obese adults (50.5 ± 3.0 yrs; 35.9 ± 1.4 kg/m<sup>2</sup>) were randomized to either LCD ( $n = 8$ ; mixed meals of 1000-1200 kcal/d) or LCD+Ex ( $n = 9$ ; 60 min/d of supervised interval exercise at 90% HRpeak for 3 min and 50% HRpeak for 3 min). An additional 350kcal (shake) was provided to LCD+Ex individuals post-exercise to equate energy availability between groups. Total PYY was measured at 0, 30 and 60min of a 75g OGTT before and after the intervention. Visual analog scales were also administered at 0 and 120min of the OGTT to assess subjective appetite. Food logs were recorded prior to and during the intervention to evaluate caloric intake. Results: Both interventions induced similar decreases in food intake ( $P = 0.001$ ) and body fat ( $P < 0.01$ ). LCD+Ex decreased fasting PYY ( $P < 0.01$ ) and increased post-prandial PYY stimulation (27.0 ± 7.0 vs. 37.0 ± 11.0%) when compared with LCD (20.1 ± 11.6 vs. 15.8 ± 3.4%,  $P = 0.11$ ). Interestingly, LCD+Ex attenuated the rise in fasting hunger scores seen with LCD ( $P = 0.05$ ). Conclusion: Combining interval exercise with a LCD favorably influences PYY and perceived hunger in obese adults. Further research is warranted to determine how adding interval exercise to long-term caloric restriction may mitigate obesity and related cardiometabolic disease.

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**RELATIONSHIP BETWEEN SKINFOLD, AIR DISPLACEMENT PLETHYSMOGRAPHY, AND BIOELECTRICAL IMPEDANCE MEASUREMENTS ON FEMALE COLLEGIATE ATHLETES**

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Anthropometric measures such as body composition are important to assess in athletic populations. Previous research has suggested that different methods of estimating body fat percentage (BF%) vary among populations, however, limited research exists in this relationship among lean, athletic female populations. PURPOSE: The purpose of this study was to determine the relationship between three body composition methods (3-site skinfold [3-SF]; air displacement plethysmography [ADP]; and bioelectrical impedance [BIA]) in female collegiate athletes. METHODS: Seventy-four Division I female athletes underwent a single test battery consisting of body composition evaluation using ADP, BIA, and 3-SF tests to estimate BF%. Pearson correlations were run to analyze the relationship between the three methods of determining BF%. RESULTS: Both formulas for 3-SF (Siri: 19.3 ± 5.2%; Brozek: 19.1 ± 4.8%) revealed a perfect ( $r = 1.000$ ,  $p < 0.001$ ) relationship with each other, and same correlation with other measurements. A significant, strong positive correlation was found ( $r = 0.756$ ,  $p < 0.001$ ) between BIA (21.3 ± 6.0%) and 3-SF. A significant, moderate positive correlation ( $r = 0.313$ ,  $p = 0.015$ ) existed between 3-SF and ADP (18.9 ± 5.9%). BIA and ADP were not significantly correlated with each other ( $r = 0.219$ ,  $p = 0.093$ ). CONCLUSION: Due to its correlation with ADP, 3-SF may be a valid estimation of BF%, while BIA may overestimate BF% in this population.

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**IS BODY MASS INDEX (BMI) THE BEST FIELD BASED PROCEDURE TO ESTIMATE OBESITY IN PRE- AND POSTMENOPAUSAL WOMEN**

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Obesity is a serious health problem worldwide and particularly in the United States as over two-thirds of the American adult population are reported to be obese or overweight. A concern with the reported prevalence is that body mass index (BMI), an inexact field-based procedure, is typically used to estimate obesity. **PURPOSE:** To evaluate several field-based procedures to determine if BMI is the most appropriate procedure to estimate obesity in pre- and postmenopausal African and European American women. **METHODS:** One-hundred and sixty-nine women between 21 and 70 years of age signed institutional informed consent forms and volunteered to participate in this study. Dual energy X-ray absorptiometer (DXA), BMI, BMI-based equations, skinfolds and circumferences, were evaluated for all women who were divided into groups based on race and menstrual status. **RESULTS:** Findings from this study indicate that means of all procedures ranged from 30.1% to 37.0%, and all the field-based body fat estimating procedures were within 4% of DXA %fat analysis, except Jackson et al. 7 site equations. Mean differences between DXA and the field-based procedures ranged from 1.1 to 5.0% based on race and between 1.1 and 6.5% differences for menopausal status. The relationships between DXA %fat and the field-based procedures ranges from r values of 0.73 to 0.90 for the total sample with the lowest relationship occurring between DXA %fat and BMI. When a BMI of 30 kg/m<sup>2</sup> and 30 %fat for each of the procedures was used to determine the percentage of women that were obese, BMI classified 23.6% as obese while the other procedures estimated 63.3 to 98.2 % of the women as obese. Jackson et al. 3-site skinfolds equation estimate of obesity was more like DXA %fat. **CONCLUSIONS:** These results suggest that other field-based procedures of estimating body fat% are more accurate, but the differences may not be sufficient to justify the higher cost.

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**EVALUATION OF RELATIONSHIPS BETWEEN BODY COMPOSITION, MAXIMAL STRENGTH, AND RESTING METABOLISM IN RESISTANCE-TRAINED FEMALES**

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**PURPOSE:** To evaluate the relationship between body composition, resting metabolism, and maximal strength in resistance-trained females. **METHODS:** Fifteen females (Mean  $\pm$  SD; Age: 20.1  $\pm$  0.9 yrs, Height: 166.0  $\pm$  3.6 cm, Weight: 65.8  $\pm$  10.6 kg) with 0.5-8 years of resistance training history were included in this study. Females were determined to be resistance-trained if they had been lifting weights consistently twice per week for the six months prior to the study. Body composition was determined from dual energy X-ray absorptiometry (DEXA) to evaluate lean mass (LM), fat mass (FM), body fat percentage (%fat), and bone mineral content (BMC). Resting energy expenditure (REE) and respiratory exchange ratio (RER) were analyzed using indirect calorimetry. Maximal strength was determined from one repetition maximum testing on bench press (BP1RM) and leg press (LP1RM), respectively. **RESULTS:** REE was highly correlated with FM and %fat (R=0.795, p<0.001, and R=0.672, p=0.006, respectively). BMC was highly correlated with LM (R=0.862, p<0.001), LP1RM (R=0.729, p=0.002), and BP1RM (R=0.708, p=0.003). LM was significantly correlated with maximal strength (LP1RM: R=0.632, p=0.011, and BP1RM: R=0.773, p=0.001). There were no significant correlations between RER and any other variable. **CONCLUSION:** REE significantly correlated only with FM and %fat, which may be due to subjects having higher %fat and FM also having greater overall bodyweight. LM was significantly correlated with BMC and maximal strength. This relationship demonstrates the importance of building LM to maintain bone health and optimize strength performance. Supported by a Grant from the National Strength and Conditioning Association.

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**THE ASSOCIATION BETWEEN WAIST TO HIP RATIO AND ANDROID TO GYNOID FAT RATIO IN COLLEGE WOMEN WITH A NORMAL BMI**

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**PURPOSE:** To assess the association between waist to hip ratio (WHR), and android to gynoid body fat ratio (AGR) in college women with a normal weight body mass index, as well as evaluating the association of both ratios with mean arterial blood pressure (MAP), and total body fat percentage (BF%). **METHODS:** Forty-five female undergraduate college students (Mean  $\pm$  SD; Age: 19.5  $\pm$  1.1 yrs.; Height: 164.3  $\pm$  8.0 cm; Weight: 58.7  $\pm$  6.4 kg) participated in this study. Android and gynoid body fat percentage measured by dual energy x-ray absorptiometry (DEXA) were used to calculate AGR; circumferences of the waist and hip (WHR) were assessed by the same technician. Blood pressure was measured in a seated position with an automated cuff. BF% was measured by DEXA. **RESULTS:** There was a moderate correlation between WHR and AGR (R=0.616, p<0.001). MAP was not significantly associated with WHR (R=0.117, p=0.445), or AGR (R=0.291, p=0.052). BF% was significantly associated with both ratios, showing a moderate association with WHR (R=0.400, p=0.006), and a strong association with AGR (R=0.723, p<0.001). **CONCLUSION:** WHR was found to be associated with AGR and BF%. Therefore, WHR may be an inexpensive method to detect and prevent obesity in a young female population where radiological techniques are not readily available.

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**LEAN MASS AND ITS RELATIONSHIP TO CARDIORESPIRATORY FITNESS IN OBESE YOUNG AFRICAN AMERICAN WOMEN**

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**PURPOSE:** African American women (AAW) have the highest rate of obesity when compared to women of other ethnicities, and AAW have lower rates of reported physical activity. This study examined the relationships between body composition and submaximal oxygen uptake to determine the relative contributions of lean and fat masses. **METHODS:** Body composition (BC) was measured using Dual-Energy X-ray Absorptiometry (DXA), and participants completed an eight-minute submaximal treadmill test. BC and VO<sub>2</sub> uptake at different walking speeds were evaluated for relationships and predictions using correlations and stepwise regressions. **RESULTS:** Fourteen young AAW (Mage = 31, SD = 8.71; MBMI = 31.68, SD = 7.78) reported engaging in moderate to vigorous weekly physical activity (MPA = 165.62 minutes/week, SD = 206.75). Lean mass was related to VO<sub>2</sub> uptake in each stage [(2.5 mph) r=.88, p<.01; (3.0 mph) r=.76, p<.01; (3.5 mph) r=.75, p<.01; (4.0 mph) r=.65, p=.01]. In stepwise regression analyses, lean mass explained 64% of the variance of VO<sub>2</sub> uptake at 2.5 mph, and 34% at 4.0 mph. **CONCLUSION:** Lean mass is more related to walking exercises in young AAW than fat mass. These results suggest that efforts to improve aerobic or cardiorespiratory fitness in young AAW should consider not only losing fat mass, but also increasing lean mass. Also, interventions that focus on increasing lean mass and improving cardiorespiratory fitness at low workloads may be easier to adopt and maintain for obese young AAW.

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**A PREDICTION EQUATION FOR ENERGY EXPENDITURE DURING WALKING OR RUNNING CORRECTED FOR ONE MILE IN NORMAL WEIGHT AND OVERWEIGHT AFRICAN AMERICAN ADULTS AND CROSS-VALIDATION OF THE EQUATION**

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Purpose: The aims of this study included development of a regression equation to predict energy expenditure (EE) during walking or running for normal weight (fat percentage  $\leq 25$  for males,  $\leq 30$  for females) and overweight (fat percentage  $> 25$  for males,  $> 30$  for females) African Americans and cross-validation the equation. Methods: Sixty-eight normal weight and overweight African Americans participated to test EE through indirect calorimetry. **P132** Multiple regression analysis was employed for EE prediction and difference between the measured EE and predicted EE was compared by a dependent t-test. Also, regression coefficients generated from cross-validation group were compared to the original equation's using the Chow statistical test. Results: Predicting EE (kcal) during walking or running corrected for one mile yielded the following equation:  $EE = 1.012 \text{ body weight} - 9.233 \text{ gender (male}=1, \text{ female}=2) + 47.188$  (standard error of estimate,  $SEE = 14.6 \text{ kcal} \cdot \text{mile}^{-1}$ ). The dependent t-test revealed no significant difference between measured and predicted EE ( $p > 0.05$ ). Also, the coefficients for body weight and gender between the original equation and the predicted equation in the cross-validation group were not significantly different ( $p > 0.05$ ). Conclusion: The results in the cross-validation group provided sufficient support to demonstrate that the derived equation for predicting energy expenditure was valid. We recommend that this equation would be helpful in directing the training program during walking or running in African American normal weight and overweight adults.

**BODY COMPOSITION IS NOT RELATED TO FITNESS OR ATHLETIC PERFORMANCE IN A SAMPLE OF FEMALE COLLEGE BASKETBALL PLAYERS**

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Elite athletes and coaches often use body composition as a predictor of performance throughout their competitive season. However, this measure is not always representative of the skills necessary for success in competition. Purpose: The purpose of this study was to examine the relationship between body composition and measures of fitness and athletic performance throughout a competitive season among a sample of women's basketball players. Methods: Body fat percentage (BF%) and relative skeletal muscle index (RSMI) were assessed using dual-energy x-ray absorptiometry (iDXA) among 12 college, female, basketball players at four points throughout the season: before and after preseason training, midway through the competitive season, and at the end of the competitive season. Anaerobic power and aerobic fitness were assessed before and after preseason training using a Wingate test and a VO<sub>2</sub> max test, respectively. Athletic performance statistics including shooting percentage, assist-to-turnover ratio, and points per game were tracked throughout the competitive season. Results: Before and after pre-season training, neither BF% nor RSMI were significantly correlated with maximal anaerobic power or maximal aerobic fitness. In addition, neither mid-season nor post-season BF% nor RSMI were significantly correlated with any measures of athletic performance. Conclusions: The results of this study indicate that within a highly skilled sport such as basketball, body composition may not correlate with fitness or skills needed for high level competition. Thus, given the potential, negative, psychological impacts of tracking body composition among athletes, it may be a better practice not to assess this measure and to instead track only measures of fitness and athletic performance.

**EXAMINING THE LIMITATIONS OF USING WEIGH INS AS A MEASURE OF BODY COMPOSITION AMONG FEMALE COLLEGE BASKETBALL PLAYERS**

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Athletes often monitor their weight throughout the season, sometimes at the recommendation of coaches, sometimes on their own and may use this measure as an indicator of their body composition. This self-monitoring can be highly misleading compared to the actual body composition changes occurring. Purpose: The purpose of this study was to compare changes body mass, fat mass, and lean mass over the course of a competitive season in a sample of female, college women's basketball players. Methods: Body composition and total mass were assessed using dual-energy x-ray absorptiometry (iDXA) at four points throughout the competitive season: prior to preseason training, after completing preseason training, in the middle of the competitive season, and at the end of the competitive season. Results: Using a repeated-measures ANOVA to analyze change on an average level, there were no significant changes in total mass, fat mass, or lean mass over the course of the season. However, on an individual level, there was high variability in changes among these variables. For example, one athlete only lost 1.8 lbs. during the competitive season, but her body fat decreased by 4.1 lbs. lean mass increased by 5.8 lbs. Another athlete lost 1.1 lbs., but her body fat increased by 2.1 lbs. and lean mass decreased by 3.2 lbs. Conclusions: These results demonstrate that weight is highly limited in reflecting actual changes in body composition, especially among training athletes. Athletes should be encouraged to not focus on their weight over the course of the season but rather, if available, have their body composition assessed, specifically focusing on lean mass. If body composition assessment is not available, weigh-ins should not be used as a surrogate for body composition nor as a potential indicator of fitness level or performance.

**EVALUATION OF AN ALTERNATIVE TO BMI PERCENTILE TO CAPTURE WEIGHT CHANGE IN OBESE YOUTH**

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Purpose: Body Mass Index percentiles (BMI%) are widely used to categorize overweight and obesity in children but the upper limit of 99.99% creates a ceiling effect. This limits the ability to identify changes in weight status for heavy children and alternative metrics should be explored. BMI50, also known as Percent Over BMI, calculates the percentage above or below the 50th percentile for a child's age- and sex-referenced 50th BMI percentile and allows for continuous evaluation of weight status without an upper or lower limit. Methods: BMI% and BMI50 were calculated for patients attending a Healthy Eating and Active Living clinic in Chattanooga, TN. **P135** Ninety-eight percent of patients presented with baseline BMI% at or above the 95th percentile. BMI% and BMI50 were also calculated at the first return visit to the clinic (average 4.5 months later) ( $n = 232$ ). BMI%Change and BMI50Change were calculated as the change from Visit 1 (V1) to Visit 2 (V2). Descriptive statistics were calculated for Change variables and for BMI50 variables for all patients who demonstrated no change in BMI%. Results: Average BMI% decreased negligibly from 98.9% ( $\pm 1.5$ ) to 98.8% ( $\pm 1.9$ ) while BMI50 also showed a small decrease from 87.2 ( $\pm 34.8$ ) to 86.8 ( $\pm 35.3$ ). Nearly 69% of patients started at and remained at or above the 99th BMI%. Among the patients who showed no change in BMI% (BMI%Change = 0,  $n = 182$ ), raw BMI change ranged from a loss of 5.9 kg/m<sup>2</sup> to a gain of 4.3 kg/m<sup>2</sup>. BMI50change in these patients ranged from a decrease of 29.1 to an increase of 18.0. Conclusions: BMI% does not adequately capture changes in body size seen among obese youth. BMI50 may present an acceptable alternative that is not subject to a ceiling limit to more accurately classify changes resulting from obesity treatment. Funding: BCBS of TN Foundation

### DIFFERENCES AMONG BODY FAT PERCENTAGE PREDICTION EQUATIONS IN A COLLEGE AGE POPULATION

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Body mass index (BMI) is known to misclassify obesity status according to body fat percentage (BF%). Purpose: To determine if body adiposity index (BAI) and the Deurenberg equation can predict BF% in traditional aged college students. Methods: Anthropometric data were collected on 172 college students (18-25y). BF% was measured using dual energy x-ray absorptiometry (GE Lunar iDXA, Waukesha, WI). Paired t-tests were used to determine group mean differences in BF% between measured and predicted values. In addition, Pearson's correlation and intraclass coefficient correlations (ICC) were used to examine the association and reliability between the values, respectively. Results: BAI-predicted BF% ( $27.35 \pm 5.04\%$ ) and Deurenberg-predicted BF% ( $23.48 \pm 7.78\%$ ) were significantly lower than DXA-measured BF% ( $28.64 \pm 9.10\%$ ),  $p = .004$  and  $p < .001$ , respectively. BAI- ( $r = .817$ ) and Deurenberg- ( $r = .847$ ) predicted BF% were strongly correlated to DXA-measured BF%,  $p < .001$ . ICC demonstrated strong reliability between DXA-measured BF% and the BAI-predicted measured BF% (ICC =  $.812$ ,  $p < .001$ ) and Deurenberg-measured BF% ( $.828$ ,  $p < .001$ ). Discussion: While statistical significance was noted, the difference of 1% between DXA-measured BF% and BAI-predicted BF% lacks clinical significance. However, our study concludes that the use of both equations is warranted in this population. Additional research is suggested to further elucidate our findings.

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### ACUTE METABOLIC AND ENJOYMENT RESPONSES OF MODERATE-INTENSITY INTERMITTENT INTERVAL WALKING

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Adherence to current physical activity guidelines can provide an array of benefits to the public; however, many Americans do not meet the current activity guidelines. Purpose: To evaluate the effects of continuous and intermittent walking on oxygen uptake ( $\dot{V}O_2$ ) and exercise enjoyment during and after exercise. Methods: Four women and six men (mean  $\pm$  SD age =  $24 \pm 5$  years) completed one 30-min continuous walking, three 10-min intermittent walking, three 8-min 40-s interval walking (IIW2), and three 8-min interval walking (IIW1) protocols of the same volume [90 metabolic equivalent (MET)-min]. Baseline  $\dot{V}O_2$  and excess post-exercise oxygen consumption (EPOC) were monitored for 20-min and accumulated  $\dot{V}O_2$  uptake was calculated as area under the curve. Enjoyment responses were captured following the initial 5 min of pre- and post-exercise rest and at 6 evenly distributed time points during exercise. Results: Accumulated  $\dot{V}O_2$  uptake and EPOC associated with intermittent walking ( $39,186 \pm 4,290$  mL; EPOC:  $2,582 \pm 339$  mL), IIW1 ( $36,964 \pm 3,789$  mL; EPOC:  $3,365 \pm 507$  mL), and IIW2 ( $35,804 \pm 3,979$  mL; EPOC:  $3,083 \pm 339$  mL) were higher than measured with continuous walking ( $24,500 \pm 2,427$  mL; EPOC:  $892 \pm 73$  mL; all  $p < 0.05$ ). Exercise enjoyment during and after exercise did not differ among the walking protocols (all  $p > 0.05$ ). Conclusion: Moderate-intensity intermittent walking and intermittent interval walking protocols resulted in higher energy expenditure during and after exercise as compared to moderate-intensity continuous walking of similar enjoyment and volume in college-aged men and women.

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### HOW DOES AIR DISPLACEMENT PLETHYSMOGRAPHY AND DIRECT SEGMENTAL BIOELECTRICAL IMPEDANCE COMPARE IN A UNIVERSITY STUDENT POPULATION?

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Various body composition analysis techniques are commonly available for use in most Exercise Physiology Laboratories. Our lab uses an aging Air Displacement Plethysmography (Bod Pod) device and a Direct Segmental Multi-frequency Bioelectrical Impedance (BSM-BIA). The BSM-BIA (Inbody 570) appears to be a more efficient method for estimating body composition, especially when testing large numbers of students in a class setting or athletic teams on our campus. We have been using the Bod Pod for a number of years, but wanted to assess a potential replacement for the Bod Pod. PURPOSE: To determine the accuracy of the BSM-BIA compared against the Bod Pod in our laboratory. METHODOLOGY: University students (N=167) volunteered for the study (age= $21.47 \pm 3.92$  yrs; WT= $69.35 \pm 10.87$  kg; HT= $171.68 \pm 8.95$  cm). Subjects reported to the lab and were randomly assigned to test first in either the BSM-BIA or Bod Pod. Once the initial test was completed, subjects were then tested in the other device. Subjects were asked to refrain from exercise, eating/drinking two hours prior to testing. Each subject complied with the manufacturer's recommendation for attire prior to each test. RESULTS: Results indicate that the BSM-BIA is an accurate estimation of body composition when compared with the Bod Pod in this student group. BSM-BIA percent fat was  $20.21 \pm 7.80$  compared to Bod Pod percent fat at  $20.89 \pm 7.92$  ( $r = .89$ ;  $p < 0.001$ ). BSM-BIA fat mass was  $14.00 \pm 6.03$  kg compared with Bod Pod fat mass at  $14.49 \pm 6.22$  kg ( $r = .91$ ;  $p < 0.001$ ). BSM-BIA lean mass was  $55.46 \pm 10.73$  kg compared with Bod Pod lean mass at  $54.72 \pm 10.28$  kg ( $r = .95$ ;  $p < 0.001$ ). CONCLUSION: These results demonstrate that the BSM-BIA is an accurate method to assess body composition in our laboratory when compared with the Bod Pod.

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### CHANGING ENERGY DENSITY OF DIET IN C57BL6/J MICE RESULTS IN ADJUSTING FOOD INTAKE TO BALANCE CALORIC INTAKE

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PURPOSE: To determine if changing between a standard chow and a high-fat/high-sugar (HFHS) Western diet altered food intake (g), caloric intake from food, and total caloric intake in mice. METHODS: Eight week old male C57BL6/J mice (n=30) were singly housed and provided with running wheels. Mice were divided into three groups and began three 5-day diet cycles, then two 8-day cycles. One group began the study on a HFHS diet (Research Diet #12451, 20% fructose water). The other experimental group and controls remained on standard chow (Teklad Diets 8604). At the end of each cycle, experimental groups switched to the opposite diet and controls remained on chow. Parameter measurements were as follows: daily food and water intake (g), post-cycle body composition. RESULTS: When mice switched from chow to HFHS, their daily caloric intake (kcal) increased (HFHS mean  $\pm$  SD  $29.5 \pm 3.0$ , Control  $13.4 \pm 3.7$ ), but food intake (g) was initially unchanged ( $p = .9799$ ). By the second day on HFHS, food intake (g) decreased ( $p = .0005$ ) and caloric intake from food was not significantly different from controls ( $p = .1058$ ). Total caloric intake remained higher in HFHS animals than controls ( $p < .0001$ ). In each cycle, as diet was altered, total intake altered to balance the difference in caloric intake. Fat mass increased in experimental groups with larger increases during HFHS feeding. Lean mass was unchanged. CONCLUSIONS: Mice responded to a change in caloric density by altering intake in an attempt to achieve caloric balance. The increased fat mass shows that caloric balance is not fully rescued in this model by an alteration of intake.

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### IMPACT OF BODY COMPOSITION ON GLOBAL ESTEEM IN COLLEGE AGE WOMEN

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**P140** Previous research has shown that women tend to score lower on surveys regarding their physical self-concept. There is much speculation regarding the reasons for decline of physical self-concept with age. Purpose: To determine if the classification of BF% impacts global esteem in women. Methods: Forty-two traditional-aged (18-25y) women participated in this study. Anthropometric data were recorded and BF% was measured using an iDXA (GE Lunar iDXA, Waukesha, WI). Each participant completed the PSDQ survey. A multivariate analysis of variance (MANOVA) was used to determine whether a difference between groups existed in global esteem, a global component of physical self-concept. The women were divided into two categories based on BF% (Healthy  $\leq 32\%$ ,  $n = 19$ ; Overfat  $> 32\%$ ,  $n = 23$ ). Results: There were no significant differences between groups in global esteem indicators based on body fat, Wilks' lambda = .865,  $F(5, 36) = 1.120$ ,  $p = .367$ . Discussion: The lack of significant differences in the global esteem measures may be attributed to an outward appearance in line with societal norms associated with beauty, further strengthened by waist hip ratio and waist circumference data. Additional research is needed to further elucidate the mechanisms associated with physical self-concept in young women.

### VALIDITY OF NOKIA BODY CARDIO SCALE VERSUS BOD POD IN YOUNG MALES AND FEMALES

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**P141** Recently, it has been shown that 68% of U.S. adults are classified as either overweight or obese ( $BMI \geq 25 \text{ kg} \cdot \text{m}^{-2}$ ). Regardless of age, ethnicity and sex, overweight and obesity are linked to an increased risk of the development of cardiovascular and metabolic diseases. However, sexual dimorphism is present in body composition and fat distribution and each affect cardio-metabolic disease risk. The aim of this study was to assess the validity of body composition measurement of Nokia Body Cardio scale versus the gold standard Bod Pod (Cosmed, Italy). METHODS: Young (age=18-25 years) and apparently healthy (no cardiovascular or metabolic disease) males ( $n=10$ ) and females ( $n=10$ ) were assessed for body composition by two modes of measurement: BodPod (BP) and Nokia BodyCardio Scale (WITH). A one-way rmANOVA (group $\times$ time) with post hoc test was employed to determine differences. All data reported as Means  $\pm$  SE. RESULTS: Male BMWITH =  $75.7\text{kg} \pm 2.5^*$ ; Male BMBP =  $75.5\text{kg} \pm 2.4$ . Female BMWITH =  $57.9\text{kg} \pm 2.5^*$ ; Female BMBP =  $57.8\text{kg} \pm 2.4$ . Male FMWITH =  $7.3\text{kg} \pm 1.5^*$ ; Male FMBP =  $10.6\text{kg} \pm 1.4$ . Female FMWITH =  $10.2\text{kg} \pm 1.5^*$ ; Female FMBP =  $12.8\text{kg} \pm 1.4$ . Male FFMWITH =  $68.2\text{kg} \pm 1.8^*$ ; Male FFMBP =  $64.9\text{kg} \pm 1.9$ . Female FFMWITH =  $47.6\text{kg} \pm 1.8^*$ ; Female FFMBP =  $45.1\text{kg} \pm 1.9$ . CONCLUSION: There were significant differences between modes of measurement for FM ( $p=0.001$ ) and FFM ( $p=0.001$ ). Also, BM was significantly different between modes of measurement ( $p=0.002$ ) and between sex ( $p=0.033$ ). Nokia Body Cardio Scale is not sensitive enough for standard body composition assessment at home.

### INTRERRATER RELIABILITY FOR DXA AND BIA FOR MEASURING TOTAL AND REGIONAL LEAN MASS

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**P142** Purpose: To assess the interrater reliability between two devices that are capable of assessing total and regional lean mass in athletes. Methods: Body composition was measured in ten male rugby players ( $21.1 \pm 1.60 \text{ y}$ ;  $88.3 \pm 14.2 \text{ kg}$ ;  $1.78 \pm 0.06 \text{ m}$ ) prior to (T1) and following (T2) their fall season, as well as before the beginning of their spring (T3) season. Total body estimates of percent fat (%FAT), fat mass (FM), and lean mass (LM) were determined by dual X-ray absorptiometry (DXA); Lunar iDXA) and bioelectrical impedance analysis (BIA, InBody 770). Regional lean mass estimates were also determined for the arms and legs from both devices. To assess the agreement between DXA and BIA on these measures, intraclass correlation coefficients (ICC), 95% limits of agreement (95% LOA), and coefficients of variation (CV%) were calculated for T1 – T3. Results: The agreement between DXA and BIA for total body estimates %FAT (ICC2,1 =  $0.85 - 0.89$ , 95% LOA =  $0.76 - 1.14$ , CV% =  $5.7 - 10.9\%$ ), FM (ICC2,1 =  $0.95 - 0.97$ , 95% LOA =  $0.78 - 1.14$ , CV% =  $5.4 - 10.3\%$ ) were variable over time, whereas agreement for total LM (ICC2,1 =  $0.72 - 0.76$ , 95% LOA =  $1.00 - 1.09$ , CV% =  $1.5 - 2.2\%$ ) and regional LM values for the arms (ICC3,1 =  $0.80 - 0.93$ , 95% LOA =  $0.89 - 1.03$ , CV% =  $2.6 - 3.7\%$ ) and legs (ICC3,1 =  $0.86 - 0.91$ , 95% LOA =  $0.90 - 1.00$ , CV% =  $2.5 - 2.8\%$ ) was consistent. Conclusion: These data suggest that the interrater reliability between dual-energy X-ray absorptiometry and bioelectrical impedance analysis is high when estimating total and regional lean mass over time but not for estimating fat mass or body fat percentage.

### BODY COMPOSITION CHANGES IN DIII ATHLETES OVER SUMMER BREAK

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**P143** PURPOSE: Data in non-athletic college-aged populations show an increase in body weight, specifically fat mass, over summer break. The aim of this study was to quantify the body composition changes in DIII athletes, who have the most limited influence by collegiate coaches and trainers over summer break due to NCAA regulations. METHODS: This study examined DIII athletes ( $n = 22$ ) over summer break. Body composition (InBody230) was assessed pre (May) and post (Aug.) summer break. Physical activity (PA) was assessed pre (May), during (July) and post (Aug.) summer break. RESULTS: Paired sample T-Tests were completed to examine changes in skeletal muscle mass (SMM), body fat mass (BFM) and percent body fat (PBF) over summer break. There was no statistical difference in any of the body composition assessments pre- to post-summer break. The change in PBF approached significance ( $-1.2 \pm 2.7$ , CI:  $-2.3$  to  $0.038$ ,  $p = 0.57$ ). On average SMM increased ( $0.25 \text{ kg} \pm 1.2$ ) while BFM decreased ( $1.0 \text{ kg} \pm 3.0$ ). There was a significant relation between the change in SMM and BFM pre- and post-summer break ( $r = -0.498$ ,  $p = 0.018$ ); however, there was no relation between any body composition changes and self reported PA. CONCLUSIONS: These preliminary data suggest the changes in body composition over summer break in DIII athletes are not statistically significant; however, on average these changes tend towards an increase in SMM and a decrease in BFM, lowering PBF. The changes in SMM and BFM may be linked to the confidence in training or nutritional habits so future analyses to examine these relations should/will be addressed.

### INFLUENCE OF RESISTANCE EXERCISE ON INFANT BODY COMPOSITION IN OVERWEIGHT/OBESE WOMEN

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**P144** PURPOSE: Research has conveyed that aerobic exercise during pregnancy is beneficial for overweight/obese women and their infants, however, resistance exercise has not been studied thoroughly in the overweight/obese population. The purpose of this study is to determine the effect of resistance exercises during pregnancy on the infant body composition. METHODS: Participants were randomized into two groups, resistance (n=7) and non-exercising control (n=7), and trained from 16 weeks gestational age until delivery. The resistance group participated in three 1-hour sessions per week targeting all major muscle groups. After birth, one month body composition measures consist of BMI, skinfold and circumference measurements, and an MRI. Multiple linear regressions were performed controlling for maternal BMI and infant gender. RESULTS: The main predictor of one month BMI was the maternal exercise group (p=.16). Gender is the main predictor for the one month birth weight (p=.044) and body fat % (p=.155). CONCLUSION: As we analyze more samples, we will continue to control for baby gender since it is a significant factor of one month body composition. With the inclusion of more specific measures from infant MRI we expect to see differences in infant body composition due to exercise exposure. Funded in part by The American Heart Association.

### BODY COMPOSITION AND INFLAMMATION IN BREAST CANCER SURVIVORS COMPARED TO HEALTHY AGE-MATCHED WOMEN

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**P145** PURPOSE: To identify any differences in measures of body composition, phase angle, the ratio between extracellular mass (ECM) and body cell mass (BCM) and inflammation [human C-reactive protein (CRP)] in breast cancer survivors (BCS) compared to healthy age-matched women (HC). METHODS: Seventeen post-menopausal BCS (stages 0-III) (age: 59±9 yrs; BMI: 26.4±5.1 kg/m<sup>2</sup>) and 18 HC (age: 59±6 yrs; BMI: 25.3±3.8 kg/m<sup>2</sup>) were recruited. After an 8 hr fast, whole body bioelectric impedance analysis was used to assess measures of body composition including lean mass (LM), fat mass (FM), body fat % (BF), BCM, ECM, ECM/BCM, and phase angle (°; degrees). Serum levels of CRP were measured via ELISA. A phase angle less than 5° and an ECM/BCM ratio greater than 1.0 was used as a criterion of lower nutritional status and cellular health. Increased inflammation was determined as CRP >3.0 mg/L. Data were analyzed via one-way ANOVA. Significance was accepted at p<0.05. RESULTS: BCS were 6.3±6 yrs post-completion of treatment. There were no significant differences in LM, FM, BF, BCM, ECM, ECM/BCM, phase angle (BCS 5.96 ±0.71°; HC 6.13±1.08°), and CRP (BCS 3.83±1.42mg/L; HC 3.10±1.88mg/L). Although not significant more BCS (n=10) had CRP levels above 3.0 mg/L than HC (n=4). CONCLUSION: Our findings suggest that BCS that are at least five years into survivorship appear to have similar body composition, phase angle, ECM/BCM and CRP levels as HC. Future research should be done to determine the effects of recent breast cancer treatment on these variables.

### BODY ADIPOSITIVITY INDEX, BODY MASS INDEX, AND BODY FAT IN YOUNG ADULTS

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**P146** The validity of body mass index (BMI) as a measure of health has been questioned, and alternative anthropometric indices have been proposed to estimate body composition. The Body Adiposity Index (BAI) has been proposed as an alternative to BMI, however the relative accuracy of these measures have not been compared to the 4 compartment (4C) model of body composition in young adults. PURPOSE: The purpose of this study was to determine if BMI or BAI were related to body fat percentage (BF%) measured from the 4C model. METHODS: Participants (n=181, 21.8±4.8 yrs, 48.4% female) volunteered for this study. BMI (kg/m<sup>2</sup>) and BAI (hip circumference)/((height)<sup>1.5</sup> - 18)) were measured with criterion. BF% was determined with the 4C model (4C %Fat). The 4C model included body mass, body volume via hydrodensitometry, total body water via bioimpedance spectroscopy, and bone mineral content via dual energy x-ray absorptiometry. Bivariate correlations between BMI, BAI, and 4C %Fat were assessed using Pearson's r in the total sample, and when stratified by sex. RESULTS: In the total sample, BAI was more strongly correlated with 4C %Fat (r=.668, p<.001) than was BMI (r=.191, p=.008). Although the magnitude of the difference between BAI and BMI was smaller when stratified by sex, BAI was more strongly correlated with 4C %Fat in men (r=.641 and .604, respectively, both p<.001), as well as in women (r=.564 and .543, respectively, both p<.001). CONCLUSION: When predicting an individual's BF% via anthropometric measures, BAI may provide a more accurate estimate than BMI in young adults.

### VARIABILITY IN RESTING ENERGY EXPENDITURE ADAPTATION FOLLOWING SHORT-TERM AEROBIC EXERCISE TRAINING: A PILOT STUDY

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**P147** PURPOSE: Recently, a "constrained model" of energy expenditure has been proposed for TEE regulation. The constrained model of TEE states that non-exercise physical activity energy expenditure (i.e. NEAT) and energy spent on basic metabolic processes may adapt to a variation in physical activity to maintain TEE within a narrow range. Thus, the purpose of this study was to determine if short-term endurance exercise training decreased resting energy expenditure (REE) in accordance with the constrained model of TEE. METHODS: Fourteen untrained men between 19 and 30 years of age were randomly assigned to a control group (n = 5) or an endurance exercise training group (n = 9). Both groups participated in a pre-testing session where resting energy expenditure (REE), peak oxygen consumption (VO<sub>2</sub>), and body composition were assessed. The exercise group then completed 16 aerobic exercise sessions (4 sessions per week) for a duration required to expend 500 kilocalories at 65% of peak VO<sub>2</sub> over a period of four weeks. After four weeks, both groups participated in a post-testing session that was identical to the pre-testing session. RESULTS: The principle findings showed no significant interaction between group and time for REE or REE relative to lean mass (p > 0.05) suggesting exercise neither increases nor decreases REE. However, secondary analyses revealed substantial variability in the response of REE to aerobic exercise training, with some participants experiencing a significant increase in REE and others a significant decrease. No such variability was observed between the pre and post REE measurements for the control group. CONCLUSIONS: Secondary analyses of individual responses of REE suggest endurance exercise training may have varying influences on REE that differ based on the individual, potentially due to a genetic basis.

#### AIR DISPLACEMENT PLETHYSMOGRAPHY UNDERESTIMATES PERCENT BODY FAT COMPARED TO DXA

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Air displacement plethysmography (ADP) is a popular and convenient means of estimating percent body fat (%BF), but often provides considerably lower estimates than dual-energy x-ray absorptometry (DXA). PURPOSE: This study demonstrate that these differences are biased towards individuals with a lower body mass index (BMI). METHODS: Percent BF was estimated using ADP and DXA on male (n=52, age=27, BMI=25.14, DXA %BF=21.1) and female subjects (n=88, age=28, BMI=24.92, DXA %BF=31.0) after a 6-12 hour fast.

**P148** Subjects wore standardized compression garments for both tests. Residual lung volume was estimated with ADP to improve reliability. Data are presented as means  $\pm$  standard deviation. RESULTS: This study demonstrates that ADP (18.8 $\pm$ 10.7%) significantly underestimates %BF in males compared to DXA (21.1 $\pm$ 9.0%; p<0.001). This difference is even more pronounced when comparing ADP to DXA in males with a BMI less than 25.0 (16.3 $\pm$ 11.0% vs. 19.2 $\pm$ 9.0%; p<0.001). A similar pattern was also observed in females (30.2 $\pm$ 9.1% vs. 31.0 $\pm$ 7.4%; p=0.007). CONCLUSIONS: While ADP can be used to provide reliable %BF changes within subjects over time, these data demonstrate that caution should be exercised when comparing different subjects, particularly males of lower BMI or %BF. Based on these data, ADP estimates of %BF can be as high as 8.9 percentage points lower than DXA.

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#### EXERCISE TRAINING, FAT DISTRIBUTION AND WEIGHT LOSS

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Purpose: To test the effects of caloric restriction (CR) with or without exercise training on intra-abdominal adipose tissue (IAAT) and cardiometabolic risk factors after achieving normal weight in previously overweight women. Secondly, to examine the independent associations between IAAT and cardiometabolic risk before and after weight loss. Methods: One-hundred and seven overweight (BMI 25.1-31.7 kg/m<sup>2</sup>) premenopausal women were randomly assigned to one of three groups: 1) CR (diet, 800 kcal/day) without exercise; 2) CR+aerobic exercise training; 3) CR+resistance exercise training to reduce BMI <25 kg/m<sup>2</sup>. Computerized tomography was used to measure IAAT, blood lipids were measured by assay, and whole-body insulin sensitivity index (SI) was measured from an oral glucose tolerance test. Evaluations were made before and after weight loss. Results: Significant time-effects were observed for: IAAT (-37.3%, P<0.001), total cholesterol (TC) (-1.6%, P=0.022), low-density lipoprotein cholesterol (LDL-C) (-4.0%, P<0.001), high-density lipoprotein cholesterol (+20.2%, P<0.001), triglycerides (TG) (-18.6%, P<0.001) and SI (+83.4%, P<0.001). However, significant group-effects and time by group interactions were not observed. While overweight, TC, LDL-C, TG and SI were significantly associated with IAAT adjusted for race, VO<sub>2</sub>max and percent fat mass, but these associations disappeared after achieving normal weight. Conclusions: Caloric restriction leading to significant weight-loss with or without exercise training appears to be equally effective for reducing IAAT and cardiometabolic risk factors. Our data are consistent with previous IAAT cut-points established from cross-sectional studies for identifying reduced cardiometabolic risk.

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#### BODY IMAGE, BODY COMPOSITION, AND WEIGHT CONTROL PRACTICES AMONG COLLEGE STUDENTS

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Purpose: To assess types of weight control and dieting practices, reasons for choosing a certain practice, body image, and body composition among college students. Methods: A sample of 81 female and 20 male participants (age: 21 $\pm$ 1 yrs, BMI: 23 $\pm$ 3 kg/m<sup>2</sup>, BF%: 22 $\pm$ 5) were recruited. Participants were asked to complete a demographic and dietary influences survey, Exercise Dependence Scale (EDS), Sedentary Behavior (SBQ), Weight Control Practices (WCP), and Multidimensional Body-Self Relations Questionnaires (MBSRQ). For statistical analyses, participants were divided into four groups based on gender classifications of BF%: well above average, above average, average, and below average. Results: Appearance Evaluation, Fitness Evaluation and Orientation, Overweight Preoccupation, Self-Classification of Weight, and Body Area Satisfaction subscales of MBSRQ were significantly different (p < 0.05) between groups. Participants with lower BF% had higher satisfaction with their appearance, were actively involved in activities to maintain their fitness and content with most areas of their body. There was a significant difference (p = 0.004) in the WCP between groups. Participants with higher BF% engaged in more WCP. However, there was no significant difference (p > 0.05) in EDS or SBQ between groups. Conclusion: College students with higher body fat are less likely to be satisfied with their body image and therefore engage in more weight control practices.

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#### THE EFFECT OF PRE-SLEEP CONSUMPTION OF CASEIN PROTEIN ON RESTING METABOLIC RATE AND APPETITE IN POSTMENOPAUSAL WOMEN

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PURPOSE: To determine the acute effects of nighttime pre-sleep consumption of casein protein (CP) and a placebo (PLA) supplement on next-morning measures of resting metabolic rate (RMR) and appetite in postmenopausal women. METHODS: This study was a randomized crossover double-blind placebo-controlled trial. Eight postmenopausal (N=8, age: 57 $\pm$ 5 yrs, BMI= 28 $\pm$ 6 kg/m<sup>2</sup>) women participated. Subjects had body composition (DXA), RMR (indirect calorimetry), and appetite (visual analog scale; VAS) measured. Subjects consumed either CP (35 g, 130 kcals) or PLA (7.2g, 10 kcals) 30 min prior to bed time on two separate occasions separated by 48-hours. RMR and measures of hunger, desire to eat, and satiety were analyzed using Paired T-tests. Significance was accepted at p $\leq$ 0.05. RESULTS: RMR (CP:1286 $\pm$ 175; PLA:1278 $\pm$ 201 kcals/day) and relative oxygen consumption (CP:2.66 $\pm$ 0.33; PLA 2.67 $\pm$ 0.26 ml/kg/min) were not different between CP and PLA. There were also no effects of CP and PLA on measures of appetite (Hunger: CP: 3.44 $\pm$ 2.98; PLA: 3.75 $\pm$ 3.06 cm; Satiety: CP: 4.06 $\pm$ 2.09; PLA:4.79 $\pm$ 3.11 cm; Desire to Eat: CP:4.28 $\pm$ 3.58; PLA:4.06 $\pm$ 3.17 cm). CONCLUSION: There were no differences in RMR and measures of appetite between CP and PLA. There is growing evidence that a small snack before bed (150-200 kcal) is not harmful to metabolism or appetite.

This study was supported with product by Dymatize Nutrition.

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**CAFFEINE AND CITRATE AURANTIUM COMPLEX ALTERS RESTING CARDIAC AUTONOMIC ACTIVITY BUT NOT DURING RECOVERY**

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Purpose: To examine the combined effects of Citrate Aurantium and Caffeine (CA+C) on cardiac autonomic activity (CAA) during ingestion and following anaerobic exercise. Methods: Ten males (25.1±3.9 yrs) who consume caffeine (≥ 95mg/day, 4 days/week) participated in the double-blind crossover designed study. The two visits consisted of taking either a CA+C or placebo (PLA) capsule with a 45-min ingestion, a repeated Wingate protocol, and 45-min recovery. CAA was assessed through Heart Rate (HR), plasma epinephrine (E) and norepinephrine (NE), and Heart Rate Variability (HRV): root mean squared of successive R-R differences (RMSSD); Standard Deviation of R-R intervals (SDNN); High-Frequency (HF); and Low-Frequency (LF). Markers were taken at four time points: pre-ingestion (Pre-ig), 45-min post (Post-ig); Wingate recovery (Pre-rcv), 45-min post (Post-rcv). Results: Markers that violated normality were log transformed prior to analysis (ln). Pre-planned comparisons were performed to assess differences between PRE and Post time points as well as between trials within their respected phase. The CA+C trial demonstrated an increase in HR, lnSDNN, lnLF, EPI, and NE Post-ig when compared to Pre-ig ( $p \leq 0.05$ ). Time based differences were observed in all CAA markers for each trial during recovery ( $p \leq 0.05$ ). Conclusion: CA+C stimulates sympathetic activity during rest (e.g. ingestion phase) without influencing parasympathetic activity. CA+C provides no influence over cardiac autonomic recovery.

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**THE EFFECTS OF CAFFEINE AND CITRUS AURANTIUM ON PERFORMANCE DURING REPEATED ANAEROBIC BOUTS IN HABITUAL CAFFEINE USERS**

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Purpose: To investigate the influence of caffeine (CAF) + citrus aurantium (CA) on peak anaerobic performance and its influence on attenuation of power over multiple anaerobic bouts. Methods: 10 male habitual caffeine users (≥ 1 serving per day; ~95mg, 4 days per week) aged 25.1 ± 3.9 yrs, volunteered for this study. This was a randomized double blind crossover design with 2 days of testing and 3-9 days between visits when either a placebo (PBO) (200mg dextrose) or supplement (SUP) (100mg CAF + 100mg CA) was consumed. The anaerobic protocol was three 30-sec bouts on a cycle ergometer with 0.80 Nm/kg resistance and 2 minutes of active recovery between bouts with peak power (PP), mean power (MP), minimum power (MinP), time to peak power (TTPP), rate of fatigue (ROF), and total work (TW) as markers of anaerobic performance Results: Repeated measures ANOVA demonstrated that average performance was not significantly different between SUP and PBO for PP ( $p = 0.520$ ), MP ( $p = 0.926$ ) MinP ( $p = 0.321$ ) and TW ( $p = 0.924$ ), as well as TTPP ( $p = 0.536$ ) and ROF ( $p = 0.284$ ). There was also no difference between SUP and PBO for comparable bouts for any of the variables tested ( $p > 0.05$ ) Conclusion: This study has demonstrated that an acute dosage of 100mg of CAF and 100mg of CA does not have any significant effect on anaerobic performance in caffeine consuming males. Additional research is needed to better understand varying dosages of these supplements during different types of exercise.

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**β-HYDROXY β-METHYL BUTYRATE SUPPLEMENTATION DOES NOT EFFECT CREATINE KINASE AND CORTISOL LEVELS ACROSS A RUGBY SEASON**

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Purpose: To investigate the effect of β-Hydroxy β-Methylbutyrate (HMB) on creatine kinase (CK) and cortisol across a rugby season. Methods: Thirteen, college-aged, recreationally trained male rugby players completed a 6-week supplementation period of either HMB + Cr (HMBCr) or Cr + placebo (PLB; dextrose). Throughout the 6-week supplementation period, participants engaged in unsupervised resistance training each week ( $2.75 \pm 1.26$  days/week), team practice hours according to the team schedule ( $16.5 \pm 5.61$  hours total), and Division 1 rugby games ( $1.40 \pm 1.28$  games). Blood samples were taken prior to and following the supplementation period. Serum CK was quantified in duplicate using commercially available reagents and analyzed using a single-cuvette spectrophotometer at a wavelength of 340 nanometers. Serum cortisol was analyzed via a plate reader in duplicate using an enzyme linked immunosorbent assay. Results: Repeated measures analysis of variance was used to determine if there were group × time interactions for CK and cortisol ( $p \leq 0.05$ ). No significant difference was shown between groups for both CK and cortisol. Regardless of supplementation, neither CK ( $p = 0.744$ ) nor cortisol ( $p = 0.454$ ) demonstrated changes over the season. Conclusions: These data indicate that supplementation with HMB is ineffective at decreasing markers associated with muscle tissue breakdown.

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**EFFECT OF β-HYDROXY β-METHYL BUTYRATE SUPPLEMENTATION ON BODY COMPOSITION AND MUSCLE STRENGTH DURING A RUGBY SEASON**

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Purpose: To determine the effect of β-hydroxy β-methylbutyrate (HMB) on body composition and muscle strength during a rugby season. Methods: Thirteen collegiate, male rugby players were matched for lean body mass (LBM) and randomly assigned to consume either HMB + creatine ( $n = 7$ ; body mass =  $88.2 \pm 16.5$  kg) or creatine + placebo (dextrose) ( $n = 6$ ; body mass =  $88.8 \pm 15.4$  kg) during their 6-week fall season. Before and after the season, body fat % (BF%) and LBM were calculated via the 4-compartment model. In addition, three maximal isometric contractions of the knee flexors were performed on a dynamometer and the highest 50-ms average was considered peak torque (PT). Two-way (group × time) repeated measures analyses of variance were used to examine changes between groups across time. Results: No group × time interactions were noted for BF% ( $p = 0.383$ ), LBM ( $p = 0.521$ ), body mass ( $p = 0.926$ ) or PT ( $p = 0.097$ ). However, main effects for time were found for BF% ( $-17.0 \pm 14.7\%$ ;  $p < 0.001$ ) and LBM ( $+3.5 \pm 3.6\%$ ;  $p = 0.008$ ). Conclusion: While a relatively small sample size was used, these data do not suggest a benefit from combining HMB with creatine supplementation for maintaining or improving body composition and muscle strength during a rugby season.

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**$\beta$ -HYDROXY  $\beta$ -METHYL BUTYRATE SUPPLEMENTATION DOES NOT REDUCE SERUM CORTISOL AND CREATINE KINASE FOLLOWING FALL AND SPRING SEASONS OF RUGBY**

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Purpose: To investigate the effect of  $\beta$ -Hydroxy  $\beta$ -Methylbutyrate (HMB) supplementation on serum cortisol, a biomarker of stress, and creatine kinase (CK), a biomarker of muscle tissue breakdown, across fall and spring rugby seasons. Methods: Seven collegiate, male rugby players (22.5 $\pm$ 1.3 yr, 179.6 $\pm$ 4.5 cm, 96.4 $\pm$ 14.7 kg) participated in this cross-over design investigation. The athletes were matched for lean body mass and randomly assigned to consume 5g of creatine and 5g of either HMB or placebo during their 6-week fall season. Following a 12-week wash-out period, athletes resumed supplementation with regimen assignments being reversed. Prior to and following each supplementation period (i.e., fall or spring), blood samples were collected and analyzed for serum concentrations of CK and cortisol. Serum CK was determined via a spectrophotometer in duplicate using an enzymatic approach and commercially available reagents. An enzyme linked immunosorbent assay kit was used to quantify serum cortisol. Data were analyzed via separate 2x4 repeated measures analysis of variance. Results: No group x time interactions were observed for CK (p=0.193) or cortisol (p=0.235). Additionally, no main effects for time were noted (CK: p=0.484, cortisol: p= 0.434). Conclusion: These data indicate HMB had no effect on CK or cortisol over the course of two 6-week seasons.

**COMPARING PHYSICAL ACTIVITY AMONG AMERICAN FOOTBALL OFFICIALS DURING A GAME**

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Being physically active (PA) decreases the risk of chronic diseases. Although officiating a football (FB) game is an obvious PA, the amount of PA achieved by officials during a game is unknown. We determined the intensity and amount of PA achieved by high school FB officiating crews (referee, side judge, back judge, umpire, electric clock operator (ECO), and linesman). METHODS: Distance and average heart rate (Timex Ironman GPS watch, T5K549) data was recorded for 76 FB officials (48  $\pm$ 9yrs) during a season of high school FB games. Data was compared between official positions using a MANOVA, and significant main effects were further explored using LSD post-hoc comparisons. A stepwise linear regression model was used to estimate predictors of distance covered. RESULTS: The main effect for distance from a MANOVA was significant (p=0.002) and post hoc comparisons indicated that distance was significantly lower for the ECO (1.5 $\pm$ 0.5mi) when compared to all other officiating positions, p<0.05. Average heart rate (pooled HR=110 bmp) did not differ between officiating positions. The overall stepwise linear regression was significant (p=0.003), where officiating position (Beta= 1.7, p=0.003) was a significant predictor of distance covered. CONCLUSION: All officials, other than the electronic clock operator, achieved similar PA amounts during a FB game (3.2 $\pm$ 0.89mi). For the average sized person, this equates to ~4,400 steps, which is 44% of the recommended 10,000 steps by the American Heart Association.

**EFFECTS OF ACUTE GOLDEN ROOT EXTRACT (RHODIOLA ROSEA) SUPPLEMENTATION ON AEROBIC EXERCISE PERFORMANCE**

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PURPOSE: The purpose of this study was to examine the effects of acute golden root extract (GRE) supplementation on aerobic exercise performance. METHODS: College aged male participants (age =20.7 yrs  $\pm$  0.95, height= 70 in  $\pm$  4.2, weight= 184 lbs  $\pm$  1.4) were recruited for this study. In a counterbalanced within groups study design, participants were supplemented with either 1,500 mg/day of GRE or placebo (gluten-free cornstarch) for 3 days. Participants also took an additional 500 mg dose of corresponding treatment 30 minutes prior to testing of each trial. During each trial, participants completed a maximal treadmill exercise test using a modified Bruce protocol. Each trial was separated by a 1 week washout period. Maximal oxygen consumption, maximal heart rate, and time to exhaustion were measured. RESULTS: Compared to placebo, GRE did not significantly alter VO<sub>2</sub>max (p=0.362). Furthermore, there were no significant differences between placebo and GRE treatment with respect to HRmax (p=0.972) and also time to exhaustion (p= 0.422). CONCLUSION: The present study suggests that acute GRE supplementation does not alter aerobic exercise performance.

**POTENTIAL VITAMIN AND MINERAL DEFICIENCIES IN DIII ATHLETES**

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PURPOSE: Recent sports performance research has demonstrated a detrimental effect on performance when particular vitamins and minerals do not meet the recommended daily allowance (RDA). This study examined the dietary habits of a representative sample of (n = 22) DIII athletes with specific attention to changes in eating habits over summer break as well as nutrient and mineral content. Of special interest was the fact that NCAA DIII athletes generally do not have access to an on staff nutritionist at their university/ college. METHODS: Athletes filled out 3-day food logs over three time points (Spring, Summer and Fall). FoodTracker (usda.gov) software was used to analyze nutrient content. RESULTS: A repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean vitamin and mineral dietary intake did not differ statistically between time points. The only nutrient variable that approached significance was iron (F(1.587, 23.808) = 2.874, P < 0.086). Nutrient data was collapsed to represent the average of 9 days and one sample T-tests were performed against the RDA for each vitamin/mineral. These data suggest possible deficiencies that are significantly less than the RDA (p<0.05) for calcium, potassium (>20%), sodium, iron (women only), magnesium, phosphorus (>20%), vitamin A, vitamin D (>20%) and vitamin E (>20%). CONCLUSIONS: Of interest in the self-reported findings was the potential deficiency in vitamin D, which has recently been suggested as a performance-limiting factor when deficient and performance enhancing when present in abundance. This data suggests a need for more in-depth analysis of dietary habits within DIII athletes to avoid nutritional deficiencies that may impact performance.

#### EXERCISE BARRIERS AND INCENTIVES FOR MUNICIPAL WORKERS IN SOUTHERN GEORGIA

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**P160** US DHHS recommends that employers create healthy worksites through promotion wellness programs that included exercise, physical activity, and nutritional education among other initiatives. **PURPOSE:** To explore exercise barriers and incentives of rural municipal workers in Southeast Georgia. **METHODS:** A cross-sectional research design was employed to evaluate the barriers and incentives for exercise among rural municipal workers in a rural setting. The four departments were Fire, Police, Public Works (PW) and Administration (Other). An electronic survey was sent to all 309 workers in November 2016. The survey asked for participants to rank 10 common exercise barriers and incentives. 123 (~40%) complete responses were used for analysis. **RESULTS:** Lack of time to exercise (mean = 2.2); Inconvenient time/location of facility (2.5); No motivation (5.3) were found to be the top three barriers. No significant differences ( $p > 0.05$ ) between departments were found for 9 exercise barrier rankings. "Cost is too much" was only significantly different result found ( $p = 0.019$ ) between departments, with Fire reporting lower than the other departments. Another barrier approaching significance was "Feel awkward exercising" ( $p = 0.054$ ); **CONCLUSIONS:** Findings are consistent with previous research highlighting time, location, and motivation as leading barriers to exercise in this setting. It is recommended that employers develop means for workers to overcome these barriers, noting that barriers differ between departments.

#### PERCEIVED PARENTAL RISK OF INJURY ACROSS AGE GROUPS FOR YOUTH RECREATIONAL SPORT PROGRAMS

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**P161** It has been estimated that close to 1.3 million youth suffer serious sport injuries per year. Parents/carers of active children aged 5–12 years report discouraging or preventing children from playing a particular sport because of injury and safety concerns. **PURPOSE:** The purpose of this study was to identify relationships among rural parents' perceived risk of injury among youth sports and demographics. **METHODS:** Parents (N=545) from a rural Georgia recreational department were recruited from a variety of youth sports to complete a researcher designed perceived injury scale. **RESULTS:** Multivariate ANOVA revealed a significant difference between age groups and injury risk ( $F(2) = 6.588$ ;  $p = .002$ ). Post-hoc analyses revealed that Younger age group parents were less concerned with injury risk ( $U_6: 3.0 \pm 2$ ) than parents of U10 ( $3.5 \pm 1$ ,  $p = .021$ ) and U15 ( $3.8 \pm 2$ ,  $p < .001$ ). Spearman-rho correlation revealed a weak, positive, significant relationship between parent's perceived ability of their child and injury risk in competition ( $r = .164$ ,  $p = .001$ ). **CONCLUSION:** The data suggest that perceived risk of injury among parents increases as the child's age and perceived performance level increases. Injury prevention programs may be better received among parents of older and more skilled youth athletes than younger athletes.

#### EFFECTS OF BRANCHED-CHAIN AMINO ACIDS, PROTEIN, AND CARBOHYDRATES ON RUNNING TIME TO EXHAUSTION AND OXYGEN KINETICS IN FEMALES

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**P162** **PURPOSE:** To examine acute consumption of branched-chain amino acids (BCAA), protein (PRO), and carbohydrates (CHO) on running time to exhaustion (TTE) and oxygen kinetics in females. **METHODS:** Twelve trained females (mean  $\pm$  SD; Age:  $27.91 \pm 8.28$  yrs; Height:  $154.05 \pm 28.43$  cm; Weight:  $61.49 \pm 9.13$  kg) completed a maximal oxygen consumption ( $VO_{2max}$ ) test to determine running intensity for visits 2-5. For visits 2-5, participants arrived 8 hours fasted and ingested their randomly assigned isocaloric supplement of BCAAs, PRO, CHO, or placebo, rested for 45 minutes, and then completed the TTE test at 90% of their  $VO_{2max}$ . Ratings of perceived exertion (RPE) were recorded at the completion of the TTE, while heart rate (HR),  $VO_2$ , and respiratory exchange ratio were recorded throughout the test. Three-day food logs were completed pre- and post-testing. **RESULTS:** There were no significant differences between treatments for TTE ( $p = 0.19$ ), oxygen kinetics ( $p > 0.05$ ), or HR ( $p = 0.771$ ). RPE was significantly higher with BCAAs compared to CHO ( $p = 0.042$ ). **CONCLUSION:** Acute consumption of BCAAs, PRO, and CHO supplements did not result in a significant difference in high-intensity exercise performance or oxygen consumption in trained females compared to placebo. BCAAs resulted in a non-significant longer TTE compared to CHO ( $\Delta 29.86 \pm 100.2$  sec), and therefore may be an explanation to the significantly higher RPE after BCAAs compared to CHO. These results also indicate CHO prior to high intensity exercise did not have a significant improvement in performance as compared to endurance exercise demonstrated by previous research. Supported by: Shepard K. Halsch Academic Enrichment Fund

#### THE EFFECTS OF BLUEBERRY SUPPLEMENTATION ON EXERCISE-INDUCED MUSCLE DAMAGE

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**P163** **PURPOSE:** To examine the effect of blueberry supplementation (BB) on delayed onset muscle soreness (DOMS) and recovery. **METHODS:** Fourteen recreationally active women (age:  $21 \pm 1$  yr; body fat:  $24.8 \pm 4.5\%$ ) participated in this double blind, matched-pairs study. Participants were matched by lean mass (LM) and randomly assigned to either a BB or a placebo (PLA) group. Leg strength was assessed via one-repetition maximum (1RM) on a leg press. Participants consumed a daily dose of freeze-dried BB powder (1.6g BB/kgLM) or a PLA (1.6g PLA/kgLM) for 7 days prior to induction of DOMS. Participants completed 6 sets of 10 repetitions at 70% 1RM on the leg press to induce DOMS. Perceived soreness (questionnaire), pressure-pain threshold (dolorimeter), and average power (AP; Biodex) of the right thigh muscles were assessed immediately before (PRE) and after (POST), 24, 48, and 72h post induction of DOMS. ANOVAs were used for analyses. Significance was set at  $p < 0.05$ . **RESULTS:** There were no group x time interactions for perceived soreness, pressure-pain threshold, and AP, however, significant time effects were observed for these variables. When comparing pre to post, 24, 48, and 72hr perceived soreness increased and pressure-pain threshold decreased significantly over time. Isokinetic leg extension AP decreased from pre to post 24hr (BB:  $83 \pm 17$  to  $76 \pm 22$  Nm; PLA:  $85 \pm 21$  to  $79 \pm 26$  Nm). **CONCLUSION:** Consumption of BB for 7 days prior to DOMS induction on a leg press does not affect rating of perceived soreness, pain threshold, nor attenuate decreases in performance compared to a PLA in active women.

### THE EFFECTS OF BRANCHED-CHAIN AMINO ACIDS, PROTEIN, AND CARBOHYDRATES ON PERCEIVED EXERTION AFTER HIGH INTENSITY EXERCISE IN FEMALES

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**PURPOSE:** To examine the effects of branched-chain amino acids (BCAAs), protein (PRO), and carbohydrates (CHO) on ratings of perceived exertion (RPE) and pain after high-intensity exercise. **METHODS:** 12 aerobically trained females (mean  $\pm$  SD; Age:  $27.9 \pm 8.3$  yrs; Height:  $154.1 \pm 28.4$  cm; Weight:  $61.5 \pm 9.1$  kg) completed a maximal oxygen consumption ( $VO_{2max}$ ) test to determine running intensity for visits 2-5. For visits 2-5, participants arrived to the lab 8 hours fasted, consumed their randomly assigned supplement, rested 45 minutes, and completed a time to exhaustion (TTE) test at 90% of their  $VO_{2max}$ . Participants completed a visual analogue scale (VAS) and pain scale pre-supplement, 30 min post-supplement, and post-TTE, and RPE was recorded post-TTE. **RESULTS:** There were no significant differences between treatments for TTE ( $p = 0.19$ ), however, BCAAs resulted in a non-significantly longer TTE compared to CHO ( $\Delta 29.86 \pm 100.2$  sec). The VAS and pain scale were not significantly different between treatments ( $p=0.295$ ;  $p=0.670$ , respectively). Post-TTE VAS and pain scale were significantly higher than pre-supplement and post-supplement ( $p=0.009$ ;  $p=0.007$ , respectively). RPE was significantly higher with BCAAs compared to CHO ( $p=0.046$ ). **CONCLUSION:** BCAAs may have a higher RPE compared to CHO due to a nonsignificant increase in running TTE. Results do not support the central fatigue theory of BCAAs as the RPE, pain and VAS scale were not significantly different from other treatments.

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### IMPACT OF HIGH-INTENSITY INTERVAL EXERCISE ON EXECUTIVE FUNCTION AND BRAIN DERIVED NEUROTROPHIC FACTOR

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**P165** **PURPOSE:** Prefrontal cortex (PFC)-dependent executive function (EF) is enhanced immediately following completion of high-intensity interval exercise (HIIE). Brain-derived neurotrophic factor (BDNF) is a key protein that enhances EF at rest and in response to acute exercise. However, no studies have examined the possible utility of plasma and/or serum BDNF as a biomarker of improved EF in response to a single session of HIIE. **METHODS:** Thirteen subjects performed the Wisconsin Card Sorting Task (WCST) to assess EF immediately following a 5 min seated rest and participation in a HIIE (10 x 20 s bouts of maximal cycling against 5.5% of the subject's body weight). Whole blood was collected prior to and immediately following HIIE and the WCST to assess plasma and serum BDNF concentrations. **RESULTS:** HIIE increased the number of correct responses ( $p = 0.048$ ) and reduced the number of total and non-preserved errors ( $p = 0.048$ ;  $p = 0.027$ , respectively) on the WCST compared to the seated rest. Elevated plasma and serum BDNF concentrations prior to exercise were also associated with enhanced WCST performance during the seated rest, and in response to HIIE, BDNF concentrations in plasma, and to a lesser extent in serum, predicted a faster and more accurate performance on the WCST. However, while plasma BDNF concentrations were unaltered and serum BDNF concentrations increased in response to HIIE ( $F[2,48] = 6.759$ ,  $p = 0.003$ ), these responses were not associated with improved WCST performance. **CONCLUSIONS:** These data provide evidence supporting circulating BDNF in plasma, and to a lesser extent in serum, as a biomarker of enhanced PFC-dependent EF at rest and in response to HIIE.

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### THE RELATIONSHIP OF COGNITIVE SCORES WITH MUSCLE POWER, STRENGTH, AND 6-MINUTE WALK IN BREAST CANCER SURVIVORS

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The relationship between cognition and aerobic fitness is well studied in breast cancer survivors (BCS); however, there is a lack of research evaluating the relationships between cognition and anaerobic fitness. **PURPOSE:** This study examined the relationship between cognition, muscle power, strength, and the 6-min walk (6MW) in BCS. **Methods:** Forty-four BCS ( $60 \pm 8$  yrs; BMI:  $29.9 \pm 6.5$  kg/m<sup>2</sup>) completed Trail-Making Test A and B [TMTA (processing speed), TMTB (executive function)], Digit Span Forward (attention) and Backward (working memory), and Controlled Oral Word Association Test [COWAT (executive function)] to assess cognitive domains. Lower body isokinetic (ISK) power and strength were assessed by the Biodex™. Endurance was assessed by the 6MW. Pearson product-moment correlations were used to evaluate relationships between cognition and anaerobic fitness. Significance was accepted at  $p \leq 0.05$ . **Results:** Faster TMTA and TMTB scores were correlated with greater ISK average power for extension at 60 degrees/sec (TMTA:  $r = -0.40$ ; TMTB:  $r = -0.31$ ) and 180 degrees/sec (TMTA:  $r = -0.45$ ; TMTB:  $r = -0.30$ ) while TMTA was correlated with greater ISK average power for extension at 120 degrees/sec ( $r = -0.34$ ). A subcategory of the COWAT was correlated with greater 6MW distance ( $r = 0.31$ ) and greater ISK average power for extension at 180 degrees/sec ( $r = 0.30$ ). **Conclusion:** Higher cognitive functioning, specifically processing speed and executive function domains, may be correlated to greater average power. These findings warrant more research on the benefits of power and strength training on cognition in BCS.

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### EXPERIMENTAL INVESTIGATION OF PRIMING HEDONIC RESPONSES TO ACUTE EXERCISE: PILOT STUDY

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**PURPOSE:** The potential for additive effects of positive affect elicitation (using a short video clip) prior to exercise on intra-exercise affect was experimentally investigated. **METHODS:** Using a within-subject design, 30 subjects (age 18-40 years) participated in two conditions, 1 week apart in a counter-balanced order. Condition 1 involved positive affect elicitation prior to exercise (“affective priming”) while Condition 2 involved no positive affect elicitation. Participation involved watching a 5-minute video (intended to elicit a positive affect), as well as walking on a treadmill at a brisk pace for 10 minutes. Affect was assessed at baseline, after the video clip (if applicable), and during the brisk walk. **RESULTS:** There were significant differences ( $P=0.03$ ) in the mean pre-to-during exercise affective valence change scores (0.5 vs 0.13) and affective activation change scores (0.87 vs 0.47) between the treatment and control conditions respectively. **CONCLUSION:** These results suggest that affect manipulation prior to exercise may influence exercise affect, which, in other studies, predicts future exercise behavior. Future studies are needed to further examine this association.

### EXPLORING THE CONCEPT OF READINESS TO EXERCISE IN OBESE ADULTS: A THEMATIC ANALYSIS

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Flexible nonlinear periodization (FNLP) was designed to optimize sport-specific resistance training by matching bout demand to pre-exercise mental and physical states (“readiness to train”). Prior to applying this participant-responsive framework to aerobic prescriptions for inactive adults, operational definitions of readiness are needed for specific populations. Purpose: Identify themes underlying obese adults’ readiness to perform aerobic bouts considered to be low demand (LDB) and high demand (HDB). Methods: Using Qualtrics, 1,059 respondents initiated the online survey. Quality responses from obese adults ( $N=112$ ) were analyzed. Respondents described physical and mental states necessary to complete an LDB (10-min slow stroll) and an HDB (60-min jog). Data were assessed using content and thematic analyses. Results: Respondents (57% female) could be classified with class II obesity ( $35\pm 5$  kg/m<sup>2</sup>) and were  $48\pm 12$  years old. One theme, body integrity (no pain/illness) emerged for both the LDB and HDB. Regarding affect/arousal, both required the need to feel rested and in a positive mood, but the HDB further indicated the need for higher states of arousal (“pumped up”). Specific to the LDB, a recurring theme suggested that it could be completed under normal or worse (hungry, sick) circumstances. Specific to the HDB were themes relating to physical fitness, proper fueling (“hydrated”, “not hungry but not too full”), and enhanced mental skills (“determination”, “focus”, “confidence”). Conclusions: These uncovered themes provide empirical evidence to guide the construction of a readiness checklist that can be validated and applied in obese adults undergoing an FNLP-based aerobic exercise program. Supported in part by a University of Tennessee Semester Research Assistants Program Grant

### IT’S PERSONAL. EXPLORING THE EFFECT OF GENERAL FITNESS COURSES ON THE PERSONAL VALUE STUDENTS PLACE ON FITNESS

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**PURPOSE** Compare the change in degree of utility value placed on fitness between students who took a lecture fitness course and completed a personal fitness assessment (Grp1), students who took a fitness lecture course but did not complete a personal fitness assessment (Grp2), and students who did not take the lecture and did not complete a personal fitness assessment (Grp3). Methods: All students ( $n=90$ ; male=15, female=15 per group) completed fitness questionnaire assessing students’ perceived utility value of fitness. Grp1 then received a fitness evaluation including blood pressure, % body fat, flexibility, muscular endurance, and aerobic fitness. Grp1 and Grp2 then completed fitness course covering major components of fitness. Finally, all three groups retook the fitness utility value questionnaire. **RESULTS:** ANCOVA was run to address hypothesis (Grp1, Grp2, and Grp3 on Final utility value with Initial utility value as the covariate. ANCOVA revealed the covariate effect was significant [ $F(1, 84) = 51.04, p < .001$ ], so it was retained in the model. The main effect (group effect) was significant [ $F(1, 84) = 3.51, p = .04, \eta^2 p = .08$ ] indicating a small effect size. Post Hoc test revealed that when controlled for initial utility value, students in Grp1 ( $M=6.06, 95\% CI [5.72, 6.39]$ ) differed significantly from Grp3 ( $M=5.43, 95\% CI [5.01, 5.77]$ ). However, Grp2 did not differ significantly from Grp1 or Grp 3. **CONCLUSION:** These results suggest providing students with their personal fitness information can enhance a general fitness lecture course and positively influence the value students’ place on fitness.

### EFFICACY OF PHYSICAL TRAINING AMONG MILITARY CADETS

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Purpose: To assess the efficacy of strength and conditioning (S&C) based physical training (SCPT) led by a cadet with formal training in S&C compared to traditional Army-based physical training (APT) at a senior military college. Methods: The Citadel is comprised of 21 cadet companies. One cadet company served as the experimental group (SCPT), receiving S&C-based PT sessions led by a cadet with academic coursework and an internship in S&C. The remaining cadet companies served as controls receiving PT sessions based on traditional Army protocol (APT), led by cadets without formal S&C training. PT sessions lasted 45 minutes, and occurred twice weekly at 0530 hours for 12 weeks. After 12 weeks all cadets (2,164) received a validated 41-item survey assessing their perceptions of PT along 6 distinct psychosocial constructs. 44% of cadets completed the survey ( $n=956$ ), with 66 from the SCPT group. Level of agreement for each item was assessed using a 5-point Likert-type scale. Independent t-tests compared differences in mean between SCPT and APT for each construct. Results: Statistically significant differences ( $p < 0.05$ ) were found in two constructs, reported as mean $\pm$ SD. Specifically, value of PT for current fitness was higher for the experimental group (SCPT  $2.4\pm 0.9$ ) vs. (APT  $2.17\pm 0.8$ ). Additionally, value of PT for lifelong fitness was higher in the experimental group (SCPT  $2.18\pm 0.92$ ) vs. (APT  $1.96\pm 0.83$ ). Conclusions: S&C-based military PT sessions led proved to be efficacious in increasing perceived value of PT sessions for current and lifelong fitness, compared to traditional Army PT sessions led by cadets without formal training in S&C.



### ARE PARENTS ACCURATELY GAUGING THEIR CHILD'S PHYSICAL ACTIVITY LEVELS?

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**P172** Purpose: Many parents may over-estimate their child's level of physical activity (PA), and not realize that their child is not meeting the recommended guidelines. We sought to determine if urban, low income parents accurately perceive the PA level of their children. Methods: Average daily steps (Omron pedometer, Model HJ-321) for four consecutive weekdays were recorded in a cross-sectional study of 53 urban children (9±1yrs). Parent perception of child PA was assessed by the pre-tested Active Where? written survey. An independent t-test was used to determine if step count differed between parent-perceived active and in-active groups. A Pearson chi-square test for proportions was used to compare objective PA level classifications and parental perceived PA levels. Results: Step count did not differ between parents who perceived their child as active (7311±2391 steps per day) versus those who perceived their child as inactive (6901±2380 steps per day), ( $p=0.584$ ). No relationship was detected between step count and parent-perceived PA levels ( $p=0.934$ ). All children were classified below the minimal recommended steps (Tudor-Locke, 2011) per day of 11,000 and 13,000 for girls and boys respectively. Among these children, 71.7% were sedentary with 35.7% of their parents incorrectly reporting them as sufficiently active. Conclusions: These results suggest that parents do not accurately perceive the amount of PA their child engages in. Increasing awareness of physical inactivity among children and the health benefits associated with PA may help reverse parental misperceptions and encourage children's PA behavior change.

### THE IMPACT OF FITNESS ZONES IN LOW-INCOME AREA PARKS

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**P173** PURPOSE: This study examined the impact of Fitness Zones (FZs) in local parks. During specified time periods, we (1) compared the number of people using FZ parks to the number who used comparison local parks (CP) without FZs, (2) compared the physical activity (PA) levels of park users in FZ parks and CPs, and (3) examined the overall usage of FZs in the FZ parks. METHODS: Scans specific to the FZs as well as the other park components (e.g. linear trails, play structures, etc.) were conducted and summed to represent a participation score. To determine the impact of FZs, the aggregated SOPARC (System for Observing Play and Recreation in Communities) results from six parks with FZs were compared to six CPs matched for location, demographics of residents, and park amenities. Independent t-tests were used to compare observations and PA levels between the FZ and CPs. RESULTS: Across the six observation periods over four days, we counted 806 people in the twelve parks (FZ n=560, CP n=246). No significant difference was found comparing the average number of people observed at the parks (FZ=93±84 observed, CP=41±43 observed,  $p=0.296$ ). PA levels were similar except more people were sedentary at the FZ parks (FZ=34±21 observed, CP=11±12,  $p=0.04$ ) CONCLUSIONS: There were twice as many people at the FZ parks (n=560) relative to the comparison parks (n=246). Of the 560 observed users at the FZ parks, roughly 17% (n=138) were using the FZ equipment. Although more people were observed at the FZ parks, most were sedentary. When implementing FZs into low-income areas, marketing and promotional programming centered around the FZs should be incorporated to encourage PA among all park users.

### PARENT AND ADOLESCENT REPORTED PHYSICAL ACTIVITY BARRIERS IN HEALTHY WEIGHT AND OBESE YOUTH

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**P174** Purpose: Differences in the report of physical activity barriers were examined in healthy weight and obese adolescents and their parents. Methods: One-hundred and fifteen adolescent-parent dyads participated in the study. The adolescent's height and weight were measured, and BMI and age-and sex-adjusted BMI percentiles were calculated. Adolescents were categorized as either healthy weight (BMI < 85th percentile, 34%) or obese (BMI ≥ 95th percentile, 66%). Adolescents and parents completed the Barriers to Physical Activity Questionnaire. Subscale scores were calculated for: body, convenience, resource, social and fitness related physical activity barriers. Results: The average age of the adolescents was 14.3 ± 1.7 years and their BMI z-score was 1.67 ± 1.05. 48% of the adolescents were white 56% were female (56%). Parents reported higher barrier scores compared to adolescents for body-related, resource, social, fitness barriers ( $p < .05$ ). When comparing barriers in healthy weight to obese adolescents, the obese adolescents had higher scores for body-related, social, and fitness barriers ( $p < .05$ ). The interaction between parent/adolescent and adolescent weight status was examined adjusting for sex and parental education. Parents of obese adolescents reported higher scores than their obese adolescent for body, social, and fitness related barriers ( $p < .05$ ), whereas, the barrier scores for these subscales were similar between parents of healthy weight and obese. No interaction effects were observed for the convenience and resource subscales. Conclusion: These results show that the report physical activity barriers varies not only by parents and adolescents, but also the weight status of the adolescent.

### EXPERIMENTAL INVESTIGATION OF EXERCISE-RELATED, PERCEIVED HEDONIC RESPONSES TO PREFERRED VERSUS IMPOSED MEDIA CONTENT

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**P175** Purpose: We evaluated the differential influence of preferred versus imposed media selections on distinct hedonic responses to an acute bout of treadmill walking, which has yet to be investigated in the literature. Methods: Twenty university students were recruited for this [160 person-visit] laboratory experiment, which employed a within-subject, counter-balanced design. Participants were exposed to eight experimental conditions, including 1) Exercise Only, 2) Texting Only, 3) Preferred Phone Call, 4) Imposed Phone Call, 5) Preferred Music Playlist 6) Imposed Music Playlist, 7) Preferred Video and 8) Imposed Video. During each visit (except Texting Only), participants completed a 10-minute bout of walking on the treadmill at a self-selected pace. Walking speed was identical for all experimental conditions. Before, at the midpoint of exercise, and post-exercise, participants completed the Feeling Scale (FS) and the Felt Arousal Scale (FAS) to measure acute hedonic response. The Affective Circumplex Scale was administered pre-exercise and post-exercise. Results: Significant pre-post change scores were observed for happy (Imposed Call:  $P=0.05$ ; Preferred Music:  $P=0.02$ ; Imposed Video:  $P=0.03$ ), excited (Exercise Only:  $P=0.001$ ; Preferred Video:  $P=0.01$ ; Imposed Video:  $P=0.03$ ), sad (Preferred Music:  $P=0.05$ ), anxious (Exercise Only:  $P=0.05$ ; Preferred Video:  $P=0.01$ ), and fatigue (Exercise Only:  $P=0.03$ ; Imposed Video:  $P=0.002$ ). For the FS all change scores were statistically significant from pre-to-mid and pre-to-post ( $p < .05$ ). Conclusions: This experiment provides strong evidence that entertaining media platforms substantially influence acute hedonic responses to exercise. Future work should explore social media strategies to promote long-term exercise adherence.

**EFFECTS OF ACUTE EXERCISE ON STRESS-INDUCED MEMORY FUNCTION**

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Purpose: Acute exercise during the memory consolidation stage can enhance memory, whereas acute psychological stress post-memory encoding has been shown to impair episodic memory function. However, no study has evaluated whether acute exercise during memory consolidation can attenuate the detrimental effects of psychological stress-induction on memory retrieval, which was the purpose of this experiment. We also evaluate potential gender-specific effects, which has yet to be explored in this context. Methods: Forty-four university students completed a between-group randomized control trial. Participants completed the WMS-III Logical Memory sub-test prior to moderate-intensity walking for 15 minutes, or sitting for 15 minutes. After walking or sitting, participants completed an oral presentation per the Trier Social Stress Test (TSST) method, and then recompleted the memory assessment. Results: There was no group x time x gender interaction effect ( $F=1.52$ ;  $P=0.22$ ), but there was evidence of a group x gender interaction ( $F=4.11$ ;  $P=0.04$ ). In both groups, men had a greater decline in memory function from the TSST. From pre- to post-assessment, respectively, male participants' Logical Memory scores decreased from 16.31 (3.4) to 14.54 (3.7), whereas female participants' scores remained more stable 17.89 (2.9) to 17.28 (3.1). Conclusions: These findings suggest gender effects extend to paragraph and logic-based memory performance, as men experienced a larger decline in memory function following a social stressor, irrespective of an acute exercise response.

**MOTIVATION AND CONFIDENCE AMONG DIVISION III ATHLETES ACROSS THE SUMMER OFFSEASON**

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PURPOSE: According to NCAA bylaws, Division III (DIII) student-athletes are prohibited from engaging in mandated practice or training with their sport teams during off season periods; therefore, maintenance of training programs is largely self-determined. METHODS: The following study examined trends in self-reported motivation and confidence among a sample of  $n=24$  student-athletes at a DIII institution over three time points (Spring, Summer, and Fall). Motivation was assessed via the Sport Motivation Scale (SMS), and four questions on a 5-point Likert scale were used to determine confidence in ability to maintain aerobic training, strength and conditioning, nutrition, and sport-specific skills. RESULTS: Repeated measures ANOVAs were completed to examine changes across the three time points. Significant changes in confidence in ability to maintain a strength and conditioning program were observed,  $F(2,14)=3.417$ ,  $p=.043$ ,  $\eta=.152$ , which showed an increase in confidence from Spring to Summer and then a decrease from Summer to Fall. CONCLUSIONS: These results indicate that DIII student-athletes may become overconfident in their ability to maintain appropriate conditioning programs during the summer offseason, and then realize their own deficits only upon returning to campus and interacting with team members and support staff. Previous research has shown that athlete's perceptions of their physical abilities are related to actual physical changes (Jones et al. 2010), so future analyses are planned to compare scores on confidence with objective measures of participants' body composition and self-reported nutritional data.

**RANDOMIZED CONTROLLED TRIAL EXAMINING THE EFFECTS OF ACUTE EXERCISE ON MEMORY FUNCTION: MEMORY CONSOLIDATION**

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Purpose: Research in humans demonstrates that exercise prior to memory encoding can help to facilitate memory function. Animal work demonstrates that stressors during the memory consolidation stage can influence memory reconsolidation and subsequent memory retention. However, our understanding of whether exercise during the memory consolidation stage can influence long-term memory in humans is relatively unknown, which was the purpose of this experiment. Methods: Using a randomized controlled trial design, at baseline, two groups ( $N=20$  per group) were exposed to a word-list episodic memory function test (RAVLT). Afterward, one group (experimental) came back into the laboratory to complete a high-intensity bout of treadmill exercise for 15-min. This exercise occurred 3-5 hours after memory encoding (i.e., during the memory consolidation stage). Both groups (experimental and control) completed a 24-hr follow-up evaluation assessing their recognition and attribution of the baseline memory assessment. Results: At the 24-hour follow-up period, the experimental group had a greater attribution score (20.8 vs. 18.4 words;  $P=.04$ ). Conclusions: High-intensity exercise during the memory consolidation stage was effective in increasing attribution-based episodic memory function.

**IMPACT OF UTILIZING SIT-STAND WORKSTATIONS FOR 10 WEEKS IN UNIVERSITY STAFF MEMBERS**

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PURPOSE: The purpose of this study was to determine the impact of utilizing sit-stand workstations throughout the workday on stress, focus, and productivity when following sit-stand progression protocols for 10 weeks. METHODS: 60 participants were randomly assigned to one of three groups. Group 1 and 2 followed a prescribed protocol to progress up to 30 and 20 minutes of standing per hour, respectively. The protocol consisted of reminder emails delivered to participants each hour to reinforce prescribed standing times. Group 3 was instructed to sit and stand according to their preference throughout the day. Stress, focus, and productivity were measured using the visual analogue scale (VAS) at the end of each day for the sitting and standing conditions. Data were analyzed using mixed ANOVA with significance set  $p < 0.05$ . RESULTS: For each group, stress was significantly lower and focus and productivity were significantly higher standing compared to sitting ( $p = 0.00$ ) over the 10 weeks. CONCLUSIONS: The results indicate that there is an increase in focus and productivity and reduction in stress when standing compared to sitting throughout the workday. Furthermore, there was no influence of standing time progression throughout the 10 weeks or total standing time per hour. Future investigations should examine the long-term utilization and compliance of the sit-stand workstations and the potential impact on overall health.

### PHYSICAL ACTIVITY ENGAGEMENT IN FIRST YEAR VERSUS SECOND YEAR COLLEGE STUDENTS

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Undergraduate students exhibit a variety of risky health behaviors including lack of regular physical activity and these behaviors may change over time in college. **PURPOSE:** The purpose of this study was to determine if days per week (d/wk) of physical activity engagement differed between first year and second year college students. **METHODS:** This was a cross-sectional study of 226 undergraduate students (20.6±2.9 y, 70.9% female, 24.9±5.6 kg/m<sup>2</sup>, 83.3% white) who completed the National College Health Assessment survey. The authors evaluated a subset of questions pertaining to days per week (d/wk) of physical activity engagement and year in college. An independent t-test was used to assess differences in physical activity engagement between first and second year students. **RESULTS:** Among respondents, 50.9% of students were in their first year. Differences existed for d/wk of moderate-intensity exercise (2.8±2.1 vs 2.3±1.9, p=0.04), vigorous-intensity exercise (2.4±2.1 vs. 1.9±1.9, p=0.05), and strength-training exercise (1.9±2.0 vs. 1.4±1.7, p=0.05) in first year vs. second year students, respectively. **CONCLUSIONS:** These results suggest targeting undergraduate students as they matriculate from first to second year as physical activity engagement may be likely to drop during this transition.

### ARE STUDENTS THAT ARE INVOLVED IN INTRAMURAL ATHLETICS MORE PHYSICALLY ACTIVE?

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Involvement in intramural athletics offers multiple opportunities to relieve stress, meet new people, and engage in physical activity. **PURPOSE:** The purpose of this study was to determine if days per week (d/wk) of physical activity engagement (PAE) differed between those who did and did not participate in intramural athletics. **METHODS:** This was a cross-sectional study of 668 undergraduate students (22.7±6.0 y, 65.2% female, 25.8±5.9 kg/m<sup>2</sup>, 83.2% white) who completed the National College Health Assessment survey. We evaluated a subset of questions assessing intramural participation and d/wk of PAE. An independent t-test was used to assess differences in PAE between those involved and not involved in intramurals. **RESULTS:** Among respondents, 23% of students reported participating in intramural athletics within the last 12 months. Significant differences existed for d/wk of moderate-intensity exercise (3.1±2.1 vs 2.5±2.0, p<0.01), vigorous-intensity exercise (2.4±1.9 vs. 1.7±1.8, p<0.01), and strength-training exercise (2.3±2.0 vs. 1.4±1.7, p<0.01) in those who did and did not participate in intramural athletics, respectively. **CONCLUSIONS:** These results indicate a difference between PAE and those who did and did not participate in intramural athletics. Future studies should assess the potential causative influence of participation in intramural athletics on PAE.

### FEELINGS OF EXHAUSTION AND PHYSICAL ACTIVITY LEVELS IN COLLEGE STUDENTS

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Due to the hectic schedule of many college students, exhaustion is common and can impede daily physical activity (PA). **PURPOSE:** The purpose of this study was to determine if days per week (d/wk) of PA engagement differed between those reporting and not reporting exhaustion during the past 2 weeks. **METHODS:** This was a cross-sectional study of 673 undergraduate students (22.7±6.0 y, 65.5% female, 25.7±5.8 kg/m<sup>2</sup>, 83.1% white) who completed the National College Health Assessment survey. The authors evaluated a subset of questions pertaining to days per week (d/wk) of PA engagement and feelings of being exhausted during the past two weeks. An independent t-test was used to assess differences in d/wk of PA engagement between those feeling and not feeling exhausted during the past two weeks. **RESULTS:** Among respondents, 47.3% of students reported being exhausted during the past 2 weeks. Differences in d/wk of PA engagement between students who reported exhaustion vs. not reported exhaustion were as follows: moderate-intensity PA (2.5±2.0 vs. 2.7±2.0 d/wk, p=0.14), vigorous-intensity PA (1.7±1.8 vs. 2.0±2.0 d/wk, p=0.05), and strength-training PA (1.4±1.7 vs. 1.8±1.9 d/wk, p<0.01). **CONCLUSIONS:** Students who reported exhaustion were less likely to engage in vigorous-intensity and strength-training PA. Future research should investigate the dose response relationship between PA and exhaustion in college students.

### FRUITS/VEGETABLES CONSUMPTION ASSOCIATED WITH PHYSICAL ACTIVITY ENGAGEMENT IN COLLEGE STUDENTS

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College provides a setting for students to make healthy lifestyle choices and is a pivotal time to begin making sustainable healthy habits. **PURPOSE:** The purpose of this study was to determine if physical activity engagement varied as a function of fruits/vegetables consumption. **METHODS:** This was a cross-sectional study of 677 undergraduate students (22.7±6.0 y, 65.4% female, 25.8±5.9 kg/m<sup>2</sup>, 83.2% white) who completed the National College Health Assessment survey. The authors evaluated a subset of questions pertaining to the usual number of fruits/vegetables consumed per day and the days per week of PA engagement. ANOVA was used to assess differences in PA engagement between levels of fruits/vegetables consumption. **RESULTS:** Most respondents reported consuming 1-2 servings of fruits/vegetables per day (63.4%). Days per week of PA engagement increased as servings of fruits/vegetables per day increased from 2.0±2.0 (0 servings/day) to 3.2±2.1 (5+ servings/day) (p<0.01) for moderate-intensity PA, from 1.8±1.8 (0 servings/day) to 2.6±2.3 (5+ servings/day) (p<0.01) for vigorous-intensity PA, and from 1.2±1.6 (0 servings/day) to 2.0±2.0 (5+ servings/day) (p=0.02) for strength-training PA. **CONCLUSIONS:** Undergraduate students who reported higher levels of fruits/vegetables consumption also engaged in more days of physical activity. College wellness programs should focus on both healthy eating and physical activity engagement as evidenced by the relationship of these two factors.

### RELATIONSHIP BETWEEN FEELINGS OF BEING OVERWHELMED AND PHYSICAL ACTIVITY LEVELS IN COLLEGE STUDENTS

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**P184** Undergraduate students lack regular physical activity which may be associated with feelings of being overwhelmed in college. **PURPOSE:** The purpose of this research was to assess the relationship of physical activity with feelings of being overwhelmed. **METHODS:** This was a cross-sectional study of 673 undergraduate students (22.7±6.0 y, 65.5% female, 25.7±5.9 kg/m<sup>2</sup>, 83.1% white) who completed the National College Health Assessment survey. The authors evaluated a subset of questions pertaining to days per week (d/wk) of physical activity engagement and feelings of being overwhelmed in college. An independent t-test was used to assess differences in physical activity engagement between those not feeling and feeling overwhelmed during the past two weeks. **RESULTS:** Significant differences in d/wk of physical activity engagement existed between those who were not and were overwhelmed for moderate-intensity physical activity (2.8±2.0 vs 2.4±2.0, p=0.005), vigorous-intensity physical activity (2.1±1.9 vs. 1.9±1.8, p=0.004), and strength-training physical activity (1.9±1.9 vs. 1.3±1.7, p<0.001). **CONCLUSIONS:** Undergraduate students who reported feelings of being overwhelmed engaged in fewer days of physical activity. Future research should assess these differences using objective measures of physical activity.

### RELATIONSHIP BETWEEN AFFECTIVE STATE AND ENJOYMENT FOLLOWING ACUTE EXERCISE

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Increasing exercise adherence is one of the main challenges in lifestyle interventions. Although the affective response to exercise has been investigated extensively, it is unclear whether one's enjoyment of exercise is influenced by pre-exercise affective state. **Purpose:** To evaluate the relationship between pre-exercise affective state and enjoyment of acute bouts of walking of varying durations. **Methods:** Regularly active college aged participants (n=29; mean ± SD age=21±2 y) completed 3 counterbalanced exercise sessions involving moderate-intensity (3–5 METs) walking for 5-, 10-, and 30-minute durations. Participants completed the Positive and Negative Affect Scale pre-exercise and Physical Activity Enjoyment Scale (PAES) immediately post-exercise. **Results:** Positive affect (PA) was similar across walking bouts (28.9±6.9). Pre-exercise PA was not associated with PAES after 5 min of walking (r=0.35, p=0.07). In contrast, there was a significant association between PA and physical activity enjoyment following both the 10- (r=0.45, p=0.02) and 30-min (r=0.73, p<0.001) walking bouts. **Conclusion:** Pre-exercise PA appears to influence physical activity enjoyment experienced following acute walking bouts lasting 10 min or more, an effect that was strongest following the longest walking duration.

### THE ROLE OF LOW-FREQUENCY POWER IN THE RELATIONSHIP BETWEEN EXERCISE AND MEMORY

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**P186** **PURPOSE:** Acute exercise (AE) has been shown to have a positive effect on memory performance, however these results are not always observed. Although some studies control for factors such as age and gender, there may be physiological factors that affect memory and the relationship between AE and memory and that may help explain inconsistent results. Low-frequency power (LF) has been suggested as a marker of baroreflex sensitivity (BRS), which is associated with memory performance. We aimed to investigate the influence of LF in the relationship between AE and memory. **METHODS:** 68 active adults (M=21.9, SD=3.9 yrs) were randomly assigned to 4 groups in relation to a memory task: 20-min AE prior (n=17), 20-min AE after (n=15), 10-min AE prior and 10-min AE after (n=19), and no exercise control (n=17). Baseline heart rate (HR) was collected for 5-min in the seated position, and R-R intervals were reduced to LF. AE consisted of cycling at 55–65% HR reserve and the memory measure was the Rey Auditory Verbal Learning Test 24-hr recall. **RESULTS:** A significant group x LF interaction was found (p=.048); LF was associated with 24-hr recall for the control group (p=.006), but not for the exercising groups (p>.05). Post-hoc tests revealed benefits to 24-hr recall only for the groups that exercised before (p=.009) or both before and after (p=.011) memory tasks compared to control. **CONCLUSION:** Evidence supports that baseline LF, as a marker of BRS, is associated with memory. Importantly, activating the sympathetic nervous system, through AE, prior to encoding appears to disrupt this relationship and improved memory performance.

### THE RELATIONSHIP BETWEEN CELL PHONE USE, SEDENTARY BEHAVIOR, AND PHYSICAL ACTIVITY IN ADULTS

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**P187** **PURPOSE:** Previous research has indicated there is a positive relationship between cell phone use and sedentary behavior, but not physical activity among college-age individuals (18–25 years old). However, these relationships have not been examined among individuals older than college age. Additionally, previous research has not included assessments of situational cell phone use (i.e. is the cell phone being used when sitting, standing, or physically active). **METHODS:** An on-line survey was completed in adults (N = 423; n = 256 females, 40 ± 16 years old) which assessed, using validated measures, cell phone use, sedentary behavior time, physical activity time and intensity and situational cell phone use. Regressions were used to assess relationships between variables. **RESULTS:** Mean cell use was 239 ± 224 min/d. Cell use was positively associated (β = 0.15, p = 0.004) with sedentary behavior and not related (β = 0.09, p = 0.10) to physical activity. 76% of respondents reported typically sitting when using the cell phone. Tertile splits were then conducted to split cell users into three groups: low (n = 152), moderate (n = 138), or high (n = 131) users. High users (521 ± 266 min/d sitting) participated in significantly more (p = 0.006) sedentary time than low users (442 ± 214 min/d) with no differences (p ≥ 0.1) between high and moderate users (471 ± 253 min/d) or between low and moderate users. **CONCLUSION:** Similar to college students, cell phone use was positively associated with sedentary behavior but not physical activity in a group of adults beyond typical college age.

#### HOW GENERAL ADULTS PERCEIVE AEROBIC EXERCISE DEMAND: A MIXED METHODS EXPLORATORY STUDY

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**P188** While designed for sport-specific resistance training, flexible nonlinear periodization may be useful for general aerobic prescription because workload demand is explicitly matched to acute physical/mental states. While aerobic demand can be quantified as a function of metabolic equivalents (METs) and time, it is also important to understand subjective perceptions prior to application. Purpose: Investigate how general adults conceptualize aerobic demand. Methods: Using online surveys, participants ranked 12 bouts differing in time (10, 30, 60-min) and intensity prompt (slow stroll, walk for pleasure, brisk walk for exercise, jog). Open-ended responses detailed aspects of an aerobic bout that can make it seem more demanding. Data were assessed using descriptive statistics and thematic analysis. Results: Participants (N=344, 48±13y, 28.3±6.3 kg/m<sup>2</sup>) generally ranked bouts according to MET-min estimations, with the 10-min jog demonstrating the largest variance. In addition to themes relating to intensity and time, a theme emerged related to interoceptive cues (sweating, breathing, increased heart rate). Conclusions: In addition to weighing bout characteristics (e.g. speed, incline, time), untrained adults also appear to consider immediate, consequential sensations as indices of demand. It is reasonable to speculate that interoceptive cues may disproportionately alter perceptions of demand relative to quantifiable volumes. For example, a 10-min jog (70 MET-min) was generally ranked as higher demand than a 60-min walk for pleasure (210 MET-min).

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#### MACHINES VERSUS FREE WEIGHTS: DOES EXERCISE MODE INFLUENCE AFFECT AND PERCEIVED EXERTION?

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**P189** PURPOSE: To compare the affective responses of performing resistance exercise on machines (MA) and free weights (FW). METHODS: Novice participants (3 Males: 20.7±0.6yrs; 80.0±18kg; 179±1.7cm; 10 Females: 28.2±10yrs; 72.3±20kg; 164±4.6cm) completed a MA workout consisting of the leg press, row, chest press, and leg curl and a FW workout consisting of a goblet squat, row, bench press, and stiff leg deadlift. Each exercise was performed at 80% 10RM for 3 sets of 9-11 repetitions with 90 secs of rest between each set. Feeling Scale (FS) and Felt Arousal Scale (FAS) were assessed before exercise, after the completion of the 7th repetition of the 2nd set of each exercise, after the 3rd set of each exercise, immediately after, 30 min after, and 60 min after. RESULTS: Repeated measures ANOVA from before to after exercise revealed that FS significantly increased from before to immediately and 60 min following exercise regardless of condition,  $F(3, 36) = 6.23, p < 0.002$ ; FAS significantly increased immediately following exercise and then returned to baseline levels at 30 and 60 min regardless of condition,  $F(3, 36) = 7.96, p = 0.001$ . Repeated measures ANOVA for FS during exercise revealed a significant increase from the first set to the third,  $F(7, 84) = 3.41, p = .008$ ; and for RPE a condition x time interaction where RPE was higher for all FW exercises except those of the chest press where RPE was higher for MA,  $F(7, 84) = 2.89, p = 0.025$ . CONCLUSION: An increase in positive affect suggests that both MA and FW exercises may provide psychological benefits. When matched for volume and intensity, novice exercisers should be given the autonomy to choose which mode of exercise that they perform.

#### THE EFFECTS OF INTERNAL AND PROXIMAL AND DISTAL EXTERNAL FOCUS CUES ON EXERCISE PERFORMANCE

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**P190** Purpose: To examine the effects of internal (IF), proximal external (PEF), and distal external focus cues (DEF) on running time to exhaustion (TTE), push-up and sit-and-reach tests. Methods: In this cross-over study, 13 recreationally active participants (mean ± SD; Age: 22.8 ± 7.5 yrs; Height: 163.4 ± 8.6 cm; Weight: 61.3 ± 10.3 kg) completed 5 separate visits to the Meredith College Human Performance Lab. The first visit consisted of a maximal oxygen consumption (VO<sub>2</sub>max) test to determine TTE running speed for visits 2-5, followed by the familiarization of the push-up, traditional sit-and-reach, and TTE tests. For the push-up test, males completed 90 degree push-ups whereas females completed 90 degree modified push-ups. For visits 2-5, participants completed a self-selected warm-up that was held consistent for each visit prior to completing the push-up test, TTE at 85% of VO<sub>2</sub>max, and the sit-and-reach under each condition of IF, PEF, DEF, and control focus (CON). Results: There was no significant difference for TTE ( $p = 0.328$ ) between IF (362.13 ± 133.6 sec), PEF (373.75 ± 158.9 sec), DEF (383.45 ± 138.9 sec), or CON (408.17 ± 178.6 sec). There were no significance differences between the types of attentional foci of IF, PEF, DEF, and CON for the push-up test ( $p = 0.557$ ) or the sit-and-reach test ( $p = 0.190$ ). Conclusions: There were no differences in exercise performance between attentional foci. While non-significant, CON resulted in 46.05 ± 104.3 sec longer TTE compared to IF, which may be a substantial difference in performance to a competitive athlete. These results indicate the importance of instructional cues on performance, using an internal cue could inhibit performance. This finding is in line with previous research done in this area.

#### EVALUATING THE EFFECTIVENESS OF APPLYING GRIEF-RESPONSE MODELS TO SPORT INJURY IN COLLEGIATE STUDENT-ATHLETES

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**P191** Purpose: The effectiveness of grief-response models in describing emotional responses to injury was evaluated in collegiate student-athletes. Additionally, the role of social support in determining emotional response was investigated. Methods: 14 collegiate student-athletes (9 female, 5 male) across five Division I sports participated in this study by completing a semi-structured interview regarding the individual's injury experience. Results: Athletes most frequently reported feeling upset during the injury diagnosis stage. For those athletes whose injury required surgical intervention, their top reported emotional response during that stage was anxiety or fear. Frustration was the most commonly expressed emotion during the rehabilitation stage. Finally, in returning to play, the top emotional response reported among participants was nervousness/anxiety. Regarding social support, participants reported one or both of their parents as their greatest source of social support, while coaches were the primary source that the student-athletes wished they had received more support. Conclusion: Preliminary findings suggest that grief models should redirect focus from shock and depression and be reworked to account for the prevalence of anxiety and frustration in multiple stages of recovery. Additionally, results identified a need for increased availability of social support resources on campus, as well as, training for coaching staff on how to better meet the expectations and needs of injured athletes.

**VIDEO VALIDATION OF WEARABLE STEP COUNTERS**

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Step counts have never before been validated using the gold-standard criterion (hand counted steps) across one day. Using a GoPro camera, we were able to review video recordings and hand count all steps taken during the waking hours of one day to validate several wearable step counters in true free-living conditions. Purpose: Using seven different devices and 14 step counting methods, we investigated the error in steps counted in a free-living environment across all waking hours of one day. Methods: Twelve adults (mean±SD, 35±13 yr) wore a GoPro pointed down at the feet to video record all steps taken across one day. They also wore eight research-grade step counters (i.e., StepWatch (SW), activPAL (AP), and ActiGraph GT9X) and five consumer devices (e.g., Fitbit, Yamax, and New Lifestyles) on the ankles, thighs, hips, and wrists. Raw AG data was processed with the ActiLife algorithm (AG), low frequency extension, and Moving Average Vector Magnitude algorithm (AGM). Steps per day was the reported outcome from each device and hand counted steps from the GoPro videos were criterion step counts. Percent of actual steps captured by each device and mean absolute percent error (MAPE) were calculated. Results: The SW recorded 95.3% to 102.8% of criterion (MAPE: 4.0% to 5.2%). The other research devices captured 76.9% to 219.7% of criterion (MAPE: 25.0% to 119.7%). The consumer devices captured 75.3% to 83.5% of criterion (MAPE: 18.6% to 24.7%). Conclusion: Across one day, the SW had the least step count error, followed by wrist worn AG and AGMs. The step count results from consumer devices and AP were remarkably similar.

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**RELATIONSHIP BETWEEN KNEE VALGUS ASYMMETRY DURING RUNNING AND KNEE LOADING DURING SINGLE LEG LANDING IN FEMALE BASKETBALL ATHLETES**

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**PURPOSE:** Most anterior cruciate ligament (ACL) injuries in women's basketball players occur during unilateral stance and are non-contact in nature. Asymmetry in knee valgus angle (KVA) during dynamic activities like running is thought to be a risk factor for ACL injury and its relationship with loading parameters during single leg landing (SLL) has not been identified. The purpose of this study was to compare ACL loading risk factors during SLL in female basketball athletes with symmetrical and asymmetrical KVA during running. **METHODS:** Twenty healthy female basketball athletes were classified in two groups (asymmetric: n=11 and symmetric: n=9) based on dynamic KVA asymmetry scores calculated using Symmetry Angle during a 3D analysis of running on a treadmill. Peak vertical ground reaction force (VGRF) and knee abduction moment (KABM) of the right limb were measured during right SLL using standard motion analysis system. Comparisons were made using Student's t-test ( $\alpha=0.05$ ). **RESULTS:** The asymmetric group had significantly higher VGRF ( $4.40\pm 0.90$  vs.  $3.68\pm 0.45$  \*BW,  $p=0.049$ ) and KABM ( $-1.33\pm 0.33$  vs.  $-1.29\pm 0.95$  Nm/kg,  $p=0.003$ ) during SLL. **CONCLUSIONS:** There is a suggestive relationship between KVA asymmetry during running and the magnitude of VGRF, KABM during SLL. Imbalances in knee kinematics during running could potentially be used as a screening tool to detect abnormal ACL loading kinetics during dynamic tasks like SLL.

**THE INFLUENCE OF SELF-SELECTED PROTECTIVE EQUIPMENT ON KINEMATICS IN YOUTH LACROSSE PLAYERS**

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Purpose: Lacrosse is a rapidly growing sport in the United States, especially amongst male youth athletes. Due to limited gear fitting protocols, athletes do not typically wear correctly fitted gear when competing. The purpose of this study was to examine the effects of self-selected lacrosse equipment compared to not wearing equipment on pelvis, trunk, and shooting humerus, forearm, and wrist kinematics during three different shot types in male youth lacrosse athletes. Methods: Ten male lacrosse players ( $12.88\pm 1.95$  yrs;  $4.90\pm 1.45$  yrs of experience,  $163.55\pm 19.9$  cm;  $48.59\pm 15.82$  kg) volunteered to participate. Participants performed five trials for each of the overhand, sidearm, and underhand shots. Kinematic data were collected at 100Hz using an electromagnetic system synced with the MotionMonitor™ and were averaged across five trials. The shots were analyzed during the phases of foot contact, maximum elbow flexion, ball release, maximum elbow extension, and maximum trunk rotation during the follow-through. Results: Repeated measures ANOVA revealed significant main effects of the Gear condition for the sidearm shot ( $F_{1,9} = 7.43$ ,  $p = 0.023$ ,  $\eta^2 = 0.452$ ) and the underhand shot ( $F_{1,9} = 8.93$ ,  $p = 0.015$ ,  $\eta^2 = 0.498$ ). Dependent samples post-hoc t-tests showed decreased trunk extension and lateral flexion toward the shooting side, as well as decreased trunk, hip, shooting-side humerus, forearm, and wrist angular velocities when performing sidearm and underhand shots while wearing protective gear. Conclusions: The current study revealed that wearing self-selected gear resulted in altered shot kinematics. Thus, future research should investigate the relationship of altered shot kinematics and injury potential in male youth lacrosse players.

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**A HISTORY OF SPORT-RELATED CONCUSSIONS DOES NOT INFLUENCE OCULOMOTOR CONTROL**

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Purpose: The aim of this study was to examine potential differences in oculomotor control among those that have and those that do not have a history of a sports related concussion (SRC) within 24-48 hours following SRC. Methods: Twenty-seven (13 female and 14 male, aged  $20 \pm 2$  years) collegiate NCAA Division I athletes with SRC participated in this study. Participants were sorted into three equal groups: no history SRC (NON), a history of one SRC (C1) and a history of two or more SRC (C2). All participants completed two trials of a sport-like antisaccade task within 24-48 hours of their injury. Raw ocular point of gaze coordinates were tracked using a monocular eye tracking device (Applied Science Laboratory, Age 7, Medford, MA) and motion capture during the sport-like antisaccade task and further analyzed using a custom algorithm. A multivariate ANOVA analyzed resultant distance (RD), mean horizontal excursion velocity (HV) and prosaccade errors (PE) by groups (NON, C1, and C2). Results: No significant omnibus differences were noted between the groups for RD ( $p=0.489$ ), HV ( $p=0.202$ ), and PE ( $p=0.202$ ). Conclusion: These data suggests that there may be no difference among those that do not have a history of SRC and those that do have a history of one or multiple SRC when assessed immediately following SRC.

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### THE EFFECTS OF CONCUSSION HISTORY ON POSTURAL CONTROL

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Purpose: To investigate how postural control is affected by previous concussions in Division I athletes. Methods: Twenty-one Division I athletes (7 no history [NON], 7 with a previous concussion [CONC1], and 7 with 2 or more concussions [CONC2]) participated in this study. The participants performed 3 trials of quiet stance in the eyes open (EO) and eyes closed (EC) conditions for 30 seconds each on a force platform (1000 Hz). The Data were analyzed with Peak Excursion Velocity (PEV) and Root Mean Square (RMS) in the anteroposterior (AP) and mediolateral (ML) directions. Two 3x2 MANOVAs were run by direction for group comparisons. Results: Overall model showed significant differences for the AP direction ( $F(26,12) = 2.424$ ;  $\eta^2 = 0.528$ ;  $p = 0.029$ ), but not the ML direction. Follow up assessments revealed that CONC2 ( $0.094 \pm 0.021 \text{ m}^* \text{ s}^{-1}$ ) swayed faster than both NON ( $0.057 \pm 0.015 \text{ m}^* \text{ s}^{-1}$ ;  $p < 0.01$ ) and CONC1 ( $0.058 \pm 0.011 \text{ m}^* \text{ s}^{-1}$ ;  $p < 0.05$ ) during EC. Also, NON ( $0.004 \pm 0.001 \text{ m}$ ) swayed less than CONC2 ( $0.006 \pm 0.001 \text{ m}$ ) in EC ( $p < 0.05$ ). Furthermore, NON ( $0.003 \pm 0.001 \text{ m}$ ) swayed less than CONC1 ( $0.005 \pm 0.001 \text{ m}$ ) and CONC2 ( $0.005 \pm 0.001 \text{ m}$ ;  $p < 0.05$ ) in the EO condition. Conclusion: These data suggest that among those who have a history of 2 or more sport-related concussions postural control is unstable when compared to those who do not have a history of SRC.

### DOMINANT VS NON-DOMINANT WEAR: A COMPARISON OF STEPS PER DAY

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With the increased popularity of activity monitors over the past decade, step counting has become a popular method of assessing physical activity. Although manufacturers suggest to wear the devices on the non-dominant (ND) wrist, consumer-and research-grade monitors can be worn on D and ND sides. PURPOSE: To determine the accuracy and compare step counts between D and ND wrist-worn devices, under free-living conditions for all waking hours. METHODS: Twelve participants (mean $\pm$ SD, 35 $\pm$ 13 yr) wore an ActiGraph GT9X and Fitbit Charge (FC) on the D and ND wrists. A GoPro was pointed at the feet to video record steps taken in a day. Hand-counted steps served as a criterion and used to calculate percent of hand-counted steps. Raw AG data was processed with the ActiLife step counting algorithm, with and without low frequency extension (AGLFE and AG, respectively) and the Moving Average Vector Magnitude algorithm (AGM). For each step counting method, a repeated measured ANOVA was used to compare the step counts from the D wrist vs. ND wrist. RESULTS: There was no significant device x wrist interaction. On average, the devices on the D wrist recorded 1,253 steps more than those on the ND wrist. Percent of hand-counted steps for D devices reported: FC-84%, AG-122%, AGLFE-220%, AGM-91% and for ND devices: FC-77%, AG-109%, AGLFE-196%, AGM-84%. Across all methods, there was a significant difference step per day between D and ND wrist ( $F(1,11)=11.81$ ,  $p=.006$ ). CONCLUSION: Users of activity monitors should be aware of the differences in steps per day between D and ND wrists.

### THE EFFECT OF BAREFOOT RUNNING USING TWO RUNNING STYLES ON LOWER EXTREMITY JOINT REACTION FORCES

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Introduction: Running mechanics vary among individuals. Investigating potential differences in lower extremity (LE) joint reaction forces (JRF) can be beneficial when exploring whether or not consistent JRF patterns may be observed when runners are utilizing a specific initial foot contact pattern. Methods: Ten male (mean age  $\pm$  SD, 34  $\pm$  11 years) and ten female participants (mean age  $\pm$  SD, 25  $\pm$  7) who were all naturally rearfoot (RF) style runners were included in this study. Joint markers were placed on lower extremity joints and each subject ran barefoot on an AMTI (Watertown, MA) instrumented treadmill while being recorded by a 12 camera Vicon (Oxford, UK) 3D motion analysis system. Subjects performed 2 running trials with RF initial contact pattern and 2 running trials with forefoot (FF) initial contact pattern. Peak JRF data (expressed as N·BW-1) were averaged from five strides during both conditions to determine average peak JRF at the ankle, knee, and hip in X, Y, and Z planes. Results: Paired samples t-test was utilized for data analysis to compare average peak JRFs during treadmill running in both conditions. Significance set at  $p < .05$ . The largest average peak JRFs occurred in the X plane of the ankle joint when subjects ran with a RF initial contact pattern: males: 19.23  $\pm$  3.17 N·BW-1 and females: 18.97  $\pm$  3.56 N·BW-1. Conclusions: Statistical analysis revealed no statistically significant difference in LE JRFs between RF and FF running patterns when comparing all subjects. In addition, no statistically significant differences were found when comparing LE JRFs in male vs female subjects. The results of this study suggest that JRFs in the ankle, knee, and hip vary from person to person and therefore it may not be possible to predict trends in LE JRFs based on initial contact pattern used when running.

### THE EFFECT OF TWO JERK TECHNIQUES ON BARBELL KINEMATICS

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The split jerk and power jerk are two commonly used lifts among strength and conditioning coaches, as well as lifts included in the sport of Olympic weightlifting. However, it is unknown which of these jerk techniques exhibit more advantageous barbell kinematics. PURPOSE: To compare the barbell kinematics between a power jerk and a split jerk at a constant load. METHODS: Twelve men were recruited for this study (height = 1.8  $\pm$  0.1 m; mass = 85.3  $\pm$  10.2 kg; age = 23.4  $\pm$  2.4 years). All subjects had been completing the jerk for a minimum of six months, and reported their split jerk 1 repetition maximum (1-RM: 105.3  $\pm$  19.1 kg). Subjects completed 3 repetitions of each jerk technique, at 85% of their split jerk 1-RM. The data were collected using 6 3D video cameras, with a sampling rate of 200Hz and were analyzed using Vicon software. A multivariate paired t-test was used to determine the effect of jerk technique on all kinematic variables. Paired samples t-tests were used as post hoc analyses when necessary. An alpha level of ( $p < 0.05$ ) was used for all inferential statistics. RESULTS: No significant differences were found between the two techniques for starting barbell position, lowest barbell position and maximum concentric velocity. Peak barbell height, range and displacement were all found to be significantly greater in the power jerk when compared to the split jerk ( $p < 0.05$ ). CONCLUSIONS: Results suggest that more work is done on the barbell, and greater range of motion, occur during the power jerk. The results suggest that more work may be done on the body during the split jerk due to the technique of dropping quickly under the bar for the catch. Less work done on the barbell could result in higher absolute loads, making the split jerk the superior technique for populations such as weightlifting athletes.

**EXAMINATION OF PROXIMAL AND DISTAL MUSCLE ACTIVATION: AN EMG STUDY**

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**PURPOSE:** Overhead throwing requires efficient movement of segments interdependently from proximal to distal with adequate muscle activations for energy transfer. With the need for proximal stability through the lower extremity in throwing, strength and conditioning programs should implement exercises that could potentially assist with proximal stability for distal mobility. The purpose of this study was to describe muscle activations of the proximal lower extremity (semitendinosus, biceps femoris, gluteus maximus, bilateral gluteus medius), and distal upper extremity (multifidus, latissimus dorsi, lower trapezius). **METHODS:** Eight active individuals (171.1±13.0 cm; 75.5±14.8 kg; 25.3±5.5 yrs) volunteered. Surface electromyographic data normalized by maximum voluntary isometric contractions were recorded during four exercises: glute-ham raise (GHR), kettlebell deadlift (KBD), kettlebell swing (KBS) and lunge with scapular retraction and depression (lungeW). **RESULTS:** Repeated measures ANOVA revealed no significant main effect of exercise ( $F_{1.5,10.8}=.86$ ,  $p=.423$ ), muscle ( $F_{1.5,10.3}=.99$ ,  $p=.380$ ), nor an interaction of exercise by muscle ( $F_{1.7,11.8}=1.5$ ,  $p=.250$ ). **CONCLUSION:** Though no exercise produced significantly greater muscle activation, overall activations during the exercises are noteworthy. Specifically examining the KBS and lungeW, both exercises elicited moderate to high activation in all musculature except for the biceps femoris (KBS) and latissimus dorsi (lungeW). The muscles selected assist in pelvic and scapular stabilization. In throwing athletes, proper pelvis and scapular kinematics are vital for energy transfer from the lower extremity to the distal to the upper extremity. Understanding muscle activations during traditional lower extremity exercises may assist clinicians and coaches training throwing athletes.

**CO-CONTRACTION INDEX OF LOWER EXTREMITY MUSCLES DURING MULTIPLE SLIP EVENTS: ROLE OF FOOTWEAR**

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**Purpose:** Co-contraction of lower extremity muscle pairs occur to improve postural stability and prevent falls, especially during slips. The purpose of the study was to assess co-contraction of lower extremity muscles when exposed to dry gait (DG), unexpected slip (US), alert slip (AS) and expected slip (ES) in three footwear types [alternative footwear: Crocs (CC) & flip-flops (FF) and slip-resistant footwear (SRF)]. **Methods:** Eighteen male participants (age: 22.28 ± 2.2 years; height: 177.66 ± 6.9 cm; mass: 79.27 ± 7.6 kg) were tested with a repeated measures counterbalanced design. Co-Contraction Index (CCI) was calculated during stance phase of gait for upper leg (UL) knee extensors (vastus medialis) and flexors (medial hamstrings) as well as for lower leg (LL) ankle dorsiflexors (tibialis anterior) and plantar flexors (medial gastrocnemius) and evaluated using a 3(footwear) × 4(gait trials) repeated-measures analysis of variance at alpha of 0.05. **Results:** Significantly lower CCI was evident in SRF compared in CC & FF in UL pair ( $p = 0.022$ ) and in CC compared to FF in LL pair ( $p = 0.001$ ). US and AS exhibited greater CCI in LL ( $p = 0.010$ ) and UL ( $p = 0.003$ ) pairs respectively. **Conclusion:** Reactive corrective responses in US and AS exhibited greater CCI compared to proactive anticipatory responses in ES, with possible lower extremity kinematic corrections. The footwear and sole design characteristics on the alternative footwear led to greater CCI during the slip events, compared to SRF. The SRF demonstrated to be the safest footwear while FF was the most hazardous footwear during slips.

**IMPACT OF MILITARY TYPE FOOTWEAR AND WORKLOAD ON PERCENT MUSCLE ACTIVATION IN UNILATERAL STATIC BALANCE**

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**PURPOSE:** Intrinsic human factors such as muscular fatigue and extrinsic environmental factors such as footwear, impact the ability to maintain balance. Military personnel have an array of compliant footwear and engage in rigorous workloads. The purpose of the study was to analyze the impact of a military type workload and two military footwear [Tactical Standard (STD), Tactical Minimalist (MIN)] on lower extremity muscle activity, during balance performance. **METHODS:** This study followed a counter balanced repeated measures design in which 22 healthy males participated. Electromyography muscle activity was recorded during maximal voluntary contractions (MVC) from medial gastrocnemius (PF) and tibialis anterior (DF) as well as during unilateral (right leg) static balance trials [eyes open (EO) & eyes closed (EC)], prior to and after a military style workload on a treadmill with a 16 kg backpack. Percent muscle activity (%MVC) during balance assessments was analyzed using a 2x2 [Footwear x Pre-Post] repeated measures ANOVA at  $p \leq 0.05$ . **RESULTS:** Significant main effect time difference was found with %MVC in EC demonstrating a significant increase in PF after an occupational workload. However, no significant differences existed between footwear. **CONCLUSION:** The current study supports previous literature that localized muscle fatigue of plantar flexors compromises balance performance. Footwear design characteristics did not impact muscle activity levels during these balance assessments. Results suggested that post-military workload an increase in muscle activity exertion was needed to maintain balance in the absence of visual feedback.

**CORRELATION OF PELVIS KINEMATICS TO GROUND REACTION FORCE IN SOFTBALL HITTING: A PILOT STUDY**

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**PURPOSE:** The purpose of this study was to determine the relationship between positional pelvic kinematics and ground reaction forces (GRF) during hitting in NCAA Division I fast-pitch softball athletes. **METHODS:** Using a stationary hitting tee, 12 softball athletes (168.0±6.5 cm, 68.0±9.7 kg, 20.4±1.6 yrs.), performed five maximal effort swings. Participants chose their preferred tee location and bat. GRF data were collected via a 40 cm x 60 cm Bertec force plate and sampled at 1000 Hz in the anteroposterior, mediolateral, and vertical directions. Kinematic data were collected at 100 Hz using an electromagnetic tracking system synced with The MotionMonitor™. Five swing trials were averaged and analyzed at the following swing events: Stance (ST), load (LD), foot contact (FC), ball contact (BC), and follow through (FT). **RESULTS:** Linear regression analyses revealed that 44.8% variance in pelvis anterior tilt at BC was affected by vertical GRF at FC ( $R^2=0.448$ ,  $R=0.669$ ,  $p=0.024$ ). Additionally, at BC, 44.2% variance in pelvis rotation was affected by mediolateral GRF ( $R^2=0.442$ ,  $R=0.665$ ,  $p=0.026$ ), 38.0% variance in pelvis rotation was affected by anteroposterior GRF ( $R^2=0.380$ ,  $R=0.616$ ,  $p=0.043$ ), and 52.5% variance in pelvis anterior tilt was affected by vertical GRF ( $R^2=0.525$ ,  $R=0.724$ ,  $p=0.012$ ). **CONCLUSIONS:** These data imply that weight distribution at foot contact and ball contact can directly affect pelvis kinematics, which could ultimately lead to alterations in swing mechanics at the trunk and upper extremity. However, this conclusion assumes that GRFs affect kinematics, rather than the kinematics affecting GRFs. Therefore, future research is needed to better understand variable predictors and their influence on hitting performance.



### CORRELATION OF TRUNK AND UPPER EXTREMITY KINEMATICS AT BALL CONTACT IN THE SOFTBALL SWING: A PILOT STUDY

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**P205** **PURPOSE:** The purpose of this pilot study was to quantify the relationship between trunk and upper extremity kinematics during hitting in NCAA Division-I fast-pitch softball athletes. **METHODS:** Twelve participants ( $168.0 \pm 6.5$  cm;  $68.0 \pm 9.7$  kg;  $20.4 \pm 1.6$  yrs) performed five maximal effort swings off a stationary tee. Kinematic data were sampled at 100 Hz using an electromagnetic tracking system. Trunk flexion, trunk rotation, trunk lateral tilt, shoulder elevation, shoulder plane of elevation, and elbow flexion were averaged across five trials and analyzed at ball contact (BC). The side of the body closest to the pitcher was defined as the lead side, while the side furthest from the pitcher was defined as the back side. **RESULTS:** Pearson product correlation statistics revealed that greater trunk extension is moderately correlated to greater elbow flexion ( $R = 0.638$ ,  $p = 0.035$ ). Additionally, greater trunk lateral tilt to the back side is moderately correlated to greater shoulder elevation ( $R = -0.668$ ,  $p = 0.025$ ). **CONCLUSIONS:** These findings suggest that trunk kinematics may have a direct influence on upper extremity position at BC. Additionally, these data could imply that trunk kinematics indirectly influence hand position at BC as alterations in elbow flexion will result in the hands closer to or further from the body, and alterations in shoulder elevation will result in the hands higher or lower when striking the ball. Therefore, kinematic changes in the proximal segments, specifically the trunk, may ultimately influence swing outcome as swing outcome is known to be directly related to hand position. Thus, further investigation into the role of the trunk and, potentially, the pelvis on the upper extremity in hitting is warranted.

### VERTICAL JUMP HEIGHT IN A STATIC COUNTERMOVEMENT JUMP VS A DROP JUMP IN DIVISION I ATHLETES

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**P207** **PURPOSE:** To compare vertical jump height in a static countermovement jump and a drop jump in Division I athletes. **METHODS:** Male and female athletes ( $n = 31$ ,  $19.9 \pm 1.4$  years,  $172.7 \pm 7.4$  cm,  $71.7 \pm 10.4$  kg) participated in two separate jump settings within 48 hours. The first consisting of a standardized warm-up followed up by three maximum countermovement vertical jumps (CMJ) measured using a vertical jump mat (JustJump). The second session started with a standard warm-up and included a drop jump from a box 30 cm high followed immediately by a maximum vertical jump attempt, captured by a 12-camera infrared 3-D motion capture system (BTS Bioengineering). This was repeated 5 times. The maximum jump height for both the CMJ and drop jump were analyzed using an independent samples t-test to compare jumps. **RESULTS:** There was a statistically significant difference in maximum vertical height of the CMJ ( $61.6$  cm  $\pm$   $2.6$  cm) and drop jump vertical ( $57.3$  cm  $\pm$   $2.0$  cm),  $p < .001$ . **CONCLUSION:** The significant difference between the jump heights is likely related to two factors: 1) the athlete's ability to decelerate a greater impact during landing from a higher point, rather than from a stationary ground position, and 2) their ability to redirect the forward and downward momentum into a positive vertical jump. It is likely that the drop jump height was decreased because muscular force and energy were used to counter these two factors.

### THE EFFECT OF A CURVED NON-MOTORIZED TREADMILL ON RUNNING GAIT LENGTH, IMBALANCE AND STEP ANGLE

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**P208** Running on a non-motorized, curved-deck treadmill is thought to improve gait mechanics. It is not known, though, if the change in gait carries over to running on a motorized treadmill or level ground. **Purpose:** To determine the effect of running on a curved non-motorized treadmill (CNT) on gait characteristics measured during a subsequent bout of running on a traditional motorized treadmill (TMT). **Methods:** Sixteen healthy college-aged participants, age (mean $\pm$ SD)  $20.4 \pm 1.6$  years volunteered to have their gait analyzed while running on a TMT and CNT. After familiarization and warm-up on both treadmills, each subject completed five, 4-minute bouts of running alternating between traditional motorized and curved non-motorized treadmills: TMT-1, CNT-1, TMT-2, CNT-2, and TMT-3. Variables of interest included step length (m), stride length (m), imbalance score (%), and step angle ( $^{\circ}$ ) and were measured using Optogait gait analysis equipment. Differences in gait characteristics among TMT-1, TMT-2, and TMT-3 can be attributed to running on the CNT. **Results:** The results show that running on a CNT resulted in significant changes in gait characteristics. Step length (TMT1 v TMT2  $p=0.001$ , TMT1v TMT3  $p=0.001$ ), Stride length (TMT1 v TMT2  $p=0.001$ , TMT1v TMT3  $p=0.001$ ), Imbalance (TMT1 v TMT2  $p=0.001$ , TMT1v TMT3  $p=0.001$ ) and Step angle (TMT1 v TMT2  $p=0.009$ , TMT1v TMT3  $p=0.001$ ). **Conclusions:** These findings suggest that running on a CNT can significantly alter gait characteristics may result in improvements in running gait that persist to subsequent running on a TMT.

### EFFECTS OF MANIPULATING STRIDE LENGTH ON GROUND REACTION FORCE AND WRIST VELOCITY DURING BASEBALL PITCHING

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**P209** Stride-leg ground reaction forces have been used to predict wrist velocity during baseball pitching and are likely influenced by stride length. **PURPOSE:** The purpose of this study is to determine the effect of stride length on peak vertical ground reaction forces (Fzpeak) of the stride leg and wrist velocity in skilled baseball throwers. **METHODS:** Ten collegiate baseball pitchers (6 right-handed, 4 left-handed) completed one laboratory testing session in which they were instructed to throw a baseball as fast and accurately as possible. After a standardized warmup, a total of 15 throws (5 Normal-stride [NS], 5 Over-stride (NS +10% [OS]), and 5 Under-stride (NS -10% [US]) were performed on a dimensionally correct pitching mound equipped with a force platform (1200 Hz). Marker trajectory data (32 reflective markers) was tracked from 10 high-speed cameras at 240 frames/sec. Fzpeak was normalized for body weight (N/BW) and wrist velocity (m/s) was measured at ball release. **RESULTS:** When all stride lengths were combined, significant correlations were found between Fzpeak and wrist velocity ( $r=0.47$ ;  $p<0.01$ ). However, there was no effect of stride length on either Fzpeak (NS= $1.63 \pm 0.20$ , OS= $1.59 \pm 0.19$ , US= $1.60 \pm 0.22$ ;  $p>0.05$ ) or wrist velocity (NS= $18.27 \pm 1.03$ , OS= $17.95 \pm 1.00$ , US= $18.12 \pm 0.85$ ;  $p>0.05$ ). **CONCLUSIONS:** These results confirm the relation between Fzpeak and wrist velocity. However, the data indicate that skilled throwers are able to compensate for changes in stride length up to 10% to maintain performance.

**EFFECT OF PACK LOAD POSITION ON TRUNK FLEXION DURING OBSTACLE TASK**

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**P210** PURPOSE: The purpose of this study was to examine the effect of three pack-loading positions on trunk flexion angle during the navigation under an obstacle. METHODS: Fifteen participants were fitted with a MOLLE rucksack weighted to 20% of bodyweight and completed two trials within each load position (bottom loaded – BL; top loaded – TL; no pack – NP) of walking under an obstacle set to each participants' acromion height. Kinematic data were recorded using a 10-camera motion capture system. RESULTS: A 1-way repeated measures ANOVA was computed and there was a significant difference in trunk flexion angle between the three loading conditions ( $F_{2,28} = 4.68$ ,  $p = 0.018$ ). A pairwise comparison revealed significantly less trunk flexion in the BL position compared to NP ( $p = 0.046$ ) and TL positions ( $p = 0.046$ ). CONCLUSION: Results indicate in the NP and TL load positions, participants presented with trunk flexion angles of  $40.98^\circ$  and  $40.31^\circ$ , respectively, whereas BL position caused  $33.12^\circ$  of trunk flexion. Mechanically, these results may support the notion of NP and TL positions creating longer moment arms between the trunk and center of mass. It is possible that the BL position creates a counter-moment, therefore limiting the amount the trunk flexes while navigating under an obstacle. Future research utilizing EMG to examine trunk musculature would be beneficial to further understand the role load position has on trunk kinematics and gait mechanics during obstacle navigation.

**EFFECTS OF MILITARY LOAD CARRIAGE ON VERTICAL GROUND REACTION FORCE PARAMETERS**

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**P211** PURPOSE: The purpose of the study was to examine the effects of load carriage imposed by an advanced military training program on vertical ground reaction force (vGRF) parameters during a simulated march. METHODS: Twelve male Army ROTC contracted Cadets experienced with military load carriage (age:  $21.6 \pm 1.2$  y, height:  $1.8 \pm 0.1$  m, body mass:  $78.5 \pm 10.0$  kg) participated in this study. A custom built instrumented treadmill was used to measure the vGRF observed during three experimental conditions designed to replicate the minimum load carriage requirements for the Expert Infantryman Badge (EIB) 12-mile march. The experimental conditions investigated in this study were performed at a 2.01 m/s pace for a duration of 3-minutes and included: 1) military issued boots (boot), 2) boot, helmet, and rifle (BHR), and 3) minimum load requirements for the EIB 12-mile march (MIN). The vGRF parameters were calculated from ten consecutive strides during the last minute of each experimental condition; they include: impact peak (IP), time to impact peak (T-IP), active peak (AP), time to active peak (T-AP), and stance time (ST). One-way repeated measures ANOVAs and Friedman tests were used to identify statistical differences in vGRF parameters between conditions. RESULTS: Statistical differences ( $p < 0.05$ ) in AP, T-AP, and ST were observed between the experimental conditions. Both AP and T-AP increased significantly during the MIN condition, whereas ST was found to statistically increase proportionally with respect to the load carried. CONCLUSIONS: The results suggest that individuals experienced with military load carriage may possess a compensating mechanism, enabling them to increase ground contact time and mitigate forces associated with military load carriage.

**EFFECT OF INSTRUCTIONS ON FORCE-TIME CHARACTERISTICS OF THE COUNTERMOVEMENT VERTICAL JUMP**

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**P212** PURPOSE: The purpose of the study was to determine the influence of verbal instructions on force-time characteristics of the countermovement vertical jump (CMJ). METHODS: A randomized cross-over design was used to investigate the effects of pre-jump instructions on force-time characteristics of the CMJ. Participants of the study were fifteen male cadets (age:  $20.3 \pm 1.4$  y; height:  $177.2 \pm 6.4$  cm; body mass:  $82.5 \pm 10.2$  kg). Following a dynamic warm-up, participants performed three maximal CMJs after receiving either external, outcome-related instructions (“Focus on jumping to maximize your jump height.”) or internal, process-related instructions (“Focus on extending your legs quickly to maximize the forces you produce.”). All jumps were performed on a dual force platform. Following data collection, force-time curves were constructed and the following variables were calculated: Jump height (JH), peak force (PF), Net Impulse (NI), Rate of Force Development (RFD), Duration (Dur), and Reactive Strength Index Modified (RSImod). RESULTS: There were no statistically significant differences observed for any of the CMJ F-t variables JH ( $t(14) = 1.26$ ,  $p = 0.227$ ,  $d = 0.24$ ), NI ( $t(14) = 2.08$ ,  $p = 0.057$ ,  $d = 0.19$ ), Dur ( $t(14) = 1.24$ ,  $p = 0.236$ ,  $d = 0.02$ ), RSImod ( $t(14) = -0.49$ ,  $p = 0.634$ ,  $d = 0.17$ ), RFD ( $Z = -1.53$ ,  $p = 0.125$ ,  $d = 0.63$ ), or PF ( $Z = -1.82$ ,  $p = 0.069$ ,  $d = 0.60$ ). CONCLUSION: Pre-jump instructions were found not to significantly influence any of the CMJ f-t variables examined. However, moderate effect sizes were observed for rate of force development (RFD) and peak force (PF), indicating that internal, process-related instructions may help increase these characteristics during a jump.

**CAN AUTOMATIC POSTURAL RESPONSES BE LEARNED?**

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**P213** PURPOSE: Automatic postural responses are the first line of defense against balance loss due to external perturbations. A common method for assessing these responses is the Motor Control Test (MCT) on the Neurocom Equitest. Postural control has demonstrated adaptability to changing environmental conditions after repeated exposure, but an examination of short term and retained adaptability to the MCT has yet to be investigated. This study was undertaken to examine neuromuscular factors associated with repeated exposure to the MCT. METHODS: Eighteen participants volunteered, and, following familiarization, performed six full randomized MCTs over six testing sessions. The first five sessions occurred on consecutive days, with the sixth occurring two days later. Muscle activity was recorded using a Noraxon EMG system from the right tibialis anterior (TA). Mean muscle activity (MMA) was examined during the forward small condition in the initial MCT across all testing days using a 1x6 repeated measures ANOVA at  $p \leq 0.05$ . RESULTS: Analyses revealed a significant time main effect with the TA exhibiting higher MMA on day 1 compared to days 5 and 6, and days 2 and 4 compared to 6 (all  $p < 0.05$ ). While not statistically significant ( $p = 0.052$ ), day 6 showed less MMA compared to day 5 suggesting a possible learning effect during the retention period. CONCLUSION: Previous literature has shown the adaptability of postural responses to varying perturbations. Our results suggest that these responses also adapt and become more efficient when exposure is repeated. Additionally, our results may suggest a retained adaptation, which could be a valuable tool in balance rehabilitation efforts moving forward.

### MUSCLE FATIGUE IS NOT NECESSARY TO INCREASE KNEE INSTABILITY WITH EXERCISE

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Intro: Female athletes experience non-contact ACL injuries at 5 times the rate of male athletes. These injuries occur more frequently at the end of halves and may be associated with exercise-induced fatigue causing knee instability. The purpose of this pilot study was to determine the effect of strenuous exercise on lateral knee movement during the landing phase of a jump. Methods: Ten subjects completed both the exercise and the control trial consisting of two 25-min game simulations on a treadmill or on a separate day the equivalent rest. Before, at half time, and immediately following the interventions subjects performed sets of 3 box jumps and vertical leaps. Surface Electromyography (sEMG) was used to assess relative muscle activation (%MVIC) and 2D video analysis to assess changes in Q Angle upon landing from a box jump. Data were analyzed by 2 factor repeated measures ANOVA. Results: Power analysis indicated the study was under powered and that 18 subjects were necessary to be adequate statistical power; therefore, results were interpreted with  $p \leq 0.1$  as significant. There was no effect of exercise on Vertical leap, a measure of muscular fatigue. However, Q angle increased by 7.4 degrees following completion of the second exercise session (Pre:  $21.7 \pm 2.34$  vs Post:  $29.2 \pm 5.48$ ) ( $p = .09$ ). %MVIC decreased significantly over time for the Gastrocnemius (Pre:  $78\% \pm 4\%$  vs Post:  $66\% \pm 5\%$ ,  $p \leq .1$ ), bicep femoris (Pre:  $68\% \pm 3\%$  vs Post:  $64\% \pm 3\%$ ,  $p \leq .05$ ) and gluteus medius (Pre:  $72\% \pm 5\%$  vs Post:  $58\% \pm 4\%$ ,  $p \leq .05$ ). The latissimus dorsi (Pre:  $48\% \pm 2\%$  vs Post:  $41\% \pm 3\%$ ,  $p \leq .05$ ) and gluteus medius (Pre:  $34\% \pm 3\%$  vs Post:  $29\% \pm 2\%$ ,  $p \leq .05$ ) muscles were activated later when comparing pre-exercise values to post-exercise results. Conclusion: These data indicate that knee instability with exercise may not require muscular fatigue, and that changes are associated with altered muscle activation. The changes in muscle activation timing may reflect compensation for altered muscle activation.

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### ANALYSIS OF VERTICAL GROUND REACTION FORCES DURING THE BASEBALL SWING IN HITTERS OF DIFFERENT SKILL LEVEL

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**PURPOSE:** The notion that weight shift is a critical component for proper progression and success to hit a baseball has been poorly supported in the literature. Although studies have examined how weight shift is influenced by various pitch types, studies have failed to examine the potential differences in weight shift between hitters of different skill. Therefore, the primary aim of this study was to examine potential differences in peak vertical ground reaction forces (GRFz) and time to peak GRFz for each leg between two different skill groups. **METHODS:** Male baseball players were placed into recreational ( $n = 6$ ) or skilled ( $n = 6$ ) groups based on if they had competed at the NCAA level. Participants completed three baseball swings while standing on two force platforms sampling at 1,000 Hz. Time to peak GRFz was related to ball contact and reported in milliseconds prior to contact. Cumulative averages of peak GRFz normalized to body weight and time to peak GRFz were calculated for each group and analyzed using an independent samples t-test ( $p < 0.05$ ). **RESULTS:** The skilled group demonstrated a significantly higher peak GRFz ( $p = 0.005$ ) and reduction in time to peak GRFz on the back leg ( $p = 0.028$ ) in comparison to the recreational group. **CONCLUSION:** Significantly higher peak GRFz and reductions in time to peak GRFz on the back leg suggests that skilled hitters exhibit a more rapid weight shift in preparation for the swing which may enhance hitting performance.

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### INFLUENCE OF PREPARATORY ARM MOTION ON PEAK VERTICAL FORCE, RESULTANT HORIZONTAL GROUND REACTION FORCE, AND PROPULSION ANGLE

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Purpose: The purpose of this study was to examine the influence of arm swing on sprint starts. The aim of the study was to compare the acceleration of a sprint start with a rapid preparatory arm swing versus a more traditional sprint start. Methods: Five males volunteered to participate in this project. Participants were allotted an unlimited time to warm up, before performing 6 maximal effort sprint starts under 2 conditions: (1) Three trials began with a pre-start arm swing prior to initiation of the run and (2) Three trials were performed while utilizing a "normal" start. Each participant was asked to begin with the rear foot on an AMTI force platform, in an athletic position with rear foot heel raised. Order of start types were randomized via coin flip. Results: One non-parametric T test was conducted and revealed a significant difference in both peak force in the vertical direction ( $p = .043$ ) and Resultant horizontal ground reaction force ( $p = .043$ ). The trials in which a preparatory arm swing was employed yielded larger vertical force values and greater horizontal forces. Conclusions: While the mechanism is still unclear, it is hypothesized that by increasing tension within the latissimus dorsi the pelvis is more stable and provides a better platform from which the gluteal muscles may act. By tensing the system, the kinetic chain can work more efficiently.

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### INFLUENCE OF REPEATED MOTOR CONTROL TESTS ON PROXIMAL LOWER EXTERMITY MUSCULATURE ACTIVATION

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**PURPOSE:** Repeated postural perturbations have been shown to alter muscle activation. The Motor Control Test (MCT) of the Neurocom Equitest is a widely used method to assess postural control responses to surface translations. Activation of proximal lower extremity muscles (PLEM) is necessary to maintain balance when exposed to large external perturbations. The activation pattern of PLEM to repeated MCT perturbations has yet to be assessed. Thus the purpose of this study is to evaluate mean muscle activity (MMA) of PLEM across multiple MCTs. **METHODS:** Eighteen healthy participants completed the study. After familiarization, participants performed five full, randomized MCTs over six testing sessions. The first five sessions occurred on consecutive days, with the sixth occurring two days after the fifth. Muscle activity was recorded using a Noraxon EMG system from the right vastus medialis (Q) and semitendinosus (H). MMA during the first trial of each backward large perturbation (BWL) was analyzed using a 1x6 [Condition x Time] RMANOVA at  $p \leq 0.05$ . **RESULTS:** Significant time main effect for Q exhibited higher MMA on Day 1 ( $73.02 \pm 24.40$  mV) than Days 2, 4, and 5. Q MMA on Day 1 did not differ from Day 3 ( $43.84 \pm 33.11$  mV) and 6 ( $52.64 \pm 39.61$  mV). **CONCLUSION:** Previous literature has demonstrated that muscle activity changes after repeated perturbations. The stretch reflex of the H inhibits the contraction of Q thus lowering muscle activation. Smaller Q MMA was found after repeated exposure, suggesting activation of PLEM becomes acclimated to postural demands of the MCT.

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#### THE INFLUENCE OF ARCH HEIGHT ON PROPULSION MECHANICS DURING FORWARD HOPPING AND LATERAL JUMPING TASKS

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**P218** PURPOSE: Previous research has demonstrated that higher arched feet develop anteroposterior ground reaction forces (GRFs) that are beneficial for forward propulsion. However, it has recently been suggested that feet with low arch heights (LA) contribute to propulsive patterns that are advantageous in lateral direction locomotive tasks. Therefore, the purpose of this project was to analyze the influence of foot architecture on GRF production during the propulsive phase of forward and lateral jumping tasks. METHODS: Twenty-two male division I athletes volunteered and were placed into either normal arch (NA) or LA groups and performed three trials of lateral hopping (speed skating; LJ) and unilateral forward hopping (FH). Peak mediolateral GRFs during the LJ and peak anteroposterior GRF, during the FH propulsion phase, were captured on an AMTI force platform AMTI and normalized to body weight. RESULTS: A series of one-way ANOVAs revealed no significant findings between LA and NA groups in peak mediolateral GRF during the LJ ( $F(1,21) = 2.656, p = .119$ ) nor in peak anteroposterior GRF during the FH ( $F(1,21) = .856, p = .336$ ). CONCLUSIONS: Although no significant differences were found between the arch heights during the jumping tasks, LAs produced greater mediolateral GRF in the LJ task and NAs produced greater anteroposterior GRF in the FH task. The findings of this study suggests that specific foot architecture is beneficial for directionally specific tasks.

#### RELATIONSHIP BETWEEN LOWER EXTREMITY STRENGTH AND GAIT CHARACTERISTICS DURING STAIR DESCENT IN OBESE SUBJECTS

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**P219** Excess body mass has been assumed to be a major contributing factor to obesity-induced biomechanical alterations during activities of daily living, such as descending stairs. However, recent evidence has shown that obesity impairs skeletal muscle contractile function. PURPOSE: To examine the relationship between gait characteristics and lower extremity strength in obese subjects during stair descent. METHODS: 14 obese (BMI:  $32.9 \pm 2.2$ , age:  $31.4 \pm 7.6$  yrs) adults descended a 3-step staircase (h: 16.25 x l: 27.8 cm) at a self-selected pace. Kinematic and kinetic data were measured with 3D motion analysis. Knee extension, knee flexion, and plantarflexion force (MVIC) were measured using a previously validated handheld dynamometer (microFET2). RESULTS: Body weight was directly related to both stance time and step width and inversely related to velocity. Relative muscle force (N/kg) of knee extensors, knee flexors, and plantarflexors decreased with increasing body mass. Relative muscle force of the knee extensors was related to step width ( $y = 0.0173x + 0.048; R^2 = 0.3535$ ). Similarly, relative plantarflexion force was related to step length ( $0.0105x + 0.5181; R^2 = 0.1312$ ). The ratio of knee extensor and knee flexor force was related to stance duration ( $0.0652x + 0.5871; R^2 = 0.2436$ ). CONCLUSION: Relative skeletal muscle force is related to obesity-induced changes in gait characteristics during stair descent. Future work should determine how increasing muscle strength affects gait parameters in obese subjects.

#### EFFECTS OF CANCER RELATED TREATMENT ON VISION AND VARIOUS COMPONENTS OF BALANCE

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**P220** Cancer survivors (CS) experience side effects of cancer-related treatment that contribute to balance deficits. These may include fatigue, loss of confidence, and visual, vestibular, and somatosensory system impairments. Studies suggest adverse side effects may regress over time. PURPOSE/METHODS: To compare the differences in vision and various components of balance between a group of 15 recent (<5yrs) and long-term (>5yrs) CS. Additionally, variables were compared for CS <2yrs post treatment to CS >2yrs post treatment. CS completed a balance confidence survey via the Activities Specific Balance Confidence (ABC) Scale, fatigue index via the Numerical Ratings Scale supplemented with the Six Faces Wong – Baker's Scale (NRS – FRS Scale), vision test via the Snellen Eye Chart (SEC), and balance assessments via the Clinical Test of Sensory Integration and Balance (CTSIB). RESULTS: Independent t test revealed significantly ( $p \leq 0.05$ ) higher scores for the SEC in CS >5yrs ( $10 \pm 0.5$ ) compared to CS <5yrs ( $9 \pm 1$ ), as well as a significantly lower sway index (SI) for the eyes open, foam surface condition of the CTSIB in CS >2yrs post treatment ( $0.95 \pm 0.23$ ) when compared to CS <2yrs post treatment ( $1.32 \pm 0.25$ ). CS >2yrs post treatment scored higher in SI for the eyes closed, foam surface condition of the CTSIB ( $4.12 \pm 0.66$ ) compared to CS <2yrs post treatment ( $3.40 \pm 0.58$ ). No other differences were found between groups for remaining variables. CONCLUSIONS: Results show that vision may contribute most heavily to balance abilities in aging CS. Further studies are warranted to address how balance and vision change after diagnosis and treatment.

#### INTRASESSION ANALYSIS IN POSTURAL CONTROL IN SPORT LIKE DUAL TASK

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**P222** Sport-like dual tasks (SDT) have demonstrated promise as a viable assessment tool for measuring postural control in athletic populations. Purpose: To compare the postural control differences between the first and last 30 seconds of athletes' performance on a SDT Methods: 26 Division I athletes (10 females and 16 males  $20 \pm 2$  yrs) performed 2 trials of 60 seconds of play during the SDT. The SDT involved participants moving an onscreen avatar by shifting their center of mass to interact with or avoid objects in the game. A force plate (1000 Hz, AMTI) collected raw center of pressure (CoP) coordinates and further analyzed. Root mean square (RMS), Peak Excursion Velocity (PEV), and Sample Entropy (SampEn) in both the anteroposterior (AP) and mediolateral (ML) were calculated and then separated by the first and last 30 seconds of the SDT. The differences between the first and last 30 seconds of the CoP were analyzed using paired samples t-tests Results: A significantly greater PEV was observed in the AP direction in the last 30 seconds ( $1.22 \pm 0.751$  m/s) compared to the first 30 seconds ( $0.470 \pm 0.307$  m/s;  $p < 0.001$ ). In the ML direction there was a significantly greater PEV in the last 30 seconds ( $2.818 \pm 1.933$  m/s) compared to the first 30 seconds ( $1.623 \pm .603$  m/s;  $p = .004$ ) was observed. No other significant differences were noted. Conclusion: The results indicate differences in the CoP data between the first and last 30 seconds of AP PEV and ML PEV.

#### DIFFERENCES IN NEUROMUSCULAR STRATEGIES BETWEEN TWO TASKS IN FEMALE LACROSSE ATHLETES

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Female athletes are 4 to 6 times more likely to sustain non-contact anterior cruciate ligament (ACL) injuries than males. While some female sports have screening methods for identifying athletes at increased risk of ACL injury, there is no successful measure for lacrosse athletes. Purpose: To compare 3D biomechanical measures in female lacrosse athletes during cutting and a straight run. Methods: Twenty-eight healthy female lacrosse athletes participated in the study. Six Vicon® Motion System cameras were used to capture kinematic data, while Bertec Force Plates recorded kinetic data. Visual 3D software was used to reconstruct 3-D coordinates for each marker and generate peak vertical ground reaction force (VGRF), peak knee abduction moment (KABM), knee valgus excursion (KVE) and peak knee flexion angle (KFA) for the right lower-limb of each participant. Results: The cutting task had significantly higher VGRF(\*BW)(2.300±0.55 vs. 1.719±0.26, p<0.0001) and KABM(Nm/kg)(-0.78±0.41 vs. -0.62±0.26, p=0.02) compared to the straight run. Measures of knee kinematics, KVE (p=0.38) and KFA (p=0.21), were not significantly different between the two tasks. Conclusions: The directional change of cutting may contribute to an increase in ligament loading. Understanding the way neuromuscular control factors manifest in regards to an ACL injury is crucial, as it offers the greatest potential for future prevention and screening in this population.

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#### SEX DIFFERENCES IN ANKLE, KNEE, HIP, AND TORSO ANGLES DURING A DROP JUMP TASK

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PURPOSE: The purpose of this study was to determine the sex differences in ankle, knee, hip, and torso flexion angles during a drop jump task in Division I collegiate athletes. METHOD: Thirty-one (16 females and 15 males) Division I collegiate athletes participated in the study to determine sex differences in the torso flexion, ankle flexion, knee flexion, and hip flexion angle upon impact from a drop jump. Participants completed five jumps from a 30-cm box followed by a maximum vertical jump attempt. Three-dimensional motion capture (BTS Bioengineering) was used to assess the kinematics which included placing reflective anatomical markers on the participants, and the attempts were recorded using 12 infrared cameras. RESULTS: There was no significant difference by sex for trunk flexion (female: 43.8 ± 9.6 deg, males: 46.9 ± 9.7 deg, p = .392), hip flexion (females: 99.8 ± 17.1 deg, males: 100.1 ± 13.2 deg, p = .950), knee flexion (females: 94.4 ± 14.8 deg, males: 98.7 ± 9.1 deg, p = .340), ankle flexion (females: 27.5 ± 4.5 deg, males: 25.7 ± 4.9 deg, p = .291), or total lower extremity flexion (females: 221.6 ± 32.3 deg, males: 224.4 ± 18.6 deg, p = .768). However, there was a significant difference in vertical jump height from the drop jump (females: 49.5 ± 6.6 cm, males: 65.6 ± 8.3 cm, p < .001). CONCLUSION: There was no significant difference by sex for ankle, knee, hip, or torso flexion angle changes, but there was a difference in vertical jump height. This indicates that there were no sex differences in loading mechanics, thus the difference in jump height may have been due to strength differences.

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#### COMPARISON OF TRAINING PERFORMANCE, RECOVERY, AND PERCEIVED EXERTION AGAINST PLAYING STATUS IN FEMALE COLLEGIATE SOCCER PLAYERS

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In team sports, in-season training needs are dependent on the amount of playing time athletes receive during games. Monitoring in-season training load responses based on playing status could be an important tool to structure individual training. PURPOSE: The aim of the investigation was to determine if the amount of, and the responses to, in-season training for collegiate soccer players differ based on playing status. METHODS: 24 Division I collegiate female soccer players were categorized as Starters (S:n=10), Contributors (C:n=6), or Noncontributors (NC:n=8). Participants wore a bio-harness during each training session. Heart rate (HR) and timing data were collected during each session. Participants provided a perceived recovery scale (PRS) score before and rating of perceived exertion (RPE) score following each training session. RESULTS: Multivariate ANOVA (continuous) and Kruskal-Wallis Test (categorical) analyses revealed no significant differences in Minutes Played (p = 0.718), %HighHR (p = 0.304), %MedHR (p = 0.456), %LowHR (p = 0.222), RPE Load (p = 0.350) or RPE scores (p = 0.259). PRS scores were significantly different (p = 0.046). Post-hoc analyses revealed that C group's median scores were lower (5) compared to S and NC group (6). CONCLUSION: The results suggest that playing status impacted physiologic/perceived stress without a difference in training load. Monitoring training may be beneficial in avoiding injury and promoting performance.

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#### EXTERNAL AND INTERNAL TRAINING LOAD RESPONSES DURING REGULAR AND RECOVERY TRAINING SESSIONS IN COLLEGIATE SOCCER PLAYERS

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Recovery from training especially during periods of intense practice is important to an athlete's preparedness for subsequent training and performance. PURPOSE: The intent of the study was to examine external and internal training load measures and perceived exertion (RPE) and recovery (PRS) during regular in-season training and recovery sessions. METHODS: 26 Division I collegiate male soccer players participated in the study. GPS and heart rate (HR) data were collected for each participant via a bio-harness. Participants provided a PRS score before and RPE following training. 18 practices were used for analysis (15 Regular, 3 Recovery). Practice type was reported by head coach. RESULTS: One-way ANOVA (continuous) and Kruskal-Wallis Test (categorical), with Practice Type as independent variable, revealed significant differences in all variables of interest: Distance (p = 0.003), %HighHR (p = 0.009), RPE Load (p = 0.013), RPE (p = 0.021), Minutes Played, %MedHR, %LowHR, and PRS (all p < 0.001). Players averaged 14.3 minutes, 0.5 miles, and RPE Load of 240 au less during Recovery sessions. PRS was also lower (median: 6) during Recovery sessions compared to Regular practices (median: 7). CONCLUSION: The data suggest that recovery sessions lower external training loads but internal training load variables may be higher following a recovery training session. This may be due to the competitive stress prior to recovery sessions.

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### COMPARISON OF TRAINING PERFORMANCE, RECOVERY, AND PERCEIVED EXERTION AGAINST PLAYING STATUS IN COLLEGIATE SOCCER PLAYERS

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In-season training needs vary in team sports depending on the amount of playing time that players receive in games. **PURPOSE:** The aim of the investigation was to determine if the amount of, and responses to, in-season training collegiate soccer players differ based on playing status. **METHODS:** 26 Division I collegiate male soccer players were categorized as Starters (S:n=10), Contributors (C:n=7), or Noncontributors (NC:n=9). Participants wore a bio-harness during each training session. Global positioning system and heart rate (HR) data were collected during each session. Participants provided a perceived recovery scale (PRS) score before and rating of perceived exertion (RPE) score following each training session. **RESULTS:** Multivariate ANOVA (continuous) and Kruskal-Wallis Test (categorical) analyses revealed significant differences in %MedHR ( $p = 0.006$ ), %LowHR ( $p = 0.024$ ), and PRS scores ( $p = 0.004$ ). Post-hoc analyses revealed that C group spent significantly less time in the %MedHR zone and more in the %LowHR zone than the other groups. Additionally, NS group reported lowest PRS. There was no significant difference in Minutes Played, Distance Ran, RPE Load, or RPE, and a trend to significance with %HighHR ( $p = 0.091$ ). **CONCLUSION:** The results suggest that playing status impacted physiologic/perceived stress without a difference in training load. Monitoring training may be beneficial in avoiding injury and promoting performance.

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### USING VERT© TO PREDICT GAME PERFORMANCE IN DIVISION I VOLLEYBALL PLAYERS

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Women's volleyball is not commonly examined during gameplay due to the difficulty calculating kinetic and kinematic data. However, a new sensor system (VERT) has been proposed to calculate various kinetics and kinematics during games. **PURPOSE:** Determine if VERT variables can predict volleyball game performance. **METHODS:** 20 female DI volleyball players wore VERT sensors on the 5th lumbar vertebrae during seven games. The VERT sensor uses an accelerometer, gyroscope, and magnetometer to calculate 15 kinetic and kinematic variables. For game performance hit percentage, service aces, service errors, solo blocks, block assists, digs, assists, and return errors were normalized using Z-scores. A multiple stepwise regression was run for front (FR) and back row (BR) players for seven games to determine which VERT variables contribute to gameplay success. **RESULTS:** The multiple regression revealed a significant regression for BR ( $F(2, 29) = 12.56, p = 0.001$ ), with an  $R^2$  of 0.47 and FR ( $F(3,41) = 13.17, p = 0.001$ ), with an  $R^2$  of 0.49. BR regression analysis was equal to:  $ZScore = -0.438 - 0.17 [20+ \text{ inch jumps}] + 0.008 [\text{active minutes}]$ . FR equals:  $ZScore = 0.228 - 0.26 [20+ \text{ inch jumps}] + 0.014 [\text{total jumps}] - 0.38 [\text{high surges/minute}]$ . **CONCLUSION:** Results indicate that VERT system may be able to help coaches and researchers monitor athlete on-court success. This may be useful during practices and scrimmages leading to games.

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### POSITIONAL DIFFERENCES IN PHYSIOLOGICAL RESPONSE TO TRAINING SESSIONS IN COLLEGIATE BASKETBALL PLAYERS

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Strength and conditioning (S&C) programs designed for basketball often use similar programming for all players. However, given the varying anthropometric nature of front court (FC) and back court (BC) players, response to stimuli may differ. **PURPOSE:** The purpose was to determine the differences in physiological markers (percent time spent in heart rate [HR] zones, peak and average HR, energy expended, physiological [PL], and mechanical load [ML]) between FC and BC players during a four week off-season university S&C program. **METHODS:** 14 Division I male basketball players (FC: 8, BC: 6) wore a bioharness to collect all research variables during summer conditioning. All variables were calculated via the software provided with the bioharness. A one-way ANOVA was run to determine differences between FC and BC players. **RESULTS:** BC players spent a significantly larger percent of time in a HR zone between 65-84% HRmax (BC:  $32.8 \pm 21.4\%$ ; FC:  $24.7 \pm 18.5\%$ ,  $p = 0.008$ ) and less time in a HR zone <65% HRmax (BC:  $61.7 \pm 28.0\%$ ; FC:  $71.0 \pm 25.4\%$ ,  $p = 0.021$ ). No other variables were significantly different, though significance was approached for HRpeak ( $p = 0.057$ ) and HRaverage ( $p = 0.075$ ). **CONCLUSION:** Results indicate that BC players experience higher sustained HR despite similar loads during S&C training.

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### RELATIONSHIP BETWEEN MECHANICAL AND PHYSIOLOGICAL LOADS ON STRENGTH GAINS IN COLLEGIATE BASKETBALL PLAYERS

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Through manipulation of training loads, different mechanical and physiological stresses can be imposed promoting physiological adaptations. **PURPOSE:** The intent of this study was to investigate the relationship between mechanical (ML) and physiological (PL) load and strength increases during 5 weeks of offseason training. **METHODS:** 10 Division I male basketball players wore a bioharness and underwent an offseason strength and conditioning (SC) program. ML and PL were calculated via the bioharness software using an accelerometer (ML) and heart rate (PL) variables. Pre and post 1RM for the bench press (BP) and trap bar deadlift (TBR) were measured by a strength coach using a standard published protocol. A spearman rho correlation was run to establish a relationship between; PL, ML, and percent change in bench press (BP%) and trap bar deadlift (TBR%). **RESULTS:** The spearman rho correlation demonstrated a significant, strong positive relationship between ML and TBR% ( $r = 0.624, p = 0.05$ ). In addition, a significant, strong negative relationship was present between average ML and BP% ( $r = -0.623, p = 0.05$ ). No significant relationships between PL and changes in 1RM for either lift (BP:  $p = 0.595$ ; TBR:  $p = 0.646$ ) were present. **CONCLUSION:** ML may be a more appropriate measure when tracking with the bioharness over PL during SC. This may be due to lesser heart rate responses with strength training. The negative relationship in BP should be further explored.

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### WEEKLY CHANGES IN PERFORMANCE, PERCEIVED EXERTION AND RECOVERY IN COLLEGIATE SOCCER PLAYERS

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Training intensity typically declines following preseason training to prepare for in-season competition. Changes in training load and perceived stress/recovery across the season may influence sport performance. The use of a bio-harness and perceived stress and recovery scale may provide useful information about an athlete's response to training. **PURPOSE:** The intent of the present study was to examine weekly training load, physiological response, and perceived exertion and recovery in collegiate soccer players. **METHODS:** 26 Division I collegiate male soccer players participated in the study. GPS and heart rate (HR) data were collected for each participant via a bio-harness. Participants provided a perceived recovery scale (PRS) score before and rating of perceived exertion (RPE) following training. **RESULTS:** Multivariate ANOVA (continuous) and Kruskal-Wallis Test (categorical), with Week as independent variable, revealed significant differences in Distance ( $p = 0.006$ ), Minutes Played, %HighHR, %LowHR, RPE Load, PRS, and RPE (all  $p < 0.001$ ) across six weeks of training. Week 1, which included all preseason practices, represented highest Minutes Played, Distance, RPE Load, and RPE. The lowest RPE, Minutes Played, Distance, and RPE Load and highest PRS were reported in Weeks 3 and 6. **CONCLUSION:** The data confirms higher training loads occur in the beginning of the pre-season and the value of multiple measures of training load and perceived intensity and recovery.

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### CHANGES IN BAT ANGLE AT MAXIMAL VELOCITY IN COLLEGIATE SOFTBALL PLAYERS

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The bat angle of a hitter is responsible for determining the path of which the ball travels and may play a role in the generation of power. The hitter must recognize the ball as it approaches the strike zone and react in milliseconds to achieve the ideal bat angle for the specific pitch. However, there is little known information about the changes in bat angle at maximal velocity. **PURPOSE:** Therefore, the purpose of this study was to examine changes of the bat angle at maximal velocity (BAMV) in collegiate softball players over their fall season. **METHODS:** Eight intercollegiate softball players [Age:  $19.3 \pm 1.2$  years; Height:  $166 \pm 9.2$ cm; Mass:  $66.9 \pm 8.9$ kg] completed three testing sessions. Before each testing session, participants completed a general as well as an on-deck warm-up (WU). At the conclusion of their on-deck WU, participants chose their respective batting stance and hit a ball off a tee with a standard softball bat (33in/23oz or 34in/24oz) of their choice. Five maximal swing trials were recorded with a 20 second elapse between each swing to mimic the time between each pitch. A Vicon Nexus motion capture system recorded all kinematic variables of interest regarding BAMV. Each cardinal plane was analyzed over each time point to utilize a three by one-way repeated measures ANOVA with an alpha level set at ( $p=.05$ ). **RESULTS:** Results of these analyses revealed no significant differences in BAMV. **CONCLUSION:** Further research needs to be conducted on bat angle throughout the strike zone in order to determine possible differences.

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### QUANTIFYING PERFORMANCE CHARACTERISTICS OF AN INTERNATIONAL LEVEL MALE WEIGHTLIFTER

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**PURPOSE:** To quantify squat jump and isometric mid-thigh pull performance characteristics of an international level male weightlifter relative to a group of male weightlifters at an Olympic training site. **METHODS:** An 85kg international level male weightlifter (22.0y, 81.63kg, 168.5cm) representing the USA was recruited for this study and compared to a group of male weightlifters ( $n=41$ ,  $24.2 \pm 4.6$ y,  $93.14 \pm 21.10$ kg,  $173.8 \pm 8.6$ cm). Data was collected as part of an on-going athlete monitoring program and athletes were familiar with all tests performed. Unloaded squat jumps and isometric mid-thigh pulls were performed on force plates sampling at 1000Hz and analyzed with LabView software. Variables analyzed included squat jump height (JH) and allometrically scaled peak power (PPa), isometric mid-thigh pull allometrically scaled peak force (IPFa) and rate of force development at 200ms (RFD200). Standardized (z) scores were calculated for the athlete on each testing variable. **RESULTS:** Testing results for the athlete and group were as follows: JH= $47.0$  vs.  $33.9 \pm 6.1$ cm ( $z=2.13$ ), PPa= $309.14$  vs  $278.68 \pm 81.76$ W·kg<sup>0.67</sup> ( $z=0.37$ ), IPFa= $263.78$  vs  $270.31 \pm 48.27$ N·kg<sup>0.67</sup> ( $z= -0.14$ ), RFD200= $4701.93$  vs  $10241.4 \pm 5422.6$ N·s<sup>-1</sup> ( $z= -1.02$ ). **CONCLUSION:** Despite having the highest absolute (total= $326$ kg) and relative (Sinclair= $389.54$ ) weightlifting total, the only variable that corresponded with the athlete's competition success was JH. These findings suggest that coaches and sport scientists can use squat jumps to predict competition success and identify talent in male weightlifters.

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### CARDIAC-AUTONOMIC RESPONSES TO IN-SEASON TRAINING AMONG COLLEGE FOOTBALL PLAYERS

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**PURPOSE:** To determine if recovery of vagally-mediated heart rate variability (HRV) to resting values occurs between consecutive-day, in-season training sessions among college football players. **METHODS:** Subjects ( $n = 29$ ) were divided into groups based on position as follows: receivers and defensive backs (SKILL,  $n = 10$ ); running backs, linebackers and tight-ends (MID-SKILL,  $n = 11$ ) and linemen (LINEMEN,  $n = 8$ ). The natural logarithm of the root-mean square of successive differences multiplied by twenty (LnRMSSD) was acquired at rest in the seated position prior to Tuesday and Wednesday training sessions. Data collection procedures were repeated over three weeks during the first month of the competitive season. **RESULTS:** A position  $\times$  time interaction was observed for LnRMSSD ( $p = 0.04$ ). Between-day differences in LnRMSSD were trivial and non-significant for SKILL (Tuesday =  $82.8 \pm 9.3$ , Wednesday =  $81.9 \pm 8.7$ ,  $p > 0.05$ ). Small and significant reductions in LnRMSSD between days were observed for MID-SKILL (Tuesday =  $79.2 \pm 9.4$ , Wednesday =  $76.2 \pm 9.5$ ,  $p < 0.05$ ) and LINEMEN (Tuesday =  $79.4 \pm 10.5$ , Wednesday =  $74.5 \pm 11.5$ ,  $p < 0.05$ ). The individual changes in LnRMSSD from Tuesday to Wednesday were significantly related to external training load ( $r = 0.46$ ,  $p = 0.02$ ) and body mass ( $r = -0.39$ ,  $p = 0.04$ ). **CONCLUSIONS:** Cardiac-parasympathetic activity did not return to resting values for LINEMEN or MID-SKILL prior to the next training session. Larger reductions in LnRMSSD tended to occur in players with greater body mass and lower workloads, though some individual variability was observed.

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### POSITIONAL DIFFERENCES IN PEAK POWER DURING COUNTERMOVEMENT VERTICAL JUMP IN PROFESSIONAL BASEBALL PITCHERS

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The vertical jump is commonly used as a field based testing measure of athletic performance. Various forms of the vertical jump and the mechanical components derived from the vertical jump have been previously studied. The countermovement jump (CMJ) is similar to many sporting movements as it uses the stretch-shortening cycle to achieve greater height in the jump and power output. Purpose: Determine neuromuscular differences between starting and relief pitchers in variables measured during the CMJ, in particular peak power. Methods: CMJ were part of a larger testing battery that occurred during minor league spring training as part of a professional baseball organizations yearly athletic performance evaluation. Seventeen (17) subjects (8 starters and 9 relievers) performed three (3) CMJ. Peak power was obtained with the use of a linear position transducer with the cable attached to a wooden dowel. They were instructed to jump as explosively as possible to try and jump to maximal height. The mean peak power obtained during the three jumps were used in the analysis. Independent t-test were used to determine if differences existed between groups. Results: CMJ peak power in the starters (6337.09 1461.86) was not significantly different from that of the relievers (6766.58 2071.46),  $t(15) = -0.488$ ,  $p = 0.633$ . Conclusions: This suggests that there are not positional differences between starting and relief pitchers in terms of neuromuscular performance. Thus, the training of lower body power should not be different between starting and relief pitchers.

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### RELATIONSHIP BETWEEN THE ECCENTRIC UTILIZATION RATIO AND 20-METER SPRINT TIMES IN DIVISION I MEN'S SOCCER PLAYERS

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PURPOSE: The purpose of this study was to examine the relationship between the eccentric utilization ratio (EUR) and 20-meter sprint (20m) times in Division I men's soccer players. METHODS: Twenty-one athletes (age =  $20.7 \pm 1.2$  years, height =  $179.38 \pm 6.09$ cm,  $76.4 \pm 6.5$ kg) performed countermovement jumps (CMJ), squat jumps (SJ), and 20m testing during a single testing session. The EUR was calculated using the athletes' jump height (EUR-JH) and peak power (EUR-PP). Person product-moment correlations were used to examine the relationship between both EUR variables and 20m. RESULTS: 20m displayed trivial and small, negative relationships with EUR-JH ( $r = -0.041$ ,  $p = 0.361$ ) and EUR-PP ( $r = -0.118$ ,  $p = 0.340$ ), respectively. No statistically significant relationships were found between 20m and either EUR variable. CONCLUSION: The results of this study found both EUR variables to be weak predictors of 20m in Division I collegiate soccer players. It is important to note, however, that these data were collected during a single post-season testing session. Accordingly, future studies should aim to examine the longitudinal changes in EUR over the course of a training year to better understand its relationship to sprint performance.

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### RELATIONSHIP BETWEEN MAXIMAL ISOMETRIC STRENGTH AND 20-METER SPRINT TIMES IN DIVISION I MEN'S SOCCER PLAYERS

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PURPOSE: The purpose of this study was to examine the relationship between maximal isometric strength and 20-meter sprint (20m) times in Division I men's soccer players. METHODS: Twenty-one athletes (age =  $20.7 \pm 1.2$  years, height =  $179.38 \pm 6.09$ cm, body mass =  $76.4 \pm 6.5$ kg) performed isometric mid-thigh pulls on dual force platforms and 20m testing during a single testing session. Pearson product-moment correlations were used to examine the relationship between the athletes' isometric peak force (IPF), allometrically scaled IPF (IPFa), and 20m. RESULTS: 20m displayed trivial, negative relationships with IPF ( $r = -0.046$ ,  $p = 0.184$ ) and IPFa ( $r = -0.184$ ,  $p = 0.425$ ). Additionally, neither of these relationships were found to be statistically significant. CONCLUSION: Despite the wealth of evidence substantiating the positive relationship between maximal strength and sprint performance, the results of this investigation do not support this notion. It is important to note, however, that the data included in this study was collected shortly after the athletes' final match of the competitive season. Consequently, accumulated neuromuscular fatigue may have attenuated this relationship. Future studies should aim to monitor these performance qualities over the course of a full competitive season to get a more comprehensive understanding of their influence on each other.

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### RELATIONSHIPS BETWEEN JUMPING AND BASEBALL PERFORMANCE

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PURPOSE: Evaluating the relationships between sport performance characteristics and sport specific variables can aid practitioners in development of strength and conditioning programs. Therefore, the purpose of this study was to evaluate the relationships between vertical jumping ground reaction force (vGRF) characteristics and both hitting and pitching performance in collegiate baseball players. METHODS: 8 position players (pos) ( $86.1 \pm 9.0$  kg) and 8 pitchers (p) ( $85.4 \pm 15.7$  kg) participated in this study. Players with less than 100 at bats or less than 20 innings pitched were excluded from this study. As part of an athlete monitoring program, all athletes participated in countermovement jump testing on a portable force plate sampling at 1000 Hz. Pearson's correlations were run between hitting and pitching statistics and assessed vGRF variables. RESULTS: Concerning pos, statistically and practically significant relationships were found between triples and body mass (bm) and between RBI and peak power (pp) ( $r=0.67$ ,  $r=0.66$ ). P with greater bm gave up fewer runs, earned runs and walks ( $r=-0.63$ ,  $r=-0.68$ ,  $r=-0.71$ ). Similarly, p with greater PP gave up fewer hits, runs and earned runs ( $r=-0.67$ ,  $r=-0.77$ ,  $r=-0.78$ ). Other practical relationships were observed, but statistical significance was not achieved, likely due to the small sample size. CONCLUSION: While the small sample size likely diminished this study's chances of achieving many statistically significant relationships, the presence of many practically significant relationships demonstrates the importance of developing explosive force production characteristics in training.

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#### **FORCE PRODUCTION ASYMMETRY AND JUMPING PERFORMANCE IN BASEBALL PLAYERS**

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**P240** **PURPOSE:** Recently, the relationship of force production asymmetry and specific performance tasks has been examined. Concerning jumps, these relationships have been examined via kinematic variables assessed with integrated force-time data. The purpose of this study was to evaluate this relationship via a direct kinetic and kinematic approach. **METHODS:** 16 collegiate baseball players (82.1±4.2 kg) performed unloaded (0 kg) and loaded (20 kg) squat (SJ) and countermovement (CMJ) jumps during this study. Kinetic data were collected via 2 adjacent force plates collecting data at 1000 Hz, while kinematic data were collected with a 6-camera 3D motion capture system (240 Hz). Kinetic asymmetry was then correlated with kinematic performance variables. **RESULTS:** No statistically or practically significant relationships were observed with kinetic asymmetry variables and vertical center of mass displacement (COMd) in either condition of the SJ or the CMJ. All relationships were in the trivial to small range ( $r = 0.0 - 0.3$ , or  $r = -0.0 - -0.3$ ). **CONCLUSION:** While mediolateral COMd may be altered by force production asymmetry, it appears that the weaker side may not influence the overall vertical COMd of jump performance. As suggested by a previous computer simulation study, the stronger side or the side producing more vertical force may be making up for the lack of force production of the other side. The lack of consistency in findings in all studies of bilateral strength asymmetry and vertical jumping performance illustrate the necessity of replicating research.

#### **THE EFFECTIVENESS OF A COLLEGIATE STRENGTH AND CONDITIONING PROGRAM FOR DIVISION III COLLEGIATE BASEBALL PLAYERS**

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**P241** The goal of a collegiate strength and conditioning program is to improve athletic performance from year to year. An athlete should be more athletically prepared to perform as a sophomore than as a freshman and the same athlete should be more athletically prepared to perform as a junior than as a sophomore. **PURPOSE:** The purpose of this investigation was to determine if the baseball strength and conditioning program implemented at LaGrange College accomplished the goal of improving long term athletic preparedness. **METHODS:** Twenty-four collegiate male baseball players performed counter movement vertical jumps on a force plate as part of an ongoing athlete monitoring program. Body mass (BM), jump height (JH), peak power (PP), and rate of force development (RFD) were compared from 2016 and 2017 to identify changes using a paired samples t test. Additionally, Cohens d was used to determine effect size. **RESULTS:** BM (2016 = 86.75 kg, 2017 = 87.79 kg,  $p = 0.159$ ) and RFD (2016 = 4608.66, 2017 = 5187.11,  $p = 0.147$ ) were not statistically different. JH (2016 = 33.17 cm, 2017 = 35.76 cm,  $p = 0.000$ ) and PP (2016 = 3882.60 watts, 2017 = 4204.80 watts,  $p = 0.000$ ) were statistically different. Effect sizes for JH ( $d = 0.76$ ) and PP ( $d = 0.55$ ) were moderate. **CONCLUSIONS:** It appears that LaGrange College baseball players improved athletic preparedness from 2016 to 2017. Changes in body composition may explain the changes in JH and PP without a change in BM, although additional investigations would be needed for confirmation.

#### **THE EFFECTS OF SLEEP TIME ON ULTRA-ENDURANCE TRIATHLON PERFORMANCE**

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**P242** **PURPOSE:** To determine the effects of sleep time (ST) on performance during a 3-day ultra-endurance triathlon (stage 1 = 10km swim, 144.8km bike; stage 2 = 275.8km bike; stage 3 = 84.4km run). **METHODS:** Eighteen triathletes (mean ± SD; age = 37 ± 7.9 yrs; height = 175 ± 7 cm; weight = 70 ± 9 kg) had sleep recorded (Fatigue Science, Vancouver BC) before, during, and 1-day after the Ultraman Triathlon. Participants wore the actigraphy band to record ST for the duration of the study, except while racing. Performance times (PT) were recorded following each race stage. Data were analyzed with SPSS (SPSS v.22, IBM, Armonk, NY). Significance was set at  $p < 0.05$ ; values reported as mean ± SD. **RESULTS:** Total ST was as follows: pre-race: 393.9 ± 81.1 min, pre-stage 1: 342 ± 90.2 min, pre-stage 2: 347.5 ± 54.6 min, pre-stage 3: 299.7 ± 107.0 min, post-race: 308.8 ± 86.3 min. Significant differences were found in ST when pre-race was compared to pre-stage 2 ( $p = .031$ ), pre-stage 3 ( $p = .001$ ), and post-race ( $p = .006$ ). Negative correlations were found between stage 1 PT and pre-stage 2 ST ( $R = -.61$ ,  $R^2 = .37$ ,  $p = .010$ ), stage 1 PT and pre-stage 3 ST ( $R = -.68$ ,  $R^2 = .47$ ,  $p = .005$ ), stage 2 PT and pre-stage 3 ST ( $R = -.62$ ,  $R^2 = .39$ ,  $p = .014$ ), pre-stage 3 ST and stage 3 PT ( $R = -.55$ ,  $R^2 = .299$ ,  $p = .035$ ), and pre-stage 3 ST and total finishing time ( $R = -.66$ ,  $R^2 = .43$ ,  $p = .008$ ). **CONCLUSIONS:** During a multistage ultra-endurance triathlon, performance time can be predicted by ST the night before. In addition, ST following a race stage can be predicted by the performance time of the race stage, with a faster performance time leading to a greater ST.

#### **DAILY HRV MONITORING DURING RESISTANCE TRAINING PROGRAM IN A COLLEGIATE ATHLETE**

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**Purpose:** Examine the relationship between total work (TW) and HRV in a collegiate athlete during an 18-week resistance training program. **Methods:** The program consisted of three 60-90 minute full-body exercise sessions per week with at least 24-hours of rest between each session. Daily 55-sec HRV measurements were taken immediately after waking using the iThlete™ smartphone application and the pulse-wave finger sensor. TW was a combination of total volume (TV) and total load (TL). TV was calculated from sets multiplied by reps of all exercises and TL was the sum of weight lifted in all exercises. HRV was separated into the weekly mean (HRVM) and the coefficient of variation (HRVCV). **Results:** No statistically significant correlations were found between HRVM and TW, TL, or TV ( $r = -.002$ ,  $p = .993$ ;  $r = -.273$ ,  $p = .273$ ;  $r = 0.39$ ,  $p = .879$ ) but statistically significant correlations were found between HRVCV and TW, TL, and TV ( $r = .525$ ,  $p = .030$ ;  $r = -.559$ ,  $p = 0.020$ ;  $r = .705$ ,  $p = .002$ , respectively). A stepwise regression showed non-significant partial correlations for TW ( $-0.232$ ,  $p = .388$ ) and TL ( $-0.323$ ,  $p = -.232$ ). **Conclusion:** No statistically significant correlations were found with HRVM. However, statistically significant correlations were found between HRVCV and TW, TL, and TV, with TV being the most important determinant. This study demonstrates that as intensity of resistance training increases or decreases from session to session through the manipulation of volume and load, HRVCV increases or decreases proportionally, directly or inversely.

### MOTIVATION OF RURAL PARENTS FOR YOUTH RECREATIONAL SPORTS PROGRAMS

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**P245** In 2016, ~46 million youth ages 6-17 years engaged in organized sports across the United States. Common parental motivations for encouraging youth sport participation center around health outcomes, socialization, enjoyment, and competition. **PURPOSE:** The purpose was to identify the motivations of rural parents for signing their kids up for recreational sport programs. **METHODS:** Parents (N=545) from a rural Georgia recreational department were recruited from a variety of youth sports to complete the Motives for Physical Activities Measure – Revised (MPAM-R) survey. **RESULTS:** Descriptive analysis revealed the top three motives for youth participation were: interest/enjoyment (n=6.49 SD .93); competence/competition (n=3.46, SD .72); and fitness (n=6.34, SD .84). Multivariate ANOVA revealed no significant difference between motivational factors by sport, gender, or race. There were significant differences between age group. Older age group parents were more concerned with fitness (U15: 6.5 ± 1; U10: 6.1 ± 1, p = .038) and appearance (U15: 4.4 ± 3; U6: 3.4 ± 3, p = .033) compared to younger age groups. **CONCLUSION:** The data suggest that parental motivation for sport focuses on enjoyment, competition and fitness. Parents of older children value appearance and fitness more than other parents. Targeting factors such as enjoyment, competition and fitness may encourage parent to sustain youth sport participation.

### RELATIONSHIP BETWEEN SUBJECTIVE AND OBJECTIVE MEASURES OF EXERTION IN DIVISION I BASKETBALL PLAYERS

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**P246** Appropriate load monitoring can help athletes and their coaches create a training program that optimize their abilities and lower the risk of injury. **PURPOSE:** To determine the relationship between subjective (rating of perceived exertion [RPE], total quality of recovery [TQR]) and objective (training load [TL]) measures of exertion during a four week off-season strength and conditioning (S&C) program. **METHODS:** 14 Division I male basketball players wore a bio-harness to collect TL during summer conditioning. The program was administered by the university S&C coach. TL was calculated via the software provided with the bio-harness. Players provided a TQR score before each session and a RPE score after each session. A Spearman-rho correlation was run to establish relationships between TL, RPE and TQR, due to the categorical nature of RPE and TQR. **RESULTS:** Analysis revealed a significant, moderate positive relationship between TL and TQR ( $r = 0.428$ ,  $p < 0.001$ ). No significant relationship existed between TL and RPE ( $r = 0.076$ ,  $p = 0.518$ ). TQR and RPE were moderately correlated in the positive direction ( $r = 0.548$ ,  $p < 0.001$ ). **CONCLUSION:** The results indicate that players TL increased during sessions in which higher TQR scores were given. This suggests that players were able to work harder on days they felt recovered.

### WEEKLY CHANGES IN PERFORMANCE, PERCEIVED EXERTION AND RECOVERY IN FEMALE COLLEGIATE SOCCER PLAYERS

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**P247** Training intensity in soccer has been reported to decrease following preseason and into the regular season as teams prepare for competition. Changes in game performance may be a result of increases in training load and perceived stress/recovery during practice across the season. Proper athlete monitoring of training load throughout the season may help minimize injuries and improve performance. **PURPOSE:** The purpose of the study was to examine weekly training load, heart rate (HR) responses, perceived exertion (RPE), and perceived recovery (PRS) in female collegiate soccer players. **METHODS:** 24 Division I collegiate female soccer players participated in the study. HR data was collected for each participant via a bio-harness. Participants provided a PRS score before and RPE score following each practice. **RESULTS:** Multivariate ANOVA (continuous) and Kruskal-Wallis Test (categorical), with each training week as the independent variable, revealed significant differences in all variables of interest (all  $p < 0.001$ ) across six weeks of training. Post-hoc analysis revealed that Weeks 1-3, which included preseason practices/games, had significantly higher Minutes Played, %HighHR, %MedHR, RPE Load, and RPE compared to Weeks 4-6. The lowest RPE, Minutes Played, %HR data, RPE Load, and highest PRS were reported in Week 4, the beginning of the regular season. **CONCLUSION:** The data suggests that as the team transitioned to competition, players' load diminished indicating that practice time focused more on game tactics and skill improvement.

### COMPARING UPPERCLASSMEN AND UNDERCLASSMEN MALE COLLEGIATE TENNIS PLAYERS

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**P248** Various performance metrics, particularly full body power and high aerobic capacity, have demonstrated to influence in game performance for male tennis players. **PURPOSE:** To determine differences in performance measures between upperclassmen (UP) and underclassmen (UN) male tennis players. **METHODS:** Nine male Division I collegiate tennis players (UN: 5, UP: 4) participated in the study. During pre-season testing, VO<sub>2</sub>max, body composition, vertical jump, and both dominant and non-dominant hand grip strength were determined. For both the hand-grip strength and vertical jump test the highest value from a two test sequence was recorded. A oneway ANOVA was run comparing these variables between UN and UP. **RESULTS:** The ANOVA revealed no statistical difference between UN and UP in any of the test variables. However, dominant hand grip strength did approach statistical significance ( $F(1,7)=5.447$ ,  $p = 0.052$ ) with the UP ( $25.5 \pm 2.7$  kg) being greater than UN ( $21.4 \pm 2.3$  kg). In addition, the UP averaged better performance measures compared to the UN, though not statistically significant. **CONCLUSION:** UP tennis players may demonstrate improved performance over UN, though the differences are variable within tests.

#### ATHLETIC PROFILE DIFFERENCES BETWEEN FRONT COURT AND BACK COURT DIVISION I FEMALE BASKETBALL PLAYERS

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Variation in physiological and anthropometric measurements among position groups is an important consideration for coaches, especially in basketball, where different positions require unique skillsets. Purpose: To determine athletic profile differences between Front court (point guard, shooting guard, small forward [F]) and Back court (power forward, center [B]) players in female Division I collegiate basketball. Methods: 14 female Division I basketball players were grouped by position (F: 7; B: 7). Athletes' height, weight, body fat percentage (BF%), dominant (DHG), and non-dominant hand-grip (NDHG) strength were measured. Body composition was assessed using a 3-site skinfold, and the greater of two trials were recorded for the DHG and NDHG. A one-way ANOVA was run to determine differences between the groups. Results: The one-way ANOVA revealed a significant difference between F and B in: height (F:  $168.00 \pm 6.30$ cm; B:  $180.34 \pm 4.64$ cm,  $p = 0.001$ ); weight (F:  $65.7 \pm 8.0$ kg; B:  $80.2 \pm 10.4$ kg,  $p = 0.012$ ); and BF% (F:  $17.1 \pm 5.2$ %; B:  $24.0 \pm 5.3$ %,  $p = 0.030$ ). However, no significant differences existed with DHG (F:  $16.2 \pm 1.9$ kg; B:  $16.4 \pm 2.2$ kg,  $p = 0.861$ ) or NDHG (F:  $15.0 \pm 1.9$ kg; B:  $16.6 \pm 2.4$ kg,  $p = 0.173$ ). Conclusion: The results from this study indicate that female B players in this study were taller, larger athletes compared to F, but had similar upper body muscular strength, as estimated by hand grip testing. The anthropometric results agree with previous research, but disagree with published research on muscular strength differences.

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#### VARIATIONS IN ATHLETIC PROFILES BETWEEN DIVISION I COMPETITION AND AMATEUR CHEERLEADERS

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Cheerleaders must have great physical prowess and proprioception to be successful at their sport. Tryouts occur annually, and roster decisions are made on a number of performance and anthropometric variables. PURPOSE: To determine variations in the athletic profile between Division I collegiate cheerleaders who successfully made the roster (T) versus those who did not (N). METHODS: 51 female cheerleaders trying out for a competitive cheer team participated in the study. For all participants, weight (W), body composition (F%) via air displacement plethysmography, vertical jump (VJ), upper body power (UP), and both dominant (DHG) and non-dominant (NDHG) hand grip strength were assessed. The greater of two trials was used for VJ, NDHG, and DHG analysis. A one-way ANOVA was run comparing the athletic profile between T and N. A stepwise multiple linear regression was run to determine the ability of the variables to predict T. RESULTS: The one-way ANOVA revealed significant differences between VJ ( $F(1,49) = 4.4$ ,  $p = 0.04$ ) and UP ( $F(1,49) = 5.9$ ,  $p = 0.018$ ) with T having greater VJ ( $47 \pm 5$  cm) and UP ( $5.42 \pm 0.7$  m) than N ( $43.7 \pm 5.3$  VJ cm,  $4.9 \pm .8$  UP m). The multiple regression revealed a significant regression for T ( $F(2,48) = 6.9$ ,  $p = 0.002$ ,  $R^2 = 0.22$ ,  $T = 2.12 - 0.094$  (UP) +  $0.032$  (NDHG)). CONCLUSION: These results suggest that a number of performance metrics, specifically VJ, but no anthropometric ones, inform roster construction.

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#### COMPARING KINETIC AND KINEMATIC PERFORMANCE BETWEEN CONTRIBUTORS AND NONCONTRIBUTORS IN DIVISION I FEMALE VOLLEYBALL PLAYERS

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Due to the difficulty and intensive analysis required, various kinetic and kinematic variables are not commonly assessed within volleyball practices. However, new sensors have the ability to calculate these variables during practice allowing for performance analysis. PURPOSE: Determine if there is a difference during practice performance between game contributors (Con) and noncontributors (Non) in female Division I collegiate volleyball athletes. METHODS: 20 Division I female volleyball players (Con: 13, Non: 7) wore a sensor on their lower back during the first four weeks of regular season practice. The sensor software uses an accelerometer, gyroscope, and magnetometer to generate 15 different biomechanical variables. All variables were normalized using an average Z-score for comparisons. The players were classified as a front row (FR) or back row (BR) player to compare Con and Non by position, via a one-way ANOVA. RESULTS: There were no significant differences in average Z-scores between Con and Non FR players (Con:  $.13 \pm .54$ ; Non:  $.17 \pm .35$ ;  $F(1,142) = .306$ ,  $p = .581$ ). A significant difference was present between Con and Non BR players (Con:  $-.22 \pm .41$ ; Non:  $-.06 \pm .58$ ;  $F(1,169) = 3.994$ ,  $p = .047$ ). CONCLUSION: The results suggest that Con and Non FR players experienced similar loads throughout practice, but Non BR players were subjected to higher loads during training.

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#### VARIATIONS IN HANDGRIP STRENGTH BETWEEN DOMINANT AND NONDOMINANT HANDS IN COLLEGIATE FEMALE ATHLETES

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Body asymmetries are a common issue for coaches, athletic trainers, and athletes. Muscular asymmetries may limit athletes' in game performance due to athletic preference and increased risk of injury. Coaches do not always have the time to perform a battery of tests, however hand grip strength has been previously associated with upper body strength. PURPOSE: The purpose of the study was to determine the difference between dominant (DHG) and non-dominant (NDHG) handgrip strength in female collegiate athletes. METHODS: Sixty-five Division I collegiate females athletes (age:  $18.8 \pm 1.2$  yrs; ht:  $163.1 \pm 8.9$  cm; wt:  $60.2 \pm 11.0$  kg) performed two maximal effort handgrip strength tests with their dominant and non-dominant hands, as indicated by writing hand preference. The greater of the two trials were recorded for the DHG and NDHG. A two tailed paired samples T-test was run comparing DHG to NDHG performance. RESULTS: There was a statistically significant difference between DHG ( $14 \pm 2.5$  kg) and NDHG ( $13 \pm 3$  kg),  $p = 0.001$ . However, the difference between sides was relatively minimal (7% difference). CONCLUSION: These results suggest that female collegiate athletes may slightly favor their dominant side during gameplay and practice. This may lead to an increased injury risk. Further testing should be done to determine if this difference is consistent throughout the body.

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### EFFECTS OF COOL-DOWN PROTOCOL UPON EXIT FROM THE FIRST-HALF ON SECOND-HALF PERFORMANCE IN NCAA D-II SOCCER PLAYERS

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**P253** **PURPOSE:** To examine the effectiveness of improving soccer performance during a match's 2nd half by including a cool-down upon exiting the 1st half. The protocol considers and seeks to address the 30-minute rest-period between the first and second half of play common for starters. **METHODS:** Eighteen NCAA D-II collegiate male soccer players participated in two trials of a soccer-match simulation. The cross-over design consisted of a cool-down and non-cool-down treatment to examine the difference in stiffness and mental, physical, and general preparation for the 2nd half. Each trial included 30 minutes of play in the 1st and 2nd half with 30 minutes of half-time. During half-time, players were randomized to either cool-down (CD) or passive rest (PR). Both groups performed a re-warmup protocol prior to the 2nd half. Blood lactate concentration, 30-meter sprint times, and questionnaires for stiffness and preparedness were assessed at six timepoints. **RESULTS:** There were significant differences ( $p < 0.05$ ) between CD and PR groups in the questionnaire regarding how stiff players perceived themselves to be. No significant differences ( $p > 0.05$ ) were found for blood lactate concentrations. There were no significant differences ( $p > 0.05$ ) in sprint times between groups. **CONCLUSIONS:** Blood lactate concentration was not lowered when a cool-down was performed upon exit from the first-half. This indicates that a re-warmup protocol might suffice for the preparation for the second-half. Questionnaire data shows that the players felt more prepared and less stiff for the remainder of the game when performing the cool-down. Sprint times did not show any significant differences between groups.

### DOES EXERCISE AFFECT EXECUTIVE FUNCTION IMMEDIATELY POST EXERCISE?

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**P254** **Introduction:** First responders and Tactical Units make critical decisions during or immediately following strenuous physical exertion. Executive function improves several minutes post exercise; however, no data is available about executive function at the cessation of exercise when sensory feedback from physiological responses to exercise such as increased heart rate (HR) and increased ventilation ( $V_e$ ), remain elevated. Therefore, the purpose of this study was to determine whether executive function was altered immediately post-exercise. **Methods:** 18 male and female subjects completed 1 maximal and 2 submaximal treadmill tests. Immediately before (Pre), immediately post (iP), and 5 minutes post (5P) exercise, subjects completed a Trail Making Test B (TMT-B). Subjects also completed 2 submaximal isocaloric bouts at 50% and 85%  $VO_{2max}$ . **Results:** The time to complete the TMT-B following the  $VO_{2max}$  test increased significantly at iP and then decreased significantly at 5P (Pre:  $25.9 \pm 1.4$ , IP:  $30.0 \pm 2.5$ , 5P:  $24.0 \pm 1.5$  sec,  $p \leq 0.05$ ). HR also increased at iP and then decreased at 5P (Pre:  $87.7 \pm 3.1$ , IP:  $192.6 \pm 3.2$ , 5P:  $131.1 \pm 4.2$ ,  $p \leq 0.05$ ). Following submaximal exercise there were no differences in the TMT-B time at 50% (Pre:  $28.5 \pm 2.6$ , IP:  $24.8 \pm 1.7$ , 5P:  $24.8 \pm 1.8$  sec,  $p \leq 0.05$ ) and 85% (Pre:  $27.2 \pm 2.2$ , IP:  $24.8 \pm 1.6$ , 5P:  $23.4 \pm 1.1$  sec,  $p \leq 0.05$ )  $VO_{2max}$  even though HR changed significantly at 50% (Pre:  $87.6 \pm 4.8$ , IP:  $127.5 \pm 6.0$ , 5P:  $96.1 \pm 4.8$  sec,  $p \leq 0.05$ ) and 85% (Pre:  $80.9 \pm 3.7$ , IP:  $158.2 \pm 6.1$ , 5P:  $93.0 \pm 3.4$  sec,  $p \leq 0.05$ )  $VO_{2max}$ . **Conclusions:** Executive function decreases immediately post high intensity exercise that may induce fatigue, but non-fatiguing, low and moderately high intensity exercise has no effect. Afferent feedback has apparently little effect on executive function.

### DIURNAL REGULATION OF SKELETAL MUSCLE ANABOLIC SIGNALING THROUGH mTORC1

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**P255** Skeletal muscle mass regulation is dependent on physical activity, hormone, and nutrient signaling. These stimuli integrate in the muscle to produce an anabolic response through the Akt / mTORC1 signaling nexus. Diurnal variation in activity levels, feeding, and circulating hormones have not been accounted for in mice muscle anabolic signaling. Much of our knowledge is limited to the fasted, inactive state, which has created gaps in our understanding of skeletal muscle anabolic signaling. **Purpose:** We examined the effect of the light and dark cycle on skeletal muscle's anabolic flux through Akt / mTORC1 in adult male mice. **Methods:** Circulating glucose, body weight, food consumption, and activity in C57BL/6 male mice were monitored for four consecutive days at the end of the light and dark cycle. Following the fourth day, mice were sacrificed at the end of light ( $n=8$ ) and dark ( $n=8$ ) cycle. Gastrocnemius muscle was analyzed. **Results:** Circulating glucose was (10%,  $p=0.002$ ) higher after the light cycle, compared to the dark cycle. Muscle 4EBP1 phosphorylation, an indicator of mTORC1 signaling, was induced at the end of dark cycle compared to the light cycle ( $p=0.003$ ). However, pAKT ( $p=0.33$ ) and pAMPK ( $p=0.79$ ) were not different between the light and dark cycle. **CONCLUSION:** Increased physical activity and food consumption occur during the dark cycle and correspond to increased muscle anabolic signaling through mTORC1. However, the anabolic diurnal flux is independent of Akt and AMPK signaling. Further work is needed to establish if skeletal muscle diurnal metabolic flux related to feeding and activity is independent of insulin signaling. Supported by NCI R01-CA121249.

### EVALUATING NEAR INFRARED SPECTROSCOPY SIGNALS FROM SKELETAL MUSCLE

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**P256** Near Infrared Spectroscopy (NIRS) uses the relative absorption of light at 760 and 850 nm to determine skeletal muscle oxygen saturation. There are currently disagreements in the literature over how to report oxygen saturation and the relative contributions of hemoglobin and myoglobin. **Purpose:** 1) Compare the separate 760nm (HHb) and 850nm (HbO2) signals separately during rest, ischemia, and reperfusion, and 2) test whether electrical stimulation to increase metabolic rate changes oxygen saturation values during 5-6 minutes of complete ischemia. **Method:** Ten participants ages = 20-29 years were measured. NIRS measurements were made in the forearm flexor muscles at rest, after 30 seconds of 6 Hz electrical stimulation, during and after 5-6 minutes of complete ischemia produced by arterial occlusion preceded by 30 seconds of 6 Hz electrical stimulation. After 4-5 minutes of ischemia 30 seconds of 6 Hz electrical stimulation was performed. **Results:** Six Hz stimulation increased metabolic rate from 0.56(0.40) at rest to 4.37(1.29). During cuff ischemia 6 Hz stimulation produced non-significant changes in HHb and HbO2: -0.82% and 0.48% of the ischemic reperfusion range, respectively. Interestingly, the HbO2 signal showed pulsatility consistent with heart rate (0.43% of ischemic reperfusion range). The HHb signal did not show pulsatility. **Conclusion:** The difference in the magnitude of pulsatility between HbO2 and HHb signals suggests different anatomical locations for these signals, further suggesting that using various ratios of HbO2 and HHb signals should be performed with caution. Increasing metabolic rate with electrical stimulation during complete ischemia did not further change the NIRS signals, suggesting complete ischemia is obtained with 5-6 minutes of complete cuff occlusion.

**OSTEOPOROSIS PREVENTION THROUGH STRUCTURED STRENGTH TRAINING**

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**P258** **PURPOSE:** In the aging population, lost bone mineral density (BMD) is a prevalent health concern. BMD reduction can cause a loss of mobility, chronic pain, and other muscular skeletal abnormalities. It is generally recommended that postmenopausal women, women over the age of 65, and men over the age of 70 should undergo DXA or other bone density measuring modality scans to test for decreases in BMD. Current clinical practices focus on prevention methods including diet supplements, exercise, and medication to help stem the natural aging process. Data from the competitors, ages ranging from 35-76, in the 2016 USA Master Weightlifting National Championship was collected using DXA to analyze BMD in the body. **METHODS:** Total body DXA comprehensive scans for BMD were performed with focuses on the forearms, femurs, and AP spine. A total body composition analysis was collected as well. In addition, several other factors were recorded from each participant including biographical information, personal records in events, and performance in the competition. Standard parametric descriptive statistical analyses were performed on the data. A median split was performed to separate both men (49yr) and women (45yr) into old and young categories. To compare both old and young competitors and men and women t-tests were performed with combination tests of those four factors. **RESULTS:** The mean Z-score for total body BMD for men was  $1.52 \pm 1.51$ , while women were  $2.11 \pm 1.10$ . Significant differences in Z-score means were not found between the scores of men and women, young men/women and old men/women, young men and young women, or old men and old women. **CONCLUSION:** Rigorous strength training and healthy lifestyles show evidence of having a positive impact on the BMD of an individual compared to the general population. The results of this study lend evidence to the beneficiary nature of structured strength conditioning on the musculoskeletal system in aging populations.

**EFFECTS OF ACUTE SUPINE REST AND HYDRATION STATUS ON MID-THIGH MUSCLE SIZE AND QUALITY AS MEASURED BY ULTRASONOGRAPHY**

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**P259** **PURPOSE:** To determine the posture induced muscle size and quality changes in both young and older adults that may occur from a change in posture. **METHODS:** Thirty-five males consisting of 23 young (age:  $21.3 \pm 2.5$  years; stature:  $177.6 \pm 5.9$  cm; mass:  $70.9 \pm 7.6$  kg) and 12 older males ( $69.8 \pm 1.5$  years;  $176 \pm 6.77$  cm;  $72.9 \pm 8.33$  kg) that were matched by body mass index and physical activity status were used for analysis. Subjects were asked to refrain from exercise for 24 hours prior to visiting the lab and arrive following an eight hour fast. Water compartments and muscle size and quality were examined with segmental bioelectrical impedance spectroscopy (BIS) and ultrasound (US) images of the right thigh and vastus lateralis (VL), respectively. All variables were examined following transition from the standing to supine position for 30 mins at 5 min intervals. **RESULTS:** Muscle CSA (mCSA) remained stable for the first 20 mins and decreased at 30 mins ( $P=0.049$ ) for both groups. There was no change in SFAT across time for the young men ( $P=0.283$ ), but SFAT was greater at 15 mins than 30 mins in the older men ( $P=0.026$ ). Corrected EI showed no change in the young ( $P=0.743$ ), but 10 mins was greater than 25 and 30 mins in the older men ( $P \leq 0.008$ ). Thigh ICW:TW and ECW:TW decreased and increased, respectively, over the 30 mins ( $P < 0.01$ ). **CONCLUSIONS:** Changes in mCSA were noted after 20 minutes in both groups; whereas changes in corrected EI were noted at 10 minutes between groups. Future studies examining mCSA and corrected EI in young and older adults may wish to take measurements within first 10 mins of supine rest. **SUPPORTED BY:** National Strength and Conditioning Association Foundation Master's Grant.

**EXAMINING MYOGENESIS IN C2C12 WITH USE OF NOTCH-1 ANTIBODY**

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**P260** **Purpose:** The influence of Notch signaling through force-activation on myogenesis, using C2C12 cells. **Methods:** C2C12 cells were seeded, proliferated, and differentiated into myotubes, then treated with Notch-1 Antibody. The effects of myotube formation were studied for 96 hours. Myoblast proliferation was observed every 24 hours for four days. Quantification of the number and area of myotubes and nuclei were recorded. **Results:** At 72 hours, treatment of C2C12 with Notch-1 antibody significantly lowered proliferation ( $P=0.004$ ). With 96 hours, treatment of C2C12 with Notch-1 antibody lowered proliferation ( $P=0.08$ ). Treatment of C2C12 with Notch-1 antibody significantly elevated nuclei per myotube ( $P=0.03$ ). Fusion index was slightly decreased with Notch-1 antibody ( $P=0.08$ ). **Conclusion:** Treatment of C2C12 with Notch-1 antibody appears to suppress proliferation. Additionally, Notch-1 antibody has a conflicting impact on fusion, as it appears to increase nuclei per myotube while slightly decreasing fusion index.

**EFFECTS OF HEEL HEIGHT ON STIFFNESS IN THE GASTRONEMIUS OF YOUNGER WOMEN**

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**P261** **PURPOSE:** Examine the effects of heel height on stiffness in the gastrocnemius in younger women. **METHODS:** Ultrasound was performed on gastrocnemius for both legs of eight women between the ages of 18-24 years of age. Their stiffness was recorded for right lateral gastrocnemius (RLG), left lateral gastrocnemius (LLG), right medial gastrocnemius (RMG) and the left medial gastrocnemius (LMG). Each subject was given a survey to specify various shoe types worn, how often they wear them, and for high heeled shoes, the average heel height. Of the eight subjects three of them wore high heeled shoes; their results were compared to those who did not wear them. Stiffness at each location of the gastrocnemius, (RLG, LLG, RMG, and LMG) was averaged for both groups. Given the small sample size data were analyzed descriptively. **RESULTS:** Non-heel wearers had greater stiffness in RLG and RMG, by 0.07 KPa and 0.129 KPa respectively, while heel wearers had higher stiffness in LLG and LMG by 0.49 KPa and 6.83 KPa. **CONCLUSION:** The stiffness values for both groups were similar. However, among the participants who reported wearing high heeled shoes, time spent in heels appears to be related to stiffness. The percentage of participants who wore high-heeled shoes was lower than expected and the height documented by each subject was lower than two inches. Additional research is needed with specific recruitment of participants who regularly wear high-heeled shoes.

#### **DIFFERENCES IN THE MITOCHONDRIAL CAPACITY OF THE RIGHT AND LEFT BICEPS BRACHII MUSCLE**

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Near infrared spectroscopy (NIRS) has been used to measure mitochondrial capacity of various muscles, but not specifically the biceps brachii. **PURPOSE:** Measure mitochondrial capacity using NIRS in the dominant and non-dominant arms of young healthy adults. **METHODS:** Five untrained subjects (mean age  $20.4 \pm 0.7$  years) were tested in the supine position with a NIRS device (Artinis, Ltd) placed in the middle of the biceps brachii muscle. Electrical stimulation (6 Hz, 25–40 mAmps) was used to activate the muscle. A 5 cm blood pressure cuff was placed proximal to the NIRS device and used for arterial occlusion (225 mmHg). **P262** The protocol consisted of 30 seconds of resting metabolism, 30 seconds of post stimulation metabolism, three minutes of ischemia followed by reperfusion to measure the rate of reoxygenation, and two mitochondrial capacity tests. The mitochondrial capacity test consisted of electrical stimulation followed by a series of 22 ischemic cuffs lasting from 5-10 seconds, each allowing muscle reoxygenation. **RESULTS:** There was no difference in mitochondrial capacity between the dominant and non-dominant arms of the untrained subjects (Lf Tc= $43.8 \pm 6.8$  s, Rt Tc= $43.4 \pm 10$  s, P = 0.93). **CONCLUSIONS:** The biceps brachii muscle had mitochondrial capacity values similar to the forearm values from previous studies, and slower than values for the gastrocnemius and quadriceps muscles. We found no evidence for differences between the dominant versus non-dominant biceps brachii muscles. Supported in part by CURO Assistantship.

#### **CHARACTERIZING THE ENDURANCE OF THE DOMINANT AND NON-DOMINANT BICEPS BRACHII**

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Accelerometer-based mechanomyography (aMMG) and electrical twitch stimulation have been used to define the endurance index of various muscles, but not in the biceps brachii. **Purpose:** The endurance index of the muscles in the non-dominant and dominant biceps brachii was measured using aMMG to determine which muscle has better endurance, and to characterize the bicep endurance relative to the endurance of the calf and forearm. **Methods:** The endurance index was determined by using electrical stimulation (25-40 mAmps) on untrained males and females 20.40.7 years (N=8) for 3 minutes at 2 Hz, 4 Hz, and 6 Hz. Stimulation pads were placed on opposite sides of the body of the bicep. Muscle twitch acceleration was measured with a triaxial accelerometer placed over the surface of the muscle. **Results:** At 2, 4, and 6 Hz, the endurance index of the dominant arm were 97.56%, 80.010%, and 48.315%, respectively. The values for the non-dominant arm were 97.613%, 84.415%, and 58.310%. Using paired T tests: no differences were found between arms for 2, 4, and 6 Hz (p=1.00, 0.54, and 0.14, respectively). **Conclusions:** The average endurance at 6 Hz in the biceps brachii (53.3%) was lower than previously published results for the forearm (68.3%) and the calf (95%). Our results suggest that the untrained dominant and non-dominant biceps brachii have the same muscle endurance index values. and that the biceps brachii has less endurance than the calf and forearm.

#### **EVALUATING A NEW ANALYSIS PROTOCOL FOR MEASURING MUSCLE MITOCHONDRIAL CAPACITY**

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Near infrared spectroscopy (NIRS) has been used to measure muscle mitochondrial capacity. The current method requires the use of 22 ischemic cuffs per test. **PURPOSE:** Develop a new analysis protocol for data collection that decreases the number of ischemic cuffs. **METHODS:** Ten young healthy untrained adults (mean age  $21.9 \pm 3.3$  years) were tested in the supine position with a NIRS device (Artinis, Ltd.) placed in the middle of the forearm flexors or the bicep brachii muscles. The muscle was activated using electrical stimulation (6 Hz, 30–45mAmps). A blood pressure cuff placed proximal to the NIRS device was used for arterial occlusion (225 mmHg). **P264** The protocol consisted two mitochondrial capacity tests per muscle. The mitochondrial tests consisted of electrical stimulation followed by a series of 22 ischemic cuffs lasting from 5-10s, with a metabolic rate obtained with each cuff. Two analyses were performed on the data. One using the standard 22 cuff exponential curve fit, while the other only used the first four metabolic rates in its calculations. **RESULTS:** The forearm rate constants were  $1.59 \pm 0.28$  1/min for the 22 cuff analysis and  $1.62 \pm 0.33$  1/min for the 4 cuff analysis. The bicep rate constants were  $1.40 \pm 0.15$  1/min for the 22 cuff analysis and  $1.31 \pm 0.11$  1/min for the 4 cuff analysis. There was no significant difference between analyses using all tests, p=0.701. **CONCLUSIONS:** The 4 cuff analysis program provides the same results as the longer 22 cuff analysis. Further testing is required, however the 4 cuff analysis has the potential to be faster and easier to tolerate for the test subjects.

#### **PRELIMINARY RESULTS OF VASCULAR FUNCTION AND AEROBIC CAPACITY PROFILE OF BREAST CANCER SURVIVORS WHO ARE WITHIN ONE YEAR OF COMPLETING PRIMARY THERAPY**

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**PURPOSE:** To describe vascular function and aerobic capacity in breast cancer survivors (BCS) who are within one year of completing primary therapy. **METHODS:** Applanation tonometry was used to evaluate vascular function (pulse wave velocity, PWV) and cardiopulmonary exercise testing to evaluate aerobic capacity (VO<sub>2</sub>peak). Descriptive statistics were used to describe the sample and Pearson correlations were used to evaluate associations between vascular function and aerobic capacity. **RESULTS:** Eight BCS, mean age=60 (8y), BMI= 29.5 (7.4), 63% white, 50% Stage 2, 63% received chemotherapy, were evaluated. Mean PWV= was 7.2 (1.65 m/s) and mean VO<sub>2</sub>peak was =17.3 (3.24 mL/kg/min). The correlation between PWV and VO<sub>2</sub>peak was moderate was moderate (r<sup>2</sup>=0.42), p=0.083). **CONCLUSION:** It has been previously established that aerobic capacity is impaired in BCS compared to age-matched, healthy non-cancer populations, and our findings support this concept (17.3 vs. ~26mL/kg/min healthy; Jones et al., 2012). Vascular function in our sample is similar to previously reported values in BCS taken at a similar time post-therapy, but the role of vascular function in aerobic capacity is less established. Our findings approach of exploring correlating correlations between poorer vascular function with and poorer aerobic capacity following primary cancer therapy is a novel concept in this population. This finding presents an opportunity for efforts designed to improve vascular function potentially through supervised, structured, progressive exercise interventions. Supported by funding from Breast Cancer Research Foundation of New York.

#### EXAMINING PERIPHERAL HEMODYNAMICS DURING HANDGRIP EXERCISE IN VARSITY ROWERS

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**PURPOSE:** This study sought to examine the impact of upper arm aerobic training on peripheral hemodynamics during exercise. **METHODS:** Seven young male trained rowers (20±1 yrs) and seven male recreationally active controls (24±1 yrs) with no history of upper limb aerobic training were recruited for this study. Subjects performed three minute bouts of progressive rhythmic handgrip exercise (4, 8, and 12 kg). Brachial artery diameter and velocity (Doppler ultrasound), heart rate (ECG), and blood pressure (Tango M2) were continuously measured at rest and during each workload. **RESULTS:** Resting values for brachial artery diameter, blood flow, mean arterial pressure, and heart rate were not different between rowers and controls. During exercise, the rowers reported significantly reduced brachial artery blood flow [4 kg (146 vs 243 ml/min); 8 kg (249 vs 417 ml/min); 12 kg (356 vs 536 ml/min)] and shear rate [4 kg (289 vs 470 s<sup>-1</sup>); 8 kg (439 vs 720 s<sup>-1</sup>); 12 kg (478 vs 797 s<sup>-1</sup>)] across all workloads when compared to controls. Brachial artery dilation, when normalized for shear rate, was significantly greater in rowers than controls during 8 and 12 kg workloads. Exercising heart rate and mean arterial pressure were not different between groups. **CONCLUSION:** The results from this study revealed rowers have improved vasoreactivity to a given shear rate stimulus when compared to untrained controls. These findings suggest that upper limb aerobic training results in improved efficiency of blood flow regulation during exercise.

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#### IMPACT OF AEROBIC CAPACITY ON PROLONGED SITTING-INDUCED VASCULAR DYSFUNCTION

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Prolonged sitting has been reported to have deleterious effects on lower limb vascular function. High amounts of aerobic fitness are associated with positive vascular adaptations that could potentially provide a protective effect against this sitting-induced vascular insult. **Purpose:** This study examined the effect of aerobic capacity on vascular function after a bout of prolonged sitting. **METHODS:** Ten young (25±3 yrs) aerobically trained subjects (VO<sub>2</sub>max: 52±7 ml/kg·min<sup>-1</sup>) and ten young (23±2 yrs) sedentary (VO<sub>2</sub>max: 38±5ml/kg·min<sup>-1</sup>) subjects matched for age and gender were recruited for the study. During the prolonged sitting session, vascular function (passive leg movement) was measured at baseline, 1.5 hours and 3 hours with Doppler ultrasonography. **RESULTS:** Vascular function data obtained prior to sitting revealed no significant difference between the high (HAC) and low (LAC) aerobic capacity groups. Independent of group, vascular function was significantly reduced after 1.5 and 3 hours of prolonged sitting, determined by Δ Peak LBF and LBF AUC. Interestingly, no significant differences between groups were revealed in Δ Peak LBF or LBF AUC at 1.5 hours or 3 hours post-sitting. **CONCLUSION:** This study found that aerobic capacity did not mitigate the vascular dysfunction resulting from prolonged sitting.

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#### AGE-RELATED AUTONOMIC REGULATION IN CPVT MICE

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**Purpose:** Catecholaminergic polymorphic ventricular tachycardia (CPVT), also called exercise-induced ventricular tachycardia is a hereditary disease that can cause sudden cardiac death in human patients. Interestingly, while patients with CPVT have normal function of the heart at rest, they show life-threatening arrhythmias during physical activity or acute emotional stress. Autonomic nervous system is known to have a role in arrhythmia pathogenesis, and its response changes with aging. However, little is known that how autonomic regulation with aging contributes to arrhythmia burdens in CPVT. **Methods:** To test our hypothesis, we examined ECG recording with a catecholaminergic challenge (caffeine, 120mg/kg + isoproterenol, 3mg/kg) in anesthetized CPVT mice at different age groups (6 weeks old, n=6; 12 weeks old, n=9; and 48 weeks old, n=6). Data expressed Mean±SE. **Results:** In CPVT mice, the frequency of arrhythmias were increased with aging (Premature ventricular contractions (PVCs)/min: 6 wks, 24.8±14.67; 12 wks, 17.7±15.65; 48 wks, 115±51.52). The resting heart rate (HR) decreased (BPM: 6 wks, 462±23; 12 wks, 419±11; 48 wks, 360±10\*, \*p <0.01) with aging, whereas the HR response after adrenergic stress was significantly increased (delta HR: 6 wks, 1.3±0.04; 12wks, 1.4±0.03; 48wks, 1.5±0.04\*, \*p <0.05). The average RR interval also increased in advanced age (msec: 6 wks, 130.2±6.27; 12 wks, 144.2±3.68; 48 wks, 168.7±5.69\*, \*p <0.01), suggesting a possibility of an increased autonomic regulation. **Conclusion:** We found that arrhythmia incidence worsens by a lowering intrinsic HR, and possibly by a modulation of parasympathetic nerve activity in CPVT mice with advanced age.

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#### THE ACCURACY OF MULTIPLE HRV METRICS ACQUIRED FROM MOBILE DEVICES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Numerous mobile devices have been devised for convenient recordings of heart rate variability (HRV). Yet, their accuracies remain questionable. **Purpose:** The purpose of this meta-analysis was to investigate the accuracy of mobile devices for measuring a multitude of HRV metrics compared to electrocardiography (ECG). **Methods:** This review was conducted in accordance with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) statement. Articles published before July 29, 2017 were located using searches of the Physical Education Index, PubMed, Scopus, and SPORTDiscus online databases utilizing combinations of the terms: heart rate variability, HRV, valid, and validity. All studies included in the meta-analysis were peer reviewed and published in English. Each effect size (ES) was calculated as the absolute standardized difference (Cohens' d) between the HRV metric recorded from the mobile device compared to ECG. Random-effects models were used to aggregate a mean ES and 95% confidence intervals (CI). **Results:** After removing duplicates, our search yielded 5,231 original records for review. Of these, eighteen studies met our inclusionary criteria. The cumulative results from 281 effects indicated a small absolute difference between mobile devices and ECG for HRV measures (ES = 0.3157, 95% CI = 0.2371, 0.3943, p <.001) with significant heterogeneity (Q = 2070.66, p <.001; I<sup>2</sup>=86.48%). **Conclusions:** These results suggest that mobile HRV devices may provide accurate measures of HRV compared to ECG.

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### EXAMINING THE ROLE OF SYMPATHETIC ACTIVATION DURING A PROLONGED SITTING BOUT

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Prolonged sitting is a potent stimulus that can disrupt lower limb vascular function through alterations in normal resting blood flow patterns and increases in arterial pressure. The role of sympathetic activation during prolonged sitting-induced vascular dysfunction is currently unknown. **PURPOSE:** The purpose of this study was to identify if changes in lower limb vascular function during prolonged sitting are attributed to the changes in sympathetic activation. **METHODS:** Twenty young (ages  $\pm 24$  yrs) healthy subjects took part in a 3 hour prolonged sitting bout. Leg vascular function (via passive leg movement), heart rate, mean arterial pressure, leg circumference, and sympathetic activation (via heart rate variability) were measured prior to sitting and at 1.5 and 3 hours after the onset of sitting. **RESULTS:** Prolonged sitting resulted in a significant reduction in vascular function at 1.5 and 3 hours post-sitting when compared to baseline. The sympathetic activation marker pNN50 was revealed to be significantly correlated with MAP, but not leg vascular function, when values were examined as a change from baseline. **CONCLUSIONS:** A strong relationship between MAP and pNN50 indicates the increased sympathetic modulation coincides with the increase in MAP, but not lower limb vascular function, during prolonged sitting.

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### PREVALENCE OF CPR TRAINING AND PUBLIC ACCESS AED AVAILABILITY AT THE UNIVERSITY OF SOUTH CAROLINA AIKEN AND OTHER SOUTHEASTERN U.S. UNIVERSITIES

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**PURPOSE:** The objective of this study was to analyze the emergency preparedness for sudden cardiac arrest at the University of South Carolina Aiken (USCA) and at other Southeastern U.S. universities. Availability of automated external defibrillators (AEDs) in public places outside of hospitals is critical in the Chain of Survival, but all people who may operate an AED still must be trained to provide effective CPR. **METHODS:** We analyzed number and placement of AEDs and prevalence of cardiopulmonary resuscitation (CPR) training. The 12 universities campuses were USCA, Appalachian State University, Coastal Carolina University, Georgia Institute of Technology, University of Alabama, University of Georgia, University of South Carolina Beaufort, Vanderbilt University, University of Florida, Florida State University, University of Tennessee, and University of Central Florida. We contacted each university and requested information about campus size, number of buildings, and number of AEDs on campus. We also requested information on how often CPR training was offered. Based on this information, we established the building to AED ratio, the acre to AED ratio, and the prevalence of on-campus CPR training. **RESULTS:** Our findings show that the average building to AED ratio was 10.9 (range: 1.3–40.8) and the average acre to AED ratio was 11.6 (range: 2.6–33.3). USCA's building to AED ratio was 1.3 and its acre to AED ratio was 13.3. Of the 12 universities studied, 11 offer periodic on-site CPR training for faculty/staff. **CONCLUSIONS:** Our results suggest a disparity in AED availability at universities in the Southeastern U.S. This could impact response to cardiac events at some universities.

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### VALIDITY OF LOWER LIMB PULSE-WAVE VELOCITY ASSESSMENTS USING AN OSCILLOMETRIC TECHNIQUE

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**Purpose:** There has been a great deal of recent interest in the effects of sedentary behavior, including sitting, on cardiovascular health. In particular, prolonged sitting has been shown to reduce leg vascular function. However, these studies have relied on complicated techniques to monitor leg vascular function. The purpose of this study was to determine the validity of supine leg-pulse wave velocity (PWV) obtained from the Sphygmocor XCEL, in supine and seated positions. The device will be deemed valid (relative to ultrasound) if the PWV mean difference between the two devices is less than 1 m/s. **Methods:** The aim is to recruit 32 participants, of which 21 have been recruited thus far (28 y [6], 43% F; BMI 24 [3]). In a single visit, lower limb (femoral-tibia) PWV was measured in sitting and supine positions using the novel cuff-based Sphygmocor XCEL device and a criterion, Doppler Ultrasound. The postural order was randomized. **Results:** In the supine position, PWV was 10.1 m/s (1.3) for ultrasound and 9.8 m/s (1.4) for XCEL. In the seated position, PWV was 13.2 m/s (2.1) for ultrasound and 13.3 m/s (1.4) for XCEL. The standard error of estimate was 1.1 m/s in the supine position and 1.2 m/s in the seated position. **Conclusions:** The difference in the standard error of estimate was slightly larger than our criterion (1 m/s) for both positions; however, the data collection has not been completed.

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### THE IMPACT OF PERIPHERAL HEMODYNAMICS ON DERIVED CENTRAL PRESSURE WAVEFORMS

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**Introduction:** Central hemodynamic parameters, such as aortic systolic pressure (cSBP), augmentation index (AIx), and pressure wave forms (Pb) may offer clinicians superior prognostic information to peripheral systolic pressure (SBP). It is unknown whether changes in peripheral hemodynamics affect central hemodynamic measurements. **Purpose:** To investigate whether changes in peripheral hemodynamics, induced using upper limb tilting, affect central hemodynamic parameters. **Methods:** A single visit, repeated measures design, 20 healthy young adults (BMI: 24 $\pm$ 2.8; 55% F). Brachial pressure waveforms were simultaneously measured in a supine position using an oscillometric device on an experimental (Sphygmocor XCEL) and control (Oscar, SunTech) arm. The experimental arm was positioned 30 degrees above, 30 degrees below, and at heart level, in a randomized order. The control arm remained at heart level. **Results:** For the experimental arm, there was a large effect change in SBP ( $\eta^2=0.82$ ,  $p<0.001$ ) and cSBP ( $\eta^2=0.81$ ,  $p<0.00$ ) when the arm was above (cSBP  $\Delta 4.9$ , SBP  $\Delta 4.6$ ) and below (cSBP  $\Delta -12.5$ , SBP  $\Delta -9.8$ ). AIx increased ( $p=0.023$ ) when the arm was below but not above. No change occurred in Pb. In the control arm, no change occurred in SBP or cSBP, but AIx decreased when the arm was above ( $p=0.04$ ). **Conclusions:** Findings provide a rationale for standardizing the upper limb position during BP measurement.

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### OXIDANT-ANTIOXIDANT BALANCE AND PERIPHERAL VASCULAR FUNCTION: THE IMPACT OF CHRONIC ANTIOXIDANT SUPPLEMENTATION

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Oxidants, such as superoxide, can act to reduce important vasoactive components or, in some instances, act in a vasodilatory capacity. PURPOSE: This study sought to determine the effects of altering the oxidant-antioxidant balance, via a chronic antioxidant (AO) supplementation, on leg vascular function. METHODS: Five healthy, young male subjects ingested an AO cocktail (500mg vitamin C, 400mg vitamin E, and 200 mg of alpha lipoic acid) twice a day for 28 days. Leg vascular function, measured via passive leg movement, was evaluated prior to supplementation (Day 0), on days 1, 7, 14, 21, 28 after the start of supplementation and 7 days after cessation (Day 35). RESULTS: Leg vascular function, measured via PLM-induced leg blood flow (LBF) and area under the curve (AUC), was significantly decreased (PLM-induced LBF: -50%; LBF AUC: -60%) on Day 28 when compared to baseline. After a 7-day cessation, leg vascular function returned to baseline. CONCLUSION: This study revealed that chronic AO supplementation progressively reduced leg vascular function in young healthy individuals. Further research is needed to identify if this reduction was due to removal of oxidant-induced vasodilatory capacity or caused by a reductive stress mechanism.

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### ARTERIAL STIFFNESS AND MITOCHONDRIAL OXIDATIVE CAPACITY IN OBESE AFRICAN AMERICANS

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Purpose: African Americans (AA) are at greater risk for arterial stiffness and mitochondrial dysfunction compared to Caucasians. Prior studies report a relationship between arterial stiffness and mitochondrial function in individuals with hypertension or gestational diabetes, but it has not been evaluated in healthier populations or AAs. This study assessed arterial stiffness and in vivo skeletal muscle mitochondrial capacity in obese AAs. Methods: Fifteen (47.7 ± 6.9 y; 34.6 ± 4.2 kg/m<sup>2</sup>; 86.7% female) AAs from an on-going exercise training study were analyzed. Mitochondrial capacity was determined via near-infrared spectroscopy and quantified as recovery kinetics of muscle O<sub>2</sub> consumption (rate constant) after a short bout of exercise, followed by bouts (5-10 s) of ischemia. Arterial stiffness was assessed as carotid-femoral pulse wave velocity (cfPWV) and aortic augmentation index (AIx). Results: No significant correlation was observed between rate constant and cfPWV (r=0.17, p=0.55) or AIx (r=-0.01, p=0.97), but approached significance with mean arterial pressure (r=0.50, p=0.057). Adjusting for age and gender revealed no significant findings between arterial stiffness and mitochondrial capacity parameters. Conclusions: Arterial stiffness was not associated with mitochondrial capacity. Future studies should consider a larger sample size or greater variance in AA participant demographics (e.g. sedentary status, BMI, gender).

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### THE EFFECT OF SEDENTARY BEHAVIOR ON ARTERIAL STIFFNESS IN OBESE AFRICAN AMERICANS

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Purpose: The association between objectively determined sedentary time and arterial stiffness has not been previously evaluated specifically in African Americans (AA). This relationship may be particularly relevant in AAs who have greater cardiovascular disease risk and arterial stiffness compared to Caucasians. Methods: The analysis sample included 18 participants (47.3 + 6.4 years old; BMI: 36.3 + 5.4 kg/m<sup>2</sup>; 83.3% female). Sedentary time was measured objectively for 7 days using triaxial ActivPAL accelerometers. Sedentary time was quantified as the amount of sitting/lying in hours per day. Data collected also included amount of time spent standing and walking in hours per day, as well as the number of daily steps and total daily energy expenditure. Arterial stiffness was assessed using carotid-femoral pulse wave velocity (cfPWV). Results: No significant relationship was observed between cfPWV and sitting/lying time (r= -0.21, p=0.40). Similarly, correlations between cfPWV and other ActivPAL variables (standing time [r= 0.19, p=0.44]; walking time [r= 0.78, p= 0.76]; steps [r= 0.04, p= 0.88]; MET hours [r=-0.00, p= 0.99]) were not significant. When adjusting for age, there was still no significant findings amongst cfPWV and all ActivPAL variables. Conclusions: The results of the present study suggest that arterial stiffness is not associated with sedentary behavior in obese AAs. Future studies should include a larger sample size or larger variation in participant demographics.

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### THE IMPACT OF SLEEP QUALITY ON PERIPHERAL VASCULAR FUNCTION IN YOUNG ADULTS

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PURPOSE: This study sought to investigate the impact of sleep quality (SQ) on peripheral vascular function in young adults. METHODS: Twenty-seven healthy young adults (age 23±1 yrs) underwent a 7-night sleep assessment (Actigraph GT3X accelerometer). Following the sleep assessment, peripheral vascular function was evaluated by flow mediated dilation (FMD) in the arm (brachial artery (BA)) and leg (superficial femoral artery (SFA)). Pearson correlations were utilized to examine the relationship between 7-night average SQ variables (efficiency [SE], wake after sleep onset [WASO], number of nightly awakenings, and time per awakening) with BA and SFA FMD responses. Each SQ variable was then split into two groups (above and below 50th percentile) and independent sample t-tests were conducted with BA and SFA FMD responses. RESULTS: SE and WASO were significantly correlated with SFA % dilation when normalized for the shear/blood flow stimulus. No significant correlations were determined with BA FMD responses. When comparing group differences, SFA dilation, when normalized for the shear/blood flow stimulus, was significantly reduced in the low SE group when compared to the high SE group (p<0.05) and in the high WASO group when compared to the low WASO group (p<0.05). CONCLUSION: This study revealed that low sleep quality is associated with reductions in lower limb, but not upper limb, vascular function in young adults.

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#### EFFECT OF MODERATE-TO-HIGH INTENSITY PHYSICAL ACTIVITY ON ARTERIAL STIFFNESS IN OBESE CHILDREN

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Aerobic exercise is recommended to reduce the development of early vascular aging (EVA) in obese kids. Children may spend their entire summer break being sedentary while acquiring no cardiovascular benefits when compared to children enrolled in a supervised summer camp with structured physical activities. **PURPOSE:** This pilot study observes the effects of six weeks of supervised structured physical activity on cardiovascular function in obese children. **METHODS:** Six obese children (body fat 39.5±7.9%, mean age 11.8±1.5 years) participated in a 6-week summer camp where they engaged in 3-hours a day of sport and recreational activities at moderate-to-vigorous intensity (average 64-76% and peak 77-95% of HRmax) for 5-days a week. Anthropometric measurements, mean arterial pressure (MAP), pulse wave velocity (PWV), augmentation index (AIx75), and resting heart rate were evaluated pre and post intervention. **RESULTS:** Supervised activity led to a decrease in body mass with a significant decrease in fat mass (pre vs post: 30.5±13.0 vs 29.1±12.4 kg, P=0.024). Additionally, a decreasing trend in MAP (83.0±6.9 vs 81.5±4.8 mmHg), AIx75 (23.2±15.2% vs 15.0±17.1%), PWV (4.5±0.2 vs 4.2±0.3 m/s) and resting heart rate (72±8 vs 68±6 bpm) was observed. **CONCLUSION:** Six weeks of moderate-to-vigorous physical activity can decrease body fat and lower indexes of arterial stiffness in obese children. Longer exercise interventions may be necessary to obtain significant cardiovascular adaptations.

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#### COMPREHENSIVE ANALYSIS ON THE VALIDITY OF ULTRA-SHORTEN HRV PARAMETERS

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**PURPOSE:** The purpose of this study was to determine the validity of ultra-shortened HRV from 1-minute recordings. **METHODS:** Twelve men (age = 23.9 ± 3.4 yrs, height = 178.6 ± 6.1 cm, weight = 81.6 ± 9.5 kg) and fifteen women (age = 21.3 ± 1.2 yrs, height = 170.7 ± 10.5 cm, weight = 71.6 ± 18.9 kg) volunteered to participant in this study. An electrocardiogram (ECG) was used to acquire heart rate data while the subjects assumed the supine position for a 10-minute period. Criterion HRV was established during the last 5-minutes of the recording period, per standard recommendations. Ultra-shortened HRV was calculated for all parameters from a 1-minute recording between the first and second minute of the supine position. The HRV measures included time domain, frequency domain, and Poincare plot parameters. Validity was confirmed by determining the correlation coefficient (r) and 1.96 standard deviation of the constant error (CE ± 1.96 SD). **RESULTS:** The 1-minute segments of RMSSD (r = 0.95, CE ± 1.96 SD = 0.01 ± 0.48) and SD1 (r = 0.95, CE ± 1.96 SD = 0.02 ± 0.48) provided the best agreement with their criterion measures. The poorest validity was found with LF (r = 0.50, CE ± 1.96 SD = 0.16 ± 2.33) and LF:HF (r = 0.55, CE ± 1.96 SD = 0.09 ± 2.13). **CONCLUSION:** The vagal parameters of RMSSD and SD1 should be chosen when measuring HRV from 1-minute recordings since they provided the most acceptable validity results. The ultra-shortened measures of LF and LF:HF should be avoided.

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#### INTER-DAY RELIABILITY OF ULTRA-SHORTENED HEART RATE VARIABILITY PARAMETERS

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**PURPOSE:** The purpose of this investigation was to determine the inter-day reliability of a multitude of HRV parameters recorded from ultra-shortened timeframes. **METHODS:** Twelve men (age = 24.1 ± 3.6 years, height = 178.6 ± 6.4 cm, weight = 82.9 ± 8.7 kg) and fifteen women (age = 21.3 ± 1.2 years, height = 170.7 ± 10.5 cm, weight = 71.6 ± 18.9 kg) volunteered to participate in this study. Data collection occurred on two days separated by 72 hours to 1 week, at approximately the same time for each day. An electrocardiogram (ECG) was used to acquire heart rate data with the subjects in the supine position for two minutes, with the first minute for stabilization and the second minute for HRV calculations. The HRV recordings were compared between Day 1 and Day 2 with intra-class correlations (ICC). Acceptable reliability was considered with an ICC of at least 0.70. **RESULTS:** The best reliability was found for the root mean square of successive normal-to-normal interval differences (RMSSD), high frequency (HF) power domain, and the standard deviation (SD1) of RR intervals perpendicular to the line of identity of the Poincare plot (ICCs ranged from 0.71 to 0.79). The poorest reliability was shown for low frequency (LF) power domain and the LF:HF ratio (ICC = 0.35 and 0.28, respectively). The ICC values for all other HRV metrics were between 0.55 and 0.68. **CONCLUSIONS:** When assessing changes in ultra-shortened HRV, practitioners should consider the vagal markers of RMSSD, HF, and SD1 since they provided the most acceptable results for inter-day reliability.

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#### TIME COURSE OF ENOS EXPRESSION AND ENDOTHELIAL FUNCTION IN RAT AORTAS FOLLOWING ACUTE EXERCISE

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**PURPOSE:** To examine the time course of eNOS expression and changes in endothelial function in rat aortas following an acute, exhaustive bout of treadmill exercise in rats. **METHODS:** 7-9 mo old, male, Wistar rats were divided into four groups (n=6/group): sedentary (SED), 6h post-exercise (6h), 24h post-exercise, and 48h post-exercise. Exercise consisted of one bout of exhaustive treadmill exercise lasting between 30-40 min. eNOS expression was determined by Western Blot and endothelium dependent vasorelaxation in the aorta was assessed by constructing an acetylcholine dose response curve (10e-10-10e-5 M) in a wire myograph. **RESULTS:** eNOS expression demonstrated a slight increase (1.4 fold) following 6 h versus sedentary. No significant differences in eNOS expression were observed in 24h and 48h versus sedentary. Maximal vasorelaxation was impaired in 6h (71.1±4.1%) and 24h (74.1±4.5%) compared to SED (87.1±4.1%) and 48h (80.7±4.3%). EC50 for 6h (3.89e-7) was significantly (p<0.05) greater than SED (1.34e-7) and 48h (1.52e-7). **CONCLUSION:** These data suggest that acute, exhaustive treadmill exercise results suggest that changes in eNOS expression do not explain the impaired endothelial dependent vasorelaxation observed up to 24h post-exercise.

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### INCREASED LAMINAR SHEAR STRESS REDUCES INFLAMMATION-INDUCED ENDOTHELIAL MICROPARTICLE APOPTOSIS IN HUVECS

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Purpose: Millions of Americans have clinical hypertension (HTN) and various cardiovascular diseases (CVD). Endothelial dysfunction can both contribute to and result from, HTN and CVD. Studies have shown an inverse relationship between the inflammatory biomarker C-Reactive Protein (CRP) and endothelial function. CRP directly acts on endothelial cells (ECs) to decrease levels of vasodilators, and increase levels of vasoconstrictors and adhesion molecules. Endothelial Microparticles (EMPs) are released from ECs after activation and apoptosis. Cultured ECs exposed to high laminar shear stress (LSS; an exercise mimetic) have been shown to decrease EMP release. Therefore, we examined the impact of CRP stimulation and LSS on EMPs. METHODS: Confluent HUVECs (n=6) were incubated with CRP and underwent high levels of shear stress (20 dynes/cm<sup>2</sup>) concurrently for 24hrs. ECs were then incubated with CRP (10 µg/mL) for an additional 24hrs before measurement. This protocol was repeated with low levels of LSS (5 dynes/cm<sup>2</sup>). EMP marker CD31, a sign of EC apoptosis, was measured using flow cytometry. Nonparametric tests were performed to assess whether there were significant differences between groups. RESULTS: Pre-conditioning of HUVECS with high levels of LSS significantly blunted the effects of CRP stimulation when compared to pre-conditioning with low levels of LSS. This manifested in a >4 fold decrease in EMPs in the high LSS condition (p<.05). CONCLUSION: Our results show that high physiological levels of LSS can protect ECs from apoptosis in the face of inflammatory insults, even in a state of low-grade inflammation. Further studies are needed to determine the effect of LSS on EC activation and in different types of ECs.

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### EFFECTS OF PHYSICAL ACTIVITY ON SYMPATHETIC, CARDIOVASCULAR, AND PERCEPTUAL RESPONSES TO A PAINFUL STIMULUS

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Purpose: The purpose of this study is to examine sympathetic neural, cardiovascular, and perceptual responses to the cold pressor test (CPT) in physically active and sedentary young women. Methods: After pre-health screening and consent, physically active (PA; n=4) and healthy sedentary (SED; n=2) women completed a VO<sub>2</sub>max test on a cycle ergometer. Subjects returned to the laboratory for autonomic function testing, where arterial blood pressure (SBP; DBP), heart rate (HR), and muscle sympathetic nerve activity (MSNA) were continuously recorded before, during, and following a two-minute CPT. Subjects were asked to rate their pain on a scale of 1-10 immediately following the CPT. Results: PA and SED women were similar in age (22.8 ±1.3 vs. 20.5 ±0.7 yr, respectively), BMI (22.7 ±1.9 vs. 23.6 ±1.1 kg/m<sup>2</sup>), and resting blood pressure (SBP: 115 ±3 vs. 113 ±15 mmHg; DBP: 72 ±8 vs. 75 ±7 mmHg). PA women performed more moderate-vigorous physical activity per week than SED (319 ±136 vs 0 ±0 min/week) and had higher VO<sub>2</sub>max values (44 ±3 vs. 31 ±5 ml/kg/min). Resting HR (62 ± 11 vs. 76 ± 12 bpm) and MSNA (7 ± 7 vs. 17 ± 1 bursts/min) tended to be lower in PA compared to SED women. During the CPT, PA and SED groups had similar increases in SBP (peak Δ = +26 ±22 vs. +41 mmHg, respectively), DBP (peak Δ = +17 ±5 vs. +22 mmHg), HR (peak Δ = +14 ±4 vs. +10 ±1 bpm), and MSNA (peak Δ = +36 ±15 vs. +28 ±8 bursts/min). SED women reported slightly higher pain ratings than PA (8.8 ±1.1 vs. 7.4 ±1.5). Conclusion: Chronic aerobic physical activity appears to be related to lower pain sensitivity; however, both groups displayed similar sympathetic neural and cardiovascular responses to a painful stimulus.

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### INVESTIGATION OF SEX DIFFERENCES BETWEEN NOKIA BODY CARDIO AND SPHYGMACOR APPLANATION TONOMETRY

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Cardiovascular disease is one of the most prevalent diseases in the world. Pulse wave velocity (PWV) is a widely utilized measure of cardiovascular health as a reflection of arterial stiffness in a clinical setting. There is an emerging technology revolution to monitor fitness and health with mobile health monitors. The Nokia Health platform includes the Body Cardio scale that is designed to bring this diagnostic tool into homes with the goal of early recognition of increased pulse transit times. The scale detects pulse transit times via a proprietary algorithm, yet males and females differ in regional distribution of body mass. However, no device has been tested against laboratory gold standards and sex differences have never been elucidated. The purpose of our study was to validate the Body Cardio scale for accurate analysis of PWV compared to a laboratory gold standard (Sphygmacor, Atcor Medical). We hypothesized that the mobile version would give greater variability, leading to increased error. METHODS: 20 normotensive, college-aged individuals (10 male, 10 female; mean 20 1.1 years) utilized the Body Cardio scale in a laboratory setting to obtain PWV measurements, each followed by standing PWV measurements with the SphygmoCor. An rmNOVA was employed for all dependent variables. RESULTS: Male pulse wave velocity was 6.3 0.179 and 6.9 0.244 and female was 5.9 0.179 and 6.6 0.244 (m/s) with Body Cardio and SphygmoCor technologies respectively. Nokia underestimated PWV in males by 0.703 and 0.653 in females; this is a statistically insignificant value. CONCLUSION: The ability of the Nokia Body Cardio to accurately measure pulse wave velocity at home for both sexes lends great healthcare significance and can lead to a wider scope of information for an individual's physician.

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### VALIDITY OF NOKIA PULSE WAVE VELOCITY SCALE VERSUS GOLD STANDARD APPLANATION TONOMETRY IN A YOUNG HEALTHY POPULATION

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Cardiovascular disease is highly prevalent and the leading cause of death within the American adult population. Pulse Wave Velocity (PWV) is considered a gold standard for measuring arterial health in adults. Deleterious changes in arterial compliance have been shown to be an early risk factor in the onset of cardiopulmonary disease. The Nokia Body Cardio Scale has been marketed to the general population for its ability to measure PWV in the home, however there is no data to show if it is an accurate measure. PURPOSE The aim of our study was to determine the accuracy and reproducibility of the PWV feature of the Nokia Body Cardio in comparison to the gold standard in applanation tonography (Sphygmocor, AtCor Medical). We hypothesized that the differences between the two measurements would not be significantly different. METHODS 20 (10 male, 10 female) normotensive healthy young adults (20 years +/-1.1 years) enrolled in this study. PWV measurements with Sphygmocor were utilized in order to maintain ecological validity with the scale. Three measurements with each operating system were obtained over a period of sixty minutes for each individual (counterbalanced). All data expressed as mean ± SE. RESULTS No significant differences were found between measurements with Sphygmocor or Nokia Body Cardio systems were detected. (PWV<sub>Sphygmocor</sub> = 6.1 ± 0.1 vs. PWV<sub>Nokia</sub> = 6.8 ± 0.2 m/s). CONCLUSION There were no statistical differences detected between devices, suggesting the home-based system of tracking PWV using the Nokia Body Cardio can be highly accurate. Monitoring cardiopulmonary health at home can be useful in providing clinical insight for longitudinal healthcare monitoring.

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#### COMPARISON OF HEART RATE AND BLOOD PRESSURE RESPONSES TO DIFFERENT TASKS

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Purpose: to compare CV and BRS to both physical and mental stressors in individuals and to determine if PA differentially affect the stress response. Methods: Participants were 18-28 years old (mean + SD = 22 + 2.6 yrs.). Participants performed two stress tasks -- handgrip test and Stroop color word test in random order. Heart rate and blood pressure were measured continuously using a CNAP monitor integrated with a Biopac MP36. BRS was determined using Nevrokard software. Habitual physical activity (PA) was measured via questionnaire. Results: Mean and peak heart rate during the Stroop task (73.4 + 9.7 and 94.3 + 13.4 bpm) were significantly higher than during the handgrip task (65.5 + 8.0 and 79.5 + 8.8 bpm). In contrast, mean and peak SBP during the handgrip task (113.4 + 13.0 and 124.0 + 15.0 mmHg) was significantly higher than during the Stroop task (111.9 + 21.1 and 123.0 + 23.4 mmHg), whereas diastolic blood pressure and BRS did not differ significantly during the two stress tasks. PA was inversely correlated to DBP for both stress tasks; however, PA was inversely associated with SBP and heart rate for the Stroop task only. PA was not related to BRS during either task. Conclusion: These results show that the two stress tasks elicit different responses which may reflect the greater metabolic demand during handgrip compared to the cognitive demand during the Stroop task. Habitual PA may dampen responsivity, especially during the Stroop task.

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#### AEROBIC TRAINING STATUS AND FATTY ACID-INDUCED hTERT MRNA EXPRESSION FOLLOWING MAXIMAL EXERCISE

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PURPOSE: Telomeres protect the ends of cellular chromosomes from degradation. Although telomere lengths within immune cells shorten naturally with age, increasing risk of disease and all-cause mortality, physical activity preserves telomere length by increasing mRNA expression of the telomerase component, telomerase reverse transcriptase (hTERT). Therefore, this study examined the influence of aerobic training status on the capacity of peripheral blood mononuclear cells (PBMCs) to express hTERT mRNA following palmitate stimulation. METHODS: PBMCs were isolated from 12 trained (T) and 11 untrained (UT) subjects pre- and post- maximal exercise, and stimulated with or without palmitate (4 hours) to examine changes in hTERT mRNA expression. RESULTS: hTERT mRNA expression remained unaltered following palmitate stimulation in T subjects at rest and in response to maximal exercise. To the contrary, palmitate-induced hTERT mRNA expression was elevated at rest relative to unstimulated PBMCs in UT subjects and following maximal exercise was suppressed relative to unstimulated PBMCs and pre-exercise expression levels ( $F [1, 81] = 7.874, p = 0.006$ ). In addition, cardiorespiratory fitness ( $VO_{2max}$ ) was negatively associated with the percent change in hTERT mRNA expression in unstimulated PBMCs ( $r = -0.496, p = 0.022$ ) and positively associated with the percent change in hTERT mRNA expression following palmitate stimulation ( $r = 0.468, p = 0.032$ ). CONCLUSION: This data suggests that aerobic training may preserve the capacity of immune cells to protect against inflammatory-induced telomere shortening following acute physiological stress.

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#### THE EFFECTS OF ISOMETRIC EXERCISE ON IMMEDIATE POST-ISOMETRIC EXERCISE GLUCOSE TOLERANCE

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PURPOSE: Dynamic exercise has been shown to improve glucose tolerance. However, it's unclear if isometric exercise produces a similar benefit. The purpose of this study was to observe if an isometric exercise session acutely improved glucose tolerance in 15 apparently healthy males. METHODS: Males, ages 18-45yrs old, who participated in less than 90 minutes of weekly physical activity were recruited. During session 1, fasting blood glucose, baseline oral glucose tolerance, and bilateral maximum voluntary contraction (MVC) were determined. During session 2 ( $\geq 24$  hours after session 1), fasting blood glucose was assessed followed by consumption for the glucose tolerance beverage. Immediately post consumption, subjects began six, 2-minute contractions at 15% MVC using bilateral quadriceps. Each contraction was separated by 1 minute of rest. Blood glucose was measured at 15, 30, 45, 60, 90, and 120min post drink consumption. RESULTS: One session of isometric exercise did not alter glucose tolerance. Blood glucose was elevated immediately following exercise, which may be due to increased sympathoadrenal activity. CONCLUSION: Our findings suggest that one bout of isometric exercise is not an effective approach to acutely improve glucose tolerance. Future studies should employ isometric exercise training programs in Type II diabetic populations to further investigate potential improvements in glucose tolerance.

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#### EXERCISE AT SIMULATED ALTITUDE ALTERS PROTEIN EXPRESSION IN PERIPHERAL BLOOD MONONUCLEAR CELLS

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PURPOSE: This work investigated whether hepatosplanchnic shunting during exercise at altitude influences protein expression in peripheral blood mononuclear cells (PBMC). METHODS: Subjects (N = 5) ran (60% $VO_{2max}$ ) for 60min under Normoxia (FIO<sub>2</sub> = 20.93%) and Hypoxia (FIO<sub>2</sub> = 13.5%). Tissue oxygen saturation levels were monitored via peripheral oxygen saturation (SpO<sub>2</sub>) and near-infrared spectroscopy (NIRS). Peripheral blood mononuclear cells (PBMC) were isolated from blood samples that were taken before (pre), after (post), 1hr (1-post), and 4hrs after (4-post) exercise. From these samples, western blot was used to analyze markers along the TLR4 signaling pathway (TLR4, p-NFκB, NFκB), indicators of cellular energy status (SIRT1 & p-AMPK), and mediators of the heat shock response (HSP32, HSP60, HSP70). Data were analyzed with Two-Way (Condition x Time) RM-ANOVAs with significance set at  $p < 0.05$ . Post hoc were run where appropriate. RESULTS: SpO<sub>2</sub> averaged  $79 \pm 1\%$  and StO<sub>2</sub> averaged  $61 \pm 2$  in Hypoxia. PBMC data indicated that HSP60, SIRT1 and p-AMPK were reduced at 1-post (by 31%, 68%, and 66% respectively, all  $p < 0.05$ ), whereas the ratio of p-NFκB to NFκB at 1-post was increased by 139% ( $p < 0.05$ ). CONCLUSION: Activation of AMPK has been shown to reduce inflammatory signaling via SIRT1 mediated deacetylation of p-NFκB. Downregulation of p-AMPK and SIRT1 following simulated altitude exposure may help PBMC maintain inflammatory capacity. Export of HSP60 to circulation following hypoxic exercise could facilitate mitochondrial biogenesis in skeletal muscle via activation of PGC-1α.

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### THE EFFECTS OF HIGH-INTENSITY INTERVAL TRAINING AND MODERATE INTENSITY TRAINING FOR IMPROVING CARDIOMETABOLIC HEALTH IN INDIVIDUALS WITH SPINAL CORD INJURY

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Background: Individuals with SCI fail to meet the recommended exercise guidelines due to limited time, resources, and structural or architectural limitations (e.g., accessibility of facilities and knowledgeable instructors). Therefore, a time efficient and effective exercise program is needed to reverse chronic metabolic conditions and improve health quality in individuals with SCI. A growing body of evidence from our group and others has demonstrated the potential for low volume high-intensity interval training (HIIT) to provide comparable or superior improvements in cardiometabolic health outcomes in able-bodied individuals compared to continuous moderate intensity training (MIT) that requires 60-80% greater time commitment. Purpose: To compare the effects six weeks of HIIT vs MIT for improving cardiovascular fitness, body composition, blood lipids, insulin sensitivity, and mitochondrial capacity in a cohort of individuals with SCI. Methods: Participants were five sedentary males (Age: 46.8 ± 12.1, % Fat: 38.4 ± 3.4) with longstanding SCI (C5-L2 injury level) randomized to six weeks of HIIT or MIT exercise training. Primary outcomes were measured at baseline and six-weeks post training. Results: These preliminary data demonstrate a significant time effect for total-cholesterol (P=0.04) and LDL-cholesterol (P=0.04). A significant group effect was observed for mitochondrial capacity (P=0.03); such that HIIT participants experienced a non-significant (P=0.07) trend for improving mitochondrial capacity with no change in the MIT group (P=0.926). No significant improvements were observed for VO<sub>2</sub>peak, body composition, and insulin sensitivity. Discussion: These preliminary data demonstrate that both HIIT and MIT can significantly improve the blood lipid profiles in individuals with SCI. Furthermore, it appears that HIIT may have a more robust effect for improving mitochondrial capacity in this population. While these data are preliminary in nature, based on data trends it is likely that we will see significant improvements in insulin sensitivity and cardiovascular fitness.

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### RATING OF PERCEIVED EXERTION IN POWER WHEELCHAIR SOCCER ATHLETES

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The Borg Rating of Perceived Exertion (RPE) is a valid and efficient method of measuring intensity levels during physical activity where traditional assessments of intensity are not appropriate and is an indicator of increased heart rate, increased sweating, and muscle fatigue. PURPOSE: To examine exercise intensity of power wheelchair soccer (PWS), a non-ambulatory sport that serves individuals with severe physical impairments where traditional intensity methods may not be appropriate. METHODS: Thirty competitive PWS athletes (Age = 23 ± 10.5 yrs, Experience = 7 ± 4 yrs) were assessed across a full half of PWS. Data collectors recorded activity status each minute (active, not active) and collected RPE at the end of the 20-minute half. Average RPE was used to assess perceived exercise intensity during PWS for the entire group and for each type of impairment (Muscular Dystrophy, n=15; Cerebral Palsy, n=4; Arthrogryposis, n=4; Others, n=7). RESULTS: For each of the four groups, the RPEs ranged between 12 to 14.5 with an average of 13.8 ± 2.2 suggesting that the physical activity was being performed at a moderate level of intensity. This finding is consistent with gameplay as athletes were active between 9-17 mins of play. CONCLUSION: PWS athletes, across impairment types, reported moderate-intensity exercise during a competitive game half. Although further empirical evidence is needed to validate exercise intensity of this non-ambulatory sport, the reported effort in the current study supports an intensity sufficient to enhance functional capacity and performance of daily living activities despite the use of a powerchair for participation.

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### PHYSICAL ACTIVITY PREDICTS STRENGTH AND FUNCTION IN WOMEN UNDERGOING BREAST CANCER TREATMENT

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The American Cancer Society estimates that women diagnosed with localized breast cancer have 5-year survival rates between 72-100%. Due to high survival rates after diagnosis, it is important to examine the effects of cancer treatment on physical function, and independence. Purpose: To prospectively analyze the extent to which cancer treatment and physical activity predicted changes in strength, shoulder mobility, and physical function in a group of 400 women with recently diagnosed, staged breast cancer. Methods: Three visits were included in this study: pre-surgery, one year, and two years post-surgical intervention. At each session, participants were instructed to perform grip strength, bicep curl, and tests of shoulder flexion and abduction. Physical function difficulty and physical activity (PA) levels were also assessed at each time point via questionnaire. Results: Linear regression analyses, controlling for baseline outcomes, demographics, and clinical factors (i.e., age, BMI, treatment) indicated that baseline PA predicted year one bicep strength ( $\beta = .266, p < 0.001$ ) and year two bicep strength ( $\beta = .268, p = 0.022$ ). Additionally, change in physical activity during the first year was significantly related to change in bicep strength ( $\beta = .276, p = 0.016$ ) and physical function ( $\beta = .333, p = 0.016$ ) at year two. Neither baseline PA nor changes in PA predicted flexibility. Conclusions: Since pre-treatment as well as PA changes during treatment affect strength and physical function, future research should target PA interventions concurrent with treatment to preserve physical function during survivorship.

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### HEMODYNAMIC RESPONSES TO A MAXIMAL EXERCISE TEST IN PARKINSON'S DISEASE PATIENTS

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Purpose: The influence of a maximal exercise test on blood pressure (BP), systemic vascular resistance (SVR), cardiac output (Q), heart rate (HR), heart rate recovery (HRR), stroke volume, end-diastolic volume, and ejection fraction was investigated in five Parkinson's disease (PD) patients and five healthy, age-matched adults (CON). Methods: Testing was completed following an 8-hour fast and consisted of three phases: resting (30 min), progressive exercise test on a motorized treadmill (~12 min) and recovery (12 min). Hemodynamic measures were monitored continuously using an impedance cardiography device, 12-lead ECG, and an automated BP system. Results: During recovery, systolic BP was significantly elevated ( $p < .05$ ) in PD when compared to CON at 3 minutes (164 vs 126 mmHg), 7 minutes (142 vs 115 mmHg), and 12 minutes (132 vs 120 mmHg) post-exercise. Peak HR was lower in PD; however, results did not reach significance ( $p = .06$ ). HRR was blunted in PD compared to CON (9 vs 24 bpm,  $p < .01$ ). Post-exercise Q was significantly lower for PD after one minute of recovery ( $p = .03$ ). Patterns for SVR were different between groups, with PD showing a significant drop from resting values during the warm-up (MD = 514), Stage 1 (MD = 737), Stage 2 (MD = 756) and Stage 3 (MD = 791) of exercise, and at minute one of recovery (MD = 682). Conclusions: These results suggest that cardiovascular and autonomic mechanisms responsible for regulating BP and HR during and after exercise are disrupted in PD patients.

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### EFFECTS OF WHOLE-BODY VIBRATION TRAINING ON STRENGTH, BODY COMPOSITION, AND FUNCTION IN SKILLED NURSING HOME RESIDENTS

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**P295** PURPOSE: To compare the effects of 12 wks of whole-body vibration training (WBVT: n=10) to standard care, which served as the control (CON: n=10), on strength, body composition, and functional performance in 20 (16 female) pre-frail and frail skilled nursing home residents (82±5 yrs). METHODS: Participants were screened for frailty syndrome using the FRAIL scale. Isometric knee extension strength (KE) was measured using a mechanical push-pull dynamometer. Bioelectrical impedance analysis was used to measure lean mass (LM) and fat mass (FM). The short physical performance battery (SPPB) was used to assess function. Participants were assigned to 12 wks of WBVT (2x/wk) or CON. WBVT consisted of 3 sets of 10 reps of 4 lower body exercises (partial squat, narrow squat, wide squat, calf raises) during vertical vibration (25-40 Hz). Data were analyzed using two-way ANOVA (group x time) and post-hoc paired t-tests. Significance was set at p≤0.05. RESULTS: There were no changes in LM or FM. There were significant group-by-time interactions for KE and SPPB. Post-hoc paired t-tests found WBVT improved KE (WBVT: 22.3±4.0 to 29.0±4.5 kg; CON: 23.8±6.3 to 23.6±9.6 kg) and improvement in SPPB performance was approaching significance (WBVT: 4.5±2.3 to 5.2±2.1 units, p=0.09; CON: 4.1±1.9 to 3.7±2.3 units). CONCLUSION: WBVT was well tolerated and occurred without adverse health complications. WBVT can be used to counteract losses in leg strength. Interventions of greater frequency and duration may help improve functional performance in pre-frail and frail older adults.

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### BODYWEIGHT CIRCUIT EXERCISE TRAINING IN ADULTS WITH TYPE 2 DIABETES MELLITUS – THREE CASE STUDIES

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**P296** PURPOSE: To examine the effects of 5-8 minutes of bodyweight circuit exercise 3-4 days/week, over 12 weeks on glucose control, metabolism, and fitness in untrained adults with type 2 diabetes (T2D), and to assess the feasibility of such training in this population. METHODS: Two males (45 and 48 yrs) and one female (47 yrs) with T2D underwent assessments of HbA1c and fasting plasma glucose and lipids. Body composition (DEXA), aerobic fitness (submaximal treadmill test), and muscular fitness (hand-grip dynamometry and isokinetic knee flexion/extension) were assessed. Participants completed 12 weeks of bodyweight circuit training (10 repetitions of bodyweight squat, 5 repetitions of modified pull-up, 5 repetitions of modified push-up, 10 repetitions of abdominal crunches). Participants completed as many cycles as possible in each session. Session duration progressed from 5-8 minutes, and session frequency progressed from 3-4 sessions per week. Assessments were repeated after 12 weeks of training. RESULTS: Mean exercise adherence rate was 85.9%. Participants completed 4.81 ± 0.73 cycles per session in week one, progressing to 9.33 ± 2.41 cycles per session in week 12 (p = 0.044). Mean time per cycle tended to decrease, from 1.06 min ± 0.10 min/cycle in week one to 0.90 ± 0.24 min/cycle in week 12 (p = 0.065). Mean knee flexor torque increased from 86.7 ± 41.4 to 92.8 ± 43.1% of body mass (p = 0.046). All participants demonstrated improvements in multiple assessments of fitness. Post-training fasting glucose was lower in both male participants (125 to 113, and 163 to 145 mg/dl). CONCLUSIONS: Vigorous bodyweight circuit exercise training was feasible and well-tolerated in this small sample of adults with T2D, and resulted in improved fasting glucose in the male participants, and improvement in multiple markers of physical fitness in all participants.

### UNDERSTANDING ARTHRALGIA IN BREAST CANCER SURVIVORS

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**P297** Breast cancer is the most common form of cancer in women, with incidence rates increasing 18% since 2008. Many women with breast cancer are prescribed aromatase inhibitors for 5-10 years to reduce the risk of cancer recurrence. Joint pain and stiffness (arthralgia) is common in women receiving aromatase inhibitors, leading to non-adherence (Nyrop et al., 2016). Purpose: To examine associations among physical activity (PA), body mass index (BMI), and arthralgia symptoms in a subsample (n=29; M age 64±11 years; BMI = 30.6±5 kg/m<sup>2</sup>) of a cohort of breast cancer survivors with a mean follow-up of 5.1 years. Methods: Women completed the Godin Leisure-Time Exercise Questionnaire, a modified Brief Pain Inventory (BPI), and short measure of joint stiffness. Results: Participants reported less than 2 days a week of moderate PA, falling far below ACSM recommendations. 48.3% reported joint pain and 61.2% reported joint stiffness, with the knee joint most commonly affected. Women who reported higher levels of moderate PA had a significantly lower BMI (r=-.389, p<.05). There was a strong trend towards women with no joint pain reporting nearly twice the level of weekly PA as those with joint pain (p=0.08). Conclusions: Due to the high occurrence of arthralgia symptoms and the low levels of PA in this sample of overweight and obese women with breast cancer, future work is necessary to monitor these trends over time. A better understanding of the role played by PA and BMI in the management of arthralgia would have important implications for adherence to aromatase inhibitors in the ongoing treatment of breast cancer.

### INFLAMMATORY MARKERS IN AFRICAN AMERICANS FOLLOWING AN ACUTE BOUT OF EXERCISE: A PILOT STUDY

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**P298** Purpose: Evidence has shown that Type-2 diabetes (T2D) causes chronic low-level inflammation. Given the increased prevalence of T2D and pre-diabetes (PD) in African Americans (AA), screening tools focusing on alterations in inflammatory markers should be considered for at risk populations. Thus, the purpose of this study was to evaluate exercise-induced gene expression and biomarker changes in AA relative to IL-6, IL-15 and C-reactive protein (CRP) in PD and healthy controls (CON). Methods: Ten subjects [5 PD; 5 CON], completed a baseline submaximal exercise test. On a second visit, blood was drawn prior to, and 1, 6 and 24 hours post-exercise [1 hr treadmill walking/running at 60% VO<sub>2</sub> reserve]. Peripheral blood mononuclear cells (PBMC) were isolated and mRNA profiling was performed via microarray, focusing on genes related to inflammation. CRP and IL-6 protein concentrations were measured using ELISA. Log-transformed data were analyzed using a group\*time ANOVA (α=0.05). Results: An interaction effect was observed for IL-15 mRNA (p=0.005) and IL-6 protein concentration (p=0.020). The PD group had significantly (p=0.005) higher levels (1.075 fold difference) of IL-15 mRNA compared to CON at 24-hour post-exercise. No change in CRP was observed (p0.4). Conclusion: AA pre-diabetics display elevated levels of some inflammatory markers following acute exercise, as compared to healthy CON.  
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**NITRATE CONSUMPTION AND PHYSICAL FUNCTION IN ICU PATIENTS**

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**P299** Ingested dietary nitrate (NO<sub>3</sub><sup>-</sup>) which is converted to nitrite (NO<sub>2</sub><sup>-</sup>) and then to nitric oxide (NO) has been shown to be ergogenic in clinical populations. The conversion of NO<sub>3</sub><sup>-</sup> to NO<sub>2</sub><sup>-</sup> is facilitated by bacteria in the oral cavity. **PURPOSE:** 1) to examine NO<sub>2</sub><sup>-</sup> levels following NO<sub>3</sub><sup>-</sup> ingestion in ICU patients receiving IV antibiotics, and 2) to determine if NO<sub>3</sub><sup>-</sup> ingestion improved physical function at hospital discharge. **METHODS:** ICU patients (n=22) were randomized to receive either NO<sub>3</sub><sup>-</sup> rich (400 mg) or NO<sub>3</sub><sup>-</sup> depleted beetroot juice (BRJ) for the duration of their hospital stay. Plasma NO<sub>3</sub><sup>-</sup> and NO<sub>2</sub><sup>-</sup> were measured prior to and three hours post consumption of the first dose. Physical function was measured at hospital discharge using the Short Physical Performance Battery (SPPB). **RESULTS:** In the NO<sub>3</sub><sup>-</sup> rich BRJ group, NO<sub>3</sub><sup>-</sup> and NO<sub>2</sub><sup>-</sup> increased from pre (26.0 ± 7.0 μM and 141.0 ± 10.1 nM, respectively) to post (245.2 ± 52.1 μM and 284.2 ± 50.3 nM, respectively) consumption. Neither NO<sub>3</sub><sup>-</sup> nor NO<sub>2</sub><sup>-</sup> increased significantly from pre to post consumption in the NO<sub>3</sub><sup>-</sup> depleted BRJ group. SPPB scores at hospital discharge were not significantly different between the NO<sub>3</sub><sup>-</sup> rich BRJ group (2.0 ± 0.9) and the NO<sub>3</sub><sup>-</sup> depleted BRJ group (3.5 ± 0.9). **CONCLUSION:** NO<sub>3</sub><sup>-</sup> supplementation in the form of beetroot juice was effective at increasing NO<sub>3</sub><sup>-</sup> and NO<sub>2</sub><sup>-</sup> levels in ICU patients even in the presence of antibiotic administration; however, physical function at hospital discharge did not appear impacted by NO<sub>3</sub><sup>-</sup> supplementation. Future studies should examine physical function beyond hospital discharge.

**IS ABILITY TO REACH A HIGH KNEE EXTENSOR VELOCITY A MARKER OF PHYSICAL FUNCTION IN OBESE OLDER ADULTS?**

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**P300** Purpose: To assess physical function in older, overweight/obese adults who can and cannot reach a knee extensor velocity of 240 deg/s. Methods: Participants (n=101, age=69.5±3.7 yrs, BMI=30.7±2.3 kg/m<sup>2</sup>, %female=53%) were randomly assigned to 5 mo, 3-d/wk, moderate intensity progressive resistance training with weight-loss via caloric restriction (RT+CR, n=53) or RT only (n=48). Physical function (400-m walk test (400MWT), Short Physical Performance Battery (SPPB), usual gait speed (UGS), chair rise time(CRT)) and knee extensor muscle function at 240 deg/s on a Biodex dynamometer were measured at a baseline visit (BV) and follow-up visit (FV). Results: At BV, physical function was better in those who reached 240 deg/s at BV (n=29) vs those who did not (n=72): 400MWT (285.57 vs 314.51 s), SPPB (11.38 vs 10.63), UGS (1.20 vs 1.13 m/s), CRT (10.49 vs 12.92 s), (All p ≤ 0.05). From BV to FV, the %Δ in physical function in those who reached 240 deg/s at BV vs those who did not was: 400MWT (2.07% vs -2.35%), SPPB (1.79% vs 5.20%), UGS (8.04% vs 6.61%), CRT (-4.78% vs -21.11%). From BV to FV, participants in both intervention groups who did not reach 240 deg/s at BV decreased chair rise time (RT: -24.14%; RT+CR: -19.32%) and increased total SPPB score (RT: 4.33%; RT+CR: 5.79%). Conclusions: The ability to achieve a high knee extensor velocity may be a marker of physical function in overweight/obese older adults.

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**EFFECTS OF PANCREATIC CANCER ON SKELETAL MUSCLE**

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**P301** **PURPOSE:** Loss of muscle mass is a debilitating outcome in patients with cancer. The purpose of this project is to determine the effects of pancreatic cancer on skeletal muscle by looking at muscle injury, fat accumulation, and collagen deposition. **METHODS:** 3 female C57BL/6 mice (7-8 weeks old) served as controls. 7 female C57BL/6 mice (7-8 weeks old) were injected with the KCM Pancreatic cell line. Mice were euthanized and tissue was harvested 2 weeks post-injection. Haemotoxylin and Eosin staining was used to quantify muscle injury. Sirius Red staining was used to observe fibrosis levels. Oil Red O staining was used to determine changes in fat accumulation. **RESULTS:** Sirius Red % area showed no significance. Haemotoxylin and Eosin stain showed a 30% increase in muscle injury in the group of mice with a tumor (P=0.08). **CONCLUSIONS:** These results suggest that the overall percentage of muscle injury is greater in those with pancreatic cancer compared to those who do not have the disease.

**EASY BREATHER EXERCISE TABLE: A FEASIBILITY EVALUATION OF A MEDICAL DEVICE TO FACILITATE GRAVITY POWERED VENTILATION**

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**P302** **PURPOSE:** Investigate if the Easy Breather Exercise Table (EBET) prototype is suitable for clinical studies in patients with Chronic Obstructive Pulmonary Disease (COPD). **METHODS:** The EBET bed uses arm power to tilt the supine subject from a Trendelenburg to a reverse-Trendelenburg position with the goal of assisting breathing. Healthy volunteers (N=40) operated the device for 15 minutes. Variables of interest: A body part discomfort scale (0 = no discomfort to 5 = very uncomfortable) administered at 0 and 13 minutes, a Borg scale rating of perceived exertion (0 to 10) at 14 minutes, and an end-of-session safety rating. **RESULTS:** Areas with the greatest discomfort at minute 13 and the associated percent reaching ≥ level 3 follow: Left elbow (5%), right elbow (5%), left wrist (23%), right wrist (28%), left hand (16%), and right hand (15%). Of these body parts, there was a significant (p ≤ 0.01) increase in discomfort from 0 to 13 minutes. Regarding exertion: 33% reported moderate to somewhat strong levels, while 13% reported strong levels. In terms of safety, 98% felt safe on the device, and 2% were undecided. **CONCLUSIONS:** Further clinical studies with the current EBET in COPD patients are not advised due to the discomfort and exertion in healthy volunteers. Safety data indicates tilting may be a viable means to achieve gravity powered ventilation, thus device modification is recommended. Supported by grants from Exhale Fully, LLC, and Univ. of NC Wilmington

**CANCER CACHEXIA ASSOCIATED MUSCLE WEAKNESS: A ROLE FOR FIBROSIS**Jonathan L. Blalock<sup>1</sup>, Brandon N. VanderVeen<sup>1</sup>, Dennis K. Fix<sup>1</sup>, and James A. Carson, FACSM<sup>1,2</sup><sup>1</sup>Integrative Muscle Biology Laboratory, University of South Carolina, Columbia, SC; <sup>2</sup>Center for Colon Cancer Research, University of South Carolina, Columbia, SC

Background: Pathological inflammation associated with chronic disease has been directly linked to muscle weakness and fatigue. Cachexia, the loss of muscle mass secondary to chronic disease specifically cancer, results in the loss of functional independence, reduced life quality, and decreased survival. While IL-6, a pleiotropic inflammatory cytokine, has an established role in cachexia-induced muscle mass loss, drivers of decreased muscle function are not well understood. Purpose: We investigated muscle fibrosis's relationship with cachexia-induced decrements in skeletal muscle function. It was hypothesized that elevated IL-6 would be associated with cachexia induced fibrosis and skeletal muscle weakness. Methods: To test this hypothesis, cachectic (>5% BW loss) ApcMin/+ mice were subjected to muscle force analysis in situ and post-mortem immunohistochemical analysis of muscle CSA and non-contractile tissue. Age matched C57BL/6 served as controls. Tibialis anterior (TA) twitch properties, tetanic force, and fatigability was examined to determine skeletal muscle function. Results: Cachectic ApcMin/+ mice had elevated plasma IL-6 ( $56.6 \pm 11.1$  pg/mL), decreased TA weight ( $43\% \pm 1$ ), and reduced absolute tetanic force ( $53\% \pm 5$ ) compared to C57BL/6. Cachectic muscle decreased specific tension ( $-34\% \pm 2$ ) compared to C57BL/6, which was associated with increased non-contractile tissue. Conclusions: We conclude that skeletal muscle weakness cannot be explained simply by reduced CSA but also the intrinsic changes to skeletal muscle structure.

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**FITNESS LEVEL DOES NOT IMPACT CARDIOVASCULAR DRIFT AND DECREASED MAXIMAL OXYGEN UPTAKE DURING HEAT STRESS**

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Cardiovascular drift (CV drift) has been shown to be related to reduced maximal oxygen uptake ( $\dot{V}O_{2max}$ ) during heat stress. At a given relative metabolic intensity (% $\dot{V}O_{2max}$ ), individuals with higher fitness levels would be expected to experience greater CV drift, and thereby greater decrements in  $\dot{V}O_{2max}$ , because of a greater metabolic heat production resulting from exercising at a higher absolute intensity. However, this has not been directly investigated. PURPOSE: To test the hypothesis that individuals with a higher initial  $\dot{V}O_{2max}$  (i.e., fitness level) will experience a greater magnitude of CV drift and accompanying decrement in  $\dot{V}O_{2max}$  compared to those with a lower initial  $\dot{V}O_{2max}$  during prolonged, moderate-intensity exercise in the heat. METHODS: Data from 7 studies ( $n = 62$ ) were used to assess the relationships between fitness level and 1) CV drift (change in heart rate and stroke volume) and 2)  $\dot{V}O_{2max}$ . CV drift and  $\dot{V}O_{2max}$  were assessed between 15 and 45 min or between 15 and 60 min of cycling at 60%  $\dot{V}O_{2max}$  in 35 °C or 30 °C. RESULTS: Initial  $\dot{V}O_{2max}$  (i.e., fitness level) was weakly related to change in heart rate ( $r=0.17$ ,  $p=0.20$ ), change in stroke volume ( $r=-0.06$ ,  $p=0.63$ ), and decrease in  $\dot{V}O_{2max}$  ( $r=-0.14$ ,  $p=0.28$ ). CONCLUSION: Contrary to our hypothesis, fitness level was essentially unrelated to the magnitude of CV drift or decrement in  $\dot{V}O_{2max}$  during prolonged submaximal exercise in the heat. However, these findings support the results of previous studies in that the greater the magnitude of CV drift—regardless of fitness level—the greater the decrement in  $\dot{V}O_{2max}$  during constant-rate, moderate-intensity exercise in the heat.

**EFFECT OF A SIMULATED TACTICAL OCCUPATION STRESSOR ON REACTION TIME**Andrew J. Hussey<sup>1</sup>, Cody E. Morris<sup>1</sup>, Lee J. Winchester<sup>1</sup>, Ariel S. Tomes<sup>1</sup>, Wesley A. Neal<sup>1</sup>, Damon M. Wilcoxon<sup>1</sup>, MiRanda N. Anderson<sup>1</sup>, William J. Bradshaw<sup>1</sup>, Dana N. Lucas<sup>1</sup>, Harish Chander<sup>2</sup>, and Scott W. Arnett<sup>1</sup>. <sup>1</sup>School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY; <sup>2</sup>Neuromechanics Laboratory, Department of Kinesiology, Mississippi State University, Mississippi State, MS

Purpose: Further work needs to be conducted on the effects exercise or physical exertion has on the body in regards to reaction time (RT). This becomes especially important to occupations who must complete a strenuous physiological workload while making potential life-and-death decisions that require a quick response. The purpose of this study was to evaluate RT in response to a simulated firefighting occupation workload. Methods: Ten healthy male adults participated in this study. While wearing proper testing attire, participants completed a simulated fire stair climb (SFSC) by completing two consecutive 3-min workloads on a Matrix C7xe ClimbMill (Matrix Fitness USA, Cottage Grove, WI, USA) at a stepping rate of 60 steps/min. The participants completed this protocol under four conditions, with some conditions including the wearing of a 34.04 kg (75 lbs) weighted vest to simulate the wearing of personal protective equipment (PPE) typically worn by a firefighter. RT was evaluated by employing a color-word interference test (CWIT) to evaluate how quickly the participant could react to distracting or incorrect visual stimuli to provide a response. The ability to answer quickly as well as accurately was assessed during the CWIT. Results: A repeated-measures ANOVA showed that there was a significantly different overall RT ( $p = 0.001$ ) during the SFSC while wearing the weighted vest being significantly worse than baseline ( $p = 0.016$ ). This difference was mirrored in RT during correct responses ( $p = 0.025$ ) exhibiting a slowed RT while wearing the weighted vest ( $p = 0.106$ ). CWIT accuracy ( $p = 0.159$ ) or RT during incorrect responses ( $p = 0.630$ ) was not shown to be significantly different from baseline. Conclusion: Based on the results of the current study, it appears that the wearing of a weighted vest to simulate PPE significantly impairs RT. These findings suggest that the decision-making ability of tactical-style occupations could be hampered in response to such a workload-induced physiological stress, exposing themselves and potential victims they are attempting to help to further harm.

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**EFFECT OF A SIMULATED TACTICAL OCCUPATION STRESSOR ON PHYSIOLOGICAL STRAIN INDEX AND BLOOD PRESSURE**Damon M. Wilcoxon<sup>1</sup>, Cody E. Morris<sup>1</sup>, Lee J. Winchester<sup>1</sup>, Andrew J. Hussey<sup>1</sup>, Ariel S. Tomes<sup>1</sup>, Wesley A. Neal<sup>1</sup>, MiRanda N. Anderson<sup>1</sup>, William J. Bradshaw<sup>1</sup>, Dana N. Lucas<sup>1</sup>, Harish Chander<sup>2</sup>, and Scott W. Arnett<sup>1</sup>. <sup>1</sup>School of Kinesiology, Recreation, & Sport, Western Kentucky University, Bowling Green, KY; <sup>2</sup>Neuromechanics Laboratory, Department of Kinesiology, Mississippi State University, Mississippi State, MS

Purpose: As a firefighter performs in live-fire suppression, it is critical to understand to the degree their physiological stress is exacerbated by the physical work they are required to conduct to reach a potential victim of an emergency. The purpose of this study was to evaluate physiological strain index (PSI) in response to a simulated firefighting occupation workload. Methods: Ten healthy male adults participated in this study. While wearing proper testing attire, participants completed a simulated fire stair climb (SFSC) by completing two consecutive 3-min workloads on a Matrix C7xe ClimbMill (Matrix Fitness USA, Cottage Grove, WI, USA) at a stepping rate of 60 steps/min. The participants completed this protocol under four conditions, with some conditions including the wearing of a 34.04 kg (75 lbs) weighted vest to simulate the wearing of personal protective equipment (PPE) typically worn by a firefighter. Some conditions involved the inclusion of a color-word interference test (CWIT) as a distracting mechanism. PSI was evaluated by continuously monitoring HR and core temperature by using CorTemp® ingestible thermometers and radio receiver (HQ, Inc., Palmetto, FL). PSI was calculated using a previously published and validated equation (Moran et al., 1998). Blood pressure was measured pre-exercise, following initial 3 min workload, and following completion of total workload. Results: A repeated-measures ANOVA showed that there was a significantly different PSI when comparing conditions ( $p = 0.001$ ). A significantly elevated PSI per min was exhibited during all six minutes of exercise for both the weighted vest and weighted vest + CWIT conditions compared to exercise conditions without the vest. Systolic blood pressure also exhibited a significantly different degree of elevation in the same manner ( $p = 0.006$ ). Conclusion: Based on the results of the current study, it appears that the wearing of a weighted vest to simulate PPE significantly elevates PSI above what would be expected by the exercise alone. These findings suggest that firefighters are potentially at a substantial degree of physiological stress from the exercise and weight of gear alone. Further work should be conducted to further evaluate the usefulness of PSI as a means to monitor firefighters during actual or simulated fire suppression.



### EFFECT OF A SIMULATED TACTICAL OCCUPATION STRESSOR ON PERCEIVED EXERTION AND BLOOD LACTATE

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Purpose: Findings by Marcora et al. (2009) and Zering et al. (2016) suggest that perceived exertion can be elevated during an exercise bout of a familiar intensity if it is followed by a task requiring substantial cognitive attention. The purpose of this study was to evaluate rating of perceived exertion (RPE) and markers of physiological stress in response to a simulated firefighting occupation workload. Methods: Ten healthy male adults participated in this study. While wearing proper testing attire, participants completed a simulated fire stair climb (SFSC) by completing two consecutive 3-min workloads on a Matrix C7xe ClimbMill (Matrix Fitness USA, Cottage Grove, WI, USA) at a stepping rate of 60 steps/min. The participants completed this protocol under four conditions, with some conditions including the wearing of a 34.04 kg (75 lbs) weighted vest to simulate the wearing of personal protective equipment (PPE) typically worn by a firefighter. Some conditions involved the inclusion of a color-word interference test (CWIT) as a distracting mechanism. RPE was measured each minute during exercise using Borg's 15-point (6–20) scale (Borg, 1982; Borg, 1998). Lactate was measured following initial 3 min workload and following completion of total workload. Results: A repeated-measures ANOVA showed that there was a significantly different RPE when comparing conditions ( $p < 0.0005$ ). A significantly elevated RPE per min was exhibited during all six minutes of exercise for both the weighted vest and weighted vest + CWIT conditions compared to exercise conditions without the vest. A repeated-measures ANOVA showed that there was a significantly different blood lactate when comparing conditions ( $p < 0.0005$ ). Conclusion: Based on the results of the current study, it appears that the wearing of a weighted vest to simulate PPE significantly elevates RPE above what would be expected by the exercise alone. Blood lactate levels mirrored these results. These findings suggest that firefighters are potentially at a substantial degree of perceived stress from the exercise and weight of gear alone.

### EFFECT OF A SIMULATED TACTICAL OCCUPATION STRESSOR ON IMMUNE SYSTEM MARKERS OF PHYSIOLOGICAL STRESS AND INFLAMMATION

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Purpose: Walker et al., 2015 reported that increases in immune system markers [interleukin-6 (IL-6), C-reactive protein (CRP)] occur simultaneously with each increase in core temperature. Of important practical consideration, this substantial physiological and psychological disturbance experienced by the firefighters suggests that the potential depression in immune system function also experienced by the firefighters could potentially create a substantial occupational hazard. The purpose of this study was to evaluate specific immune system markers in response to a simulated firefighting occupation workload. Methods: Ten healthy male adults participated in this study. While wearing proper testing attire, participants completed a simulated fire stair climb (SFSC) by completing two consecutive 3-min workloads on a Matrix C7xe ClimbMill (Matrix Fitness USA, Cottage Grove, WI, USA) at a stepping rate of 60 steps/min. The participants completed this protocol under four conditions, with some conditions including the wearing of a 34.04 kg (75 lbs) weighted vest to simulate the wearing of personal protective equipment (PPE) typically worn by a firefighter. Some conditions involved the inclusion of a color-word interference test (CWIT) as a distracting mechanism. Salivary cortisol (CORT) was measured at baseline, following initial 3 min workload, and following completion of total workload. CRP was evaluated at baseline and one hour following the completion of each workload. Results: A repeated-measures ANOVA showed that there was a significantly different blood lactate when comparing conditions ( $p < 0.0005$ ). Both Conditions 2 and 4 exhibited a significantly higher BL ( $p < 0.05$ ) than Conditions 1 and 3. There were not shown to be any significant differences ( $p > 0.05$ ) as a result of the SFSC between Conditions 2 and 4 or any differences between Conditions 1 and 3 in regards to BL. Neither CORT ( $p = 0.116$ ) or CRP ( $p = 0.700$ ) was shown to be significantly different across conditions or from baseline. Conclusion: Based on the results of the current study, it appears that the wearing of a weighted vest to simulate PPE significantly elevates BL above what would be expected by the exercise alone. This illustrates the significant increase in exercise intensity while wearing the simulated PPE. However, the degree of exercise employed was not enough (with or without the weighted vest) to elicit any substantial changes in inflammatory markers.

### RELATIONSHIP BETWEEN PHYSIOLOGICAL AND PERCEPTUAL HEAT STRAIN DURING SIMULATED INDUSTRIAL TASKS IN A HOT AND HUMID ENVIRONMENT

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Purpose: Differences between perceived heat stress and physiological heat stress were tested in 12 subjects. Methods: 90 min of testing was performed in a hot and humid environment of 31.2°C WBGT at moderate work intensity (280 kcal/hr) while wearing light clothing. Three 30 min work cycles included the following tasks: 1) bench stepping, 2) pulling cinder blocks, 3) stacking/unstacking cinder blocks, 4) coiling/uncoiling hose, and 5) manual dexterity activity. Data were collected every 10 min on: core body temperature (CT), heart rate (HR), rate of perceived exertion (RPE), and thermal sensation (TS). Perceptual heat strain (PeS) was calculated using RPE and TS. Physiological heat strain (PhS) was calculated using CT and HR. Results: CT and TS rose continuously throughout the 90 min work trial. CT was different over the work trial ( $p = 0.008$ ), and final mean CT was 38.5±0.5°C. HR and RPE fluctuated depending upon which task was being performed at the 10 min data collection time point. HR was different over the work trial ( $p = 0.001$ ). PeS and PhS were not significantly different over the 90-min work trial ( $p = 0.086$ ). The greatest disparity between PeS and PhS was during the first 50 min (mean difference = 0.8). However, from 60 to 90 min the subjects' PeS more closely matched the PhS (mean difference = 0.1). Conclusions: These results suggest that perceptual heat strain can be used as an indicator of physiological heat strain at a moderate intensity under similar hot and humid environmental conditions. Supported by Grant No. 5T42OH008421 09 from NIOSH / CDC to the Southwest Center for Occupational and Environmental Health (SWCOEH), a NIOSH Education and Research Center (Award Number: 0010059D)

### BOUT VS. NON-BOUT PHYSICAL ACTIVITY MINUTES ON METABOLIC SYNDROME RISK FACTORS IN COLLEGE STUDENTS

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PURPOSE: To examine moderate-to-vigorous physical activity (MVPA) minutes in bouts of > 10 minutes, MVPA minutes in non-bouts, as well as other physical activity (PA) variables and their association with metabolic syndrome (MetS) risk factors in college students. METHODS: Seventy-two female (n = 48) and male (n = 24) college students (20.3 ± 1.6 yr; BMI = 24.7 ± 4.7) underwent body composition measurement, fasting blood draw, blood pressure (BP) assessment, and 7-day objective PA assessment via accelerometry. Stepwise linear regression analysis was utilized to determine the impact of PA variables on MetS risk factors. RESULTS: Step counts were the only significant predictor of waist circumference (Beta = -0.4,  $P < 0.01$ ) and systolic BP (Beta = -0.3,  $P = 0.02$ ). Total number of bouts > 10 minutes were the only significant predictor of high density lipoprotein (Beta = 0.3,  $P < 0.01$ ) and total number of MetS risk factors (Beta = -0.3,  $P = 0.03$ ). Non-bout minutes were not significant for any MetS risk factor. When divided into tertiles by step counts, waist circumference was greater in the lowest (86.4 cm ± 9.6) and middle (87.6 ± 13.4) tertile compared to the highest tertile (74.8 ± 9.4,  $P < 0.05$ ). CONCLUSIONS: Results emphasize the importance of PA to MetS risk in college students. Whether total PA accrued, as measured by steps, or PA occurring in bouts is more important may differ by specific risk factor.

**SERUM PROTEIN S100B: A MARKER OF EXERCISE, NOT BRAIN INJURY**

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**P311** PURPOSE: Protein S100B (S100B) levels measured in cerebral spinal fluid have been shown to be indicative of brain injury severity and length of recovery. Recently, serum protein S100B has been under investigation as a marker of brain injury sustained during sport. This study was conducted to compare changes in serum S100B related to impacts and exercise. METHODS: To determine if serum S100B increased as a result of impacts, serum was taken from 16 collegiate football players before and after 4 regular season games. The change in S100B from pre- to post-game was compared to the total number of hits (body and head) they received during the game and the number of plays each player participated in. The number of hits and plays were calculated by reviewing game film. Changes in S100B due to running while wearing and not wearing a football helmet was determined by measuring S100B in 8 subjects before and after running on a treadmill at 6 mph for 8 minutes. RESULTS: Change in S100B was highly and significantly correlated to the number of hits and number of plays that football players experienced during a game ( $R^2 = 0.65$ ,  $p < 0.001$ ;  $R^2 = 0.63$ ,  $p < 0.001$ , respectively). Treadmill exercise caused a significant increase in S100B from pre- to post-treadmill protocols both with (pre = 0.0220.005 mug.L-1 vs. post = 0.0290.007 mug.L-1,  $p = 0.007$ ) and without (pre = 0.0220.004 mug.L-1 vs. post = 0.0290.012 mug.L-1,  $p = 0.012$ ) wearing a football helmet. CONCLUSIONS: Past research on S100B as a measure of brain injury may have erroneously assumed that impacts cause release of S100B when it is more likely that S100B is being released simply due to exercise. Further research into the response of S100B to exercise is warranted.

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**ASSOCIATION BETWEEN STEP COUNTS AND BLOOD LIPIDS AMONG PEOPLE LIVING WITH HIV/AIDS**

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**P312** People living with HIV/AIDS (PLWHA) often exhibit poor lipid panels increasing their risk for cardiovascular disease (CVD). The purpose of this investigation is to examine the association between physical activity (PA), measured in step counts, and risk factors for CVD among PLWHA being treated with antiretroviral therapy. METHODS: Participants were recruited as part of a home-based PA intervention aimed to reduce risk factors of CVD for PLWHA. Clinical assessments were conducted at baseline prior to randomization. PA levels were measured via accelerometer and considered compliant with a total on-body time of at least 10 hours a day for 4 days. Groups were determined using recent minimum recommendations of 5400 daily steps. RESULTS: Final analysis included a total of 42 individuals with valid accelerometer and blood lipid data. Independent t-tests showed that those with step counts  $\geq 5400$  ( $n=25$ ) had significantly higher ( $p=0.01$ ) HDL cholesterol ( $49.96 \pm 19.4$ ) compared to those more sedentary ( $n=17$ ;  $37.76 \pm 12.14$ ). LDL, triglycerides, and glucose were also higher in the sedentary group but did not reach significance. CONCLUSION: These data show the importance of even minimal PA among PLWHA. All blood lipids showed a trend suggesting improved lipid profile for those accumulating 5400 or more steps per day, with only HDL showing a significant difference. Further investigations should explore the relationship between increased PA and cardiovascular health in deconditioned clinical populations, such as PLWHA.

**OPTIMAL LOAD FOR HIGH-SPEED EXERCISE**

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**P313** Purpose: Identify an optimal load for knee extensions done on a high-speed exercise device called the Impulse (Impulse Technologies; Newnan GA). Methods: Subjects (14 women, 9 men) made six laboratory visits. The first two visits entailed familiarization to the knee extension exercise. For their last four visits they did four 30-second knee extension sets with different loads (0, 7.5, 12.5, 17.5 lbs.) added to the Impulse weight sled. A Latin Squares design to counterbalanced the sequence of the sets, which reduced the risk of an order effect and fatigue's impact on our results. Subjects rested 120 seconds between sets and were told to exert maximal effort. Peak and average force values were each analyzed with a 2 (gender) x 4 (load) ANOVA, with repeated measures for load. T-tests served as our post-hoc. Results: Average force (mean + sem) had a load effect (0:  $43 + 2$  N < 7.5:  $76 + 4$  N < 12.5:  $89 + 4$  N < 17.5:  $99 + 5$  N), while peak force produced a two-way interaction, in which men produced significantly higher values than women per load examined (please see Table below).  
Peak force (N) 0 lbs. 7.5 lbs. 12.5 lbs. 17.5 lbs.  
Women  $458 + 30$   $810 + 53$   $909 + 57$   $953 + 66$   
Men  $586 + 53$   $1041 + 95$   $1168 + 113$   $1238 + 119$   
Conclusions: Our results suggest heavier loads produce higher peak and average force values, and men produce greater peak forces than women.

**VALIDATION OF A STAIR CLIMB TEST FOR CLINICAL USE**

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**P314** PURPOSE: To validate a stair climb test (SCT) against the gold standard six-minute walk test (6MWT) in healthy adults. METHODS: One hundred thirty-seven subjects performed 6MWT, during which the maximum distance covered in six minutes was followed by SCT during which subjects climbed four flights of stairs (total height 10.52 m) as quickly as possible. Physiological measures which included heart rate (HR; pulse oximetry), systolic (sBP) and diastolic (dBP) blood pressure (digital automatic monitor), oxygen saturation (pulse oximetry), respiratory rate (RR), and dyspnea (modified Borg scale) were measured before and immediately after 6MWT and SCT and 4 min after SCT. RESULTS: Heart rate increased from  $78.35 \pm 13.67$  beats.min-1 to  $108.51 \pm 24.81$  beats.min-1 during 6MWT and from  $83.91 \pm 15.23$  beats.min-1 to  $137.14$  beats.min-1 during SCT. Dyspnea ratings rose to  $1.59 \pm 1.33$  during 6MWT and to  $3.18 \pm 1.45$  during SCT. There was a moderate, positive correlation ( $r = 0.53$ ,  $p = 0.00$ ) between the average distance walked during 6MWT ( $582.85 \pm 85.89$  m) and the average ascending speed during SCT ( $0.45 \pm 0.12$  m.sec-1). There was a significant positive correlation for HR ( $r = 0.67$ ,  $p = 0.00$ ), RR ( $r = 0.64$ ,  $p = 0.00$ ), dyspnea ( $r = 0.66$ ,  $p = 0.00$ ), sBP ( $r = 0.58$ ,  $p = 0.00$ ), and dBP ( $r = 0.49$ ,  $p = 0.00$ ) after 6MWT and SCT while there was not a relationship for oxygen saturation. CONCLUSION: Based on the significant correlations in time to completion and physiological variables between the two tests, the SCT may be a viable alternative to the 6MWT, especially in settings where the 6MWT cannot be performed due to lack of time or space.

### EFFECTS OF PROGRESSIVE AEROBIC EXERCISE AND RESISTANCE TRAINING IN OLDER HIV+ ADULTS

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**P315** PURPOSE: More than half of HIV infected (HIV+) adults within the US are older than 50 years and exercise training is understudied in this high-risk population. We conducted a randomized trial in HIV+ older adults to examine the effects of progressive aerobic exercise and resistance training (AEX+RT) on VO<sub>2</sub>peak and strength vs. sedentary controls. METHODS: Sedentary HIV+ men 50+ years of age were randomized to AEX+RT or control groups. The AEX+RT group received 16-weeks of supervised center-based training with progression to a target of 45 minutes of AEX at 70-80% HRR. The RT protocol consisted of 6 exercises progressed to 80% of baseline 1-RM. Control participants remained sedentary. Both groups were tested at baseline and 16-weeks. Paired t-tests were used to test pre/post differences within and between groups. Results are presented as mean ±SE. RESULTS: The AEX+RT group (N=5) increased VO<sub>2</sub>peak (0.23 ± 0.07 L/min, p= 0.03) and there was no change in the control group (N=7) (0.05 ± 0.08 L/min, p= 0.5) with a significant between group difference (p=0.03). Chest press strength increased in the AEX+RT group (29 ± 6% 1-RM, p=0.01) and there was no change in the control group (3 ± 8 % 1-RM, p=0.9). Leg press increased in the AEX+RT group (37± 7% 1-RM, p=0.01) and there was no change in the control group (2±7 % 1-RM, p=0.6). Between group differences in strength were significant (p<0.05). There were no significant adverse events or drop-outs within either group. CONCLUSIONS: Progressive, heart rate controlled AEX+RT was well tolerated and effective in increasing VO<sub>2</sub>peak, and strength, in older, HIV+ men. To target the underlying mechanisms of advanced aging in HIV+ men AEX+RT may be an effective training strategy. Supported by Veterans Affairs Merit Award 101 RX000667 (PI, Oursler)

### THEORETICAL PREDICTORS OF PHYSICAL ACTIVITY AMONG PEOPLE LIVING WITH HIV/AIDS

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**P316** Although physical activity (PA) has proven health benefits, many people living with HIV/AIDS (PLWHA) remain inactive. Incorporating theories of health behavior in PA prescription can help improve PA adoption and maintenance. PURPOSE: To determine 1) theoretical predictors of PA and 2) differences in theoretical constructs between PLWHA who were active and those who were not. METHODS: Physiological and psychosocial baseline data were collected from 68 PLWHA prior to randomization into a home-based PA intervention or education only group. PA was determined by accelerometer-derived average number of step counts per day (active = ≥5400 or not active = <5400 step counts). The Self Efficacy for Exercise Scale, Processes of Change – PA Scale, Decisional Balance for Exercise Scale, and Social Support for Exercise Scale assessed Social Cognitive Theory and Transtheoretical Model constructs. RESULTS: Multiple regression analysis from participants with complete accelerometer data (N = 50) revealed that self-efficacy (p = 0.03) was the only statistically significant predictor of physical activity. Independent t-tests determined that there was a statistically significant difference in processes of change (self-liberation) (p = 0.05) in those who met the minimal amounts of PA (n = 30) and those who did not (n = 20). CONCLUSION: This study highlights the importance of health and fitness professionals developing self-confidence to begin (and maintain) PA skills for PLWHA. Self-efficacy and self-liberation can be cultivated through mastery experiences, social modeling, verbal persuasion, stress-free practice, and commitment to PA.

### EFFECT OF MODERATE-TO-HIGH INTENSITY PHYSICAL ACTIVITY ON PEAK OXYGEN CONSUMPTION IN CHILDREN

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**P317** Obese children need to improve well-being and physical capacity to limit weight gain and prevent early comorbidities. Supervised, play-based physical activity has shown to be a valuable exercise intervention to improve physical capacity in children. Peak oxygen consumption (VO<sub>2</sub>peak) is considered to be the best cardiorespiratory fitness and exercise tolerance indicator in this population. Purpose: This pilot study aims to observe the effects of six weeks of supervised, structured physical activity during summer break on peak aerobic capacity in obese children. Methods: Six obese subjects (body fat 39.5±7.9%, mean age 11.8±1.5 years) engaged in 3-hours of moderate-to-vigorous (average and peak heart rate of 64-76% and 77-95% of HRmax, respectively) sport and recreational activities 5 days a week. VO<sub>2</sub>peak, peak respiratory quotient (RQpeak), and power at peak exercise (PWpeak) were evaluated via a graded exercise test to exhaustion on a cycle ergometer. Results: After the exercise intervention, VO<sub>2</sub>peak significantly decreased (1.89±0.37 vs 1.74±0.28 L/min, P=0.036) along with an increasing trend in PWpeak (115.2±23.9 vs 126.3±17.7 watt) and RQpeak (1.00±0.09 vs 1.10±0.05). Conclusion: Six weeks of moderate-to-vigorous physical activity, can decrease VO<sub>2</sub>peak and increase exercise tolerance which may be caused by a metabolic shift towards anaerobic metabolism.

### EFFECT OF MODERATE-TO-HIGH INTENSITY PHYSICAL ACTIVITY ON OXYGEN UPTAKE EFFICIENCY IN OBESE CHILDREN

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**P318** Obese children are less active and likely to be lower in cardiorespiratory fitness (CRF) compared to normal-weight children, therefore, placing them at a higher risk of developing cardiometabolic disorders with age. Furthermore, children potentially increase screen time and reduce physical activity (PA) during summer breaks from school, unlike those who enroll in a supervised camp that incorporates structured PA. PURPOSE: This pilot study observes the effects of supervised, structured PA on oxygen uptake efficiency plateau (OUEP) and slope (OUES) on the oxygen consumption (VO<sub>2</sub>) at the first ventilatory threshold (VT1) on obese children. METHODS: Six children (body fat 39.5±7.9%, mean age 11.8±1.5 years) participated in a 6-week summer camp where they engaged in 3-hours a day of sport and recreational activities at moderate-to-vigorous intensity (average 64-76% and peak 77-95% of HRmax) for 5-days a week. A graded exercise test to exhaustion was performed on a cycle ergometer to evaluate cardiorespiratory parameters in all subjects. RESULTS: OUEP significantly decreased (pre vs post: 39.5±2.2 vs 36.6±2.2, P≤0.01) and OUES showed a decreasing trend (2146±671 vs 1856±360) while VO<sub>2</sub> at VT1 did not change (15.6±3.9 vs 15.0±4.5 ml/kg/min) post-intervention. CONCLUSION: Moderate-to-vigorous PA performed for 3 hours a day may be too intense of a stimulus for obese children. This is likely a cause of the decrease in OUE during exercise.

#### ANTHROPOMETRIC MEASURES AND PERFORMANCE TESTS IN THE EVALUATION OF PERFORMANCE AND INJURY RISK IN DIVISION I COLLEGIATE ATHLETES

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**P319** PURPOSE: Measurement tools like mean and peak power, eccentric utilization ratio (EUR), and simple anthropometrics have potential predictive value in determining athletes' accelerative and decelerative movement strategies. The objective of the present study is to determine the efficacy of these measurements in identification of pathological preferential movement strategies which may limit performance or heighten injury risk. METHODS: Thirty-one NCAA Division I athletes (16 females, 15 males) were recruited and asked to perform five trials of a simple drop-jump task. Subjects met inclusive criteria if they were cleared for full participation. Body composition, mean and peak power, EUR, bodily segment lengths, and handheld dynamometer muscle forces were assessed. A 3-D infrared motion capture system was used to measure peak joint flexion ranges of motion. A stepwise linear regression was applied to identify influential factors in the accelerative and decelerative preferential strategies between male and female athletes. RESULTS: Findings suggest that torso length ( $r=.530$ ,  $p=.042$ ) and torso to femur length ratio ( $r=.782$ ,  $p=.005$ ) are potentially related to peak trunk, and peak knee flexion values respectively in males. In females, EUR held value in relation to peak trunk flexion ( $r=.675$ ,  $p=.004$ ), hip flexion ( $r=.604$ ,  $p=.013$ ), and combined lower extremity flexion ( $r=.552$ ,  $p=.027$ ) strategies in females. CONCLUSIONS: These findings suggest that while males have highly variable movement strategies that are strongly associated with anthropometrics, females may tend to rely more heavily on storage and return of eccentric energy via the contractile components of the posterior chain in order to increase athleticism and create greater joint integrity in decelerative tasks.

#### THE EFFECTS OF SOCIOECONOMIC STATUS ON HEALTHCARE ACCESS

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**P320** Purpose: Two Mecklenburg County Senior centers were compared to assess their health, using cholesterol levels and repeat attendance to assessments. Methods: The Tyvola Senior Center consists of a higher socioeconomic group (\$65,863.00) of individuals who pay a fee to attend the gym and receive one-on-one exercise trainings, while, overall, the attendees at the Bette Rae Recreation Center have a lower socioeconomic status (\$21,624.00) and also pay a fee for gym access and one-on-one exercise training. The two centers both had access to free quarterly health risk assessments where cholesterol was examined. Results: After four rounds of data collection, the 68 repeater participants at Bette Rae averaged a total cholesterol level of 171 mg/dL, a HDL level of 61 mg/dL, and a LDL level of 83 mg/dL. In the same time frame, the 43 Tyvola repeater participants averaged a total cholesterol level of 189 mg/dL, an HDL level of 56 mg/dL, and an LDL level of 101 mg/dL. Conclusions: Research suggests that living at a lower socioeconomic status would lead to a lower overall health, however, this was not shown by our data. Bette Rae Recreation center participants, not only had better average cholesterol values across all rounds, they also had more participants return to the health risk assessments. This indicates that Bette Rae participants rely more heavily on these assessments to maintain their overall health.

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#### EFFECT OF CONCURRENT AEROBIC AND RESISTANCE TRAINING ON STRENGTH: HIGH INTENSITY INTERVAL AND RESISTANCE TRAINING

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**P321** While exercise guidelines include both aerobic and resistance exercise (RE), concurrently performing steady state aerobic exercise and resistance exercise on the same day has been shown to attenuate strength gains compared to RE alone. High intensity interval training (HIIT) has been shown to increase aerobic fitness equal to steady state aerobic exercise while positively influencing muscular strength (MS). Purpose: To determine the impact of adding HIIT to a RE program on strength gains. Methods: Thirty-six healthy college aged students were randomly selected to control (C), HIIT, RE, or Combined (CB) HIIT and RE groups. Activities were performed twice weekly separated by a minimum of 48 hours. The HIIT consists of 10 sets of 100 meter sprints with 60 seconds fast walking between sets. The RE consists of 4 sets of six repetitions at 80% of 1RM for both leg press and leg extensions. The CB group performed HIIT followed by RE concurrently on the same day. Lower body MS was measured on a leg press pre and post eight week intervention. Percent change in MS was evaluated. Significance was set at  $p<0.05$ . Results: When compared to controls, only the RE and CB groups significantly increased strength with no difference between RE and CB. Conclusion: Concurrent RE and HIIT training does not reduce the strength improvements observed with RT alone in active college age individuals.

#### COMPARISON OF GROSS MOTOR FUNCTION AMONG DIFFERENT AGE GROUPS OF THE OLDER ADULT POPULATION RESIDING IN INDEPENDENT LIVING

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**P322** Purpose: The purpose of this study was to exam the relationship between gross motor function and capacities required for daily activities in older adults. Methods: Thirty-four older adults (females: N = 33, males: N = 1; Right-handed: N = 29, Left-handed: N = 5), ages 61 to 90 years ( $76 \pm 8.6$ ), with minimal neurological deficits or cognitive impairments (assessed with Mini-mental State Examination score  $> 20$ ) and no restrictive cardiovascular or respiratory ailments were medically cleared after completing a Physical Activity Readiness – Questionnaire (PAR-Q) for this study. Each participant completed time-up-and-go (TUG), six minutes walking (6MWT), Jamar handgrip strength and pinch force test, Purdue Pegboard Test and Jebsen Hand Function Test. Correlation analysis was conducted among the variables. Results: Pearson's correlation test indicated that TUG was significantly correlated with all grip force variables ( $p<0.05$ ), all pinch force variables ( $p<0.05$ ) (except Jamar Pinch Force-Lateral Pinch), all Purdue pegboard variables ( $p<0.05$ ) (except Purdue Pegboard Assembly), and all Jebsen test variables ( $p<0.05$ ). 6MWT was significantly correlated with total condition (number of conditions reported in PAR-Q) ( $p<0.05$ ). Conclusions: In aging population, the task of TUG may represent fine motor functions in addition to locomotion and balance. Endurance ability is related to the accumulation of physical conditions/problems.

**DETERMINING INTENSITY CUT-POINTS FOR WRIST-WORN ACTIGRAPH GT9X ACCELEROMETERS DURING TREADMILL WALKING**

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PURPOSE: Wrist-worn placement of triaxial accelerometers to assess physical activity (PA) is appealing due to a greater level of comfort and improved wear compliance. However, studies evaluating PA intensity cut-points for wrist-worn accelerometers are limited. METHODS: Twenty participants (22.8±2.9 yrs, 24.3±2.1 kg/m<sup>2</sup>, 30% female) completed a single study visit that included a 6 min bout of sedentary activity (reading, writing, computer/device work) followed by three 6 min bouts of treadmill walking at speeds of 2.0, 3.0, and 4.0 mph at 0% grade interspersed with 5 min of rest. An accelerometer (ActiGraph GT9X Link) was worn on the non-dominant wrist while MET levels were assessed by indirect calorimetry (Parvo TrueOne 2400). Receiver operating characteristics (ROC) curves were generated to determine 15 sec vector magnitude (VM) cut-points for sedentary (<1.5 METs), light (1.5 - <3 METs), and moderate and higher (≥3 METs) PA. RESULTS: The area under the ROC curves to differentiate between sedentary and moderate or higher intensity PA was 0.95 (95% confidence interval [CI]: .88-1.0; p<0.001) and 0.89 (95% CI: .81-.97; p<0.001), respectively. The identified 15 sec VM cut-points that maximized sensitivity and specificity was ≤362 (90% and 90%, respectively) for sedentary activities, 363–1085 for light PA, and ≥1086 (80% and 80%, respectively) for moderate and higher intensity PA. CONCLUSION: This study determined Actigraph GT9X cut-points that correspond to sedentary, light, and moderate PA intensities during walking at speeds up to 4 mph in young adults.

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**COMPARISON OF SELF-ESTEEM, BODY IMAGE, AND MOTIVES OF PHYSICAL ACTIVITY IN COLLEGE STUDENTS IN GROUP AND SOLO EXERCISE**

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Previous research has shown significant differences in the intensity of exercise performance and perceived body image between individuals with and without an exercise partner (Plante et al., 2010). Little research has been found which has compared the psychological factors between those who exercise with a group class and those who exercise alone. The purpose of this research study is to compare self-esteem, body image, and physical activity motives between individuals who experience group exercise and those who exercise alone. Participants included 126 college-aged students (31 males, 95 females) at a southeastern university who engaged in either group exercise classes or solo exercise (40 group fitness, 86 solo exercise). The majority of students were white, non-Hispanic (69.8%) and senior students (53.2%). Participants completed a battery of surveys that measured self-esteem, body esteem, and motives of physical activity: the Rosenberg Self-Esteem Scale, Body Esteem Scale, and Motives of Physical Activity-Revised Scale. Data was analyzed by t-tests for each subscale. Since no male participants participated in group fitness classes, comparisons were only made among the female sample. It was expected that self-esteem, motivation and body esteem would be significantly higher in those that participate in group exercise than those who exercise by themselves. However, results showed that there was no significant difference between the groups on any measured construct. Means for self-esteem, body esteem, and motives for physical activity were all similar and high in response. These results are not consistent with previous literature on body esteem and performance, but do show the regardless of the exercise setting, college-age females had high levels of self-esteem and body-esteem. In conclusion, physical activity engagement in the areas of group exercise and solo exercise are both beneficial for maintaining higher levels of self-esteem, body esteem, and motives for physical activity within this small sample.

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**MONOCYTE INFLAMMATORY RESPONSE TO ACUTE EXERCISE IN BREAST CANCER SURVIVORS**

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PURPOSE: To examine monocyte intracellular cytokine production following acute aerobic exercise in breast cancer survivors. METHODS: 5 breast cancer survivors [56 (7y), BMI 28.3 (8.7)] completed a cardiopulmonary exercise test (CPET). In a subsequent trial, 45 minutes of intermittent cycling at 60% of CPET peak wattage was performed. Blood was taken at rest, 0h and 1h post-exercise. Following 4h of lipopolysaccharide (LPS) stimulation, CD14+ monocyte IL-6, TNF $\alpha$  and IL-1 $\beta$  expression was evaluated using flow cytometry. RESULTS: Leukocyte number increased (+29.8%, p=0.013) with a trend for monocytes (+27.8, p=0.080) at 0h. LPS stimulation increased IL-6 expression (Con: 13.3%, LPS+: 61.1%, p=0.035) which compared to rest was 44% lower at 1h but did not reach significance (p=0.118). Stimulation tended to increase TNF $\alpha$  (Con: 29.2%, LPS+: 69.5%, p=0.081) and IL-1 $\beta$  (Con: 39.1%, LPS+: 82.8%, p=0.070) levels, and these levels were unchanged with exercise. CONCLUSIONS: Preliminary results suggest acute exercise does not exacerbate TNF $\alpha$  and IL-1 $\beta$  expression following simulation and potentially attenuates the IL-6 response during recovery. This may have important implications for immune function and the response to pathogens in these patients. Funding from the Breast Cancer Research Foundation of New York.

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**METABOLIC DIFFERENCES IN AMINO ACID PLASMA CONCENTRATIONS IN HIGH- AND LOW-ACTIVE MICE**

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Purpose: The purpose of this study was to conduct basic metabolic analysis on high-active (HA; C57L/J) and low-active (LA; C3H/HeJ) mice, and determine basic metabolic differences between amino acid (AA) pathways in these activity types. Methods: At 12wks of age, 20 HA male mice (body weight: 27.5 ± 1.2g; lean mass: 22.5 ± 1.3g; fat mass: 2.5 ± 0.7g; food intake: 3.4 ± 0.8g) and 23 LA male mice (body weight: 25.8 ± 1.2g; lean mass: 21.0 ± 1.1g; fat mass: 2.5 ± 0.5g; food intake: 3.0 ± 1.0g), under anesthesia had a catheter placed in the right jugular vein for blood sampling. Plasma AA concentrations were determined by LC-MS/MS. Data were analyzed using unpaired t-tests for each AA. Results: LA mice had significantly higher concentrations of all amino acids (p<0.0001), except for GLN, ARG and GLY (p=0.8011, 0.7895, and 0.9167) respectively. LYS was the only AA significantly lower (p=0.0002) in the LA mice. Conclusions: The consistently higher AA concentration in LA mice could indicate that modified AA metabolic pathways are linked to lower activity levels.

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### EFFECTS OF GROUP EXERCISE ON BLOOD PROFILES IN OLDER ADULTS

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**P327** PURPOSE: We examined the differences in blood lipid profiles amongst exercising older adults, and sedentary older adults of Shamrock Senior Center. METHODS: blood lipid profile measurements consisting of total cholesterol, high-density lipoprotein, low-density lipoprotein and triglycerides were assessed in both exercising older adults (n=14, 75.5±7.4 y, BMI=27.5±4.1) and sedentary older adults (n=7, 80.0±10.3 y, BMI=30.0±5.4) via Cardiocheck Analyzer. The exercising older adult group participated either in a low impact aerobics class or strength training class 3 times a week for 45 minutes each session for a minimum of 3 months. RESULTS: The mean values for exercising older adults (total cholesterol=171.9, high-density lipoprotein =56.2, low-density lipoprotein =87.6, triglycerides=148.3) trend toward healthier values over the sedentary older adults (total cholesterol=184.1, high-density lipoprotein =45.9, low-density lipoprotein=100.1, triglycerides=184.6) in each of the variables measured. CONCLUSION: These results suggest older adults who participate in a group exercise program can improve blood lipid profiles.

Supported by a grant from Sharon Towers Continuing Care Retirement Community.

### RELIABILITY AND VALIDITY OF NIRS MITOCHONDRIAL CAPACITY PROTOCOL IN SKELETAL MUSCLE

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**P328** PURPOSE: To establish reliability of a near-infrared spectroscopy (NIRS) mitochondrial capacity protocol and assess validity using heating and cooling interventions. METHODS: 14 young healthy people (men=8; women=6) participated in the study. The standard protocol consisted of a series of blood pressure cuffs above the NIRS probe and electrical stimulation to the vastus lateralis (thigh), gastrocnemius (calf) and flexor carpi radialis (forearm). For reliability, the standard protocol was used on the forearm between days (24 hours separating test days). Within day reliability was tested in the thigh, calf and forearm during the standard protocol, and hot and cold conditions. To test validity, we heated the local area to 40 degrees Celsius or cooled to -4 degrees Celsius. Each condition was repeated twice in one day. RESULTS: The between day reliability for the forearm was 3% (n=11; average coefficient of variation (CV)) and the within day CV was 5% (n=14). The within day CV for the calf was 6% and the thigh was 5% (n=14). For the cold condition the forearm was 12%, the calf was 4% and the thigh was 4%. For the hot condition the forearm was 6%, the calf was 5% and the thigh was 5%. In the forearm and calf, cold increased the time constant and heat decreased the time constant (p<0.05). In the thigh, heat decreased the time constant (p<0.05), but cold was not different from control. CONCLUSION: These results suggest that the NIRS mitochondrial capacity has good within and between day reliability in forearm, calf and thigh. Mitochondrial capacity time constants are increased by cold and decreased by heating in the forearm and calf, which suggests good construct validity. The thigh had a decreased time constant with heating, but cooling failed to significantly increase the time constant. This is likely due to difficulty of cooling a large muscle area.

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### NO LIPOLYTIC SUPPRESSION WITH PRE-EXERCISE CARBOHYDRATE REGARDLESS OF ITS GLYCEMIC INDEX

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**P329** INTRODUCTION: It is well-documented that ingesting carbohydrate prior to exercise reduces fat oxidation, and that this effect is attenuated with low glycemic index carbohydrates. However, it is yet to be established whether these metabolic effects are primarily the result of alterations in the mobilization of free fatty acids (FFA) from adipose tissue (i.e. lipolysis) or whether these effects impact exercise performance. PURPOSE: To determine the impact of pre-exercise carbohydrate of different glycemic indices on subcutaneous abdominal adipose tissue (SCAAT) metabolism and running performance. METHODS: Ten trained male runners completed three experimental trials consisting of 30 min at 60% VO<sub>2</sub>max, 30 min at 75% VO<sub>2</sub>max, and a 5-km time trial (TT). Thirty min prior to exercise, participants consumed one of three beverages: 1) 75 g low glycemic index modified starch supplement (UCAN), 2) 75 g high glycemic index glucose-based supplement (G), or 3) a non-caloric placebo (PL). SCAAT lipolysis was assessed via microdialysis. RESULTS: Prior to exercise, blood glucose and insulin were elevated with G vs. PL (+53.0 ± 21.3 mg·dL<sup>-1</sup> [SD]; p = 0.000; +33.9 ± 11.0 μU·mL<sup>-1</sup>; p = 0.000) and G vs. UCAN (+36.6 ± 24.9 mg·dL<sup>-1</sup>; p = 0.00007; +25.2 ± 11.0 μU·mL<sup>-1</sup>; p = 0.000), respectively. Fat oxidation was attenuated, and carbohydrate oxidation increased prior to exercise with G vs. PL (-0.06 ± 0.06 g·min<sup>-1</sup>; p = 0.005; +0.18 ± 0.07 g·min<sup>-1</sup>; p < 0.0001) and G vs. UCAN (-0.06 ± 0.05 g·min<sup>-1</sup>; p = 0.004; +0.18 ± 0.14 g·min<sup>-1</sup>; p < 0.0001). There were no differences in SCAAT lipolysis or running performance. CONCLUSIONS: Pre-exercise carbohydrate results in metabolic effects favoring carbohydrate utilization, and these effects are attenuated with low glycemic index carbohydrate. However, these effects are not the result of alterations in SCAAT lipolysis, nor do they affect exercise performance.

### TRACKING BLOOD PROFILES FOR REPEAT PARTICIPANTS ACROSS OLDER ADULTS- MECKLENBURG COUNTY: A 10-MONTH STUDY

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**P330** PURPOSE: To determine one's risk for cardiovascular diseases using a diagnostic lipid panel to recommend potential lifestyle modifications and reduce risk factors. METHODS: At multiple Health Risk Assessments each participant had blood lipid levels analyzed to see if they were within the recommended levels. A lancet was used to pierce the skin of the participant's finger to create a small incision from which to draw blood. The first drop of blood was wiped away with the gauze pad. A capillary tube was used to collect a sample of blood from the pricked finger. The capillary tube was emptied, via a capillary plunger, onto the lipid strip in the CardioChek system to analyze the blood lipid profile. Upon completion of the test, the participant's numbers were recorded and explained. RESULTS: Average lipid levels (total cholesterol, LDL, and triglycerides) for repeaters were lower in Round 4 (167mg/dL, 89.57mg/dL, 138.01mg/dL) than those in Round 1 (174mg/dL, 90.22mg/dL, 152.51mg/dL). A slight decrease in HDL levels occurred (57.09mg/dL to 54.2mg/dL). However, the average for repeat participants remained above the desired value of 40mg/dL. There was a decrease in the frequency of multiple risk factors (total cholesterol, triglycerides). CONCLUSIONS: These results conclude that through consistent exercise blood lipid values can be improved, decreasing the risk for cardiovascular disease.

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### EFFECTS OF GROUP OR INDIVIDUAL EXERCISE ON TRIGLYCERIDES AND BLOOD GLUCOSE VALUES IN SENIORS

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**P331** **PURPOSE:** We examined the variances in triglycerides and blood glucose levels between active seniors and sedentary seniors at Southview Senior Center. **METHODS:** Pre and post triglycerides (TG) and blood glucose (BG) measurements were taken by a small prick to the finger using the CardioChek Analyzer. The active seniors participated in individual strength training or low-intensity aerobics group sessions 2-3 times a week for 30 minutes each for a minimum of three months. **RESULTS:** Pre values for the active seniors (n=10) were TG1=137.8mg/dL & BG1=124mg/dL and TG1=123.6mg/dL & BG1=127.3mg/dL for the sedentary seniors (n=14). Three month post measurements were TG2=94.42mg/dL & BG2 107.3mg/dL for the active seniors and TG2=165.0mg/dL & BG2=124.5mg/dL for sedentary seniors.

**CONCLUSION:** These results suggest that seniors who actively partake in group or individual exercise programs have lower risks for cardiovascular and metabolic diseases. Supported by a grant from Sharon Towers Continuing Care Retirement Community

### CHANGES IN BLOOD PH AND AMMONIA FOLLOWING REPEAT SPRINT PERFORMANCE

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**P332** The relationship between relative intensity and changes in blood pH and ammonia are not well characterized. **PURPOSE:** The primary aim of the study was to determine how changes in relative exercise intensity following repeat sprint performance affect changes in blood pH and blood ammonia concentrations. **METHODS:** Healthy college-age males (n = 12) completed one 30 second Wingate cycle sprint test as a familiarization trial. A minimum of 48 hours after the familiarization trial, participants returned to the lab. Resting venous and capillary blood samples were obtained to determine blood ammonia, pH, and lactate levels. Participants then completed 3 Wingate sprint tests, separated by 5 minutes each. Finger capillary blood was immediately obtained after each test to determine lactate and pH values. After the final test, an additional venous blood sample was obtained to determine blood ammonia values. **RESULTS:** Data are shown as 1st vs. 2nd vs. 3rd tests, respectively. There was a significant effect for time for peak power (750.08 ± 39.55 vs. 675.42 ± 30.01 vs. 615.60 ± 37.72 Watts); F = 4.66, p = 0.05, mean power (632.67 ± 30.71 vs. 561.25 ± 22.16 vs. 524.40 ± 26.46 Watts); F = 5.04, p = 0.04, pH (7.72 ± 0.01 vs. 7.63 ± 0.02 vs. 7.62 ± 0.02); F = 70.18, p < 0.01, and lactate (12.36 ± 1.14 vs. 14.10 ± 1.13 vs. 16.95 ± 1.22 mg/dL); F = 42.02, p < 0.01. Blood ammonia values did increase from pre- to post-exercise (0.33 ± 0.09 vs. 1.07 ± 0.22 mg/dl); t = 3.62, p < 0.01, but there was no correlation between post-exercise ammonia values and change in peak or mean power. There was a weak, but significant correlation between change in peak power and change in pH (R2 = 0.34, p = 0.05) and change in mean power and change in pH (R2 = 0.44, p = 0.02). **CONCLUSIONS:** Greater reductions in peak power and mean power correlated with change in blood pH, but not post-exercise ammonia values.

### DIURNAL METABOLIC FLUX ASSOCIATED WITH WASTING IN FEMALE TUMOR BEARING MICE

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**P333** Many cancers are associated with altered diurnal homeostasis, which can lead to systematic and tissue metabolic dysfunction. Although the preservation of systemic metabolic homeostasis has been linked to wasting prevention and improved survival, we have a limited understanding of the drivers associated with cancer-induced metabolic dysfunction during naturally occurring fasting and feeding cycles. **Purpose:** Using a preclinical colon cancer model we examined diurnal metabolic flux in the female Apc Min/+ mouse. **Methods:** Female C57BL/6 (WT) and ApcMin/+ (MIN) mice were sacrificed immediately following the light and dark cycle at 12 and 20 weeks of age. MIN-20 mice had significant body weight loss (8%, p=0.02) from peak weight, while MIN-12 had not initiated bodyweight loss. **Results:** MIN-20 had a 22% increase in elevated circulating glucose following the light cycle (p=0.03) when compared to MIN-12. MIN-12 liver mass increased (12%, p=0.04) after the dark cycle when compared to the light cycle, which was not present in MIN-20. Stomach size, an indirect marker of food consumption, was (23%, p=0.04) greater in MIN-20 following the light cycle compared to MIN-12. **Conclusions:** Cancer-induced weight loss in the female mouse blunted several diurnal variations related to metabolism. These findings have implications for understanding cancer-induced metabolic disruptions that can impact life quality and survival.

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### EFFECTS OF A KETOGENIC SUPPLEMENT OR A WHEY PROTEIN BREAKFAST MEAL ON METABOLISM, SATIETY AND ENERGY INTAKE

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**P334** **PURPOSE:** To determine the effects of whey protein (WP) versus Ketobomb™ (KB), added to an isocaloric breakfast smoothie on energy expenditure (EE), satiety and energy intake. **METHODS:** Fifteen women (age, 29±10 years; body fat 28.5±4.7%) participated in this randomized, double blind, crossover study. After a 12-hour fast, prior to consuming the test meal, resting metabolic rate (RMR) was assessed via indirect calorimetry, and satiety (hunger (H), fullness (F), desire to eat (DE) and prospective food consumption (PC)) via visual analog scale (VAS). After consuming the isocaloric (450 kcals) test meal containing either 54g WP (40% kcals protein) or 52g KB (40% kcals fat), VAS on satiety was administered every 30 minutes for the 3-hour post-prandial period. The thermic effect of the meal (TEM) and respiratory quotient (RQ) were assessed at 45, 105 and 165 minutes after meal completion. An ad libitum lunch meal was provided to assess energy intake. **RESULTS:** There was a significant group by time effect for VO2 (p<0.001) and RQ (p=0.001). Consumption of the WP elicited a greater TEM at all time points. RQ was significantly lower after WP compared to KB. Significant group by time interactions were observed for H (p=0.022), F (p<0.001) and DE (p=0.02) but not PC (p=0.107). Perceived H and DE were significantly lower, and perceived F was greater in the WP condition compared to KB. Energy intake (WP: 577.8±282.4 vs. KB: 624.6±220.1 kcals) did not differ between conditions (p=0.197). **CONCLUSION:** WP appears to be more advantageous in promoting satiety and increasing energy expenditure.

**CROSS-TOLERANCE: HYPOXIA STRESSES PERIPHERAL BLOOD MONONUCLEAR CELLS (PBMC) MORE THAN HYPERTHERMIA**

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**P335** Recent work has substituted hyperthermic exercise for hypoxic preconditioning prior to ascent to altitude. **PURPOSE:** This work investigated whether hyperthermic and hypoxic exercise elicit an equivalent stress response in PBMC. **METHODS:** Subjects (N=4) ran (65%VO<sub>2</sub>max) for 60min under three environmental conditions: Control (20°C/FIO<sub>2</sub>=20.9%), Hypoxia (20°C/FIO<sub>2</sub>=13.5%), and Hyperthermia (38°C/FIO<sub>2</sub>=20.9%). Core temperature (T<sub>c</sub>) and peripheral oxygen saturation (SpO<sub>2</sub>) were measured during exercise. PBMC were isolated from blood samples taken at Pre, Post, 1-Post, and 4-Post exercise. Protein content of markers along the TLR4 signaling pathway (TLR4, p-NFκB, NFκB) and indicators of cellular energy status (SIRT1 & p-AMPK) were determined via western blot. Group differences were determined with 2-Way (Condition x Time) RM ANOVAs with statistical significance set at p≤0.05. Post hoc were run where appropriate. **RESULTS:** SpO<sub>2</sub> averaged 79±1% in Hypoxia. Maximal T<sub>c</sub> in Hyperthermia was 39.2±0.2°C. p-NFκB was elevated (+94%) at 1-Post in Hypoxia (p<0.01) but not in Hyperthermia. p-AMPK was reduced (p<0.01) at 1-Post in Hypoxia (-66%) and Hyperthermia (-50%). SIRT1 was reduced (p<0.01) at 1-Post in Hypoxia (-68%) and Hyperthermia (-47%). **CONCLUSION:** Hypoxic exercise increased inflammatory signaling in PBMC. p-AMPK and SIRT1 may have been downregulated to help maintain pro-inflammatory capacity. Simulated altitude exposure appears to stress PBMC more than hyperthermia, suggesting that further research on the mechanics of cross-tolerance in human PBMC is warranted.

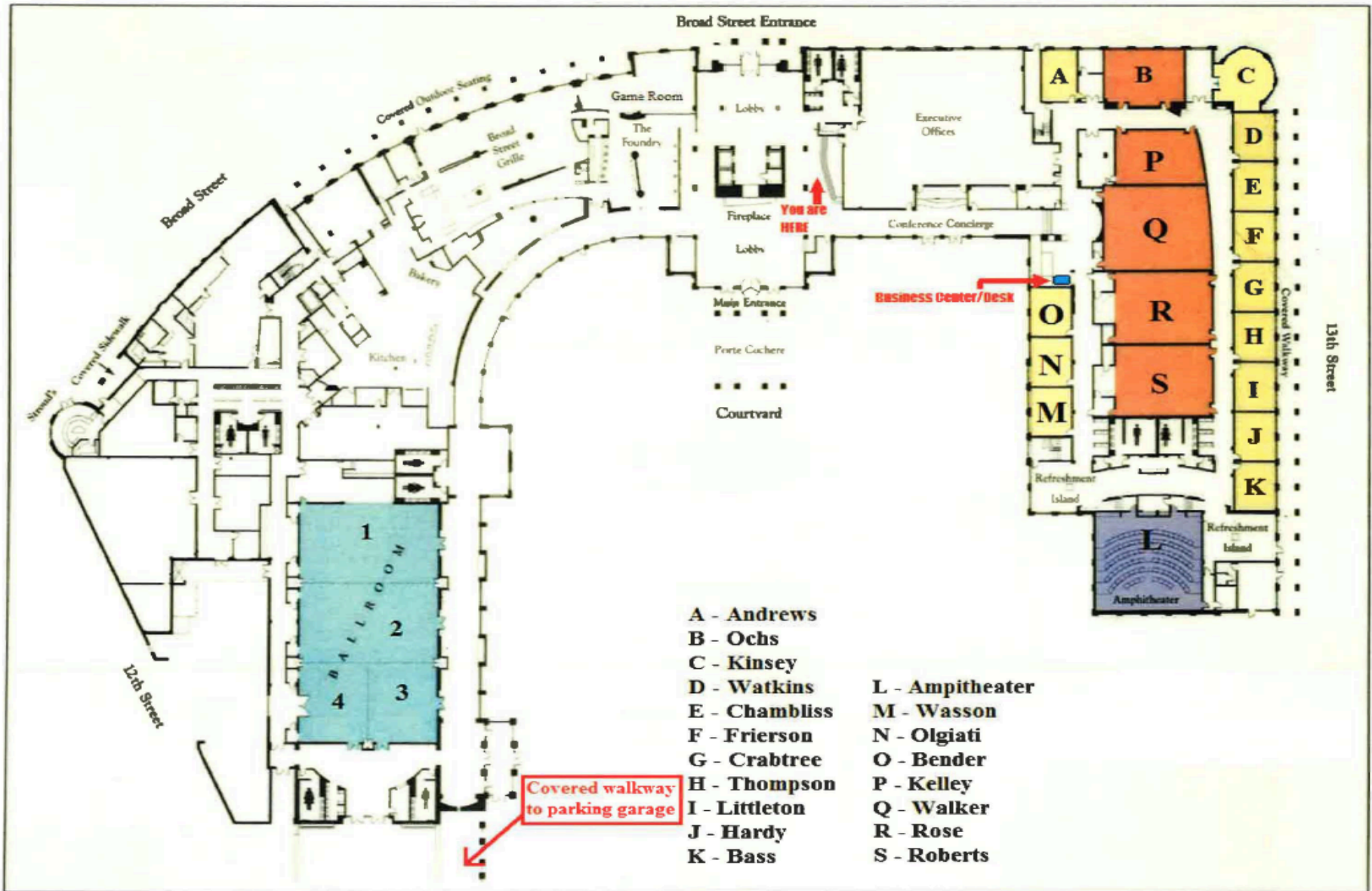
**ALTITUDE PROMOTES GUT LEAK AND LEUKOCYTE ACTIVATION**

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**P336** **PURPOSE:** This study tested whether altitude-associated ischemic stress damages the gastrointestinal barrier, activates leukocytes, and promotes inflammation. **METHODS:** Five subjects (N=5) ran (60%VO<sub>2</sub>max) for 60min at sea level (Normoxia: FIO<sub>2</sub>=20.9%) and at ~4000m of simulated altitude (Hypoxia: FIO<sub>2</sub>=13.5%). Peripheral oxygen saturation (SpO<sub>2</sub>) and absolute tissue saturation (StO<sub>2</sub>) were measured with pulse oximetry and NIRS. I-FABP, markers of leukocyte activation (CD14, ICAM-1, IL-8, MCP-1, MPO), and cytokines (TNFα, IL-1β, IL-6, IL-10, IL-12) were measured in plasma samples collected Pre, Post, 1hr-Post, and 4hr-Post exercise. Data were analyzed with 2-Way RM-ANOVAs (Condition x Time) with statistical significance set at p≤0.05. **RESULTS:** In Hypoxia SpO<sub>2</sub> averaged 79±1% and StO<sub>2</sub> averaged 61±2. Significant interaction effects were shown for I-FABP and IL-8 (p=0.05). Post hoc analysis indicated I-FABP increased more from Pre to Post in Hypoxia (112%) than in Normoxia (30%). IL-8 increased more from Pre to Post (60%) and 1hr-Post (83%) in Hypoxia than in Normoxia (33% & 57%, respectively). Significant main effects were shown for IL-6, ICAM-1, CD14, and MCP-1. All were higher in Hypoxia (p=0.05). MPO increased at Post in Normoxia (121%, p=0.05), and at 1hr-Post in Hypoxia (129%; p=0.02). **CONCLUSION:** Preliminary data suggest exercise at altitude may increase gastrointestinal barrier damage and leukocyte activation, as indicated by higher levels of I-FABP, IL-8, and MCP-1. Increased CD14 and ICAM-1 suggest TLR4-mediated inflammatory signaling may also be elevated, but the delayed increase in MPO following exercise at altitude warrants further investigation.



Time/Day	Lobby	Conference	Ochs	Kelley	Walker	Rose	Roberts	Amphitheater	Chattanooga Ballroom	Ballroom	Kinsey	Littleton	Frierson	Crabtree	Game Room
15-Feb		Concierge							1,2,3,4	Foyer					
11:00 AM											Board Meeting				
12:00 PM											11:00-1:00				
1:00 PM	Registration											AV Meeting			
2:00 PM	Student Help Desk				PC2	PC1						1:00-1:45			
3:00 PM	1:00-6:00 pm				PC3										
4:00 PM		Exhibits	TP1-TP6	O1-O8	S1	S2	T1	T2		Student Awards					
5:00 PM		4:00-6:30 pm	4:00-5:30	4:00-6:00	S3	S4	T3	T4		D1-D8, M1-M8, U1-U8					
6:00 PM										P1-P48					
7:00 PM									Keynote	4:00-6:00					
8:00 PM									7:30-9:00						
9:00 PM	SEACSM Social														
10:00 PM	9:00-10:30														
16-Feb		Concierge							1,2,3,4	Foyer					
6:00 AM									Emily Haymes B-fast						
7:00 AM									6:45-7:45						
8:00 AM	Registration	Exhibits	TP7-TP12	O9-O16	S5	S6	T5	T6		Posters					
9:00 AM	Student Help Desk	8:00-6:00 pm	8:00-9:30	8:00-10:00	S7	T7	T8	T9		P49-P120					
10:00 AM	8:00-5:00 pm								ACSM Pres. Address	8:00-9:30					
11:00 AM									Clinical Crossover						
12:00 PM				Minority Health			Biomechanics	Clinical Track						Past Pres. Lunch	
1:00 PM				Interest Group			Interest Group	12:30-5:45	Basic Science					12:00-1:00	
2:00 PM				12:30-1:15			12:30-1:15		1:15-2:15						
2:30 PM			TP13-TP18	O18-O24	S8	S9	T10			Posters					
3:00 PM			2:30-4:00	2:30-4:30						P121-P192					
3:30 PM					S10	T11	T12			2:30-4:00					
4:00 PM															
4:30 PM									Student Bowl	4:30-6:00					
5:00 PM															
6:00 PM					Grad Fair	Grad Fair									Clinical Reception
7:00 PM					6:15-7:45	6:15-7:45									6:30-7:15
8:00 PM															
17-Feb		Concierge							1,2,3,4	Foyer					
7:00 AM	Run meet at 6:30							Clinical Track						Yoga	
8:00 AM		Exhibits	TP19-TP24	O25-O32	T13	T14		7:30-12:45		Posters				6:45-7:45	
9:00 AM		8:00-12:00 pm	8:00-9:30	8:00-10:00	T15	T16	S11			P193-P264 8:00-9:25					
9:30 AM										Posters					
10:00 AM					T17	T18	T19			P265-P336 9:30-11:00					
11:00 AM					Montoye										
12:00 PM					Lecture				Luncheon						
1:00 PM									12:00-2:00						
2:00 PM											Board Meeting				
											2:00-4:00				



**THANKS TO OUR 2018  
SUPPORTERS & EXHIBITORS**

... from the Southeast Chapter of the American College of Sports Medicine

**SUPPORTERS**

**Gannon University  
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<http://www.gannon.edu/>**

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<http://www.nova.edu/>**

**Liberty University  
Bronze Level Supporter  
[www.liberty.edu/](http://www.liberty.edu/)**

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[www.hologic.com/](http://www.hologic.com/)**

**American College of Sports Medicine  
<http://www.acsm.org/>**

**Gatorade Sports Science Institute  
[www.gssiweb.com](http://www.gssiweb.com)**

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### Exhibitors:

**Biodex**

[www.biodex.com/](http://www.biodex.com/)

**BioPac**

[www.biopac.com/](http://www.biopac.com/)

**Creative Health Products**

<https://www.chponline.com/>

**COSMED USA, Inc.**

[www.cosmedusa.com](http://www.cosmedusa.com)

**National Strength and Conditioning Association**

[www.nscs.com/](http://www.nscs.com/)

**ParvoMedics**

[www.parvo.com/](http://www.parvo.com/)

**University of Southern Florida**

<http://health.usf.edu/medicine/orthopaedic/index.htm>

**Tekscan**

<https://www.tekscan.com/>