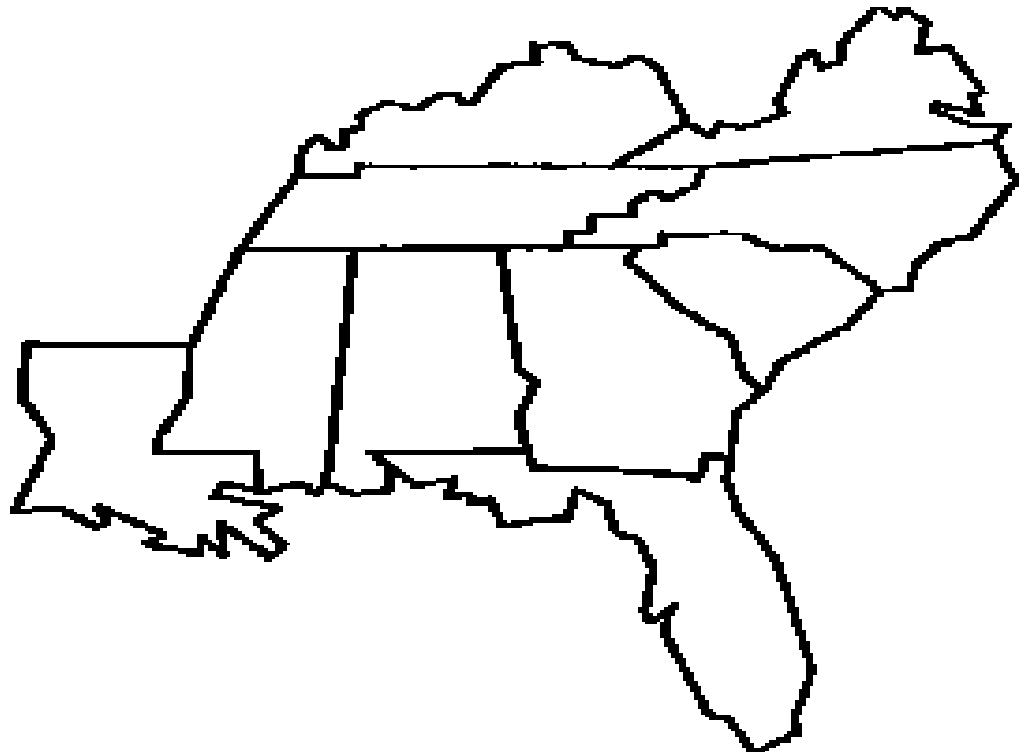


**AMERICAN COLLEGE  
of SPORTS MEDICINE**  
SOUTHEAST REGIONAL CHAPTER

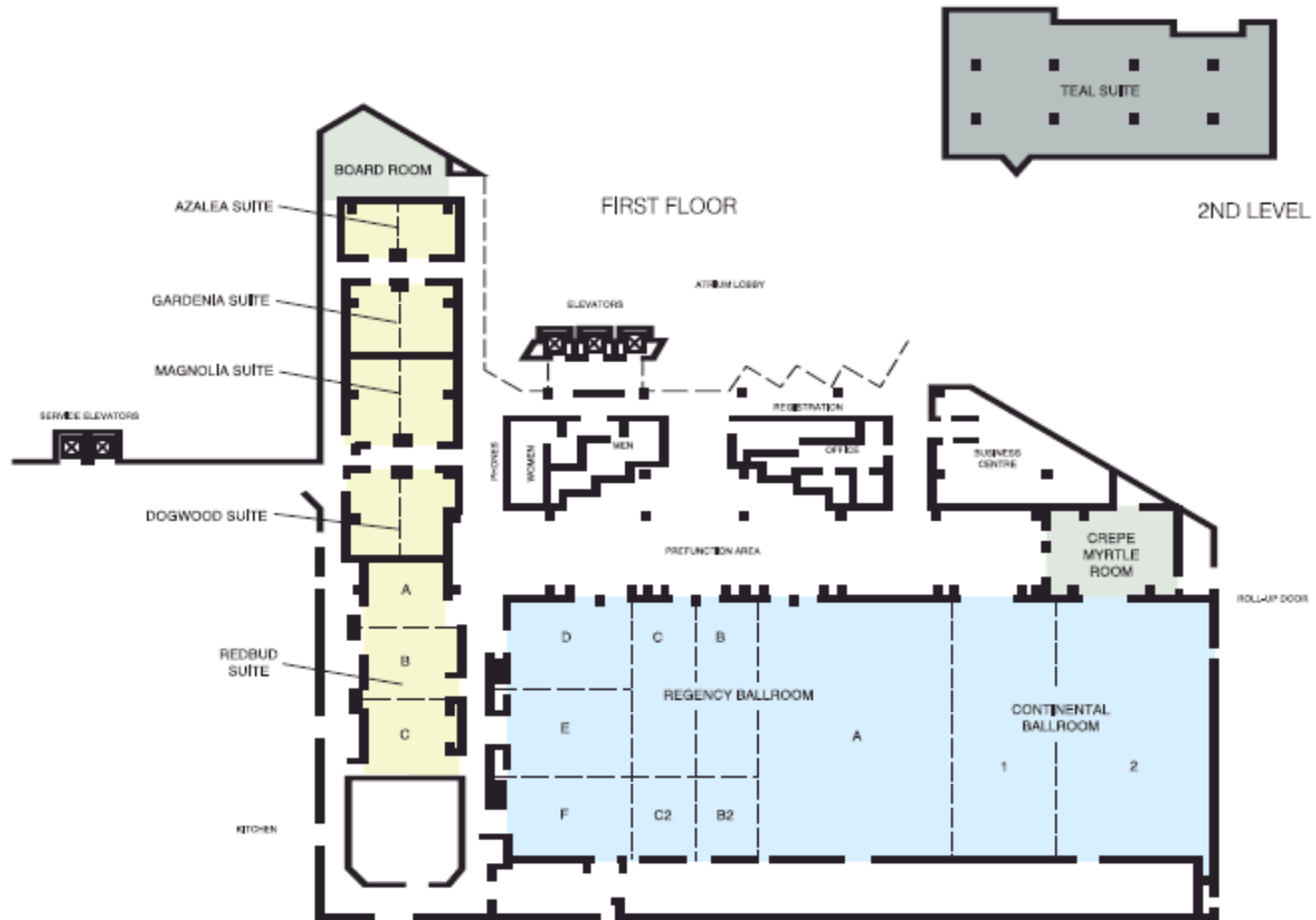
**February 3-5, 2011  
39th Annual Meeting  
Hyatt Regency Hotel  
Greenville, South Carolina**

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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)

# 2011 SEACSM Meeting: HYATT Regency, Greenville SC Floor Plan



**Thirty-Ninth Annual Meeting**

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

**Hyatt Regency Hotel  
Greenville, South Carolina  
February 3-5, 2011**

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

**Officers**

**President:** Peter Grandjean, Baylor University

**Past President:** Alan Utter, Appalachian State University

**President-Elect:** David Pasco, Auburn University

**Executive Board:**

Sean Bryan, Clinical Representative, University of South Florida/Morton Plant Mease/ BayCare Health System

James Churilla, At-Large Member, University of North Florida

Brandon Hollis, Student Representative, Louisiana State University

Cherilyn Hultquist, At-large Member, Kennesaw State University

Mark Loftin, At-large Member, The University of Mississippi

John Quindry, At-Large Member, Auburn University

Beverly Warren, Representative to ACSM, Virginia Commonwealth University

**Executive Director:**

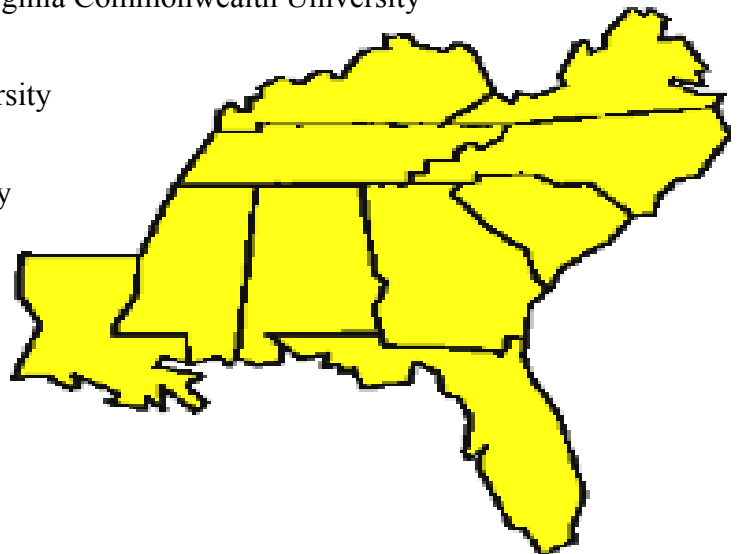
Carolynn Berry, Winston Salem University

**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

### **CME Meeting Objectives**

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

- Recognize common conditions encountered in the endurance athlete.
- Plan appropriate medical coverage of local endurance events.
- Recognize common biomechanical risk factors that may lead to overuse injuries in the endurance athlete.
- Develop treatment plans for endurance athletes appropriately addressing nutritional and psychological factors.

### **Accreditation**

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of the Orthopaedic Research Foundation of the Carolinas and the Southeast Chapter of the American College of Sports Medicine. The Orthopaedic Research Foundation of the Carolinas is accredited by the ACCME to provide continuing medical education for physicians.

### **AMA/PRA**

The Orthopaedic Research Foundation of the Carolinas designates this educational activity for a maximum of 9 AMA PRA Category I Credit(s)<sup>TM</sup>. Physicians should only claim credit commensurate with the extent of their participation in the activity.

### **Continuing Education Credits**

SEACSM is an approved provider for ACSM and NATA (P840). Continuing education credits (CECs) have been applied for through NSCA, AFP and ACE. An attendee form will be available to sign to be eligible to receive up to 16 CECs from the Commission of Dietetic Registration. Attendance verification forms will be available for these and other organizations upon request.

### **Faculty Disclosure**

In accordance with ACCME requirements, faculty at all educational activities that receive CME credit must provide the audience with (1) disclosure of financial relationships they have with the supporters of this conference or with the manufacturers of products discussed in their presentations, and (2) disclosure of unlabeled or unapproved uses of drugs or devices that are discussed in their presentations. Speakers will disclose this information at the time of their presentations.

### Disclosure of Unlabeled/Unapproved Uses of Drugs or Devices

Notice: In accordance with the ACCME Standards for Commercial Support, the audience is advised that one or more presentations in this continuing medical education activity may contain reference(s) to unlabeled or unapproved uses of drugs or devices. Speakers will disclose this information at the time of their presentation.

### Acknowledgement of Commercial Support

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges the program support from: SonoSite, Steadman Hawkins Clinic of the Carolinas, Acceleration Sports Institute, Gatorade Sports Science Institute, VacuMed, and Bodystat.



### 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.



**Planning Committee**

David Pascoe, Sean Bryan, Michael Berry, Kyle Cassas, Peter Grandjean, James Churilla, Cherilyn Hultquist,  
Brandon Hollis, Mark Loftin, John Quindry,Carolynn Berry, Don Torok, Alan Utter, Beverly Warren

**SEACSM List of Reviewers**

Michael McKenzie, Winston Salem, Jonathan Wingo & Gary Hodgers, University of Alabama, Matt Green, N. Alabama, Mike Flynn & Tim Scheett, College of Charleston, Gregory Martel & Will Lyerly, Costal Carolina, Gordon Fisher & Gary Hunter, UAB, Robert Buresh, Kennesaw University, Sue Graves & Don Torok, FAU, Jay Garner, Ole Miss, Bruce Gladden, Auburn University, David Bassett, University of Tennessee, Justin Shoyer, University of Louisiana at Lafayette, Dave Szymanski, Loiusiana Tech, Tony Marsh & Pat Nixon, Wake Forest, J. Larry Durstine, University of South Carolina, Paul Davis, University of North Carolina-Greensboro, Paul Miller, Elon University, Rebecca Battista & David Nieman, Appalachian State, Robert McMurray, University of North Carolina-Chapel Hill, Janet Rankin, Virginia Tech, Ed Acevedo, Virginia Commonwealth University, Mindy Millard-Stafford, Georgia Institute of Technology, Pete Grandjean, Baylor.

**SEACSM Meetings & Officers**

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
1st	Fall 1973 Gatlinburg, TN	Andrew Kozar	
2nd	Fall 1974 Atlanta, GA	Clyde Partin	
3rd	Fall 1975 Charlottesville, VA	Dan Copeland	
4th	Fall 1976 Murfreesboro, TN	Rankin Cooter	
5th	Fall 1977 Lexington, KY	Ed Howley	Steve Blair Ron Byrd Joe Smith
6th	Fall 1978 Columbia, SC	Russ Pate	
7th	Feb. 16-17, 1979 Atlanta, GA	Dennis Wilson Ed Howley Ron Byrd	Earl Allen Thad Crews Art Weltman
8th	Feb. 8-9, 1980 Charlotte, NC	Ron Byrd Dennis Wilson Paul Ribisl	Bruce Gladden Jay Kearney Russ Pate
9th	Feb. 6-7, 1981 Charleston, SC	Paul Ribisl Ron Byrd Bill Herbert	Joe Chandler Tom Cronan Kirk Cureton
10th	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
11th	Feb. 4-5, 1983 Gainesville, FL	Russ Pate Bill Herbert Kirk Cureton	Jon MacBeth (ES) Earl Allen David Cundiff Scott Powers
12th	Feb. 3-4, 1984 Auburn, AL	Kirk Cureton Russ Pate Chris Zauner	Ron Bos (ES) Emily Haymes Phil Sparling Mike Stone

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
13th	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
14th	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
15th	Jan. 29-31, 1987 Charleston, SC	Scott Powers Robert McMurray Diane Spitler	Ron Bos (ES) Terry Bazarre J. Larry Durstine Steve Messier Allen Moore (S) Russ Pate (N) Janet Walberg
16th	Jan. 28-30, 1988 Winston-Salem, NC	Diane Spitler Scott Powers Phil Sparling	Ron Bos (ES) Dalynn Badenhop Gay Israel Steve Messier Russ Pate (N) Janet Walberg Rankin Mark Senn (S)
17th	Jan. 19-20, 1989 Atlanta, GA	Phil Sparling Diane Spitler Emily Haymes	Ron Bos (ES) Dalynn Badenhop Kirk Cureton (N) Mark Davis Gay Israel Ben Kibler (MD) David Peltzer (S) Art Weltman
18th	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
19th	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

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
20th	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
21st	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)
22nd	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
23rd	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
24th	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)
25th	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



	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
26th	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
27th	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
28th	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
29th	Jan. 25-27, 2001 Charlotte, NC	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

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
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 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

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
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
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

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 Montoyo	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

**SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE  
2011 ANNUAL MEETING SCHEDULE (OUTLINE)**

**THURSDAY, February 3, 2011**

- 12:00-2:00 SEACSM EXECUTIVE BOARD MEETING (Board Room)**
- 1:00-6:00 REGISTRATION (Main Lobby)**
- 4:00-9:00 EXHIBITS (Prefunction Area)**
- 4:00-5:00 Tutorial T1 (Crepe Myrtle)**  
Complementary and Alternative Medicine (CAM): Does it Belong in the Fitness Profession?
- 4:00-5:15 ORAL FREE COMMUNICATIONS OFC1 & OFC2**
- O1-04 Spinal cord injured persons, athletic training **(Regency Ballroom D)**
- O5-08 Exercise and health/disease **(Continental)**
- 4:00-5:30 SYMPOSIUM S1 & S2**
- S1 How to Compete for the Graduate Assistantship and Job You Want **(Redbud)**
- S2 From Pregnancy to Adolescence-Current Guidelines Regarding Physical Activity including Barriers, Benefits, and Practical Application**(Regency Ballrooms B& C)**
- 4:00-6:00 STUDENT AWARD POSTER PRESENTATIONS I (Teal)**  
D1-8, M 1-8, U 1-8; Authors Present 4:30-6:00. Chair: Matt Barberio
- 5:30-6:30 TUTORIALS T2-T4**
- T2 Secrets for a Successful ACSM Fellowship Application **(Red Bud)**
- T3 Exercise as an Intervention for Improving and Maintaining Functional Capacity in Older Adults: New Perspectives **(Regency Ballroom A)**
- T4 Engaging Undergraduates and Graduates in Research: Improve Your Productivity and Student's Education **(Crepe Myrtle)**
- 5:15-6:45 SYMPOSIUM S3**
- S3 Mitochondria, Oxidative Stress and Cell Survival from the Perspective of the Exercised Heart **(Regency Ballrooms E&F)**
- 7:30-9:00 KEYNOTE ADDRESS (Continental Ballroom)**  
**"Exercise Can Protect Against a Broken Heart"**  
Dr. Dr Scott Powers, Ph.D., FACSM  
UAA Endowed Professor and Distinguished Professor  
Applied Physiology and Kinesiology, University of Florida  
Presiding: Dr John Quindry, SEACSM Member at Large, Dept. Kinesiology, Auburn Univ.
- 9:00-11:00 SEACSM SOCIAL (Regency Ballrooms A, B, & C)**

**FRIDAY, February 4, 2011**

- 6:45-7:45 WOMEN'S BREAKFAST (Regency Ballrooms E & F)**  
*(Registration Required)*  
**"OPPORTUNITYISNOWHERE"**  
Beverly J. Warren, Ed.D., Ph.D., FACSM  
Interim Provost and Vice President for Academic Affairs; Virginia Commonwealth University; Past SEACSM President

- 8:00-5:00 REGISTRATION (Main Lobby)**
- 8:00-6:00 EXHIBITS (Prefunction Area)**
- 8:00-9:30 SYMPOSIUMS S4 –S6**
- S4 The Post-bariatric Surgery Patient: Your Next Client? **(Red Bud)**
- S5 Lactate-Protected Hypoglycemia ("LPH"): A Potential Cancer Treatment? **(Regency Ballrooms B&C)**
- S6 Cardiorespiratory, Neuroendocrine, and Immuno-Inflammatory Adaptations to Concurrent Mental and Physical Stress **(Crepe Myrtle)**
- 8:00-9:15 ORAL FREE COMMUNICATIONS OFC3 & OFC4**
- O9-O12 Cardiovascular physiology **(Continental)**
- O13-O15 Competitive athletes, nutrition **(Regency Ballroom D)**
- 8:00-9:15 Tutorial T5**
- T5 Ultra Endurance Events: Medical, Training and Physiological Effects **(Regency Ballroom A)**
- 8:00-9:30 POSTER PRESENTATION II: P1-P24 (Teal)**
- Authors Present 8:00-9:00 AM  
Cardiovascular, Body comp/energy balance/weight control, Connective tissue/Bone/Skeletal muscle
- 9:30-9:45 BREAK**
- 9:45-10:45 ACSM PRESIDENTIAL ADDRESS (Continental Ballroom)**
- "The Immune Response: Friend or Foe?"**  
Thomas Best, MD, Ph.D., PACSM  
Professor of Family Medicine and Pomerene Chair of Primary Care  
Director of the Division of Sports Medicine, Ohio State University Medical Center  
Presiding: Dr Pete Grandjean, SEACSM President, HHPR, Baylor University
- 10:45-11:00 BREAK**
- 10:45-12:15 POSTER PRESENTATION III: P25-P48 (Teal)**
- Authors Present 10:45-11:45 AM  
Competitive athletes, Fitness/Testing/Assessment
- 10:45-12:15 SYMPOSIUM 7**
- S7 From Athletes to Older Adults: Dietary Protein and Exercise Interact for Optimal Physical Performance **(Redbud)**
- 11:00-12:00 TUTORIALS T6 & T7**
- T6 To Do or Not To Do a Post Doc: What, Why, and Where **(Regency Ballroom E)**
- T7 The Promotion of Health and Performance Through Mindfulness Based Stress Reduction **(Regency Ballrooms A)**
- 11:00-12:00 ORAL FREE COMMUNICATIONS OFC5 & OFC6**
- O16-O19 Epidemiology and preventive medicine **(Regency Ballroom D)**
- O20-O23 Psychology, Biomechanics, Assessment **(Regency B & C)**
- 12:00-1:15 PAST PRESIDENT'S LUNCH (Regency Ballroom F)**

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**SEACSM Clinical Track Program (Crepe Myrtle)****The Endurance Athlete**

- 12:30 pm Welcome and Announcements-Kyle J. Cassas, MD  
12:40 pm GI Problems in Athletes: Thomas M. Best, MD, PhD, FACSM  
1:15 pm Exercise Physiology for the Practicing Clinician:Ray Moss, PhD, Furman University  
1:40 pm Ultra-Endurance Events: John Millon, MD  
2:00 pm The Medical Tent: SC Half Ironman Perspective: Dave Sealy MD  
**2:25 pm Break**  
2:40 pm Fellow Case Presentations: Panelist: Delmas Bolin, MD, PhD & Chad Asplund, MD  
Case 1 N. Kopp, DO, Univ of Kentucky, Knee Injury - Soccer  
2:55 pm Case 2 M. Huggins, MD, Emory Sports Medicine, Ankle Pain - Kickboxing  
3:10 pm Case 3 M. Close, DO, Steadman Hawkins Sports Medicine, Knee Injury – Football  
3:20 pm Gait Analysis: Bert Fields, MD  
3:50 pm Basic Bike Fit: Dave Mruz DC  
**4:15 pm Break**  
4:30 pm Evaluation and Treatment of Exertional Leg Pain: Delmas Bolin, MD, PhD, FACSM  
5:00 pm Psychology of Endurance Sport: Drew Brannon  
5:20 pm Discussion  
**6:30-8:30 pm Reception (Redbud)**
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- 1:30-2:30 MONTOYE SCHOLAR LECTURE (Continental Ballroom)**  
**“Physical Inactivity: The Biggest Public Health Problem of the 21st Century?”**  
Dr. Steven Blair P.E.D.; President and CEO, Cooper Institute  
Adjunct Professor: University of South Carolina School of Public Health  
University of Texas Health Science Center School of Public Health  
The College of Education at the University of Houston  
The College of Education Academy for Research and Development at the University of North Texas  
Presiding: Dr Larry Durstine, University of South Carolina, Past SEACSM President, 2008 Montoye Scholar
- 2:30-2:45 BREAK**
- 2:45-4:15 SYMPOSIUM S8**  
S8 Exercise-Induced Oxidative Stress: Cause and Consequences  
**(Regency Ballrooms E & F)**
- 2:45-4:15 TUTORIALS T8-T10**  
T8 Dartfish: A Movement Analysis and Data Collection **(Red Bud)**  
T9 Phenotype and Cardiovascular Disease Morbidity and Mortality in Multicultural Populations **(Regency D)**  
T10 Physical Activity during Pregnancy for Chronic Disease Prevention **(Regency B & C)**
- 2:45-4:00 ORAL FREE COMMUNICATION OFC7**  
O24-O27 Fitness testing assessment **(Regency A)**
- 2:45-4:15 POSTER PRESENTATIONS IV: P49-P72 (Teal)**  
Authors Present 2:45-3:45  
Biomechanics, Fitness/Testing/Assessment
- 4:30-5:30 STUDENT BOWL (Continental Ballroom)**  
**Moderator:** Dr. Michael Turner, UNC Charlotte
- 5:45-7:00 SEACSM GRADUATE STUDENT FAIR (Regency Ballrooms A, B, & C)**

## **SATURDAY February 5, 2011**

**8:00-9:00 REGISTRATION (Main Lobby)**

**8:00-12:00 EXHIBITS (Prefunction Area)**

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### **Clinical Track**

7:30 am Welcome and Announcements  
Kyle J. Cassas, MD

7:40 am Foot and Ankle Problems in the Endurance Athlete: Bryan Weatherby, MD

8:10 am Vascular Issues in Endurance Athletes: Bruce Gray, MD

8:40 am Fellow Case Presentations: Panelist: Damond Blueitt, MD & Rob Hosey, MD  
Case 4 W. Bailey, MD, Moses Cone Sports Medicine, Head Injury - Football

8:55 am Case 5 H. Youmans, MD, American Sports Medicine Inst, Hemoptysis - Football

9:10 am Case 6 R. Brewer, MD, Vanderbilt Sports Medicine, Weakness - Ultra Marathon

9:25 am The Female Athlete: Michelle Wilson, MD

9:55 am Strength Training Effects on Endurance Performance:  
Peter M. Magyari, PhD, HFS, CSCS

**10:20 am Break**

10:35 am Rehab Issues in Endurance Athletes/Functional Movement Screen:  
Brad Eggebraaten, PT, ATC

11:05 am Fellow Case Presentations: Panelist: Stephanie Husen, DO & John Batson, MD  
Case 7 G. Visser, MD, Univ of South Florida, Thoracic Injury - Football

11:20 am Case 8 C. Rainbow, MD, Moses Cone Sports Medicine, Hip Injury - Football

11:35 am Case 9 U. Khan, MD, American Sports Medicine Inst., Arm Pain - Football

11:50 am Sports Nutrition and the Endurance Athlete: Speaker TBD

12:20 pm Voting for Best Case Presentation

Closing Remarks

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### **8:00-9:00 TUTORIALS (T11, T12)**

T11 The Common Cold is Less Common Among the Fit (**Regency Ballrooms E & F**)

T12 Breast Cancer Survivors, Weight Management and Physical Activity: Physiological and Psychosocial Implications (**Regency Ballrooms B & C**)

### **8:00-9:30 SYMPOSIUM S9**

S9 Regulation of Skeletal Muscle Atrophy (**Red Bud**)

### **8:00-9:00 ORAL FREE COMMUNICATIONS OFC8, OFC9**

O28-O30 Exercise evaluation and clinical (**Regency D**)

O31-O34 Environmental and thermal (**Regency A**)

### **8:00-9:45 POSTER PRESENTATION V: P73-P96 (Teal)**

Authors present 8:00-9:00  
Metabolism, endocrinology/immunology, epidemiology/preventative medicine

### **9:00-10:15 BASIC SCIENCE LECTURE (Continental Ballroom)**

**"Imaging the Neuromuscular System"**

Dr. Jeff Lichtman, M.D.

Harvard University, Professor of Molecular and Cellular Biology

Presiding: Dr David Pascoe, SEACSM President Elect, Dept. Kinesiology, Auburn University

### **10:15-10:30 BREAK**

### **10:30-12:00 SYMPOSIUM S10**

S10 Assessing Oxygen Delivery and Mitochondrial Function (**Redbud**)



**10:30-11:30 TUTORIALS T13-T15**

- T13 Training Considerations for Triathletes: Off Season Resistance Training and Coaching the Mature Athlete **(Regency Ballrooms E & F)**
- T14 Balance Training: Why Everyone Should Do it (45-50 minute) **(Regency Ballrooms B & C)**
- T15 A Simplified Presentation of the Keys to Statistical Interpretation to Prevent Mistaken Uses and Interpretation of Common Statistical Tests **(Regency Ballroom A)**

**10:30-11:45 ORAL FREE COMMUNICATIONS OFC10**

- O35-O37 Fitness/testing/Assessment **(Regency Ballroom D)**

**10:15-12:00 POSTER PRESENTATION VI: P97-P118 (Teal)**

Authors Present 10:15-11:15  
Exercise evaluation/clinical, psychology/psychiatry/behavior, growth and development

**12:00-2:00 SEACSM LUNCHEON AND LECTURE (Continental Ballroom)**

**“Quantifying the Limits of Human Performance Outside of the Laboratory”**  
Brent Ruby, Ph.D., FACSM; University of Montana  
**Presiding:**

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

**HAVE A SAFE TRIP HOME; SEE YOU NEXT YEAR AT SEACSM IN FLORIDA**

# SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE 2011 ANNUAL MEETING SCHEDULE (COMPLETE)

**THURSDAY, February 3, 2011**

**12:00-2:00 SEACSM EXECUTIVE BOARD MEETING (Board Room)**

**1:00-6:00 REGISTRATION (Main Lobby)**

**4:00-9:00 EXHIBITS (Prefunction Area)**

**4:00-5:00 Tutorial (Crepe Myrtle)**

T1 COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM): DOES IT BELONG IN THE FITNESS PROFESSION?

Amanda Timberlake M.S., R.D., *Life University, Atlanta, GA*

Chair: Amy Knab, *Appalachian State University*

**4:00-5:15 ORAL FREE COMMUNICATIONS OFC1**

Spinal cord injured persons, athletic training (**Regency Ballroom D**)

Chair: JoEllen Sefton, *Auburn University*

O1 4:00 VALIDITY OF BIOELECTRICAL IMPEDENCE ANALYSIS (BIA) FOR ESTIMATION OF TOTAL BODY WATER (TBW) IN SPINAL CORD INJURED (SCI) PERSONS.  
Bolten M.<sup>1,2</sup>, Harnish, C.<sup>1,2</sup>, Miller J.<sup>1,2</sup>, Gorgey, A.<sup>1</sup>, Daniels, J.<sup>1</sup>, Gater, D.<sup>1,2</sup>. *McGuire VAMC, Richmond, VA, 2Virginia Commonwealth University, Richmond, VA*

O2 4:15 A COMPARISON OF PREDICTED VS. ACTUAL RESTING METABOLIC RATE (RMR) IN SPINAL CORD INJURED (SCI) PERSONS.  
A. Keeley<sup>1,2</sup>, C. Harnish<sup>1,2</sup>, J. Miller<sup>1,2</sup>, A. Gorgey<sup>1</sup>, J. Daniels<sup>1</sup>, D. Gater<sup>1,2</sup>  
(1) *McGuire VAMC, Richmond, VA*, (2) *Virginia Commonwealth University, Richmond, VA*

O3 4:30 COMPARISON OF THE EFFECTS OF 16 WEEKS ARM CRANK ERGOMETRY (ACE) AND FUNCTIONAL ELECTRICAL STIMULATION CYCLING (FESC) IN SPINAL CORD INJURED (SCI) PERSONS.  
Radan, J., Harnish, C., Miller, J., Daniels, J., Poarch, H., Gater, D. *McGuire VAMC, Richmond, VA, Virginia Commonwealth University, Richmond, VA*

O4 4:45 INITIAL CONCUSSION PRESENTATION DOES NOT PREDICT TIME FOR RETURN TO PARTICIPATION OR INITIAL SYMPTOM REPORT.  
Thomas A. Buckley and Barry A. Munkasy. *Department of Health and Kinesiology, Georgia Southern University, Statesboro, GA*

**4:00-5:15 ORAL FREE COMMUNICATIONS OFC2**

Exercise and health/disease (**Continental**)

Chair: Joseph Pierce, *East Carolina University*

O5 4:00 POOR VASCULAR HEALTH INCREASES LOAD ON THE HEART AND DECREASES EXERCISE CAPACITY.  
D.P. Credeur, B.C. Hollis, M. Lupo, C.P. Earnest and M.A. Welsch. *Dept. of Kinesiology, LSU, and Pennington Biomed. Res. Cntr, Baton Rouge, LA*

O6 4:15 PHYSICAL ACTIVITY IN YOUNG CHILDREN DURING THE SCHOOL DAY.  
J.I. Flynn<sup>1</sup>, D.P. Coe<sup>1</sup>, J.T. Fairbrother<sup>1</sup>, and S. Durham<sup>2</sup>  
(1) *University of Tennessee, Dept. of Kinesiology, Recreation, and Sport Studies*,  
(2) *Dept. of Child and Family Studies and the Early Learning Center*

- 07 4:30 THE SESSION RPE RESPONSE TO SELF-SELECTED AND IMPOSED EXERCISE INTENSITIES.  
L. Haile, J. L. Andreacci, E. F. Nagle, F. L. Goss, R. J. Robertson. *Center for Exercise and Health-Fitness Research, University of Pittsburgh, Pittsburgh, PA*
- 08 4:45 THE ROLE OF EXECUTIVE FUNCTION IN 400 METER WALK PERFORMANCE: THE SENIOR'S HEALTH & ACTIVITY RESEARCH PROGRAM - PILOT (SHARP-P)  
Katie Yamamoto, Jeffrey A. Katula, Alexander Lucas, Janine Jennings, Claudine Legault, Sarah Gaussoin, Kaycee Sink, Stephen Rapp, W. Jack Rejeski, & Mark Espeland. *Wake Forest University, Wake Forest University School of Medicine, Winston-Salem, NC*
- 4:00-5:30 SYMPOSIUM S1 & S2**
- S1 HOW TO COMPETE FOR THE GRADUATE ASSISTANTSHIP AND JOB THAT YOU WANT.  
A. Bosak<sup>1</sup> and G. Ryan<sup>2</sup>. (1) *Georgia Southwestern State University*, (2) *University of Alabama*. **(Redbud)**
- S2 FROM PREGNANCY TO ADOLESCENCE-CURRENT GUIDELINES REGARDING PHYSICAL ACTIVITY INCLUDING BARRIERS, BENEFITS, AND PRACTICAL APPLICATION.  
R.A. Battista<sup>1</sup>, D.P. Coe<sup>2</sup>, and L.M. Mudd<sup>1</sup>; (1) *Appalachian State University*, (2) *University of Tennessee* **(Regency Ballrooms B & C)**
- 4:00-6:00 STUDENT AWARD POSTER PRESENTATIONS I: P1-P24 (Teal)**  
D1-8, M 1-8, U 1-8; Authors Present 4:30-6:00  
Chair: Matt Barberio, Auburn University
- D1 EXERCISE INDUCED CARDIOPROTECTION AGAINST TISSUE NECROSIS.  
Lindsey Miller<sup>1</sup>, John Quindry<sup>1</sup>, Graham McGinnis<sup>1</sup>, Megan Irwin<sup>2</sup>, Michael Landram<sup>2</sup>, Zea Urbiztondo<sup>2</sup>, Lacey Allums<sup>1</sup>  
(1) *Auburn University, Auburn, AL*; (2) *Appalachian State University, Boone, NC*
- D2 THERAPEUTIC ULTRASOUND AFFECTS IGF-I SPLICE VARIANTS IN HUMAN SKELETAL MUSCLE.  
Diana C. Delgado Diaz<sup>1,2</sup>, Brad Gordon<sup>1</sup>, Matthew C. Kostek<sup>1</sup>. (1) *University of South Carolina, Columbia, SC*. (2) *Universidad Industrial de Santander, Bucaramanga, Colombia*.
- D3 EFFECTS OF 5-FLUOROURACIL CHEMOTHERAPY ON VOLUNTARY PHYSICAL ACTIVITY.  
S.E Mahoney, J.M Davis, J.L McClellan, M.D Carmichael, M Pena and E.A Murphy  
*Dept. of Exercise Science, University of South Carolina, Columbia, SC*.
- D4 EFFECTS OF FOUR MONTHS OF ELECTRICAL STIMULATION-INDUCED RESISTANCE TRAINING ON PARALYZED MUSCLE.  
T.E. Ryan, K.K. McCully FACSM, and Q. Zhao. *Departments of Kinesiology and Physics. University of Georgia, Athens, GA*
- D5 INCREASED EXPRESSION OF BRAIN INFLAMMATORY CYTOKINES FOLLOWING DOWNHILL RUNNING IN MICE.  
B.T Gordon, EA Murphy\*, J.L McClellan, M.D Carmichael, and J.M Davis.  
*Dept. of Exercise Science and \*Dept. of Pathology, Microbiology, and Immunology, University of South Carolina, Columbia, SC*
- D6 RESVERATROL'S EFFECT ON INFLAMMATION ASSOCIATED WITH MUSCLE DEGENERATION/REGENERATION: A DOSAGE TRIAL.  
B.S. Gordon, D.C. Delgado, M.C. Kostek. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC*

- D7      PHYSIOLOGIC TRAINING RESPONSES TO ARM CRANK ERGOMETRY (ACE) AND FUNCTIONAL ELECTRICAL STIMULATION CYCLING (FESC) IN SPINAL CORD INJURED (SCI) PERSONS.  
C. Harnish, J. Daniels, J. Miller, H.D. Poarch, Gater. McGuire VAMC, Richmond, VA; *Virginia Commonwealth University, Richmond, VA*
- D8      EFFECTS OF MUSCADINE GRAPE EXTRACT ON INTESTINAL INFLAMMATION IN THE APCMin/+ MOUSE.  
J.L McClellan<sup>1</sup>, J.M Davis<sup>1</sup>, T Tae<sup>1</sup>, JL Steiner<sup>1</sup>, M.D Carmichael<sup>1</sup> and E.A Murphy<sup>2</sup> (1) Dept. of Exercise Science and (2) \*Dept. of Pathology, Microbiology, and Immunology, University of South Carolina, Columbia, SC
- M1      EXERCISE-INDUCED CARDIOPROTECTION AND APOPTOTIC BEHAVIOR DURING IR INJURY: THE ROLE OF SARCOLEMMA AND MITOCHONDRIAL ATP SENSITIVE POTASSIUM CHANNELS.  
G.R. McGinnis<sup>1</sup>, L.E. Miller<sup>1</sup>, J.M. Iriwin<sup>2</sup>, G. Nanayakkara<sup>1</sup>, R. Amin<sup>1</sup>, J.C. Quindry<sup>1</sup> (1) *Auburn University, Auburn AL* (2) *Appalachian State University, Boone, NC*
- M2      MOTIVATIONAL FACTORS AND BARRIERS TO PHYSICAL ACTIVITY AMONG TRADITIONAL VS. NON-TRADITIONAL COLLEGE STUDENTS.  
K. Kulavic, C.N. Hultquist, Ph.D., and J.R. McLester, Ph.D., FACSM. *Department of Health, Physical Education and Sport Science, Kennesaw State University, Kennesaw, GA*
- M3      LEUCINE SUPPLEMENTATION DOES NOT REDUCE CIRCULATING INFLAMMATORY CYTOKINES FOLLOWING ECCENTRIC EXERCISE.  
Marcus M. Lawrence, Tyler J. Kirby, Jeffrey M. McBride, N. Travis Triplett, Tracie L. Haines, Jared W. Skinner, and Kevin A. Zwetsloot, *Appalachian State University, Boone, NC*
- M4      THE RELATIONSHIP BETWEEN SERUM AND SALIVARY CORTISOL LEVELS IN RESPONSE TO DIFFERENT INTENSITIES OF EXERCISE.  
M. VanBruggen, A.C. Hackney, FACSM, R.G. McMurray, FACSM, and K.S. Ondrak. *Dept. of Exercise and Sport Science, University of North Carolina, Chapel Hill, NC*
- M5      SEX DIFFERENCES IN CARDIAC AUTONOMIC MODULATION DURING MAXIMAL CYCLE ERGOMETER TESTING.  
A.N Lightner, A.M Moody, B Fernhall, S.R Collier; *Vascular Biology and Autonomic Studies Laboratory, Appalachian State University, Boone, NC and University of Illinois, Champaign, IL*
- M6      EXERCISE-INDUCED APOPTOSIS OF LYMPHOCYTES DOES NOT DEPEND ON ANAEROBIC TRAINING STATUS.  
D.D. Kirkwood, R.L. Zierten, S.D. Bean, M.A. Schafer, T.S. Lyons, S.W. Arnett, F.T. Esslinger, J.W. Navalta. *Dept of KRS, Western Kentucky University, Bowling Green, KY*
- M7      THE EFFECTS OF 4 WEEKS OF AEROBIC TRAINING ON ARTERIAL STIFFNESS AND THE RENIN-ANGIOTENSIN AND ALDOSTERONE SYSTEM ON STAGE-1 HYPERTENSIVE, OBESE INDIVIDUALS.  
A.M Moody, A.N Lightner, K Sandberg, H Ji, S.R Collier. *Vascular Biology and Autonomic Studies Laboratory, ASU and Georgetown Medical University*
- M8      LEFT VENTRICULAR DIASTOLIC PARAMETERS OF ACTIVE AND INACTIVE AGING C57BL/6J MICE.  
M. Nicole Chavis, Tricia J. Hubbard, and Michael J. Turner. *Department of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC*

- U1 PHYSICAL ACTIVITY IMPACTS ON VENTRICULAR STRUCTURE AND CHARACTERISTICS IN AGING MICE.  
Sophie B Guderian, Tricia J Hubbard, Michael J Turner. *Department of Kinesiology, University of North Carolina - Charlotte, Charlotte, NC*
- U2 MILD/MODERATE CALORIC RESTRICTION IN MICE ALTERS GENE EXPRESSION IN THE STRIATUM AND INCREASES VOLUNTARY WHEEL RUNNING.  
Meghan Kusper, Larry G. Canipe, Jenna Dixon, R. Andrew Shanely, Amy M. Knab  
*Appalachian State University, College of Health Sciences, Boone NC*
- U3 THE INFLUENCE OF CARBOHYDRATE-ELECTROLYTE SOLUTION INGESTION ON EXERCISE PERFORMANCE IN A WARM ENVIRONMENT.  
S.H. Batten, S.P. Bailey, E.E. Hall, W.R. Bixby & P.C. Miller. *Dept. of Exercise Science, Dept. of Physical Therapy, Elon University, Elon, NC*
- U4 AGE-RELATED CHANGES IN TYPE 1 FIBER GROUPING IN HUMANS.  
K.R Hardin<sup>1</sup>, C.D Thomas<sup>1\*</sup>, M.M Bamman<sup>2</sup>, A.P Jung<sup>1</sup>, and J.K Petrella<sup>1</sup> (1) *Exercise Science and Sports Medicine Dept, Samford Univ., Birmingham, AL*, (2) *Dept. of Physiology and Biophysics, UAB*, \*denotes equal contribution and presenting authors
- U5 COMPARISON OF SKIN TEMPERATURE DIFFERENCES IN ACTIVE VERSUS PASSIVE RECOVERY FOLLOWING SHOULDER AND ANKLE ICING.  
M.R. Hart & D. D. Pascoe FACSM, *Dept. of Kinesiology, Auburn Univ., Auburn, AL*
- U6 CORE MUSCLE ACTIVATION AND KINETICS OF A PASSE BALANCE.  
K.W. Malcolm and C.J. Ketcham. *Exercise Science, Elon University, Elon, NC*
- U7 EXERGAMING IN ADULTS: CAN APPROPRIATE INTENSITY LEVELS BE ACHIEVED FOR HEALTH BENEFITS?  
R.M. Perron, C.A. Graham, P.C. Miller, W.R. Bixby FACSM, E.E. Hall FACSM, *Dept. of Exercise Science, Elon University, Elon, NC*
- U8 HELPER T CELL RESPONSE TO SUPRAMAXIMAL EXERCISE IN UNTRAINED INDIVIDUALS.  
R.L. Zierten, S.D. Bean, D.D. Kirkwood, T.S. Lyons, F.T. Esslinger, J.W. Navalta. *Dept of KRS, Western Kentucky University, Bowling Green, KY*

**5:15-6:45 SYMPOSIUM S3**

- S3 MITOCHONDRIA, OXIDATIVE STRESS AND CELL SURVIVAL FROM THE PERSPECTIVE OF THE EXERCISED HEART.  
John C. Quindry<sup>1</sup> and Andreas N. Kavazis<sup>2</sup> (1) *Auburn University, Dept of Kinesiology, Auburn, AL*; (2) *Mississippi State University, Dept of Kinesiology, Starkville, MS*  
**(Regency Ballrooms E&F)**

**5:30-6:30 TUTORIALS T2-T4**

- T2 THE SECRETS FOR A SUCCESSFUL ACSM FELLOWSHIP APPLICATION.  
B.L. Marks, *Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, NC* **(Red Bud)** Chair: Michael McKenzie, Winston-Salem State University
- T3 EXERCISE AS AN INTERVENTION FOR IMPROVING AND MAINTAINING FUNCTIONAL CAPACITY IN OLDER ADULTS: NEW PERSPECTIVES.  
C.L. Sipe, *Dept. of Kinesiology, UNC-Greensboro, Greensboro NC*  
**(Regency Ballroom A)** Chair: Stephen Rossi, Georgia Southern University
- T4 ENGAGING UNDERGRADUATES AND GRADUATES IN RESEARCH: IMPROVE YOUR PRODUCTIVITY AND STUDENTS' EDUCATION  
J.M. Green<sup>1</sup>, P.A. Bishop<sup>2</sup>, J. Petrella<sup>3</sup>; (1) *University of North Alabama*, (2) *University of Alabama*, (3) *Samford University* **(Crepe Myrtle)**  
Chair: Benjamin Gordon, University South Carolina

**7:30-9:00 KEYNOTE ADDRESS (Continental Ballroom)**  
**"Exercise Can Protect Against a Broken Heart"**  
Dr. Dr Scott Powers, Ph.D., FACSM  
UAA Endowed Professor and Distinguished Professor  
Applied Physiology and Kinesiology, University of Florida  
Presiding: Dr John Quindry; SEACSM Member at Large, Dept Kinesiology,  
Auburn University

**9:00-11:00 SEACSM SOCIAL (Regency Ballrooms A, B, & C)**

**FRIDAY, February 4, 2011**

**6:45-7:45 WOMEN'S BREAKFAST (Regency Ballrooms E & F)**  
**(Registration Required)**  
**"OPPORTUNITY IS NOWHERE"**

Beverly J. Warren, Ed.D., Ph.D., FACSM  
Interim Provost and Vice President for Academic Affairs; Virginia Commonwealth  
University; Past SEACSM President

**8:00-5:00 REGISTRATION (Main Lobby)**

**8:00-6:00 EXHIBITS (Prefunction Area)**

**8:00-9:30 SYMPOSIUMS S4 –S6**

S4

THE POST-BARIATRIC SURGERY PATIENT: YOUR NEXT CLIENT?

Paul G. Davis, FACSM<sup>1</sup>, Ronald K. Evans<sup>2</sup>, Cody L. Sipe<sup>1</sup>. (1) *Department of Kinesiology, University of North Carolina at Greensboro, Greensboro, NC;* (2) *Department of Health and Human Performance, Virginia Commonwealth University, Richmond, VA* **(Red Bud)**

S5

LACTATE-PROTECTED HYPOGLYCEMIA ("LPH"): A POTENTIAL CANCER TREATMENT?

L. Bruce Gladden<sup>1</sup>, Matthew L. Goodwin<sup>2</sup>, James R. McDonald<sup>1</sup>, and Yi Sun<sup>1</sup>.  
(1) *Department of Kinesiology, Auburn University, Auburn, AL,* (2) *Weill Cornell Medical College, Cornell University, New York, NY*

**(Regency Ballrooms B&C)**

S6

CARDIORESPIRATORY, NEUROENDOCRINE, AND IMMUNO-INFLAMMATORY ADAPTATIONS TO CONCURRENT MENTAL AND PHYSICAL STRESS.

E.O. Acevedo<sup>1</sup>, H.E. Webb<sup>2</sup>, and C.J. Huang<sup>3</sup>. (1) *Virginia Commonwealth University, Richmond, VA,* (2) *Mississippi State University, Starkville, MS,* (3) *Florida Atlantic University, Boca Raton, La* **(Crepe Myrtle)**

**8:00-9:15 ORAL FREE COMMUNICATIONS OFC3**

Cardiovascular physiology **(Continental)**

Chair: Bonita Marks, University North Carolina at Chapel Hill

O9 8:00

AEROBIC FITNESS AND BARORECEPTOR SENSITIVITY IN HEALTHY ADOLESCENTS.

E.A. Dameron, P.A. Nixon, L.K. Washburn. *Depts. of Health and Exercise Science and Pediatrics, Wake Forest University, Winston-Salem, NC*

O10 8:15

THE EFFECTS OF AEROBIC EXERCISE TIMING ON NOCTURNAL BLOOD PRESSURE DIPPING IN PRE-HYPERTENSIVE INDIVIDUALS.

B. Cartner, K.R. Fairbrother, S.R. Collier; *ASU, Vascular Biology and Autonomic Studies Laboratory; Boone, NC*

O11 8:30

THE EFFECTS OF 4- AND 8- WEEKS OF SUPERVISED EXERCISE TRAINING ON METABOLIC AND CARDIOVASCULAR FUNCTION IN OVERWEIGHT ADOLESCENT CHILDREN.

M. Meucci<sup>1</sup>, C. Curry<sup>2</sup>, H. Wheeler<sup>2</sup>, H. Crawford<sup>2</sup>, C. Cook<sup>2</sup>, and S. R. Collier<sup>2</sup>.  
(1) *Universita degli Studi di Roma "Foro Italico", Rome, Italy.* (2) *Vascular Biology and Autonomic Studies Laboratory, ASU, Boone, NC*

O12 8:45 ASSOCIATION BETWEEN VASCULAR STIFFNESS AND REACTIVITY: INFLUENCE ON PHYSICAL FUNCTION IN THE ELDERLY.  
B.C. Hollis, D.P. Credeur, N.M. Johannsen and M.A. Welsch. <sup>1</sup>Dept. of Kinesiology, Louisiana State Univ., <sup>2</sup>Pennington Biomedical Research Center Baton Rouge, LA

**8:00-9:00 ORAL FREE COMMUNICATIONS OFC4**  
Competitive athletes, nutrition **(Regency Ballroom D)**  
Chair: Bill Barfield, College of Charleston

O13 8:00 EFFECT OF WHOLE-BODY VIBRATION AS ACUTE RECOVERY METHOD ON SPRINT PERFORMANCE AFTER FATIGUING EXERCISE.  
G. Balilionis, S. Nepocaty, A. B. Collins, Y. Neggers, C. P. Katica, P.A. Bishop. *Department of Kinesiology, Department of Human Nutrition and Hospitality Management, The University of Alabama, Tuscaloosa, AL*

O14 8:15 EFFECT OF WHOLE-BODY VIBRATION AS RECOVERY METHOD AFTER FATIGUING SQUAT EXERCISE.  
S. Nepocaty, G. Balilionis, C.P Katica, J.E. Wingo, M.T. Richardson, P.A. Bishop. *Department of Kinesiology, The University of Alabama, Tuscaloosa, AL*

O15 8:30 INFLUENCE OF XPAND NITRIC OXIDE REACTOR, L-ARGININE  $\alpha$ -KETOGLUTARATE, AND CAFFEINE SUPPLEMENTATION ON RE-OXYGENATION OF THE CALF MUSCLE WITH RESISTANCE EXERCISE.  
B.C. Collins, J. LaManca, D. Hubbard, K. Palmer, C. Orcino, M. Overstreet, V. Kutch, C. Wolff, M. Kolankowski, and S. Mazzetti; *Salisbury University, Laboratory for Human Performance, Salisbury, MD*

**8:00-9:15 Tutorial T5**  
T5 ULTRA ENDURANCE EVENTS: MEDICAL, TRAINING AND PHYSIOLOGICAL EFFECTS.  
D. Horton, Ed.D, Liberty University, G. Wortley, MD, *Lynchburg Family Medicine Residency, Lynchburg, VA*, Michael A. Welsch, PhD, FACSM, *Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA* **(Regency Ballroom A)**  
Chair: Adam Knight, Mississippi State University

**8:00-9:30 POSTER PRESENTATION II: P1-P24 (Teal)**  
Authors Present 8:00-9:00 AM  
Cardiovascular, Body comp/energy balance/weight control, Connective tissue/Bone/Skeletal muscle Chair: Will Lyerly, Coastal Carolina University

P1 LIMB-SPECIFIC TRAINING IMPROVES PEAK VASCULAR CONDUCTANCE.  
G.S. Wimer<sup>1</sup>, M.J. Lee<sup>2</sup> and J.C. Baldi<sup>2</sup>. (1) *Department of Adolescent and Adult Education, Armstrong Atlantic State University, Savannah, Georgia* and (2) *Department of Biological Sciences, Northern Arizona University, Flagstaff, AZ*

P2 THE EFFECT OF AEROBIC EXERCISE TRAINING ON ENDOTHELIAL FUNCTION IN AFRICAN AMERICAN AND CAUCASIAN POSTMENOPAUSAL WOMEN.  
D. Swift, J. Weltman, J. Patrie, S. Saliba, G.A. Gaesser, E.J. Barrett, and A. Weltman, *Department of Human Services, University of Virginia, Charlottesville, VA*

P3 MULTI-FLAVANOID SUPPLEMENTATION ALONE HAS NO EFFECT ON RESTING CARDIAC AUTONOMIC MODULATION IN YOUNG PRE-HYPERTENSIVE INDIVIDUALS.  
Hannah E. Wheeler, Rebecka Kappus, Chelsea D. Curry, Janice Welsh and Scott R. Collier; *Vascular Biology and Autonomic Studies Laboratory, ASU, Boone, NC*

P4 THE EFFECTS OF 4-WEEKS OF SUPERVISED EXERCISE ON VASCULAR AND HEMODYNAMIC FUNCTION IN ADOLESCENT CHILDREN.  
J. Welsh, M Meucci, CD Curry, H Wheeler, H Crawford, C Cook, SR Collier. *Appalachian State University, Vascular Biology and Autonomic Studies Laboratory, Boone, NC*

- P5 THE EFFECTS OF MAXIMAL EXERCISE ON HEART RATE VARIABILITY.  
H.E. Crawford, B. Fernhall, S.R. Collier; *Vascular Biology and Autonomic Studies Laboratory, ASU, Boone, NC and University of Illinois, Champaign, IL*
- P6 CARDIOVASCULAR RISK AND DISABILITY IN PEOPLE WITH MS BEFORE AND AFTER 16-WEEKS OF STRENGTH TRAINING.  
W.M. Pryor, R.D. Larson, and L.J. White. *Dept. of Kinesiology, The University of Georgia, Athens, GA*
- P7 EFFECT OF EXERCISE TRAINING ON NEUROMUSCULAR PERFORMANCE IN CACHECTIC MICE.  
M.J. Puppa, J.D. Aartun, J.P. White, K.T. Velbzquez, S. Sato, J.A Carson, FACSM. *Dept. of Exercise Science, University of South Carolina, Columbia, SC*
- P8 CHARACTERIZATION OF A MOUSE MODEL OF CANCER RELATED FATIGUE USING MEASURES OF PHYSICAL ACTIVITY.  
J Steiner<sup>1</sup>, JM Davis<sup>1</sup>, MD Carmichael<sup>1</sup>, EA Murphy<sup>2</sup>, JM McClellan<sup>1</sup>, and S Mahoney<sup>1</sup>.  
(1) *Dept. of Exercise Science and (2) Dept. of Pathology, Microbiology & Immunology, University of South Carolina, Columbia, SC.*
- P9 RELIABILITY ESTIMATION OF TGMD-2 USING G-THEORY.  
Y. Kim, P.D. Hart, M. Kang. *Dept. of Human and Health Performance, Middle Tennessee State University, Murfreesboro, TN37132. I. Park. Dept of Physical Education, Seoul National University, Seoul, South Korea.*
- P10 BODY COMPOSITION IN BREAST CANCER SURVIVORS: A ONE-YEAR FOLLOW UP.  
E. Simonavice, P.Y. Liu, J.Z. Ilich, J-S. Kim, and L.B. Panton, *Dept. of Nutrition, Food & Exercise Sciences, The Florida State University, Tallahassee, FL*
- P11 EVALUATION OF PHYSICAL ACTIVITY, SPASMS, AND DIET AFTER SCI.  
E.M. Callaway, K.A. Battles, K.K. McCully FASCM, M. A. Johnson, K. Porter, D. Backus, K. Tansey. *Depts. of Kinesiology and Foods and Nutrition, The University of Georgia, Athens, GA 30602 and Shepherd Center, Atlanta, GA*
- P12 ENERGY EXPENDITURE FROM EXCESS POST OXYGEN CONSUMPTION: A META-ANALYSIS.  
John C. Sieverdes, Vaughn W. Barry, Michael W. Beets. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC*
- P13 THE VALIDITY OF MULTI-FREQUENCY BIOELECTRICAL IMPEDANCE MEASURES TO DETECT CHANGES IN THE HYDRATION STATUS OF WRESTLERS DURING ACUTE DEHYDRATION AND REHYDRATION.  
Pratt, B. A. and Utter, A. C. *Department of Health Leisure and Exercise Science, Appalachian State University, Boone, NC.*
- P14 RELATIONSHIP BETWEEN DXA AND 7 SITE SKINFOLDS.  
Swain, BH; Hull, JA; Mackey, DO; Ritsche KR; McKenzie, MJ. *Department of Human Performance and Sport Sciences; Winston Salem State University*
- P15 RELATIONSHIP BETWEEN BODY COMPOSITION, ANAEROBIC CAPACITY, AND AEROBIC CAPACITY.  
D.O. Mackey, J.A. Hull, B.H. Swain, K.J. Ritsche, M.J. McKenzie; *Dept of Human Performance and Sport Sciences, Winston Salem State Univ, Winston Salem NC*
- P16 BARIATRIC SURGERY AND INSULIN SENSITIVITY IN TYPE 2 DIABETICS: ROLE OF PROXIMAL SMALL INTESTINE BYPASS.  
C.I Amato, M.A Reed, W.J Pories, WH Chapman, J.R Pender, H.A Barakat, T Green, E.B Tapscott, C.A Tanner, R.H Peacock, T.P Gavin, FACSM and G.L Dohm. *College of Health & Human Performance, East Carolina University, Greenville, NC*



- P17 REGRESSION EQUATIONS FOR SKINFOLDS WITH DXA AS STANDARD.  
Dustin K. Raymer, Michael R. McCammon, Charles Tanner, Robert Hickner, FACSM  
*Human Performance Laboratory, East Carolina University, Greenville, NC*
- P18 THE EFFECTS OF BODY MASS INDEX ON RESTING BLOOD PRESSURE IN RURAL CHILDREN.  
Colleen M. Daly, Leah E. Robinson, Danielle D. Wadsworth, and Mary E. Rudisill  
*Department of Kinesiology, Auburn University*
- P19 IMPACT OF ADIPOSITY AND MUSCLE QUALITY ON PHYSICAL FUNCTION IN COMMUNITY-DWELLING OLDER MEN AND WOMEN.  
C.L. Ward<sup>1</sup>, R.J. Valentine<sup>2</sup>, E.M. Evans<sup>1</sup>, (1) *Department of Kinesiology, University of Georgia, Athens, GA*, (2) *Department of Kinesiology and Community Health, University of Illinois, Urbana, IL*
- P20 IL-6 INCREASES IN SKELETAL MUSCLE INTERSTITIUM OF UNTRAINED YOUNG MEN IN RESPONSE TO RESISTANCE EXERCISE.  
Kevin A. Zwetsloot<sup>1</sup>, Justin Hardee<sup>1</sup>, Marcus M. Lawrence<sup>1</sup>, Brian Pratt<sup>1</sup>, Joseph R. Pierce Jr.<sup>2</sup>, and Robert C. Hickner<sup>2</sup> ; (1) *Appalachian State University, Boone, NC* & (2) *East Carolina University, Greenville, NC*
- P21 EFFECT OF 3.5% AND 10% CONCENTRATION TOPICAL MENTHOL ON PERIPHERAL BLOOD FLOW AND STRENGTH.  
J. Schilero.<sup>1</sup>, L. Winchester<sup>1</sup>, R. Topp<sup>2</sup>, D. Jacks<sup>1</sup> (1) *Dept. of Health and Sport Sciences*, (2) *School of Nursing, University of Louisville, Louisville, KY*
- P22 EXERCISE INTERVENTION ON BONE MINERAL DENSITY IN LEAN AND OBESE PREPUBESCENT CHILDREN.  
C. Squibb, R.C. Hickner, J. Mazzawi, K. Thomas  
*Human Performance Laboratory, East Carolina University, Greenville, NC*
- P23 THE EFFECT PHYSICAL ACTIVITY HAS KNEE OSTEOARTHRITIS WITH GENDER DIFFERENCES.  
Aaron M. Kauffman, Michael J. Turner, and Tricia Hubbard. *Department of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC.*
- P24 OSTEOARTHRITIS AND THE EXERCISING KNEE.  
Aurora V. Trujillo, Michael J. Turner, and Tricia Hubbard. *Department of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC.*

**9:30-9:45 BREAK**

**9:45-10:45 ACSM PRESIDENTIAL ADDRESS (Continental Ballroom)**

**"The Immune Response: Friend or Foe?"**

Thomas Best, MD, Ph.D., PACSM

Professor of Family Medicine and Pomerene Chair of Primary Care

Director of the Division of Sports Medicine, Ohio State University Medical Center

Presiding: Dr Pete Grandjean, President SEACSM, HHP, Baylor University

**10:45-11:00 BREAK**

**10:45-12:15 POSTER PRESENTATION III: P25-P48 (Teal)**

Authors Present 10:45-11:45 AM

Competitive athletes, Fitness/Testing/Assessment

Chair: Kevin Zwetslot, Appalachian State University

- P25 INJURY AND PHYSICAL LIMITATIONS IN FEMALE DIVISION 1 ATHLETES: COMPARING COLLEGIATE SOFTBALL AND SOCCER ATHLETES.  
M.L. Santos and K.A. Brooks. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*

- P26 RELATIONSHIP BETWEEN SOCCER SPECIFIC SKILLS AND ANTHROPOMETRIC DATA IN NCAA DIVISION I FEMALE SOCCER ATHLETES.  
S.L. Clark, K.A. Brooks. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P27 COMPARISON TORQUE PRODUCTION IN BASEBALL PITCHERS AND FOOTBALL QUARTERBACKS USING THE BIODEX.  
Z.J. Myers, K.A. Brooks, D.J. Szymanski. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P28 EFFECT OF ICE BAG RECOVERY ON CLOSED- AND OPEN-HANDED WEIGHT-ASSISTED PULL-UPS.  
Nick T. Bacon<sup>1</sup>, Jonathan E. Wingo<sup>2</sup>, Mark T. Richardson<sup>2</sup>, Greg A. Ryan<sup>2</sup>, Tracey C. Pangallo<sup>2</sup>, and Phillip A. Bishop<sup>2</sup>. (1) *Belmont University, Nashville*; (2) *University of Alabama, Tuscaloosa, AL*
- P29 EFFECT OF SPECIFIC HIGH INTENSITY INTERVAL TRAINING (HIIT) MODALITIES ON MULTI-EVENT PERFORMANCE.  
M.D. Barberio, D.J. Elmer, & D.D. Pascoe FACSM. *Auburn University, Auburn, AL*
- P30 CHANGES IN BODY COMPOSITION FROM YEAR-TO-YEAR IN NCAA DIVISION 1 MALE ATHLETES.  
S.L. Beam, G.W. Lyerly, D.M. Beam, G.F. Martel. *Department of Kinesiology, Recreation and Sport Studies, Coastal Carolina University, Conway, SC*
- P31 THE EFFECT OF YEAR IN COLLEGE ON SPEED AND POWER IN FEMALE SOFTBALL ATHLETES.  
Allyson Townsend, Tom Carroll, and William R. Barfield, FACSM. *Health and Human Performance, College of Charleston, Charleston, SC*
- P32 EFFECTS OF DIFFERENT TYPES OF WARM-UP ON SWIMMING PERFORMANCE IN MASTERS SWIMMERS.  
A.B. Collins, S. Nepocaty, G. Balilionis, P.A. Bishop. *Department of Kinesiology, The University of Alabama, Tuscaloosa, AL*
- P33 COMPARISON OF A FIELD BASED TEST TO ESTIMATE FUNCTIONAL THRESHOLD POWER AND POWER AT LACTATE THRESHOLD.  
T.P Gavin, FACSM, J Van Meter, P Brophy, G Dubis, K.N Potts, and R.C Hickner, FACSM. *Departments of Exercise and Sport Science and Physiology, Human Performance Laboratory, East Carolina University, Greenville, NC*
- P34 CHARACTERISTICS OF ATHLETES PARTICIPATING IN SPORTS AT RISK FOR THE FEMALE ATHLETE TRIAD.  
A. Delalija and R.A. Battista. *Department of Health, Leisure and Exercise Science, Appalachian State University.*
- P35 HEALTH-FITNESS MEASURES IN DIVISION II FEMALE COLLEGIATE SOCCER PLAYERS.  
L.L. Gover, J.M. Green, J.H. Hornsby, J.R. McIntosh; *Department of HPER, University of North Alabama*
- P36 RELATIONSHIP OF STRENGTH VARIABLES TO JUMP AND SPRINT PERFORMANCE IN COLLEGIATE (D-1) SPRINTERS.  
Henry B. Nowell, Ashley Kavanaugh, Mark South, Michael H. Stone, Michael W. Ramsey, *Center of Excellence for Sport Science and Coach Education and Department of KLSS, East Tennessee State University, Johnson City, TN*
- P37 THE BIOAVAILABILITY OF LACTATE DIHYDRATE AND CALCIUM LACTATE MONOHYDRATE.  
*Maria Sherrer and Willard W. Peveler, Northern Kentucky University*

- P38 COMPARISON OF EQUATIONS CALCULATING VERTICAL JUMP TESTING IN COLLEGIATE MEN'S BASKETBALL.  
B. Ritter, K.A. Brooks, D.J. Symanski. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P39 VALIDITY AND RELIABILITY OF THE MYOTEST DEVICE: A COMPARISON TO 1 REP MAX TESTING, AND 70% MAX TESTING OF BENCH PRESS OF COLLEGE AGED MALES.  
D.M. Accardo, D.J. Szymanski, K.A Brooks, and E. Beiser. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P40 THE EFFECTS OF HEAD/NECK FLEXION, EXTENSION AND ROTATION ON SIT AND REACH FLEXIBILITY SCORES.  
S.B. Hardwicke, K. Walters., and N. Hinkley. Health and Human Performance Program, Ferrum College, Ferrum, VA
- P41 ARE THE FITNESS LEVEL OF OUR UPCOMMING PHARMACISTS DECREASING?  
S. Sneed<sup>1</sup>, J. S. Forsse<sup>1</sup>, T. Williams<sup>1</sup>, K. Gancayco<sup>1</sup>, D. Jones<sup>1</sup>, A. Drane<sup>1</sup>, R. Hobson<sup>1</sup>, and B. Coyne<sup>1</sup> M. Ed. RCEP, L. Andrews<sup>2</sup>, (1) *Dept. of Kinesiology*, (2) *Dept. of Pharmacy, The University of Louisiana at Monroe, Monroe, LA*
- P42 METABOLIC COST OF USING WEIGHTED GLOVES DURING BRISK WALKING.  
P.G. Lambeth, M.D. Austin, D. Dew, and D.C. Nieman. *Dept. HLES, Appalachian State University, Boone, NC*
- P43 THE EFFECTS OF AN ACUTE OVERSPEED WARM-UP ON SPRINT PERFORMANCE IN COLLEGIATE ATHLETES.  
J.T. Lee, W.R. Bixby (FACSM), P.C. Miller, & E.E. Hall (FACSM). *Department of Exercise Science, Elon University, Elon, NC*
- P44 COMPARISON OF UNITS FOR EXPRESSING AEROBIC POWER IN CHILDREN.  
Cecily Lehman and Robert G. McMurray, *Department of Exercise and Sport Science, University of North Carolina, Chapel Hill, NC*
- P45 VALIDITY AND ACCURACY OF SUBMAXIMAL CYCLING COMPARED TO MAXIMAL TREADMILL EXERCISE TESTING ON COLLEGE-AGED PARTICIPANTS.  
L. E. Phillips, K.A. Brooks, and D. J. Szymanski. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P46 EVALUATION OF MODE DEPENDENCY OF THE VE/VCO<sub>2</sub> SLOPE IN OBESE ADOLESCENTS.  
A.C. Scheps, S.L. Hall, M.K. Bowen, R.L. Franco, and R.K. Evans. *Department of Health and Human Performance, Virginia Commonwealth Univ, Richmond, VA*
- P47 CHANGES IN PRE-SEASON MEASURES OF BODY COMPOSITION, AEROBIC ENDURANCE, AND SPEED IN COLLEGE SOCCER PLAYERS.  
S. J. Rossi and J.L. McMillan. Human Performance Laboratory, *Georgia Southern University, Statesboro, GA*
- P48 THE HEALTH BENEFITS OF RECREATIONAL GOLF.  
Hope H. Epton, Gregory F. Martel, Stacey L. Beam, Kelly M. Fitzsimmons, Timothy J. Meyler, G. William Lyerly. *Department of Kinesiology, Coastal Carolina University, Conway, SC*

#### **11:00-12:00 TUTORIALS T6 & T7**

- T6 TO DO OR NOT TO DO A POSTDOC: WHAT, WHY, AND WHERE.  
J.E. Wingo<sup>1</sup>, T.L. Moore-Harrison<sup>2</sup>, M.J. Sabatier<sup>3</sup>, and G.J. Hodges<sup>1</sup>. (1) *Department of Kinesiology, University of Alabama, Tuscaloosa, AL*, (2) *Department of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC*, (3) *Department of Natural Sciences, Clayton State University, Morrow, GA* **(Regency Ballroom E)**  
Chair: Matt Green, University North Alabama

- T7 THE PROMOTION OF HEALTH AND PERFORMANCE THROUGH MINDFULNESS BASED STRESS REDUCTION.  
Mary J. Sandage and T.J. Exford, *Department of Kinesiology, Auburn University, Auburn, Alabama (Regency Ballrooms A)*  
Chair: Paul Davis, University of North Carolina-Greensboro

**10:45-12:15 SYMPOSIUM S7**

- S7 FROM ATHLETES TO OLDER ADULTS: DIETARY PROTEIN AND EXERCISE INTERACT FOR OPTIMAL PHYSICAL PERFORMANCE.  
Michael J. Saunders, FACSM, James Madison University, Harrisonburg, VA  
Ellen M. Evans, FACSM, *University of Georgia, Athens, GA (Redbud)*

**11:00-12:00 ORAL FREE COMMUNICATIONS OFC5**

Epidemiology and Preventative Medicine (**Regency Ballroom D**)  
Chair: Danielle Wadsworth, Auburn University

- O16 11:00 THE RELATIONSHIP BETWEEN GREENWAY ACTIVE TRANSIT ACCESSIBILITY WITH GREENWAY-RELATED PHYSICAL ACTIVITY.  
D. L. Wolff, E.C. Fitzhugh, D. Bassett, C. Cherry. *Univ. of Tennessee, Knoxville, TN*
- O17 11:15 EPIDEMIOLOGY OF SKIN CANCER RISK FACTORS IN COLLEGE AGE STUDENTS.  
Kevin D. McCarthy and Silas N. Pearman, III, *Department of Health Sciences, Furman University, Greenville, SC*
- O18 11:30 ENERGY COSTS OF PHYSICAL ACTIVITIES FOR WHEELCHAIR USERS: A SYSTEMATIC REVIEW.  
Scott A. Conger, David R. Bassett, Jr., FACSM; *Univ of Tennessee, Knoxville, TN*
- O19 11:45 PERCEIVED NEIGHBORHOOD CHARACTERISTICS ARE ASSOCIATED WITH PHYSICAL ACTIVITY AND WEIGHT STATUS AMONG RURAL AND URBAN YOUTH.  
JB Moore, SB Jilcott, KA Shores, J Brinkley, RC Brownson. *East Carolina University, Greenville, NC*

**11:00-12:00 ORAL FREE COMMUNICATIONS OFC6**

Epidemiology and preventive medicine (**Regency B & C**)  
Chair: Wendi Weimar, Auburn University

- O20 11:00 COLLEGIATE PHYSICAL ACTIVITY CLASS SATISFACTION WITH LIFETIME INTENT TO PARTICIPATE IN THE ACTIVITY.  
R. Hardin, E.C. Fitzhugh, T. Mirabito, *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee, Knoxville, TN*
- O21 11:15 RELATIONSHIP BETWEEN "COGNITIVE" SYMPTOMS AND NEUROPSYCHOLOGICAL TEST PERFORMANCE IN COLLEGE ATHLETES.  
H.R. Lee, J.E. Resch, C.N. Brown, S.G. Piland, S.N. Macciocchi, M.S. Ferrara.  
*Department of Kinesiology, The University of Georgia, Athens, GA*
- O22 11:30 POWERTRIP: STRENGTH AND POWER TRAINING TO IMPROVE THE ABILITY TO RECOVER FROM A FORWARD LEANING POSITION?  
D.N. Pamukoff, E.C. Haakonssen, M.L. Madigan, A.P. Marsh, *Dept. of Health & Exercise Science, Wake Forest University, Winston-Salem, NC*
- O23 11:45 EFFECT OF AN ACUTE BOUT OF INTENSE PHYSICAL EXERTION ON SHOOTING ACCURACY IN POLICE OFFICERS: CURRENT & RECRUITS  
K.J. Kelleran<sup>1</sup>, M.A. Sloniger, FACSM<sup>2</sup>, H.V. MacDonald<sup>3</sup>, B.A. Watkins<sup>2</sup>.  
(1) *Dept. Human Movement Sciences, Old Dominion University, Norfolk, VA 23529.* (2) *Dept. Health & PE, Indiana University of Pennsylvania, Indiana, PA 15705.* (3) *Dept. Kinesiology, University of Connecticut Storrs, CT*

- 12:00-1:15 PAST PRESIDENT'S LUNCH (Regency Ballroom F)**
- 1:30-2:30 MONTROYE SCHOLAR LECTURE (Continental Ballroom)**  
**"Physical Inactivity: The Biggest Public Health Problem of the 21st Century?"**  
 Dr. Steven Blair P.E.D.; President and CEO, Cooper Institute  
 Adjunct Professor: University of South Carolina School of Public Health  
 University of Texas Health Science Center School of Public Health  
 The College of Education at the University of Houston  
 The College of Education Academy for Research and Development at the University of North Texas  
 Presiding: Dr Larry Durstine, University of South Carolina, Past SEACSM President, 2008 Montoye Scholar
- 2:30-2:45 BREAK**
- 2:45-4:15 SYMPOSIUM S8**  
 S8 EXERCISE-INDUCED OXIDATIVE STRESS: CAUSE AND CONSEQUENCES.  
 Scott K. Powers, Erin E. Talbert, Mathew B Hudson. *University of Florida, Gainesville, FL (Regency Ballrooms E & F)*
- 2:45-4:15 TUTORIALS T8-T10**
- T8 DARTFISH: A MOVEMENT ANALYSIS AND DATA COLLECTION TOOL.  
 W.H. Weimar and A.M Sumner, *Auburn University, Auburn, AL (Red Bud)* Chair: Justin Shroyer, University of Louisiana at Lafayette
- T9 PHENOTYPE AND CARDIOVASCULAR DISEASE MORBIDITY AND MORTALITY IN MULTICULTURAL POPULATIONS.  
 Jurine H. Owens and L. Jerome Brandon, *Department of Kinesiology & Health, Georgia State University, Atlanta, GA (Regency D)*  
 Chair: Leah Robinson, Auburn University
- T10 PHYSICAL ACTIVITY DURING PREGNANCY FOR CHRONIC DISEASE PREVENTION.  
 J.A. Flohr, K.A. Mattran C.M. Nicewonger. Morrison Bruce Center, *Department of Kinesiology. James Madison University. Harrisonburg, VA (Regency B & C)*  
 Chair: Dawn Coe, University of Tennessee
- 2:45-4:00 ORAL FREE COMMUNICATION OFC7**  
 Fitness testing assessment **(Regency A)**  
 Chair: Tim Scheett, College of Charleston
- O24 2:45 RELATIONSHIPS BETWEEN MEASURES OF JUMP PERFORMANCE AND STRENGTH FOLLOWING THREE DIFFERENT METHODS OF RESISTANCE TRAINING.  
 C.J. MacDonald<sup>1</sup>, H.S. Lamont<sup>1</sup>, J.C. Garner<sup>2</sup>, K. Jackson<sup>2</sup>, A.A. Kavanaugh<sup>1</sup>, C.R. Carter<sup>1</sup>, & E.M. Owens<sup>1</sup>; (1) *Center of Excellence for Sport Science & Coach Education; Sports Science Laboratory; East Tennessee State University, Johnson City, TN* (2) *Applied Biomechanics and Ergonomics Laboratory; University of Mississippi, University, MS*
- O25 3:00 HEART RATE VARIABILITY AND VO<sub>2</sub> MAX IN HEALTHY COLLEGE STUDENTS.  
 A.G. Thompson<sup>1</sup>, C.R. Grieco<sup>1</sup>, D.P. Swain FASCM<sup>1</sup>, J.A. Onate<sup>2</sup>, N. Cortes<sup>3</sup>. (1) *Old Dominion University, Norfolk, VA.* (2) *The Ohio State University, Columbus, OH.* (3) *George Mason University, Fairfax, VA*
- O26 3:15 RECOVERY AND SORENESS IN TRAINED FEMALES AFTER AN EXHAUSTIVE RESISTANCE TRAINING PROTOCOL.  
 J.A. Campbell, J.E. Wingo, M.T. Richardson, Y.H. Negggers, J.C. Lawrence, J.D. Leeper, and P.A. Bishop. *Dept. of Kinesiology, The University of Alabama, Tuscaloosa, AL*

- O27 3:30 SEX DIFFERENCES IN RESTING HEMODYNAMICS AND ARTERIAL STIFFNESS FOLLOWING 4 WEEKS OF RESISTANCE VS. AEROBIC EXERCISE TRAINING IN HYPERTENSIVES.  
Curry CD, Sandberg K, Schafer P, Ji H, Fernhall B, Collier SR. *Vascular Biology and Autonomic Studies Lab. ASU. Boone, NC*
- 2:45-4:15 POSTER PRESENTATIONS IV: P49-P72 (Teal)**  
Authors Present 2:45-3:45  
Biomechanics, Fitness/Testing/Assessment  
Chair: David Elmer, Auburn University
- P49 PREDICTORS OF FUNCTIONAL CAPACITY AND ABILITY DIFFER AMONG OLDER INDIVIDUALS.  
Hope LR, Hollis, BC, Credeur, DP, Lupo, M, Earnest, CP, Johannsen, NM. and Welsch, MA. *Dept. of Kinesiology, LSU, and PBRC, Baton Rouge, LA*
- P50 COMPARISON OF TWO FIELD-BASED TESTS TO PREDICT MAXIMAL OXYGEN UPTAKE IN SOCCER AND CROSS-COUNTRY ATHLETES.  
M.S. Green, T.D. Martin, R. Ito, B.D. Seale. *Dept. of Kinesiology and Health Promotion, Troy University, Troy, AL*
- P51 EFFECT OF RESISTANCE TRAINING MODE ON PEAK RUNNING VELOCITY IN RECREATIONAL RUNNERS.  
P.O. Gelinias, J. Linde, S.N. Gray, B.M. Newman, L.D. Madray. *Department of Exercise and Sports Science, University of South Carolina Aiken, Aiken, SC*
- P52 THE COMPARISON OF CALORIC EXPENDITURE ESTIMATED BY THE WII FIT PLUS TO A METABOLIC CART.  
Sadie E. Sandifer\*, Nancy E. Thompson\*, Robert W. Hensarling, Alan P. Jung, John K. Petrella, *Samford University, Birmingham, AL*  
\* Denotes equal contribution and presenting authors
- P53 NO RELATIONSHIP BETWEEN FUNCTIONAL EXERCISE ASSESSMENTS AND HIP AND KNEE RUNNING BIOMECHANICS IN TRIATHLETES.  
B. Harrison, N. Rendos, A. Weltman, J. Hertel, J. Hart. *Dept. of Kinesiology, The University of Virginia, Charlottesville, VA*
- P54 LACTATE THRESHOLD VALUES FOR ANAEROBIC ATHLETES.  
J.H. Hornsby, J.M. Green; *Dept of HPER, Univ. of North Alabama, Florence, AL*
- P55 FIELD TEST VALIDATION OF THE BORG 15-POINT CATEGORICAL SCALE FOR RATING OF PERCEIVED EXERTION.  
Del Pozzi, AT<sup>1</sup>, Pritchett RC<sup>2</sup> Katica, CP<sup>1</sup>, and Pritchett KL<sup>2</sup>, (1) *Department of Kinesiology, The University of Alabama, Tuscaloosa Alabama*, (2) *Department of Nutrition, Health, and Exercise Science, Central Washington University, Ellensburg Washington*
- P56 AEROBIC AND ANAEROBIC POWER TEST RESULTS ON NASCAR PIT CREWS.  
D. Dew, D.C. Nieman, and P.G. Lambeth. *Appalachian State University, Human Performance Lab, North Carolina Research Campus, Kannapolis, NC*
- P57 ADDITIONAL NEUROMUSCULAR AND PHYSIOLOGICAL HEALTH BENEFITS TO USING DUMBBELLS WITH NINTENDO WII FITNESS GAMES, A PILOT STUDY.  
L.H. Hixson, M.R. Hooper, J. R. McLester, FACSM, and C. N. Hultquist. *Dept. of Health, Physical Education, and Sport Science, Kennesaw State University, Kennesaw GA*
- P58 THE IMPACT OF ALTERED LEAD IN PEDAL TIME DURING THE WINGATE TEST.  
J.A. Hull, D.O. Mackey, B.H. Swain, K.J. Ritsche, M.J. McKenzie. *Dept of Human Performance and Sport Sciences, Winston Salem State Univ., Winston Salem NC*

- P59 SUSPENSION TRAINING IMPROVES MUSCULAR ENDURANCE, MUSCULAR STRENGTH, CARDIOVASCULAR FITNESS, AND BODY COMPOSITION IN COLLEGE-AGED FEMALES. G. Walker<sup>1</sup>, M. Schecke<sup>1</sup>r, B. Heck<sup>1</sup>, C. Luhn<sup>1</sup>, T. Gore<sup>1</sup>, K. Stevens<sup>1</sup>, J. Ziker<sup>1</sup>, W. Dudgeon<sup>2</sup> and T. Scheett<sup>1</sup>. (1) *Department of Health and Human Performance, College of Charleston and Department of Health, Exercise, and Sport Science*, (2) *The Citadel, Charleston, SC*
- P60 APPLICATION OF MAXIMAL HEART RATE PREDICTION EQUATIONS IN YOUNGER ADULTS. A.R. Gaspari, G.F. Martel, C.M. Rockey, G.W. Lyerly, S.L. Beam. *Department of Kinesiology, Coastal Carolina University, Conway, SC*
- P61 THE EFFECTS OF BIOFREEZE AND ICE ON BLOODFLOW. Elizabeth R. Ledford, Robert Topp, Dean E Jacks. *Dept. of Exercise Physiology, University of Louisville, Louisville, KY*
- P62 INFLUENCE OF FOOTWEAR ON LIMITS OF STABILITY. John Fox<sup>1</sup>, Justin F. Shroyer<sup>2</sup>, Jay Patel<sup>1</sup>, Andrea M. Sumner<sup>1</sup> & Wendi Weimar<sup>1</sup> (1) *Dept. of Kinesiology, Auburn University, Auburn, AL. 36849*, (2) *Dept. of Kinesiology, University of Louisiana, Lafayette, Lafayette, LA*
- P63 THE EFFECT OF FOOTWEAR ON UNILATERAL STANCE SWAY VELOCITY. J.F. Shroyer<sup>1</sup>, J.E. Shroyer<sup>1</sup>, A. Sumner<sup>2</sup>, J. Patel<sup>2</sup>, and W. Weimar<sup>2</sup> (1) *Departments of Kinesiology, University of Louisiana at Lafayette, Lafayette, LA 70506* and (2) *Auburn University, Auburn, AL*
- P64 VERTEBRAL COMPRESSION WITH A BACK SQUAT. Jaynesh H. Patel, Bradon Romer, John Fox & Wendi H. Weimar, *Auburn University, Auburn, AL*
- P65 PHASE RATIOS AND EFFORT DISTRIBUTION OF AMERICAN COLLEGIATE TRIPLE JUMPERS. Braden Romer<sup>1,2,3</sup>, Dean Johnso<sup>2</sup>, Terriha Romer<sup>2</sup>, and Amanda Sinclair<sup>1</sup>. (1) *Department of Health Sciences, University of Colorado at Colorado Spring*; (2) *Northwestern State University of Louisiana*; (3) *University of Louisiana at Lafayette*
- P66 THE EFFECT OF FOOTWEAR ON DUAL STANCE BALANCE. J. C. Snead<sup>1</sup>, J. F. Shroyer<sup>1</sup>, J. H. Patel<sup>1</sup>, A. M. Sumner<sup>1</sup>& Wendi H. Weimar<sup>1</sup>, (1) *Auburn University, Auburn, AL* (2) *University of Louisiana, Lafayette, Lafayette, LA*
- P67 ACUTE EFFECTS OF WHOLE BODY VIBRATION ON POSTURAL CONTROL MEASURES IN OLDER WOMEN. John C. Garner<sup>1</sup>, Hugh S. Lamon<sup>2</sup>t, Chip Wade<sup>3</sup>, & Christopher MacDonald<sup>2</sup> (1) *Applied Biomechanics and Ergonomics Laboratory, The University of Mississippi* (2) *Exercise and Sport Sciences Laboratory, East Tennessee State University* (3) *TigErgonomics Laboratory, Auburn University*
- P68 EFFECT OF SUSPENSION TRAINING ON FLEXIBILITY AND BALANCE IN COLLEGE-AGED WOMEN. J. Ziker<sup>1</sup>, T. Gore<sup>1</sup>, K. Stevens<sup>1</sup>, G. Walker<sup>1</sup>, M. Schecker<sup>1</sup>, C. Luhn<sup>1</sup>, B. Heck<sup>1</sup>, W. Dudgeon<sup>2</sup> and T. Scheett<sup>1</sup>. (1) *Department of Health and Human Performance, College of Charleston, and Department of Health, Exercise, and Sport Science*, (2) *The Citadel, Charleston, SC*
- P69 ASSESSMENT OF FOOTBALL PLAYER ANKLE JOINT MOTION DURING VERTICAL STEP DOWN MOVEMENT. Nigel Collins<sup>1</sup>, Sara McGinley<sup>2</sup>, Daniel Carruth<sup>2</sup>, Brendon Hale<sup>3</sup>, and Adam Knight<sup>3</sup>. (1) *Dept of Industrial and Systems Engineering*; (2) *Center for Advanced Vehicular Systems*; (3) *Dept of Kinesiology. Mississippi State University, Mississippi State, MS*

P70 EFFECT OF THERAPEUTIC HORSEBACK RIDING ON GAIT IN A DOWN SYNDROME PARTICIPANT.

Lindsey Triplett, Laura Beth Roby, Jennifer Morton, Katherine Gilliland, and Adam C. Knight. *Department of Kinesiology, Mississippi State University, Mississippi State, MS*

P71 ASSESSMENT OF FOOTBALL PLAYER HIP JOINT MOTION DURING VERTICAL STEP DOWN MOVEMENT.

Kelly Harkins<sup>1</sup>, Sara McGinley<sup>2</sup>, Daniel Carruth<sup>2</sup>, Brendon Hale<sup>1</sup>, and Adam Knight<sup>1</sup>. (1) *Department of Kinesiology*, (2) *Center for Advanced Vehicular Systems. Mississippi State University, Mississippi State, MS*

P72 ASSESSMENT OF FOOTBALL PLAYER KNEE JOINT MOTION DURING VERTICAL STEP DOWN MOVEMENT.

Eddie Neal<sup>1</sup>, Sara McGinley<sup>2</sup>, Daniel Carruth<sup>2</sup>, Brendon Hale<sup>1</sup>, and Adam Knight<sup>1</sup>. (1) *Department of Kinesiology*, (2) *Center for Advanced Vehicular Systems. Mississippi State University, Mississippi State, MS*

**4:30-5:30 STUDENT BOWL (Continental Ballroom)**

**Moderator:** Dr. Michael Turner, University of North Carolina-Charlotte

**5:45-7:00 SEACSM GRADUATE STUDENT FAIR (Regency Ballrooms A,B, & C)**

**SATURDAY February 5, 2011**

**8:00-9:00 REGISTRATION (Main Lobby)**

**8:00-12:00 EXHIBITS (Prefunction Area)**

**8:00-9:00 TUTORIALS (T11, T12)**

T11

THE COMMON COLD IS LESS COMMON AMONG THE FIT.

D.C. Nieman, Human Performance Lab, *Appalachian State University and the North Carolina Research Campus, Kannapolis, NC*

**(Regency Ballrooms E & F)** Chair: Andrew Shanley, Appalachian State University

T12

BREAST CANCER SURVIVORS, WEIGHT MANAGEMENT AND PHYSICAL ACTIVITY: PHYSIOLOGICAL AND PSYCHOSOCIAL IMPLICATIONS.

E.M. Evans<sup>1</sup>, FACSM, S.L. Mihalko<sup>2</sup> (1) *Dept. of Kinesiology, University of Georgia, Athens, GA* ; (2) *Health and Exercise Science Dept., Wake Forest University, Winston-Salem, NC* **(Regency Ballrooms B & C)**

Chair: Katrina DuBose, East Carolina University

**8:00-9:30 SYMPOSIUM S9**

S9

REGULATION OF SKELETAL MUSCLE ATROPHY.

S.M. Senf, A.J. Smuder, W.B. Nelson and A.R. Judge. *Department of Applied Physiology & Kinesiology and Department of Physical Therapy, University of Florida, Gainesville, FL* **(Red Bud)**

**8:00-9:00 ORAL FREE COMMUNICATIONS OFC8**

Exercise evaluation and clinical **(Regency D)**

Chair: Jonathan Wingo, The University of Alabama

O28 8:00 INFLUENCE OF FUNCTIONAL TEST RESULTS ON FITNESS ROUTINES IN CURRENTLY EXERCISING OLDER ADULTS.

J.E Still, AE O'Brien, A George, M.E Cress. *Dept. of Kinesiology, The University of Georgia, Athens, GA*

O29 8:15 THE EFFECTS OF AEROBIC EXERCISE TIMING ON QUALITY OF SLEEP.

K.R Fairbrother, B. Cartner, S.R Collier; *ASU, Vascular Biology and Autonomic Studies Laboratory; Boone, NC*



O30 8:30 REINTEGRATION OF ACCELEROMETER COUNTS FOR PRESCHOOL CHILDREN: COMPARISON USING DIFFERENT EPOCH LENGTHS.  
Youngwon Kim, Michael W. Beets, Kerry McIver, and Marsha Dowda.  
*Department of Exercise Science, the University of South Carolina, Columbia, SC*

**8:00-9:15 ORAL FREE COMMUNICATIONS OFC9**

Environmental and thermal (**Regency A**)

Chair: Gordon Fisher, University of Alabama at Birmingham

O31 8:00 INFLUENCE OF BODY FATNESS ON THERMOREGULATORY EFFECTOR RESPONSES DURING EXERCISE IN THE HEAT.  
J.D. Eitner, G.S. Wimer, L.H. Long, W.H. Baird, and G.K. Limbaugh,  
*Armstrong Atlantic State University, Savannah GA*

O32 8:15 EFFECT OF HALF-TIME COOLING ON THERMOREGULATORY RESPONSES AND SOCCER-SPECIFIC PERFORMANCE TESTS.  
Y. Zhang<sup>1</sup>, L. Nepocatychn<sup>2</sup>, C.P. Katica<sup>2</sup>, P.A. Bishop<sup>2</sup>, J. Sjobqvist<sup>2</sup>, G. Balilionis<sup>2</sup>.  
(1) *Allied Applied Exercise Science Organization*; (2) *Department of Kinesiology, The University of Alabama, Tuscaloosa, AL*

O33 8:30 HYPERTHERMIC EFFECTS ON METABOLISM DURING TREADMILL RUNNING.  
L.C. Eschbach<sup>1</sup>, J.A. Bunn<sup>2</sup>, K.A. Terracina<sup>1</sup>, L. Mitchell<sup>1</sup>, and S. Povich<sup>1</sup>.  
(1) *Dept. of Health, Exercise and Sports Science, Meredith College, Raleigh, NC.* (2) *Dept. of Exercise Science, Campbell University, Buies Creek, NC*

O34 8:45 INDICES OF DEHYDRATION STATUS DURING SUMMER HEAT WAVE.  
Deborah M. Michael, Jochen Kressler, Namrita K. O'Dea, Michael L. Jones, Maxime E. Buyckx, Mindy Millard-Stafford, FACSM. *Georgia Institute of Technology, Atlanta, GA*

**8:00-9:45 POSTER PRESENTATION V: P73-P96 (Teal)** Chair: TJ Exford, Auburn University

Authors present 8:00-9:00

Metabolism, endocrinology/immunology, epidemiology/preventative medicine

P73 INFLUENCE OF ACTN3 AND IGF2 VARIANTS ON MUSCLE RECOVERY FOLLOWING INTENSE ENDURANCE EXERCISE.  
Qingnian Goh, Christopher A. Boop, Michael J. Saunders, FACSM, Nicholas D. Luden, Joseph M. Devaney, Christopher J. Womack, FACSM. *Human Performance Laboratory, Dept of Kinesiology, James Madison University, Harrisonburg, VA.*

P74 DUODENAL-JEJUNAL BYPASS SURGERY DOES NOT INCREASE LIVER INSULIN SIGNAL TRANSDUCTION OR LIVER INSULIN SENSITIVITY.  
R.D McKernie, R.C Sloan, III, E.Z Lukosius, M.A Reed, J.R Pender, V Boghossian, J.J Carter, K Parikh, J.W Price, E.B Tapscott, W.J Pories, G.L Dohm, and T.P Gavin, FACSM. *East Carolina University, Greenville, NC*

P75 EXERCISE AND POSTPRANDIAL LIPEMIA: A SYSTEMATIC REVIEW.  
E.C. Freese and K.J. Cureton, FACSM, *Dept. of Kinesiology, The University of Georgia, Athens, GA*

P76 POSTPRANDIAL LIPEMIA AND PHYSICAL ACTIVITY IN YOUTH: SUGGESTIONS FOR FUTURE RESEARCH AND IMPLICATIONS FOR POLICIES AIMED AT EARLY PREVENTION OF CARDIOVASCULAR DISEASE.  
D. Bornstein, J. Trilk, R. Pate. *Dept. of Exercise Science, Arnold School of Public Health, University of South Carolina, Columbia, SC*

P77 SUBSTRATE OXIDATION AND BLOOD LACTATE RESPONSE TO VARYING EXERCISE INTENSITIES IN BREAST CANCER PATIENTS AND HEALTHY CONTROLS.  
K.P. Tosti, C.L. Battaglini, S.E. Evans, D. Groff and A.C. Hackney FACSM.  
*Dept of Exercise and Sport Science, Univ of North Carolina, Chapel Hill, NC*

- P78 EFFECTS OF MULTIVITAMIN SUPPLEMENTATION ON HEART RATE RESPONSE IN AEROBICALLY UNTRAINED COLLEGE AGED STUDENTS.  
G. Ryan<sup>1</sup>, M. Sloniger, FACSM<sup>2</sup>, D. Corbett<sup>3</sup>, C. Katica<sup>1</sup>, and S. Bishop<sup>1</sup>  
*(1) Dept. of Kinesiology, University of Alabama, (2) Dept. of Health and Phys. Ed., Indiana University of Pennsylvania, (3) Dept. of Exercise Physiology, Kent State University*
- P79 EFFECT OF AN ACUTE BOUT OF RESISTANCE EXERCISE TRAINING ON RESTING ENERGY EXPENDITURE.  
J.M Ernst<sup>2</sup>, T.P Gavin<sup>2</sup>, M Pickerill<sup>1</sup>. *(1) Department of Kinesiology- Sports Medicine, DePauw University, Greencastle, IN and (2) Department of Exercise and Sport Science, Human Performance Laboratory, East Carolina University, Greenville, NC*
- P80 HALF- AND FULL- MARATHON RUNNERS: 92 PRACTICES AND PERCEPTIONS CONCERNING HYDRATION.  
E.K. Neal<sup>1</sup>, M.T. Richardson<sup>2</sup>, J.E. Wingo<sup>2</sup>, J.D. Leeper<sup>2</sup>, Y.H. Neggers<sup>2</sup>, and P.A. Bishop<sup>2</sup>. *(1) University of North Alabama, Florence, AL, (2) The University of Alabama, Tuscaloosa, AL*
- P81 STUDENT ATHLETES KNOWLEDGE OF SPORTS NUTRITION.  
A. Elizabeth Marshall<sup>1,2</sup> and Thomas A. Buckley<sup>2</sup> *(1) Nutritional Feats, LLC, Statesboro, GA. and (2) Department of Health and Kinesiology, Georgia Southern University, Statesboro, GA*
- P82 SIX WEEKS OF BLUEBERRY INGESTION PRIOR TO A 2.5-H RUN EXERTS POSITIVE EFFECTS ON NK CELL COUNTS, OXIDATIVE STRESS, AND INFLAMMATION.  
S.R. McAnulty, L.S. McAnulty, D.C. Nieman FACSM, L. Shooter, D.A. Henson, and A.C. Utter FACSM. *Depts. of Health, Leisure, and Exercise Science, Nutrition and Health Care Management, Biology, Appalachian State University, Boone NC*
- P83 RESTING METABOLIC EFFECTS DIFFER FOR ISOCALORIC CAFFEINATED GEL VS. BEVERAGE.  
Namrita K. O’Dea, Jochen Kressler, Deborah M. Michael, Michael L.Jones, Mindy Millard-Stafford, FACSM. *Georgia Institute of Technology, Atlanta, GA*
- P84 THYROID HORMONAL RESPONSES TO INTERVAL AND STEADY STATE EXERCISE.  
A. Kallman, K.P. Tosti, D.A. Rubin, C.L. Battaglini and A.C. Hackney FACSM.  
*Department of Exercise & Sport Science, Univ of North Carolina, Chapel Hill, NC.*
- P85 CIRCULATING ADIPOKINES ARE RELATED TO INSULIN SENSITIVITY BUT NOT BMI.  
J.R. Pierce<sup>1</sup>, R.M. Kraus<sup>1</sup>, J.A. Houmard<sup>1</sup>, W.E. Kraus<sup>2</sup>, C.J. Tanner<sup>1</sup>, M.D. Choi<sup>1</sup>, R.C. Hickner<sup>1</sup>. *(1) East Carolina University, (2) Duke University Medical Center*
- P86 EFFECTS OF TRANS-RESVERATROL SUPPLEMENTATION ON SERUM GLUCOSE AND INSULIN LEVELS AND mRNA EXPRESSION OF METABOLICALLY RELEVANT PROTEINS IN RESPONSE TO A GRADED EXERCISE TEST IN OVERWEIGHT FEMALES.  
G.M. Hudson, B. Shelmadine, M. Cooke, J. Genovese, M. Greenwood, D.S. Willoughby.  
*Dept. of Health, Human Performance, & Recreation, Baylor University, Waco, TX*
- P87 SHORT-TERM HIGH INTENSITY INTERVAL TRAINING DOES NOT IMPROVE THE PHYSIOLOGICAL STRESS RESPONSE, MOOD STATE, OR BODY COMPOSITION.  
A.W. Kinsey<sup>1</sup>, M. Chong<sup>2</sup>, H.S. Friedman<sup>2</sup>, T. Dodge<sup>2</sup>, P.C. Fehling<sup>2</sup>, and M.J. Ormsbee<sup>1</sup>. *(1) Dept. of Nutrition, Food, and Exercise Sciences, Florida State Univ, Tallahassee, FL; (2) Health and Exercise Sciences Department, Skidmore College, Saratoga Springs, NY*
- P88 RELATIONSHIP BETWEEN AEROBIC POWER EXPRESSED PER UNIT FAT FREE MASS AND INSULIN SENSITIVITY IN CHILDREN.  
B. Ahn, R.G. McMurray and J.S. Harrell, *Depart of Exercise and Sport Science, University of North Carolina, Chapel Hill, NC*

- P89 PREVALENCE OF RISK FACTORS FOR CARDIOVASCULAR DISEASE IN COLLEGE STUDENTS.  
M. Colna, A. Gunasekera, J. Lawson, and M. Feigenbaum. *Dept of Health Sciences, Furman University, Greenville, SC*
- P90 SHORT AND LONG TERM EFFECTS OF THE COPENHAGEN SCHOOL CHILD INTERVENTION STUDY (CoSCIS) ON CARDIOVASCULAR RISK FACTORS.  
Anna Bugge, Bianca El-Naaman, Karsten Froberg and Lars B. Andersen. *Centre for Research in Childhood Health, IOB, University of Southern Denmark, 5230 Odense, DK*
- P91 PREVALENCE OF RISK FACTORS FOR METABOLIC SYNDROME IN COLLEGE STUDENTS.  
J. Lawson, A. Gunasekera, M. Colna, and M. Feigenbaum. *Dept of Health Sciences, Furman University, Greenville, SC*
- P92 PREVALENCE OF RISK FACTORS FOR TYPE 2 DIABETES MELLITUS IN COLLEGE STUDENTS.  
A. Gunasekera, J. Lawson, M. Colna, and M. Feigenbaum. *Dept of Health Sciences Furman University, Greenville, SC*
- P93 PHYSICAL INACTIVITY AND RISK OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG U.S. ADULTS.  
Peter D Hart, Youngdeok Kim, and Minsoo Kang, *Kinesmetrics Laboratory, Department of Health and Human Performance, Middle Tennessee State University*
- P94 DOES EXERGAMING ACHIEVE THE SAME LEVELS OF FITNESS INTENSITY AS MENTOR-BASED PHYSICAL ACTIVITY?  
C.A. Graham, R.M. Perron, J.R. Feldman, E.E. Hall and E.K. Bailey, *Dept. of Exercise Science, Elon University, Elon, NC*
- P95 MP USE INCREASES  $VO_2$ ,  $VCO_2$  AND  $VO_2/KG$  DURING STEADY STATE RUNNING.  
D.P. Garner<sup>1</sup>, M.A. Rodriguez<sup>1</sup>, W.D. Dudgeon<sup>1</sup>, E.J. McDivitt<sup>1</sup>, and T.P. Scheett<sup>2</sup>.  
(1) *Dept. of Health, Exercise, and Sport Science, The Citadel* and (2) *Dept. of Health and Human Performance, College of Charleston.*
- P96 BARIATRIC SURGERY AND INSULIN SENSITIVITY IN OBESITY: ROLE OF PROXIMAL SMALL INTESTINE BYPASS.  
R.H Peacock, M.A Reed, W.J Pories, WH Chapman, J.R Pender, H Barakat, T Green, E Tapscott, C.A Tanner, C.I Amato, T.P Gavin, FACSM and G.L Dohm. *East Carolina University, Greenville, NC*

**9:00-10:15 BASIC SCIENCE LECTURE (Continental Ballroom)**

**"Imaging the Neuromuscular System"**

Dr. Jeff Lichtman, M.D.

Harvard University, Professor of Molecular and Cellular Biology

Presiding: Dr David Pascoe, SEACSM President Elect, Dept. Kinesiology, Auburn University

**10:15-10:30 BREAK**

**10:30-12:00 SYMPOSIUM S10**

- S10 ASSESSING OXYGEN DELIVERY AND MITOCHONDRIAL FUNCTION.  
Kevin K. McCully FASCM<sup>1</sup>, Terence E. Ryan<sup>1</sup>, L. Bruce Gladden FASCM<sup>2</sup>, and James R. McDonald<sup>2</sup>; ( 1) *Department of Kinesiology, University of Georgia, Athens, GA* , (2) *Department of Kinesiology, Auburn University, Auburn, AL (Redbud)*

### 10:30-11:30 TUTORIALS T13-T15

- T13 TRAINING CONSIDERATIONS FOR TRIATHLETES: OFF-SEASON RESISTANCE TRAINING AND COACHING THE MATURE ATHLETE  
Willard W. Peveler<sup>1</sup>, Andy Bosak<sup>2</sup>, and D. E. Wittenberg<sup>3</sup>. (1) Northern Kentucky University, (2) Georgia Southwestern State University, (3) Florida Atlantic University  
**(Regency Ballrooms E & F)**  
Chair: Andy Bosak, Georgia Southwestern State University
- T14 BALANCE TRAINING: WHY EVERYONE SHOULD DO IT?  
E.A. Wikstrom. Dept. of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC 28223 **(Regency Ballrooms B & C)**  
Chair: Greg Martel, Coastal Carolina University
- T15 A SIMPLIFIED PRESENTATION OF THE KEYS TO STATISTICAL INTERPRETATION TO PREVENT MISTAKEN USES AND INTERPRETATION OF COMMON STATISTICAL TESTS.  
J.C. Simonsen, Area of Human Performance and Exercise Science, Milligan College, Milligan College, TN **(Regency Ballroom A)**  
Chair: Lindsay Schreiber, Auburn University

### 10:30-11:30 ORAL FREE COMMUNICATIONS OFC10

- Fitness/testing/Assessment **(Regency Ballroom D)**  
Chair: Rebecca Battista, Appalachian State University
- O35 10:30 PHYSIOLOGIC RESPONSES TO RUNNING WITH A STROLLER  
D. Gregory<sup>1</sup>, K. Vickers<sup>1</sup>, J. Flynn<sup>1</sup>, C. Connolly<sup>1</sup>, K. Pfeiffe<sup>2</sup>, and D. Coe<sup>1</sup>  
(1) Kinesiology, Recreation, and Sport Studies, University of Tennessee, Knoxville, TN and (2) Kinesiology, Michigan State University, East Lansing, MI
- O36 10:45 SUPERVISED ACTIVITY INCREASES ADOLESCENT FITNESS AND DECREASES RESTING ENERGY EXPENDITURE GREATER THAN UNSUPERVISED SUMMER BREAK  
Carol J. Cook, Chelsea D. Curry, Hannah E. Wheeler, Hannah E. Crawford, Marco Meucci, Scott R. Collier. Be Active Appalachian Partnership and Department of Health, Leisure, and Exercise Science, Vascular Biology and Autonomic Studies Laboratory, Appalachian State University, Boone, NC
- O37 11:00 PERCEIVED VERSUS ACTUAL CLASSIFICATION OF CARDIOVASCULAR AND BODY COMPOSITION PARAMETERS  
J.A. Bunn<sup>1</sup>, L.C. Eschbach<sup>2</sup>, and A.N. Street<sup>2</sup>; (1) Department of Exercise Science, Campbell University, Buies Creek, NC; (2) Department of Health, Exercise, and Sports Science, Meredith College, Raleigh, NC

### 10:15-12:00 POSTER PRESENTATION VI: P97-P118 (Teal)

- Authors Present 10:15-11:15  
Exercise evaluation/clinical, psychology/psychiatry/behavior, growth and development  
Chair: Mary Sandage, Auburn University
- P97 AEROBIC EXERCISE TRAINING IN CHILDREN OF EXTREMELY OBESE AND LEAN PARENTS IMPROVES FAT OXIDATION.  
Ashley Colon, Audrey Eaves, Joseph A. Houmard, Human Performance Laboratory, Dept. of Exercise and Sport Science, East Carolina University, Greenville, NC
- P98 GOLF: THE EFFECT OF WALKING VERSUS UTILIZING A PULL-CART ON CARDIOVASCULAR RESPONSES.  
G. William Lyerly, Stacey L. Beam, Timothy J. Meyler, Kelly M. Fitzsimmons, Hope H. Epton, Gregory F. Martel. Coastal Carolina University, Conway, SC

- P99 TEST-RETEST RELIABILITY AND VALIDITY OF THE SENIOR FITNESS TEST.  
H. Guzzardo, D.P. Credeur, B.C. Hollis, M. Lupo, C.P. Earnest, N.M Johannsen and M.A. Welsch. *Dept. of Kinesiology, LSU, and Pennington Biomed. Research Center, Baton Rouge, LA*
- P100 REDUCTIONS IN FUNCTIONAL SYMPATHETIC OVERACTIVITY IN OBESE ADOLESCENTS FOLLOWING A WEIGHT MANAGEMENT PROGRAM.  
S.L. Hall<sup>1</sup>, R.L. Franco<sup>1</sup>, M.K. Bowen<sup>1</sup>, M. Stern<sup>2</sup>, E.P. Wickham<sup>3</sup>, R.K. Evans<sup>1</sup>  
(1) *Departments of Health and Human Performance, (2) Psychology, and (3) Pediatrics. Virginia Commonwealth University, Richmond, VA*
- P101 ASSESSING ENDURANCE EXERCISE CAPACITY IN MICE USING A FORCED SWIM TEST.  
Jasmine L. Hardy and Reuben Howden. *Dept.of Kinesiology, UNC Charlotte, NC*
- P102 STEP UP YOUR COMMERCIAL BREAKS.  
J.A. Steeves, D.L. Thompson, FACSM, D.R. Bassett, FACSM. *Dept. of Kinesiology, Recreation, and Sport Studies, University of Tennessee, Knoxville, TN*
- P103 ACUTE CARDIOVASCULAR RESPONSES TO PLAYING GOLF: WALKING VS. RIDING.  
Kelly M. Fitzsimmons, G. William Lyerly, Stacey L. Beam, Hope E. Epton, Timothy J. Meyler, Gregory F. Martel. *Department of Kinesiology, Coastal Carolina University, Conway, SC*
- P104 LACK OF CORRELATION BETWEEN IMPORTANCE OF PRO ATTITUDE OF EXERCISE AND OBJECTIVE AND SELF-REPORTED FITNESS MARKERS.  
L. Martin, D. Jacks, R. Topp, P. Abi Nader, L. Wakefield. *Department of Exercise Physiology/Nursing, University of Louisville, Louisville, KY*
- P105 UNDERGRADUATE STUDENTS' RESIDENCE LOCATION AND ITS RELATIONSHIP TO EXERCISE IN CAMPUS FITNESS FACILITY.  
Sydney E. Davis\*, Jami K. Graham\*, Robert W. Hensarling, Alan P. Jung, John K. Petrella, *Samford University, Birmingham, AL*  
\* Denotes equal contribution and presenting authors
- P106 THE INFLUENCE OF ADVENTURE EXPERIENCE ON ANTICIPATED AND EXPERIENCED ANXIETY LEVELS AMONG PARTICIPANTS.  
K. Graben, B. Harrison, B. Hale. *Department of Kinesiology, Mississippi State University*
- P107 ALL A-TWITTER: A NEW MOTIVATIONAL TOOL FOR INCREASING PHYSICAL ACTIVITY.  
N.M. Gell, D.D. Wadsworth. *Department of Kinesiology, Auburn Univ., AL*
- P108 PERCEIVED SOCIAL SUPPORT IN A REHABILITATION SETTING.  
T.B. Truscott, C.N. Hultquist, Ph.D, and J.R. McLester, Ph.D, FACSM,  
*Department of Health, Physical Education, and Sport Science, Kennesaw State University, Kennesaw, GA*
- P109 THE INFLUENCE OF CONCUSSION HISTORY ON COGNITIVE PERFORMANCE IN COLLEGE ATHLETES.  
R.A. Gardner, D.J. Lawton E.E. Hall FACSM, W.R. Bixby FACSM, P.C.Miller, S.E. Folger, K.P. Barnes; *Dept. of Exercise Science, Elon Univ., Elon, NC*
- P110 IMPROVEMENTS IN QUALITY OF LIFE IN MIDDLE-AGED WOMEN FOLLOWING 8 WEEKS OF PROGRESSIVE RESISTANCE TRAINING.  
Melissa J. Benton, PhD, RN, CNS, FACSM and Maura C. Schlairet, EdD, RN, CNL.  
*College of Nursing, Valdosta State University, Valdosta, GA*

- P111 FREQUENCY OF EXERCISE TRAINING ON AEROBIC AND STRENGTH FITNESS CHANGES IN OLDER WOMEN.  
G. Fisher <sup>1</sup>, G.R. Hunter <sup>2</sup>, J.P. McCarthy <sup>3</sup>, and C.S. Bickel <sup>3</sup>. (1) *Dept of Nutrition Sciences*, (2) *Dept of Human Studies*, and (3) *Dept of Physical Therapy, University of Alabama at Birmingham, Birmingham, AL*
- P112 COMPARISON BETWEEN ECCENTRIC AND HIGH VELOCITY TRAINING ON FUNCTIONAL PERFORMANCE IN OLDER ADULTS.  
T. J. Leszczak<sup>1</sup>, J. M. Olson<sup>2</sup>, J. Stafford<sup>2</sup>, and R. Di Brezzo<sup>2</sup> (1)*Austin Peay State University, Clarksville, TN*; (2) *Department of Health Sciences, Kinesiology, Recreation and Dance, University of Arkansas, Fayetteville, AR*
- P113 COMPARISON OF AEROBIC POWER IN UNITS OF TOTAL BODY MASS VERSUS FAT FREE MASS IN ADOLESCENTS.  
P.A. Hosick, R.G. McMurray, J.S. Harrell. *Dept. of Exercise and Sport Science, school of Nursing, University of North Carolina, Chapel Hill, NC*
- P114 COMPARISON OF ACTIVE COMMUNITY-DWELLING SENIORS IN A STRUCTURED AND NON-STRUCTURED EXERCISE PROGRAM.  
B. Sue Graves, FACSM & Anita D'Angelo. *Florida Atlantic University, Boca Raton, FL*
- P115 FAMILIARIZATION OF A CLINICAL TOOL, THE TIMED 25 FOOT WALK TEST, IN INDIVIDUALS WITH RELAPSING REMITTING MULTIPLE SCLEROSIS.  
R.D. Larson MS, T. Baumgartner PhD, L.J. White PhD.; *Department of Kinesiology, The University of Georgia, Athens, GA*
- P116 EFFECT OF LEG COOLING VERSUS ICE VEST COOLING ON TIME TRIAL PACED CYCLING.  
C.P., Katica, A.T., Del Pozzi, G., Balilionis, R.L., Herron, S.H., Bishop, G.A., Ryan, and J.E., Wingo. *Department of Kinesiology, Univ of Alabama, Tuscaloosa, AL*
- P117 SAFETY PERCEPTIONS AND PHYSICAL ACTIVITY DURING PREGNANCY.  
Catrina W. Wold, Lanay M. Mudd, and Sara E. Riggs. *Dept. of Health, Leisure, & Exercise Science, Appalachian State University, Boone, NC*
- P118 HIGH INTENSITY EXERCISE INCREASES CELL DEATH OF B-LYMPHOCYTES (CD19) IN ANAEROBICALLY TRAINED INDIVIDUALS.  
S.D. Bean, D.D. Kirkwood, R.L. Zierden, M.A. Schafer, S.W. Arnett, J.W. Navalta. *Dept of KRS, Western Kentucky University, Bowling Green, KY*

**12:00-2:00 SEACSM LUNCHEON AND LECTURE (Continental Ballroom)**

**“Quantifying the Limits of Human Performance Outside of the Laboratory”**

Brent Ruby, Ph.D., FACSM

University of Montana

Presiding: Alan Utter, Past President, Appalachian State

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

## COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM): DOES IT BELONG IN THE FITNESS PROFESSION?

Amanda Timberlake M.S., R.D., *Life University, Atlanta, GA*

T1

Approximately 40% of the population use CAM therapies, regardless of their efficacy. Consequently, fitness professionals may be called on to be a resource to aid their clients in the understanding of these modalities. This presentation will explore the pros and cons of various CAM treatments, using an evidenced based model with a review of the scientific literature when available, to support or refute the claims of these therapies. A variety of topics will be covered including: an overview of the historical evolution of CAM remedies; defining an adaptogen and identifying which herbs are considered such; explaining qi and how it is used in Chinese Medicine; and describing research problems in CAM using Naturopathy, Homeopathy, and Chinese Medicine as examples. The role of the “Sport Chiropractor” will be addressed; in addition this tutorial will explore the effectiveness of using hypnosis as an adjunct therapy for weight loss; the difference and similarities between Rolfing and Massage; and describe what “energy work” is, including Therapeutic Touch and Reike. There are many CAM therapies available that may be beneficial to individuals and fitness professionals should be open to evaluating them, unfortunately, there may be just as many that are potentially dangerous. There will be a discussion of the difference between unproven and disproven approaches, and why this discussion is necessary for CAM therapies.

## THE SECRETS FOR A SUCCESSFUL ACSM FELLOWSHIP APPLICATION

B.L. Marks, *Department of Exercise and Sport Science, University of North Carolina at Chapel Hill, 27599-8700*

T2

“I don’t understand why my application for ACSM fellowship was denied. It looked to me like I met all the necessary criteria” This is a common concern the credentialing committee receives after fellowship decisions are delivered to unsuccessful applicants. Ultimately, the ACSM wants to facilitate members moving up to fellowship status. Therefore, the goal of this tutorial is to help guide potential applicants through the application process. Is an applicant really ready to apply for ACSM fellowship? If so, which route should be taken? Research? Service? Exceptional Service? How much research “is enough”? Isn’t all service “exceptional”? Sometimes the question is “Why Bother?” Or, the committee asks, “What took you so long?” The application form can appear daunting, perhaps even discouraging, but there is a method to the documentation madness. Despite all the detailed instructions, application blunders still occur and many of the errors are often avoidable. This tutorial will demystify the fellowship application/review process by discussing the various application sections, provide “Do and Don’t Do” tips, and will conclude with a Q&A period.

## EXERCISE AS AN INTERVENTION FOR IMPROVING AND MAINTAINING FUNCTIONAL CAPACITY IN OLDER ADULTS: NEW PERSPECTIVES

C.L. Sipe, *Dept. of Kinesiology, UNC-Greensboro, Greensboro NC 27402*

T3

Functional capacity has been shown to decline steadily with advancing age during late adulthood. Exercise is often recommended as a way to offset the deleterious affects of biological aging and increase functional capacity. Specifically, cardiovascular exercise, basic progressive resistance training, muscular power training, balance training and a variety of “functional” training strategies are often cited. However, the research literature provides mixed results as to which exercise protocols are most effective. This is due to a number of methodological differences between studies such as research design; exercise protocols; subject population; and measures of functional capacity, which makes a direct comparison of results difficult. The current evidence suggests that a “one-size-fits-all” approach will not yield optimal increases in functional capacity due to the diverse characteristics of the older adult population such as age, gender, health status and functional status. In addition, while Nagi’s Disablement Model is a classic theoretical framework that has served as a foundation for many exercise interventions, more contemporary models have been recently developed that take into consideration the latest evidence regarding aging, exercise and functional capacity. First, this tutorial will examine the current evidence regarding the efficacy of specific exercise interventions to increase functional capacity in older adult populations. Secondly, contemporary theoretical frameworks for understanding function and disability will be explained. Thirdly, directions for future research will be discussed.

## ENGAGING UNDERGRADUATES AND GRADUATES IN RESEARCH: IMPROVE YOUR PRODUCTIVITY AND STUDENTS’ EDUCATION

J.M. Green<sup>1</sup>, P.A. Bishop<sup>2</sup>, J. Petrella<sup>3</sup>; (1) *University of North Alabama*, (2) *University of Alabama*, (3) *Samford University*

T4

Graduate and undergraduate students often show considerable interest and potential for research, but remain uninvolved for multiple reasons. When departmental faculty are active in a wide range of research, student involvement is enhanced. However, even active research programs can be improved through greater student-involvement. While there are many obstacles to student research, especially in schools with a baccalaureate degree emphasis or small graduate programs, creative approaches and initiative make it possible to involve and encourage students. This 60-minute interactive tutorial will focus on effective methods for engaging undergraduate and graduate students in research. Included will be the long term advantages for students and faculty resulting from enhanced student participation, and suggestions for: a) increasing involvement in research, b) research requirements as a component of the curriculum, c) involvement in ongoing departmental research, and d) opportunities to present and publish for students. The target audience for this tutorial will be all faculty who may desire to increase student involvement in research as well as graduate students who plan to teach.

Authors/component/time:

Green: Introduction & purpose, advantages to involving students (5min)

Petrella: Inclusion of research in an undergraduate curriculum (15-20min)

Bishop: Strategies for getting student excited about research, some examples (10-15min)

Green: Student presentation and publication opportunities (15-20min)

### ULTRA ENDURANCE EVENTS: MEDICAL, TRAINING AND PHYSIOLOGICAL EFFECTS

D. Horton, Ed.D, Liberty University, G. Wortley, MD, *Lynchburg Family Medicine Residency, Lynchburg, VA*, Michael A. Welsch, PhD, FACSM, *Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA, 70803*

T5

Ultra distance endurance events uniquely challenge the physiological capacities of elite athletes. These challenges become even greater when one considers that many of these events are performed under extreme geographical and/or environmental conditions. The purpose of this symposium is to provide the audience with an appreciation for the determinants and trends of elite human performance, and to discuss the practical aspects of training, nutrition, and injury prevention/treatment for such events. Specifically, Dr. Horton will focus on training and nutrition for multi-day ultra distance running events. Dr. Wortley will discuss the critical aspects of medical coverage for ultra distance events, often held in remote locations with difficult access and communications. Finally, Dr. Welsch will focus on the physiological needs for athletes involved in ultra distance speed skating. The information presented aims to provide basic scientists with an appreciation of the determinants and trends of elite human performance, and a perspective of the upper range of physiological capacities of elite athletes. Finally, information regarding exercise training for individuals involved in ultra-distance sporting events will be discussed.

### TO DO OR NOT TO DO A POSTDOC: WHAT, WHY, AND WHERE

J.E. Wingo<sup>1</sup>, T.L. Moore-Harrison<sup>2</sup>, M.J. Sabatier<sup>3</sup>, and G.J. Hodges<sup>1</sup>. (1) *Department of Kinesiology, University of Alabama, Tuscaloosa, AL 35487*, (2) *Department of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC 28223*, (3) *Department of Natural Sciences, Clayton State University, Morrow, GA 30260*

T6

Doctoral training typically provides basic preparation for a research-oriented academic career. Students receive training in a series of specific techniques tailored to their doctoral studies; however, there is often insufficient training in grant-writing, manuscript preparation, public speaking, and student mentoring. A postdoctoral fellowship can provide opportunities to develop these vital skills, learn new skills, expand one's professional network, and secure employment prior to seeking a competitive position in academia or industry. Currently there are also postdoctoral opportunities that provide pedagogical training. This tutorial will provide attendees with the basics regarding postdoctoral fellowships, including a description, rationale for pursuit of a postdoc, and strategies to find and secure a fellowship. The intended audience will be graduate students considering research careers, but information covered also will be applicable to undergraduate students contemplating post-baccalaureate plans.

### THE PROMOTION OF HEALTH AND PERFORMANCE THROUGH MINDFULNESS BASED STRESS REDUCTION

Mary J. Sandage and T.J. Exford, *Department of Kinesiology, Auburn University, Auburn, Alabama*

T7

Mindfulness-based stress reduction (MBSR, Kabat-Zinn) is a structured program that cultivates present moment non-judgmental awareness and attention, independent of the Eastern cultural belief systems and religious framework from which it emerged. The benefits of MBSR have been linked, but not limited, to increased immune system function, decreased anxiety, reduced perception of chronic pain, reduced incidence of repeat heart attack, weight loss and weight maintenance, as well as management of depression and attention deficit disorder. Theoretically, cultivation of attention through mindfulness, specifically, has been proposed as an important skill for disengaging individuals from habits and unhealthy behaviors through the promotion of intrinsic behavioral regulation (Brown & Ryan, 2003; Levesque & Brown, 2007). The attention and non-judgmental awareness of thoughts and emotions (positive and negative) can influence behavioral choices that influence quality of life. Following a review of the MBSR literature, this tutorial will describe the basic components of the well-established standard eight week MBSR course that has been implemented world-wide and the specific adaptations of that curriculum for a 15-week, semester long stress reduction course that targets the college age student population. Using a retrospective research design that used anonymous student descriptions of course benefits and an informal survey, responses demonstrated increased positive health outcomes, enhanced wellness perceptions, improved academic performance, improved performance in competitive athletics, and improved sleep. The targeted benefits of this course will be discussed in light of the adaptations from the standard MBSR curriculum.

### DARTFISH: A MOVEMENT ANALYSIS AND DATA COLLECTION TOOL

W.H. Weimar and A.M Sumner, *Auburn University, Auburn, AL 36849*

T8

Dartfish is a powerful tool for analyzing motion but does have some limited data collection capabilities. Dartfish has been gaining popularity in biomechanics programs and with coaches due to its frame by frame capabilities, zooming tools, and comparison function that has been widely seen on the televised coverage of the Olympics. Perhaps most memorable are the overlaying of the videos of the downhill skiers of the Winter Olympics and the divers of the Summer Games. Therefore, the purpose of this tutorial is to provide the attendee with an overview of the basic techniques of movement analysis, as well as the analyzing tools and data collection capability of the software. The beginning of the tutorial will focus on how to approach movement analysis with special attention to breaking movements down into components as well as understanding what specific movements imply such as muscle tightness, weaknesses or inefficient movements. Next, camera basics will cover lighting concerns, including shutter speed and f-stop as well as appropriate camera angles for different movement skills. Previous analyses will be presented to demonstrate how the drawing tool and key positions can help convey pertinent information to the athlete/coach. Next, the data collection tools will be demonstrated and a comparison between the data extracted using Dartfish vs Ariel Dynamics will be presented. Last, how Dartfish can be used to teach classes in biomechanics and applied anatomy will be addressed.



## PHENOTYPE AND CARDIOVASCULAR DISEASE MORBIDITY AND MORTALITY IN MULTICULTURAL POPULATIONS

Jurine H. Owens and L. Jerome Brandon, *Department of Kinesiology & Health, Georgia State University, Atlanta, GA 30303*

T9

African Americans (AA) have a disproportionate prevalence of cardiovascular disease (CVD) morbidity and mortality, but do not have similarly high incidences of metabolic syndrome risks (which are predictors for CVD) as Euro and Latino Americans. If the physical heritable characteristics of the human organism (genotype) are generally similar and CVD is genetically based, AA would be expected to have similar rates of CVD morbidity and mortality as other racial/ethnic groups. Phenotype disposition appear to be distinguishing characteristics partially responsible for the difference in AA CVD morbidity and mortality. Apparently, the genetic admixture results in an environmental exposure and behavior disposition that is at the heart of African Americans health, disease and mortality rates. Phenotype in this paper is the constellation of observable traits that are equal to genotype, behavior and environment stimuli. The mapping of genotypes into phenotypes maybe different in different environments. This suggest that genetic admixture, environment, cultural preferences, lifestyle behaviors and related metabolic patterns are likely contributors to the greater CVD morbidity and mortality observed in AA in the United States. This tutorial will include a summary of papers in the literature and data from our lab that explore the differences in prevalence and the influence of phenotype characteristics on CVD morbidity and mortality in different racial/ethnic groups. Based on current knowledge, population specific health care appear to be warranted as one size or treatment system does not fit or serve all populations equally well.

## PHYSICAL ACTIVITY DURING PREGNANCY FOR CHRONIC DISEASE PREVENTION

J.A. Flohr, K.A. Mattran C.M. Nicewonger. Morrison Bruce Center, *Department of Kinesiology, James Madison University, Harrisonburg, VA 22807.*

T10

The American College of Obstetricians and Gynecologists recommends pregnant women participate in 30 minutes of moderate intensity physical activity (PA) throughout pregnancy. Potential benefits of PA to the mother and fetus/child include reduced maternal hypertension, risk for preterm delivery, and a reduced risk of a high birth weight child. The natural pattern of increased coagulation potential and reduced fibrinolytic potential during pregnancy may protect pregnant women against hemostatic challenges of placental separation; however, these changes also present an increased risk for thromboembolic complications. Hemostatic disturbances may lead to poor maternal-fetal circulation and ultimately restrict fetal growth, specifically between the 2nd and 3rd trimester. Exposure to elevated blood glucose levels has the potential to mimic health consequences similar to diabetes. Offspring born to mothers with insulin resistance suffer infant morbidity and obesity linked to future development of type II diabetes. These issues are complicated by the fact that women are becoming pregnant at higher starting weights and gaining excess weight. Little is known; however, about how trimester-specific PA patterns during pregnancy impact insulin sensitivity, and the fibrinolytic profile in relation to maternal health risk and fetal growth. This tutorial will explore how physical activity patterns influence maternal benefits, offspring outcomes, and chronic disease risk for mother and child, while specifically investigating the potential benefits of physical activity to attenuating risk for diabetes and cardiovascular disease.

## THE COMMON COLD IS LESS COMMON AMONG THE FIT

D.C. Nieman, Human Performance Lab, *Appalachian State University and the North Carolina Research Campus, Kannapolis, NC 28081*

T11

Moderate exercise training causes favorable perturbations in immunity and a reduction in incidence of upper respiratory tract infection (URTI). During each bout of moderate exercise, an enhanced recirculation of immunoglobulins, neutrophils, and natural killer cells occurs that persists for up to 3-h post-exercise. This exercise-induced surge in immune cells from the innate immune system is transient but improves overall surveillance against pathogens. As moderate exercise continues on a near-daily basis for 12-15 weeks, the number of symptoms days with URTI is decreased 25-50% compared to randomized sedentary controls. Epidemiologic and animal studies support this inverse relationship between URTI risk and increased physical activity. In a recent 12-week study of 1,000 community adults, we showed that high perceived physical fitness and near-daily aerobic activity were important correlates of reduced URTI frequency (43% and 46%, respectively), severity (32%, 41%), and symptomatology (34%, 41%). Among the various demographic and lifestyle factors evaluated, perceived fitness and exercise frequency ranked second only to older age in the magnitude of reduction of days with URTI during the winter and fall seasons. In summary, high perceived physical fitness and near-daily aerobic activity predict reduced URTI frequency and symptomatology. These data are consistent with government guidelines urging the general public to include exercise within their daily routines to improve health.

## BREAST CANCER SURVIVORS, WEIGHT MANAGEMENT AND PHYSICAL ACTIVITY: PHYSIOLOGICAL AND PSYCHOSOCIAL IMPLICATIONS

E.M. Evans<sup>1</sup>, FACSM, S.L. Mihalko<sup>2</sup> (1) *Dept. of Kinesiology, University of Georgia, Athens, GA*; (2) *Health and Exercise Science Dept., Wake Forest University, Winston-Salem, NC*

T12

Health-related quality of life is important for breast cancer survivors (BCS) as both the cancer and treatment impact multiple aspects of health including physical, emotional and psychosocial domains. Obesity is linked to risk for initial diagnosis of breast cancer, prognosis and reoccurrence of the cancer. Moreover, breast cancer diagnosis and treatment options have deleterious effects on body composition including increases in adiposity and reductions in bone mass. Reduced physical function and fatigue are common side effects of breast cancer treatment with fatigue often persisting years after successful treatment. Obesity is also linked with reductions in physical function and fatigue, especially in middle-aged and older women, cohorts most at risk for breast cancer. Consequently, weight management and physical activity are increasingly being recommended as adjunct therapeutic lifestyle changes to conventional medical treatment in BCS. Beyond weight management, physical activity also favorably impacts physical function and psychosocial health. The “teachable moments” during and after treatment may be an optimal time to improve physical activity and to address weight management, subsequently enhancing prognosis and the long-term health of BCS. The purpose of this tutorial is to discuss recent literature regarding the link between breast cancer and obesity, how treatment impacts body composition, and the importance of weight management and physical activity to enhance physical and psychosocial health in BCS. Topic is of interest for any attendees with an interest in women's health.

### TRAINING CONSIDERATIONS FOR TRIATHLETES: OFF-SEASON RESISTANCE TRAINING AND COACHING THE MATURE ATHLETE

Willard W. Peveler<sup>1</sup>, Andy Bosak<sup>2</sup>, and D. E. Wittenberg<sup>3</sup>. (1) Northern Kentucky University, (2) Georgia Southwestern State University, (3) Florida Atlantic University

**T13**

This tutorial examines available literature on the effect of off-season resistance training on triathlon performance and special considerations for coaching the mature athlete. It has been suggested that resistance training in the off-season can lead to improved endurance performance. Current research supports performance improvements when examining time to exhaustion, distance traveled during a fixed time and performance time over a fixed distance. It is believed that increased endurance performance occurs due to improved economy, neuromuscular adaptations, increased power production, and a possible increase in lactate threshold. Both low and high repetition programs have been shown to increase endurance performance. Optimal form of resistance training has yet to be identified. Significant increases in endurance performance have been demonstrated following weight training, plyometrics, and sport specific resistance. Consideration to practical application of a resistance program will be discussed. This tutorial will also cover coaching the mature (30 to 49 year old) ultra-distance triathlete, who is training and racing half-ironman or longer events. To design a successful training plan, other variables must be considered that are not applicable for younger, professional, or collegiate athletes. Many studies have researched single sport collegiate/elite athletes, but few exist that deal with the mature triathlete. Over 1 million individuals (30 to 49 age) competed in a multisport event in 2008. With both the numbers of these athletes and professionals who coach them continuing to grow, more research is needed that examines the specific issues that affect this population. This tutorial will review the special needs and coaching techniques for the mature triathlete, as well as discuss pertinent prior research and suggest future research areas.

### BALANCE TRAINING: WHY EVERYONE SHOULD DO IT?

E.A. Wikstrom. Dept. of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC 28223

**T14**

Lower extremity injuries are extremely common consequences of physical activity and represent a significant public health problem. Injury associated with physical activity is a leading cause of physical activity cessation and often results in life-long residual symptoms including physical inactivity and an increased risk of developing osteoarthritis. The cause of these consequences is hypothesized to be impaired neuromuscular control, often quantified as decreased balance. Indeed, balance deficits increase the risk of suffering a lower extremity injury. Further, lateral ankle sprains and ACL tears, two common lower extremity injuries, are known to cause balance deficits and alterations in supraspinal motor control mechanisms (i.e. central adaptations). Clinically, the presence of central adaptations clearly indicate that previously established rehabilitation protocols, which focused exclusively on the local injury site, are insufficient for restoring proper neuromuscular control and preventing negative sequela. Balance training, is a therapeutic intervention that can address the central adaptations and balance deficits. Indeed, balance training: 1) improves balance, 2) reduces the risk of injury, and 3) leads to neural adaptations at multiple sites within the central nervous system in both healthy and clinical populations. Despite the known benefits, balance training is not always incorporated in rehabilitation programs. Therefore, this tutorial lecture will review the latest basic, applied, and clinical research regarding balance training and optimal treatment parameters in an effort to enhance clinical practice and stimulate scientific discussion.

### A SIMPLIFIED PRESENTATION OF THE KEYS TO STATISTICAL INTERPRETATION TO PREVENT MISTAKEN USES AND INTERPRETATION OF COMMON STATISTICAL TESTS.

J.C. Simonsen, Area of Human Performance and Exercise Science, Milligan College, Milligan College, TN 37682

**T15**

Understanding why certain statistical tests are used is critical to proper interpretation of the results. Many times in professional research, tests are used improperly, therefore compromising the validity of conclusions based on otherwise valid data: e.g. "Because the males and females were not statistically different, we combined the groups." Misunderstandings are partially due to the fact that what statistical tests do is confusing. Also, the way hypothesis testing is traditionally taught in math classes often leads to a fundamental misunderstanding of what the research data show.

In this tutorial, the basic assumptions associated with statistical tests and the probability statements that are made in relation to the tests will be presented in a simplified way. This will help clarify the valid conclusions and frequent errors made based on the results of common statistical tests. Everyone who has taken statistics, but still finds statistics confusing, will benefit from this tutorial.



### HOW TO COMPETE FOR THE GRADUATE ASSISTANTSHIP AND JOB THAT YOU WANT

A. Bosak<sup>1</sup> and G. Ryan<sup>2</sup>. *(1) Georgia Southwestern State University, (2) University of Alabama.*

Students often fear what the immediate future may hold for them regarding further education or new employment. In order to decrease stress and fears of the unknown it is extremely important that students get a “head start” in searching for the right graduate program or career for them. Thus, this symposium’s purpose is to acquaint students with the nuances of competing for graduate assistantships and careers in exercise science, rehabilitative sciences, and related fields. This presentation will 1) outline various tasks that students should seek to accomplish in order to be competitive in today’s job market and 2) serve as a “help-session” in assisting students with where to look for certain graduate assistantships, how to apply, and how to attempt to obtain their desired graduate assistantship or job. This session will also demonstrate how students can maximize their efforts in areas such as academics, research/scholarship, community/professional/university service, internships, certifications, and awards in order to enhance their portfolios. This presentation is intended for undergraduate students seeking future graduate degrees, graduate students who will continue their studies, and recently graduated young professionals who are looking for employment or who are new assistant professors and are seeking ways to advise their current students for future graduate degrees or careers. A special feature of this presentation is not only just having an assistant professor’s perspective on how to prepare students for graduate schools and careers, but also a current doctorate student will give their testimony as to what they did to receive graduate assistantships for both of their graduate degrees.

S1

### FROM PREGNANCY TO ADOLESCENCE-CURRENT GUIDELINES REGARDING PHYSICAL ACTIVITY INCLUDING BARRIERS, BENEFITS, AND PRACTICAL APPLICATION

R.A. Battista<sup>1</sup>, D.P. Coe<sup>2</sup>, and L.M. Mudd<sup>1</sup>; *(1) Appalachian State University, (2) University of Tennessee*

In exercise testing and prescription, pregnant women, children, and youth are often referred to as special populations and therefore require different physical activity (PA) recommendations, as well as precautions, to consider during exercise testing and prescription. The benefits of PA vary for these populations compared to the guidelines set forth for the average adult. Healthy women can engage in PA during pregnancy, and doing so may benefit both mother and fetus during and after pregnancy. Children should not be considered “miniature adults” since they are physiologically immature compared to adults, and their abilities and responses to exercise preclude the use of adult guidelines. Moving into adolescence, a variety of factors including biological maturation will “muddy the waters” regarding the benefits and recommendations for PA. As such these populations require alternate guidelines for PA as well as awareness regarding the safety and efficacy of PA. Therefore, the purpose of this symposium is to discuss the state of the science on the benefits of PA in pregnant and post-partum women, children, and adolescents. Objectives include the following; 1) presenting the most current recommendations for PA for each population; 2) reviewing the current literature related to the benefits of being physically active; and 3) providing practical tips for increasing PA in each population.

S2

### MITOCHONDRIA, OXIDATIVE STRESS AND CELL SURVIVAL FROM THE PERSPECTIVE OF THE EXERCISED HEART

John C. Quindry<sup>1</sup> and Andreas N. Kavazis<sup>2</sup> *(1) Auburn University, Dept of Kinesiology, Auburn, AL; (2) Mississippi State University, Dept of Kinesiology, Starkville, MS*

Mitochondrial function is central to muscular contractions. The mitochondria are classically described as a “cellular powerhouse”, though this perspective is now considered limited. Research findings from the last decade reveal that mitochondria are vital organelles that can serve as the final arbitrators of life or death during physiologic insults, as they are not only required to produce ATP, but can also trigger necrosis, apoptosis, and autophagy. In tissues where energy supply/demand is tightly controlled, such as the heart, various cellular processes related to mitochondrial function retain particular importance. This symposium will be presented in three parts and will focus on key relationships between mitochondrial function and cell survival in the heart. Following an introduction to mitochondrial function and the production of reactive oxygen species (ROS), specific discussion will be given within the context of two clinically relevant stress paradigms within the heart. The first stress model pertains to the role of mitochondria and oxidative stress following administration of the anti-cancer drug doxorubicin. The final topic will examine the role of the mitochondria in combating ischemia-reperfusion generated oxidative stress in the exercised heart.

S3

### THE POST-BARIATRIC SURGERY PATIENT: YOUR NEXT CLIENT?

Paul G. Davis, FACSM<sup>1</sup>, Ronald K. Evans<sup>2</sup>, Cody L. Sipe<sup>1</sup>. *(1) Department of Kinesiology, University of North Carolina at Greensboro, Greensboro, NC; (2) Department of Health and Human Performance, Virginia Commonwealth University, Richmond, VA*

Each year in the US, approximately 130,000 people undergo weight loss surgeries. Over the first 1-2 years following surgery, most patients lose substantial weight and experience lessening, or even total reversal, of obesity-related co-morbidities such as type II diabetes. A number of patients, however, exhibit short-term suboptimal weight loss (e.g., <50% of excess body weight) or experience long-term weight regain. Given the incidence, cost, and risk of these surgeries, it is important to emphasize both short- and long-term behaviors that contribute to optimal post-operative weight loss and maintenance. The purpose of this symposium is to discuss the role of both pre- and post-surgical physical activity on weight loss outcomes. The symposium will begin with an overview of the major types of bariatric surgeries, their effectiveness and side effects, and post-surgical dietary changes that are commonly implemented. Then, the role of pre- and post-surgical physical activity in optimizing initial weight loss and long-term weight maintenance will be addressed. To conclude, strategies and nuances involved in developing safe and effective exercise programs will be discussed. This symposium targets both exercise professionals in community and clinical settings and researchers interested in the bariatric population.

S4

### **LACTATE-PROTECTED HYPOGLYCEMIA (“LPH”): A POTENTIAL CANCER TREATMENT?**

L. Bruce Gladden<sup>1</sup>, Matthew L. Goodwin<sup>2</sup>, James R. McDonald<sup>1</sup>, and Yi Sun<sup>1</sup>. (1) *Department of Kinesiology, Auburn University, Auburn, AL 36849*, (2) *Weill Cornell Medical College, Cornell University, New York, NY 10021*

The Pasteur Effect describes cellular bioenergetics in the presence or absence of oxygen (O<sup>2</sup>); in conditions of low O<sup>2</sup>, hypoxia, glycolysis to lactate (fermentation) dominates whereas the presence of O<sup>2</sup>, normoxia or hyperoxia, there is greater oxidative metabolism and less fermentation. In contrast, the Warburg Effect describes a condition in which tumor cells rely heavily on glycolysis even in the presence of ample O<sup>2</sup>. The Warburg Effect was discovered by Otto Warburg in the 1920s in cancer cells and is associated with a heavy reliance on glucose uptake. Many cancer cells *in vitro* die in the absence of glucose as a fuel. This has led to the novel hypothesis that cancer might be treated *in vivo* by severe hypoglycemia. The obvious complicating factor in such a treatment would be the denial of essential fuel to normal tissues, particularly the brain. However, there is abundant evidence, particularly from the literature on exercise metabolism, that lactate can serve as a fuel for most tissues throughout the body, including the brain. Accordingly, lactate might serve as a protective or salvage fuel for normal tissues in the face of severe hypoglycemia that would injure or kill Warburg cancer cells. This symposium will provide a) a mechanistic background for the concept of lactate-protected hypoglycemia (“LPH”), b) a review as well as new data on the response of isolated cancer cells to hypoglycemia and hyperlactatemia, and c) early results on the challenges of creating hyperlactatemia and severe hypoglycemia in an *in vivo* system.

S5

S7

### **CARDIORESPIRATORY, NEUROENDOCRINE, AND IMMUNO-INFLAMMATORY ADAPTATIONS TO CONCURRENT MENTAL AND PHYSICAL STRESS**

E.O. Acevedo<sup>1</sup>, H.E. Webb<sup>2</sup>, and C.J. Huang<sup>3</sup>. (1) *Virginia Commonwealth University, Richmond, VA*, (2) *Mississippi State University, Starkville, MS*, (3) *Florida Atlantic University, Boca Raton, FL*.

Acute physical and psychological stressors, individually, alter physiological homeostasis, and chronic psychological stress is considered a determinant of cardiovascular diseases including hypertension, stroke, and atherosclerosis (Dimsdale, 2008; Olinski et al., 2002). Military personnel, law enforcement officers, firefighters, and rescue workers are often subjected to combinations of physical and psychological stress (i.e., physical dangers, mental stress, physiological exertion) in the course of participating in occupational challenges (Beaton, Murphy, Johnson, Pike, & Corneil, 1998; Corneil, Beaton, Murphy, Johnson, & Pike, 1999). These professions have also demonstrated an increased rate of ischemic heart disease compared to other population cohorts. In particular, firefighting is an occupation that includes concurrent mental and physical challenges, and interestingly, a number of studies have shown that firefighters have increased rates of ischemic heart disease compared to other population cohorts (Baris et al., 2001; Hessl, 2001; Sepkowitz and Eisenberg, 2005). This seminar will address the impact of combined stress, physical and mental, on three systems clearly implicated as important in the development of cardiovascular disease. Studies that have addressed cardiorespiratory, neuroendocrine, and immuno-inflammatory adaptations to dual challenge conditions will be presented and discussed. More importantly, plausible mechanisms that help to explain the relationship between exposure to dual stressors and health outcomes, including cardiovascular disease, will be presented. Finally, this symposium will demonstrate support for the benefit of ecologically valid investigations that address the relationship between occupational stress and health.

S6

S8

### **FROM ATHLETES TO OLDER ADULTS: DIETARY PROTEIN AND EXERCISE INTERACT FOR OPTIMAL PHYSICAL PERFORMANCE**

Michael J. Saunders, FACSM, James Madison University, Harrisonburg, VA, Ellen M. Evans, FACSM, *University of Georgia, Athens, GA*

The “optimal” dietary protein intake for physical performance has been a topic of extensive examination in recent years. Physical performance can be measured in both athletic endeavors and public health domains. Strength athletes have long-appreciated the importance of protein ingestion for performance, due to its’ critical role in muscle protein balance. Endurance athletes may also benefit from protein ingestion during and following heavy exercise, as recent studies have reported improved endurance performance and indices of post-exercise recovery with carbohydrate+protein co-ingestion, although this paradigm is still under debate. From a public health perspective, the important role of dietary protein for the preservation of muscle mass to maintain strength and physical function in older adults is well documented. What is less appreciated is the role that dietary protein may play in the maintenance of bone mass. Moreover, dietary protein may be an important factor during weight loss to enhance fat mass loss while simultaneously preserving lean and bone mass, the latter being critical in older individuals at higher risk for physical disability. Limited evidence also suggests that dietary protein and exercise interact in their effects on body composition constituents under weight loss conditions. The purpose of this symposium is to discuss recent literature regarding the effects of protein intake on the aforementioned aspects of health and human performance, and is targeted to students, professionals and practitioners with an interest in these topics.

### **EXERCISE-INDUCED OXIDATIVE STRESS: CAUSE AND CONSEQUENCES**

Scott K. Powers, Erin E. Talbert, Mathew B Hudson. *University of Florida, Gainesville, FL 32611*

This symposium will provide state-of-the-art research information on important topics related to exercise-induced oxidative stress. Specifically, this session will begin with a critical overview of the evolving definition of oxidative stress and provide the latest information regarding the cellular sources of radical production during exercise. Additionally, the controversial role that radicals play as both signaling and damaging molecules in cells will be discussed. Finally, this program will highlight the recent advances in antioxidant research relative to the advisability of antioxidant supplementation for active individuals engaged in an exercise training program.

### REGULATION OF SKELETAL MUSCLE ATROPHY

S.M. Senf, A.J. Smuder, W.B. Nelson and A.R. Judge. *Department of Applied Physiology & Kinesiology and Department of Physical Therapy, University of Florida, Gainesville, FL 32611*

S9

Skeletal muscle atrophy and weakness are a consequence of muscle disuse as well as various diseases, including cancer, sepsis, heart failure and AIDS. The atrophy is a result of decreased protein synthesis and increased protein degradation, the latter of which appears to involve a variety of proteolytic systems, including calpains, caspase-3, and the ATP-dependent ubiquitin proteasome pathway. However, our understanding of the signaling pathways involved in the regulation of these pathways is just beginning to be defined and understood. The focus of this symposium will be on the central role of the redox sensitive transcription factor family nuclear factor kappaB (NF-kappaB) and its regulation of skeletal muscle wasting. NF-kappaB activity is increased in multiple models of skeletal muscle wasting and data will be presented to show that inhibition of NF-kappaB activation during skeletal muscle disuse significantly attenuates the increase in calpain activity, caspase-3 activation, and key components of the ubiquitin proteasome pathway. Moreover, we will show that inhibition of NF-kappaB activity, using either genetic or pharmacological tools, inhibits disuse muscle atrophy and weakness. We will further demonstrate that specific inhibition of calpain prevents caspase-3 activation and that specific inhibition of caspase-3 prevents calpain activation, during muscle disuse. These findings demonstrate a regulatory crosstalk exists between calpain and caspase-3 during muscle disuse.



### ASSESSING OXYGEN DELIVERY AND MITOCHONDRIAL FUNCTION

Kevin K. McCully FASCM<sup>1</sup>, Terence E. Ryan<sup>1</sup>, L. Bruce Gladden FASCM<sup>2</sup>, and James R. McDonald<sup>2</sup>; (1) *Department of Kinesiology, University of Georgia, Athens, GA 30602*, (2) *Department of Kinesiology, Auburn University, Auburn, AL 36849*

S10

Oxidative metabolism is important in everyday activities and overall health. However, with disease, inactivity, and aging; oxidative function often becomes impaired, most often due to a combination of cardiovascular (O<sup>2</sup> delivery) and mitochondrial (O<sup>2</sup> utilization) dysfunction. This symposium will present two approaches to develop data for a multiscale model O<sup>2</sup> delivery and O<sup>2</sup> utilization in health and disease. The first approach uses a highly controlled model of isolated, perfused oxidative skeletal muscle can be inhibited to mimic aspects of human disease. The second approach will focus on measurements of O<sup>2</sup> delivery and O<sup>2</sup> utilization in human disease. This symposium will present a) an introduction to measurements of O<sup>2</sup> on-kinetics and their relationship to mitochondrial function and O<sup>2</sup> delivery, b) recent results from isolated, perfused oxidative skeletal muscle in which NIRS is combined with O<sup>2</sup> on-kinetics, c) a critical overview of in vivo assessments of blood flow and mitochondrial function using Doppler ultrasound and 31P MRS, and d) recent results using these methods on people with spinal cord injuries. The goal of the symposium is to provide an overview of these oxidative and mitochondrial assessments, and to encourage future research in this area.



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### VALIDITY OF BIOELECTRICAL IMPEDENCE ANALYSIS (BIA) FOR ESTIMATION OF TOTAL BODY WATER (TBW) IN SPINAL CORD INJURED (SCI) PERSONS

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01

The purposes of this study were to determine the validity of BIA as an estimate of TBW for use in a four compartment body composition model. Methods: 34 (26 males, 8 females) motor complete SCI persons with level of injury (LOI) from C4-T11 took part in a series of body composition related tests. Mean (+ SD) age, height and weight were 42.6 (11.22) yr, 172.9 (8.6) cm and 88.9 (23.80) kg, respectively. Participants were measured for body fat % (%BF), fat mass (FM) and fat free mass (FFM) using a four compartment model based on underwater weighing, DXA (GE Lunar), and D2O to determine total body water (dTBW). TBW was estimated using BIA (QuadScan 4000, BodyStat, Ltd) at ~ 1500 hr (BIA PM) following at least 20 min of rest in a supine position, and again upon waking at ~0600 hr (BIA AM). All data were analyzed using Jump (v 8.0, SAS, Inc.) with a significance level 0.05. Results Mean (+ SE) %BF, FM, FFM, BIA PM, BIA AM, and dTBW were 34.6 (+ 8.10), 30.3 (14.38), 55.2 (11.08), 43.6 (1.48) L, 45.2 (1.76) L and 44.9 (1.72), respectively. Results of one-way ANOVA indicated that BIA PM was lower (p=0.0020) than BIA AM. When compared to actual dTBW, BIA AM (Corr=0.98, p=0.0001) was more closely related than BIA PM (Corr=0.59, p=0.002). Regression analysis indicated that the use of BIA AM alone accounted for ~96% of the variability in dTBW (p<0.0001), whereas BIA PM accounted for only ~35% of variation. Conclusions: BIA AM appears to be a valid estimate that closely matches dTBW than BIA PM. It is recommended that BIA AM be used for estimating TBW.

### A COMPARISON OF PREDICTED VS. ACTUAL RESTING METABOLIC RATE (RMR) IN SPINAL CORD INJURED (SCI) PERSONS

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02

Purpose: To determine differences in measured resting metabolic rate (RMR) of spinal cord injured (SCI) persons and their corresponding predicted RMR (pRMR) based on data from able-bodied individuals. Methods: 34 (26 males, 8 females) motor complete SCI persons C4-T11 level of injury (LOI) took part in body composition related tests. Mean (±SD) age, height, and weight were 42.6 (11.22) yr, 172.9 (8.6) cm and 88.9 (23.80) kg, respectively. Body fat % (%BF) was determined using a four compartment model via underwater weighing, DXA (GE Lunar), and D2O to determine total body water. RMR was estimated via indirect calorimetry (Cosmed k4b2) upon waking at ~0600 hr and (pRMR) calculated using the Harris-Benedict equation using Cosmed software (v 9.1b). All data were analyzed using Jump (SAS, Inc., v 8.0) with a significance level 0.05. Results: Mean (±SE) %BF, Fat Mass (kg), Fat Free Mass (kg), RMR (kcal/day), and pRMR (kcal/day) were 34.6 (8.10), 30.3 (14.38), 55.2 (11.08), 1601.6 (70.49) kcal, and 1800.8 (58.27) kcal, respectively. One-way ANOVA indicated that RMR for SCI persons was significantly lower (p=0.0004) than predicted for able-bodied persons. Based on LOI of ≤ T4 (+T4), it was noted that RMR for those >T4 (1827.8 + 123.11) was higher than individuals ≤ T4 (1507.4 + 79.47), ± (adj R<sup>2</sup> = 0.10), Gender (adj R<sup>2</sup> = 0.25), FM (adj R<sup>2</sup> = 0.11), and pRMR (adj R<sup>2</sup> = 0.31) were all related to RMR, however, pRMR plus LOI T4 were the best model (p=0.0008), accounting for 32.8% of the variability in RMR. Conclusions: RMR for SCI is lower than pRMR for able-bodied, and a combination of pRMR and LOI offers the best estimate for SCI RMR.

### COMPARISON OF THE EFFECTS OF 16 WEEKS ARM CRANK ERGOMETRY (ACE) AND FUNCTIONAL ELECTRICAL STIMULATION CYCLING (FESC) IN SPINAL CORD INJURED (SCI) PERSONS

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03

PURPOSE: The purpose of this study was to determine the impact of 16 weeks of FESC versus voluntary ACE on bone density, % body fat (%BF), and VO<sub>2</sub> peak in motor complete SCI persons. METHODS: 14 subjects were randomized into either ACE or FESC, with six (5 males, 1 female) motor complete T4-L2 SCI completing the training period to date. Mean (± SD) Age (47.8 ±10.67 yr), Height (167.5 ± 9.83 cm), and Weight (80.9 ± 9.94 kg) were similar between groups and were combined. Prior to and after training an ACE VO<sub>2</sub> Peak GXT (Parvo) and DXA (GE Lunar) were performed. Training consisted of 60 min/day, 5 days/week for 16 weeks of training on either a Monark 881 E ACE or ERGYS FES cycle ergometer. Heart rate was measured continuously (Polar RS 400) throughout each session and stored. Results were analyzed with Jump statistical software (v 8.0, SAS, Inc) and significance level set at 0.05; all data are expressed as mean (± SE). RESULTS: Initial T-score was -0.2 ± 1.05, while VO<sub>2</sub> Peak was 13.9 ± 2.75 ml.kg.min<sup>-1</sup>. Both groups showed comparable changes; overall weight and %BF decreased 2.7 (±1.48) kg and 1.3 (±0.59)%, respectively, while VO<sub>2</sub> Peak and T-Score increased 2.03 (±0.91) and 0.2 (±0.62), respectively. ACE training, however, provided consistently greater improvements (1.9 to 5.3 vs. -1.3 to 3.2 ml.kg.min<sup>-1</sup>) in cardiovascular fitness, as measured by an ACE GXT. CONCLUSIONS: ACE data show a greater HR response during training than FESC. While FESC training may provide limited cardiovascular stimulus, ACE testing likely overestimates improvements from ACE.

### INITIAL CONCUSSION PRESENTATION DOES NOT PREDICT TIME FOR RETURN TO PARTICIPATION OR INITIAL SYMPTOM REPORT

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04

Multiple grading scales utilize loss of consciousness (LOC) and post-traumatic amnesia (PTA) as core tenets of injury severity, however prospective data supporting this is limited. Therefore this study's purpose was to prospectively investigate the relationship between on-field LOC or PTA with initial self-reported symptoms and time to return to participation (RTP). The subjects were 30 intercollegiate student-athletes (16M, 19.7±1.5 years old, 1.76±0.2m, 77.6±27.2 kg, 0.9±1.3 previous concussions) who suffered a concussion (15.6% LOC and 31.3% PTA) and were evaluated on the scene by a certified athletic trainer. The mean RTP was 10.8±3.7 (range 2-20 days) and the mean symptom severity on the 22-item 0-6 graded symptom checklist was 34.6±29.9. Pearson correlation identified no relationships between RTP and LOC (r=0.199, P=.291) or PTA (r= -0.013, P=0.946). There was also no correlation between initial symptom severity and LOC (r=0.270, P=0.149) or PTA (r=0.098, P=0.608). Finally, concussion history did not correlate with RTP (r= 0.073, P=0.702), initial symptom severity (r= 0.010, P=0.960), or LOC (r=0.150, P=0.428), however there was a significant moderate correlation with presence of PTA (r=0.381, P=0.038). These findings suggest that the presence of LOC or PTA is not related to either RTP or the initial self-report symptom severity. This study supports previous findings that the initial presentation of LOC or PTA should not be used as a predictor of injury severity in grading scales and supports retrospective symptom-based grading.

### POOR VASCULAR HEALTH INCREASES LOAD ON THE HEART AND DECREASES EXERCISE CAPACITY

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Advancing age is associated increased vascular stiffness and decreased endothelial function, both considered major risk factors for cardiovascular disease, secondary to their influence on afterload. **PURPOSE:** To determine if vascular stiffness and reactivity are related to pulse pressure (PP), myocardial oxygen demand (Rate Pressure Product; RPP), and exercise capacity ( $VO_2$ peak). **METHODS:** Participants (n=51; Male= 17, Female=34; Age=75  $\pm$  5 yrs) performed a graded exercise test (GXT) for determination of  $VO_2$  peak, and max RPP. In addition, participants underwent vascular tests, to determine carotid-to-posterior tibial pulse wave velocity (PWV) and changes in brachial artery diameter before and after forearm occlusion and an ice bath (Brachial Artery Reactivity=BAR). **RESULTS:** Average HR, SBP and DBP before the GXT were 63  $\pm$  8 bpm, 126 $\pm$ 3 and 75 $\pm$ 7 mmHg. Peak  $VO_2$ , HR, SBP and DBP at peak exercise were 16.38 $\pm$ 3.6 ml/kg/min, 137 $\pm$ 17 bpm, 197 $\pm$ 21, and 83 $\pm$ 14 mmHg. Peak RPP was 26883 $\pm$ 4675AU. PWV was 8.03 $\pm$ 1.6 m/sec. Baseline, peak and minimal brachial diameters were 3.35 $\pm$ 0.7, 3.56 $\pm$ 0.7 and 3.21 $\pm$ 0.6 mm, with a BAR of 9.1 $\pm$ 4.2 %. BAR and PWV were related ( $r=-0.39$ ;  $p=0.016$ ). Linear regression indicated PWV, BAR and peak Pulse Pressure accounted for 34% of the model to predict RPP ( $p=0.001$ ). A MANCOVA indicated those in the highest tertile of vascular health (PWV < 9.50 m/s; and BAR > 9.5%) had a lower peak PP and higher peak  $VO_2$  ( $p < 0.05$ ). **CONCLUSION:** Increased vascular stiffness and a decrease in reactivity are associated with a higher peak pulse pressure, RPP and lower  $VO_2$ Peak.

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### THE SESSION RPE RESPONSE TO SELF-SELECTED AND IMPOSED EXERCISE INTENSITIES

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Session Rating of Perceived Exertion (RPE) is used to quantify the global perceptual response to an entire exercise bout. The primary purpose of this investigation was to compare the Session RPE response to self-selected (SS) and imposed (IMP) exercise of the same intensity in college-aged males. 16 recreationally active subjects [mean  $\pm$  SD: age, 22.6  $\pm$  2.2 yr; peak oxygen uptake, 3.34  $\pm$  0.53 l/min] participated in this investigation. Subjects performed a 20-min, SS exercise trial on a cycle ergometer. Subjects were allowed to adjust the intensity at the 5, 10, and 15-min time points. One week later, subjects performed the IMP exercise trial. Subjects were unaware that the IMP intensity was the same as their previous self-selected intensity. The intensity was automatically adjusted and subjects were told it was "selected by the investigators" During both the SS and IMP trials, Acute RPE were measured for the overall body (undifferentiated) every 5 min using the Adult OMNI-Cycle (0-10) RPE Scale. 15 min following a 5-min cool-down period, subjects were asked to rate Session RPE for the overall body. For both the SS and IMP trials, Session RPE was significantly greater than Acute RPE (5.0 vs. 4.4 and 4.6 vs. 4.1, respectively,  $p < 0.05$ ). In addition, while Acute RPE was similar between trials, Session RPE was significantly greater for the SS trial compared to the IMP trial ( $p < 0.05$ ). These results indicate there is a mismatch between Session RPE and Acute RPE during cycle ergometer exercise in young, recreationally active males.

### THE ROLE OF EXECUTIVE FUNCTION IN 400 METER WALK PERFORMANCE: THE SENIOR'S HEALTH & ACTIVITY RESEARCH PROGRAM - PILOT (SHARP-P)

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In a 2 x 2 factorial design, 73 older adults were randomized into one of four treatment groups: physical activity (PA), cognitive training (CT), combined (PACT), or healthy aging education (HAE). All groups met for 4 months. Participants in the PA condition performed center-based walking and flexibility training 2 days/week as well as home-based PA. The CT group performed repetition lag training 2 days/week for the first 2 months and 1 day/week for months 3 and 4. The PACT group completed both physical activity and cognitive training interventions. The HAE group involved healthy aging lectures and met 1 day/week for the duration of the trial. GS was calculated from performance of the 400 m walk test. Executive Function (EF) was operationalized as a composite measure of 5 measures of EF (Trail Making task, Erikson Flanker Task, task switching, N-back, and self-ordered pointing test) and four measures of episodic memory (Hopkins Verbal Learning Test-immediate and delayed; Logical Memory parts I and II). A main effects analysis revealed that participants receiving PA experienced significant improvements in GS (0.059m/s). Multiple regression analyses indicated that PA and changes in executive functioning accounted for 11.5 % of the variance in change in Gait Speed (GS; Adj.R<sup>2</sup>=.12;  $p < .05$ ). Change working memory ( $\beta = 0.2812$ ,  $p < 0.05$ ) was the only variable to account for unique variance in change in GS. This is the first study to document a significant relationship between training induced changes in EF and changes in GS.

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### PHYSICAL ACTIVITY IN YOUNG CHILDREN DURING THE SCHOOL DAY

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Recommendations for physical activity (PA) suggest young children should accumulate 60 minutes of moderate-to-vigorous physical activity (MVPA) per day. Recent studies show that most young children do not achieve this amount of PA during the school hours. **PURPOSE:** To assess amount of time spent in MVPA, percentage of children meeting MVPA recommendations, and step counts during school hours. **METHODS:** Subjects were 52 children (4.8  $\pm$  0.8 yrs), enrolled in three preschools and one kindergarten. PA was assessed using an accelerometer (Actigraph GT3X) with epochs set at 15 s. The accelerometer was used to assess time spent in MVPA during the normal school day (8:00am - 3:00pm) using cut points developed by Pate et al. (2006) and daily steps counts. Independent sample t-tests were used to determine whether sex differences existed for MVPA and step counts. **RESULTS:** The study showed that 26.9% of children met the recommended 60 minutes of MVPA per day during school hours. Average time spent in MVPA was 50.4  $\pm$  20.6 minutes per school day, and average steps were 4338.0  $\pm$  2.0 steps per school day. No significant differences were found between boys and girls. **CONCLUSIONS:** The overall average time spent in MVPA during the school day indicates that it may be possible for young children to achieve recommended levels of MVPA during the school day. However, parents should also encourage PA outside of school in order to ensure meeting the recommendations for daily MVPA.

### **AEROBIC FITNESS AND BARORECEPTOR SENSITIVITY IN HEALTHY ADOLESCENTS**

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09

In adults, reduced baroreceptor sensitivity (BRS) and lower aerobic fitness are both associated with increased risk for developing hypertension. To date no studies have looked at the association between fitness and BRS in adolescence. The purpose of this study was to examine this association in healthy adolescents. Forty-one healthy subjects (23 males, 18 females), 14 years of age, volunteered to participate. Spontaneous BRS was measured for 10 minutes in the supine position using a Continuous Non-Invasive Arterial Pressure Monitor (CNAP) and a 3-lead ECG. NeuroCard Software was used to determine BRS in the time and frequency domains. Aerobic fitness was obtained via maximal exercise testing, and peak oxygen uptake ( $\text{VO}_2$  max) was determined from expired gases. Spearman correlational analysis was used to examine the association between aerobic fitness and BRS measures. Mean  $\text{VO}_2$  max was  $42.8 \pm 10.9$  mL/kg.min<sup>-1</sup>. Mean BRS was  $33.0 \pm 14.8$  ms/mm Hg<sup>-1</sup> for time domain and  $42.6 \pm 24.6$  ms/mm Hg<sup>-1</sup> for high frequency band. Correlational analysis revealed that fitness was inversely correlated with BRS in both the time and frequency domains ( $r = -.283$ ,  $p = .094$  and  $r = -.293$ ,  $p = .067$ , respectively), reaching statistical significance in males only. These results do not support beneficial effects of fitness on BRS. Further analysis of this association with adjustment for potential confounders is warranted.

### **THE EFFECTS OF AEROBIC EXERCISE TIMING ON NOCTURNAL BLOOD PRESSURE DIPPING IN PRE-HYPERTENSIVE INDIVIDUALS**

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010

During the typical nocturnal sleep cycle, BP will “dip” or decrease when compared to diurnal pressure reducing stress on the cardiac system. Compared with a reference group of normotensive dippers, hypertensive non-dippers may experience a much higher relative risk of cardiovascular mortality than normotensive non-dippers and hypertensive dippers. Post exercise hypotension may augment the dipping response, however, exercise timing on sleep pressures has never been elucidated. Therefore, the purpose of this study was to examine how exercise timing affects circadian blood pressure and specifically nocturnal blood pressure. **METHODS:** Three pre-hypertensive subjects, 2 male and 1 female, (mean age  $43 \pm 4$  years) with no self-reported cardiac disorders participated in this study. Following a graded exercise test during visit 1, subjects reported for 3 exercise times at 7am, 1pm, and 7pm in random order to perform a 30 min treadmill protocol at 65% of their  $\text{VO}_2$ max. An Oscar 2™ ambulatory blood pressure cuff was used to monitor blood pressure responses for the 24 hrs immediately following exercise. **RESULTS:** Aerobic exercise at 7 am invoked the greatest dip in nocturnal pressure (SBP: -21.1% drop at 7am vs. +8.0% increase at 1pm vs. -16.7% drop at 7pm, DBP: -24.1% drop at 7am vs. +2.5% increase at 1pm vs. -18.9% drop at 7pm) than exercise in the afternoon or evening time slots. **CONCLUSION:** Exercising in the morning may be the most beneficial epoch of time for greater nocturnal blood pressure dipping.

### **THE EFFECTS OF 4- AND 8-WEEKS OF SUPERVISED EXERCISE TRAINING ON METABOLIC AND CARDIOVASCULAR FUNCTION IN OVERWEIGHT ADOLESCENT CHILDREN**

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011

The cardiovascular and arterial effects exercise training are well known in adults but not in children. Therefore the purpose of this study was to evaluate the cardiovascular effects of supervised vs. unsupervised summer break activity in adolescent children. **METHODS:** 22 overweight subjects (body fat  $27.4 \pm 8.4\%$ , mean age  $10.1 \pm 1.3$  years) were divided into 4 (4w,  $n=6$ ) and 8 week (8w,  $n=6$ ) activity groups and unsupervised summer break controls (C,  $n=10$ ). The 4w and 8w groups performed supervised play-based activity 5 days per week for 6 hours per day, the control group was asked to maintain a normal summer break. Pulse wave velocity (PWV), augmentation index (AIx), and blood pressure were evaluated pre and post. **RESULTS:** The 8w cohort significantly decreased mean arterial pressure (MAP,  $81 \pm 5.2$  to  $74 \pm 5.7$  mmHg) and both supervised groups significantly decreased AIx ( $20.3 \pm 6.4\%$  to  $16.4 \pm 5.5\%$ ,  $22.4 \pm 5.4\%$  to  $16.7 \pm 6.2\%$  for 4w and 8w respectively). **CONCLUSION:** Adolescent children can decrease arterial stiffness and MAP with play-based activity which may afford them greater cardiovascular protection than their sedentary counterparts.

### **ASSOCIATION BETWEEN VASCULAR STIFFNESS AND REACTIVITY: INFLUENCE ON PHYSICAL FUNCTION IN THE ELDERLY**

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012

Advancing age is associated with changes in structure and function of arteries including increased stiffness and decreased reactivity, which may contribute to a decline in physical function. **PURPOSE:** To examine associations between measures of vascular stiffness (Pulse Wave Velocity (PWV)), reactivity (Brachial Artery Reactivity (BAR)) and physical function (Senior Fitness Test Score (SFT)). **METHODS:** Individuals ( $n=53$ ; Male=18, Female=35; Age= $75 \pm 5$  yrs) were selected from the local community. To assess vascular stiffness, a carotid-to-posterior tibial artery PWV was performed using tonometry. BAR was defined as the change in artery diameter in response to forearm occlusion (FMD) and a cold pressor test (CPT), using ultrasonography. To assess physical function the Senior Fitness Test was used. **RESULTS:** Average central pulse pressures and PWV were  $50.8 \pm 12.7$  mmHg and  $8.03 \pm 1.6$  m/sec. Resting brachial diameters, peak (FMD) and nadir (CPT) were  $3.35 \pm 0.7$ ,  $3.56 \pm 0.7$  and  $3.21 \pm 0.6$  mm, with a BAR of  $9.1 \pm 4.2\%$ . Average ranking for the SFT was  $34.3 \pm 13.2\%$ . Pearson correlations indicate an inverse relationship ( $r = -0.39$ ;  $p = 0.015$ ) between PWV and BAR. BAR was ( $r = 0.44$ ;  $p = 0.005$ ) related to SFT. A MANCOVA revealed those individuals with the highest SFT scores had a lower PWV ( $p = 0.045$ ) and greater BAR ( $p = 0.05$ ). **CONCLUSION:** These data indicate a relationship between vascular stiffness and reactivity, as well as physical function. Individuals with higher physical function scores had lower vascular stiffness and greater vasoreactivity.

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**EFFECT OF WHOLE-BODY VIBRATION AS ACUTE RECOVERY METHOD ON SPRINT PERFORMANCE AFTER FATIGUING EXERCISE.**

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**013** The purpose of the study was to compare three types of recovery methods: no vibration, Whole Body Vibration (WBV), or WBV+ local muscle cooling (WBVC) on actual and perceived recovery and sprint performance. Eight physically active females, aged  $24 \pm 3$  yr volunteered to participate in the study. Participants in a repeated-measures design completed a Yo-Yo intermittent test to volitional fatigue and 5 x 20-m sprints to invoke fatigue, then a recovery method followed by 5 x 20- m sprints to assess performance post-recovery. Rating of perceived exertion (RPE), heart rate (HR) and lower-leg volume were measured after fatiguing exercise, after 10 minute recovery treatment, and after sprints. No significant mean difference ( $p = 0.59$ ) was found among no vibration, WBV, or WBVC regarding average final 20-meter sprint times ( $3.83 \pm 0.21$ ,  $3.80 \pm 0.16$ , and  $3.81 \pm 0.16$  s, respectively) or 10-meter split times ( $2.21 \pm 0.13$ ,  $2.18 \pm 0.12$ , and  $2.18 \pm 0.11$  s, respectively). In addition, no significant difference was observed in perceived recovery ( $p = 0.15$ ) following recovery treatment; lower-leg volume comparing pre and post recovery treatment no vibration; WBV and WBVC ( $p = 0.25$ ,  $p = 0.10$  and  $p = 0.23$ , respectively) or HR ( $p = 0.28$ ) and RPE ( $p = 0.79$ ) following post-recovery 5 x 20-meter sprints. However, individual data indicated that 38 % ( $N = 3$ ) of the participants performed their fastest with WBV and 25 % ( $N = 2$ ) with WBVC compared to 38 % ( $N = 3$ ) with no vibration. In conclusion, some athletes may perform better after WBV or WBVC compared to traditional recovery method.

**EFFECT OF WHOLE-BODY VIBRATION AS RECOVERY METHOD AFTER FATIGUING SQUAT EXERCISE.**

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**014** The purpose of the study was to compare three types of recovery methods: no vibration, Whole Body Vibration (WBV) and WBV+ local muscle cooling (WBVC) on lower-body performance, perceived recovery, and muscle soreness. Seven physically active males, aged  $28 \pm 3$  yr volunteered to participate in the study. Participants completed three sets of squats to fatigue, each recovery treatment and two Wingate Anaerobic Tests in a repeated-measures design. Lower leg volume, rating of perceived exertion (RPE), and heart rate (HR) were measured after fatiguing exercise, 10 minute recovery treatment, and maximal performance test. Wingate 1: No significant mean difference ( $p = 0.13$ ) was found among no vibration, WBV, or WBVC regarding peak power ( $1115 \pm 253$ ,  $1118 \pm 240$ , and  $1179 \pm 263$  W, respectively), mean power ( $p = 0.48$ ), or fatigue index ( $p = 0.32$ ). Wingate 2: No significant ( $p = 0.24$ ) mean difference was found among no vibration, WBV, or WBVC regarding peak power ( $1072 \pm 237$ ,  $1097 \pm 246$ , and  $1140 \pm 274$  W, respectively), mean power ( $p = 0.38$ ), or fatigue index ( $p = 0.28$ ). Individual data indicated that 71 % ( $N = 5$ ) of the participants performed their best with WBVC and 29 % ( $N = 2$ ) with no vibration. In addition, a significantly improved ( $p = 0.03$ ) perceived recovery was observed in after WBV ( $6 \pm 1$ ) and WBVC ( $6 \pm 1$ ) compared to no vibration ( $4 \pm 1$ ). Lower leg volume comparing pre- and post- recovery treatment was significantly higher after WBV ( $p < 0.001$ ) and WBVC ( $p = 0.03$ ) but not after no vibration ( $p = 0.34$ ). The findings support psychological and possible performance enhancing benefits after the use of WBV and WBVC as a recovery method in some athletes.

**INFLUENCE OF XPAND NITRIC OXIDE REACTOR, L-ARGININE  $\alpha$ -KETOGLUTARATE, AND CAFFEINE SUPPLEMENTATION ON RE-OXYGENATION OF THE CALF MUSCLE WITH RESISTANCE EXERCISE**

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**015** Xpand Nitric Oxide reactor is proposed to increase blood flow to skeletal muscles due to the effect of arginine to increase nitric oxide and vasodilation, but previous research has shown that caffeine and creatine cause vasoconstriction which would increase muscle re-oxygenation time. The purpose of this study was to examine the influence of Xpand Nitric Oxide Reactor, L-arginine  $\alpha$ -ketoglutarate and caffeine supplementation on re-oxygenation after exercise. Nine recreationally active men ( $21 \pm 1.1$ yr) performed 3 sets of 20 repetitions of seated single-leg calf raise at 60% 1-RM with 3min rests. The same calf raise exercise was performed with each supplement: L-arginine  $\alpha$  ketoglutarate (Arginine), jet alert caffeine (Caffeine), Xpand Nitric Oxide Reactor (Xpand), and placebo. Soleus muscle re-oxygenation time was measured immediately post exercise using near infra-red spectroscopy. There were no significant differences in muscle re-oxygenation half-times among Xpand ( $0.43 \pm 0.15$  mins), Arginine ( $0.34 \pm 0.12$  mins), Caffeine ( $0.45 \pm 0.28$  mins), and placebo ( $0.35 \pm 0.19$ mins). Therefore, our findings support our hypothesis that Xpand does not improve muscle re-oxygenation during exercise.

**THE RELATIONSHIP BETWEEN GREENWAY ACTIVE TRANSIT ACCESSIBILITY WITH GREENWAY-RELATED PHYSICAL ACTIVITY**

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**016** Greenways (GW) are often accessed from home or work using various modes of active transit (AT) (i.e., walk, run, bike). However, design characteristics or siting of GWs may create AT-related barriers to accessing GW (e.g. high traffic volume, fences, limited access points, loop design). PURPOSE: Examine relationship between GWs with low and high potential for AT-related access with GW-related physical activity (PA). METHODS: A trail intercept survey was administered to 211 adults (September 2010) on two GWs, one with high and one with low potential for accessing GW through AT (Knoxville, TN). Survey measured self-reported GW PA over past week, AT mode used to access GW, and demographics. PA (MET-mins/wk) was the dependent measure and AT accessibility the primary independent variable (high-AT vs. low-AT). Non-parametric tests were used to detect significant differences. RESULTS: Users ( $N=80$ ) of high-AT GW, compared to users of low-AT GW ( $N=131$ ), were more likely younger, male, and never married. Among those who drove to access GW (61.3% of high-AT and 97.7% of low-AT), low-AT GW users had a shorter drive time to GW ( $8.5 \pm 5.4$  vs.  $12.7 \pm 9.7$ min.), ( $p = .045$ ). High-AT GW users were also more likely to engage in vigorous PA (23.8% vs. 13.7% running,  $p = .000$ ) while using GW less frequently ( $2.6 \pm 1.9$  vs.  $3.6 \pm 2.0$  days/wk,  $p = .004$ ). There were no significant differences in PA MET-mins or proportion of users meeting PA guidelines between users of GWs. CONCLUSION: Greenways with high and low potential for AT access have significantly different profiles of users. However, regardless of GW AT potential, these differing users accumulated similar levels of GW-related PA. GW planners and designers, in considering AT access characteristics of the GW, can anticipate unique types of users.

### EPIDEMIOLOGY OF SKIN CANCER RISK FACTORS IN COLLEGE AGE STUDENTS

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**O17** A cross sectional analysis comparing knowledge, attitudes, and behaviors of college age students (N=280) for skin cancer risk factors was conducted by comparing data sets from a decade ago to the present (2000 to 2010). Risk reduction patterns included more students practicing protective behaviors than ten years ago, such as more use of sunscreen and less total sunburns in a lifetime ( $p < .10$ ), though more than 66% of students reported total sunburns that would elevate risk for melanoma in both groups. In addition, students reported using lower SPF values for sunscreen than recommend by major medical societies ( $p < .10$ ). Male students showed greater risk patterns for more total sun exposure, sunburns, and lack of sunscreen use ( $p < .10$ ). Female students showed greater risk patterns for more frequent use of tanning beds ( $p < .05$ ) but demonstrated greater knowledge of skin cancer identification methods ( $p < .05$ ). Over 80% of students had never had preventive medical screenings for skin cancer, and 3% of students reported having been diagnosed with skin cancers. More prevention and educational efforts are needed to help reduce the risk for skin cancers, given that the majority of students still exhibit behavior patterns that place them at high risk for skin cancer development.

### ENERGY COSTS OF PHYSICAL ACTIVITIES FOR WHEELCHAIR USERS: A SYSTEMATIC REVIEW

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**O18** Several physical activity compendiums have been developed for able-bodied adults. However, these compendiums have tended to omit the energy costs of wheelchair activities. **PURPOSE:** Utilizing a systematic review of the literature, this investigation sought to review the published energy costs of activities performed by wheelchair users for the development of a compendium of wheelchair-related physical activities. **METHODS:** PubMed, SportDiscus, and ProQuest databases were searched using the key words: wheelchair, disability, energy expenditure, physical activity, and  $VO_2$ . A total of 266 studies were identified by the initial search terms. Inclusion criteria were studies utilizing individuals who routinely use a manual wheelchair, indirect calorimetry as the criterion measurement, energy expenditure expressed as METs or  $VO_2$ , and physical activities typical of wheelchair users (such as vacuuming, table tennis, wheeling on tile floor, arm ergometer exercise, etc.) . Studies that allowed less than three minutes to attain a metabolic steady-state were excluded. **RESULTS:** Eleven studies met the inclusion criteria. These studies included a total of 365 individuals with a majority of the participants having a spinal cord injury at levels of C5 or below. A total of 63 different wheelchair activities were identified with energy expenditure values ranging from 0.8 (rest) to 12.5 (handcycling at a maximal effort) kcal/kg·hr<sup>-1</sup>. **CONCLUSION:** The energy requirements for various activities of wheelchair users often differ between wheelchair users and able-bodied adults. This review compiled and summarized a compendium of physical activities for wheelchair users into a single source.

### PERCEIVED NEIGHBORHOOD CHARACTERISTICS ARE ASSOCIATED WITH PHYSICAL ACTIVITY AND WEIGHT STATUS AMONG RURAL AND URBAN YOUTH

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**O19** Physical inactivity and obesity exist at higher levels in rural communities compared to urban communities. We examined associations between moderate/vigorous physical activity (MVPA), overweight/obesity, and perceived neighborhood features in rural and urban middle school youth (N = 441). Participants completed the Physical Activity Questionnaire for Older Children (PAQC) and a validated environment questionnaire. Participants' heights and weights were measured. Of the 441 youth, 73 were excluded due to reported illness in the previous week. The final sample included 368 students: 52% female, 48% white, median age 12 yrs. Approximately 46% of participants were overweight or obese (26%). After adjusting for age, race, sex, and BMI (for MVPA), we found significantly ( $p < 0.05$ ) higher MVPA among youth who indicated well lit neighborhood streets or adequate bicycle/walking trails; participants reporting a "lot" of neighborhood crime displayed significantly higher BMI. Hierarchical clustering of responses on the PAQC revealed a subset of 60 youth with very low activity levels who were less likely to report that it was safe to walk or jog, that walkers or others playing were easily seen, the presence of walkable destinations, or the presence of home exercise equipment. Compared to the remainder of the sample (n=308), the clustered participants had significantly greater odds of being obese and were more likely to be rural. In conclusion, aspects of the perceived community environment were associated with lower levels of MVPA, higher BMI, and increased odds of being obese.

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### COLLEGIATE PHYSICAL ACTIVITY CLASS SATISFACTION WITH LIFETIME INTENT TO PARTICIPATE IN THE ACTIVITY

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**O20** One goal of Physical Education Activity Programs (PEAP) is to promote lifelong fitness habits. Thus, the purpose of this study was to examine the relationship of PEAP class satisfaction with the lifetime intent to continue participating in the class-specific physical activity (PA). Continued participation in specific PA can be linked to satisfaction originating from past PA experiences. **METHODS:** Enrollees (N=1586) in PEAP classes (N=57) at the University of Tennessee were asked to complete a questionnaire at the end of the class term. This study measured satisfaction with PEAP classes using a 9-dimension PA Class Satisfaction Questionnaire developed by Cunningham (2007). Respondents were asked to rate their intent to continue the activity throughout their lifetime (1=strongly disagree to 8=strongly agree). Correlations and multiple regression were used to detect associations between satisfaction and intent. **FINDINGS:** All nine satisfaction dimensions were significantly correlated with lifetime-PA intent ranging with a low of 0.326,  $p < 0.000$ , (Normative Success) to a high of 0.421,  $P < 0.000$ , (Diversiary Experiences). However, only two satisfaction dimensions were significantly associated with lifetime-intent after controlling for age, gender, ethnicity, and class standing in multiple regression [F(6,573)=26.97;  $p < 0.000$ ; Adjusted R<sup>2</sup>=.212] Relaxation (beta=.248) and Fun and Enjoyment (beta=.210). **DISCUSSION:** Relaxation, fun and enjoyment are clear indicators of intent for lifelong participation. Program administrators and instructors should solicit feedback from students to ensure these constructs are aspects of the class.

#### RELATIONSHIP BETWEEN “COGNITIVE” SYMPTOMS AND NEUROPSYCHOLOGICAL TEST PERFORMANCE IN COLLEGE ATHLETES

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The suggested concussion management protocol is comprised of self-report symptoms, neuropsychological and balance measures. Several studies have addressed the relationship between computerized neuropsychological (CNP) test and self-reported symptoms related to concussion. These symptoms have been categorized into cognitive, neurobehavioral, and somatic constructs. The purpose of this study was to examine such relationships between SRS measuring cognition using the Head Injury Scale-revised (HIS-r) and CNP scores. Forty-six collegiate athletes underwent a post-concussion assessment at 24 hours after injury. Instruments utilized were the HIS-r and the CNP test using ImPACT. The HIS-r measured 22 symptoms related to concussion and are measured on both duration and severity on a 6-point Likert scale. Cognitive symptom duration was statistically significantly correlated with visual memory ( $r(44) = -.340, P < .05$ ) as well as with reaction time ( $r(44) = .346, P < .05$ ) and the cognitive construct. Cognitive symptom severity was statistically significantly correlated with verbal memory ( $r(44) = -.342, P < .05$ ), visual memory ( $r(44) = -.323, P < .05$ ), visual motor speed ( $r(44) = -.316, P < .05$ ) and reaction time ( $r(44) = .368, P < .05$ ) and the cognitive construct. We found that the composite score representing the cognitive construct of SRS share a moderate correlation to each of the ImPACT composite scores. However, a lack of strong correlation indicates independence across these measures, which provides continued support for employing a multifaceted concussion assessment protocol for making return-to-play decisions.

O21

#### POWERTRIP: STRENGTH AND POWER TRAINING TO IMPROVE THE ABILITY TO RECOVER FROM A FORWARD LEANING POSITION?

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Age related sarcopenia contributes to the etiology of falls in older adults. Improving muscle strength and power may mitigate the effects of sarcopenia and improve one's ability to recover from a fall. Previous studies have used a forward leaning task to simulate the biomechanical requirements of a fall and quantify maximum recoverable lean angle (lean max). 23 older adults (age 65-79 yrs) were recruited to participate in a 6 week lower extremity resistance training intervention (3 times per week=18 sessions) and randomized to strength or power training. Measurements of lean max, strength and power in leg extension and leg press were recorded at baseline and following training. A total of 15 participants completed the intervention (power=8, strength=7). Muscle strength and power improved in both groups and there were trends towards greater improvements in power in the power training group. The strength group showed non-significant trends towards a greater improvement in lean max following training compared to the power group (+4.73 degrees vs.+ 0.09 degrees;  $p=0.154$ ,  $p=0.154$ ). These results suggest that a standard strength training program may be sufficient to improve recovery from a forward leaning position.

O22

#### EFFECT OF AN ACUTE BOUT OF INTENSE PHYSICAL EXERTION ON SHOOTING ACCURACY IN POLICE OFFICERS: CURRENT & RECRUITS

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The effect of an acute bout of intense physical exertion (PE) upon shooting accuracy in police officers is unknown. The purposes of this study were to a) determine the effects of PE on heart rate and firing accuracy in Police Officers (PO) and Police Officer Recruits (POR), and b) to determine if PO responds differently than POR to PE. PO (n=5) and POR (n=11) were randomly assigned to a counterbalanced order of a Static Shooting Protocol (SSP) or an Active Shooting Protocol (ASP). A line-of-duty PE simulation was implemented within the ASP. Each subject used a 9mm pistol to fire eight shots within two minutes (1 shot, every 15sec) at eight separate archery targets while standing at a distance of 40 feet. Statistical significance was set at an alpha level of  $p < 0.05$ . Heart rate significantly increased from SSP to ASP in both PO ( $89.4 \pm 22.9$  vs.  $140.4 \pm 16.5$  b/min) and POR ( $112.2 \pm 19.3$  vs.  $159.1 \pm 8.3$  b/min). A significant decrease was found in PO initial firing accuracy (SSP =  $7.4 \pm 3.2$  vs. ASP =  $3.2 \pm 2.6$ ) between conditions, but not for POR initial firing accuracy (SSP =  $5.4 \pm 3.2$  vs. ASP =  $4.9 \pm 2.8$ ). Results indicate that although more accurate during the SSP, PO firing accuracy decreases immediately following PE, the same is not true for POR. PE appears to have a greater effect on the firing accuracy of professionals as opposed to professionals in training.

O23

#### RELATIONSHIPS BETWEEN MEASURES OF JUMP PERFORMANCE AND STRENGTH FOLLOWING THREE DIFFERENT METHODS OF RESISTANCE TRAINING

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Complex training is commonly utilized in an attempt to facilitate peak power production and Rate of Force Development (RFD) via Post Activation Potentiation (PAP). This research compared the effects of six weeks of; resistance (RT), plyometric (PT), and complex training (CT) upon the relationship between peak ground reaction forces (pGRF), jump performance, and strength. Thirty-four recreationally trained college aged males ( $21.44 \pm 3.32$  years) were trained using 1 of 3 methods; resistance (RT; n = 13;  $180.14 \pm 4.75$  cm;  $83.85 \pm 20.54$  kg), plyometric (PT; n = 11;  $181.41 \pm 7.97$  cm;  $81.25 \pm 10.43$  kg), or complex training (CT; n = 10;  $185.17 \pm 5.56$  cm;  $87.54 \pm 9.04$  kg) twice a week for 6 weeks. Participants were tested pre (W1) and post (W9) training to assess vertical jump height (CMVJ; cm), broad jump distance (BDJ; cm), pGRF (N), and multiple 1RM (kg) strength measures. Correlation matrices calculated on % change scores for performance measures from W1 to W9 between conditions, revealed significant positive and negative correlations ( $r$  range =  $-.730$  through  $.996$ ;  $p < .01^*$  and  $p < .05^{**}$ ). The greatest total of significant correlation coefficients ( $r$ ) for % change was seen for the RT group. Differences in training adaptations between groups at both the muscular and neuromuscular level may account for the differences seen.

O24

### HEART RATE VARIABILITY AND VO<sub>2</sub> MAX IN HEALTHY COLLEGE STUDENTS.

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**025** Results from recent studies suggest the relationship between heart rate variability (HRV) and VO<sub>2</sub>max is inconclusive. Possible correlations between resting HRV and VO<sub>2</sub>max were examined in twenty-four healthy college students (22 ± 3.7 yr). HRV time and frequency-domain measures were calculated from electrocardiogram (ECG) recordings taken by a BioHarness during supine metronomic breathing (6 bpm). Five minutes of recumbent rested breathing was performed prior to five minutes of ECG recording. An incremental, maximal treadmill test and closed circuit spirometry was used to determine VO<sub>2</sub>max (51.6 ± 11.1 mL.kg<sup>-1</sup>.min<sup>-1</sup>). Several significant inverse correlations between HRV indices and resting heart rate were found in both time and frequency-domain measures: Standard Deviation of Normal R-R intervals (r = -0.876, p<0.001), Root Mean Squared of the Standard Deviation (r = -0.827, p<0.001), HRV Triangular Index (r = -0.789, p<0.001), Low Frequency (LF) in milliseconds (r = -0.758, p <0.001), and High Frequency (HF) in milliseconds (r = -0.725, p<0.001). There were, however, no correlations between HRV indices and VO<sub>2</sub>max. These findings suggest that in a healthy college-aged population HRV and VO<sub>2</sub>max are independent of one another. Future research should examine the differences in athletic performance of equally fit individuals with different HRV profiles.

### RECOVERY AND SORENESS IN TRAINED FEMALES AFTER AN EXHAUSTIVE RESISTANCE TRAINING PROTOCOL

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**026** The purpose of this investigation was to examine the recovery capabilities and soreness profiles of 10 resistance-trained females (ages 19-35) following three sets to failure for eight resistance exercises. The intensity used to elicit responses was the participants' 10-repetition maximum for each lift. Recovery was measured as the ability to replicate the total number of repetitions performed in the first set of the baseline workout compared to the first set total in subsequent workouts. Participants repeated the baseline session following 24, 48, 72, or 96 hours of passive recovery. After 24 hours, the group mean for repetitions (10.0 ± 1.1 reps) was similar to baseline (10.7 ± 0.5 reps; p > 0.05). But at 48 hours and 72 hours, the group performed significantly better (11.5 ± 1.3; p = 0.01 and 11.4 ± 1.2; p = 0.004 reps for 48 and 72 hours, respectively) than at 24 hours. Soreness was also measured using a 100-mm visual analog scale (VAS). Soreness peaked at 24h and was significantly higher than baseline for all recovery periods (all p < 0.05). Additionally, at 48 hours, soreness was significantly correlated to the number of repetitions (r = -0.77, p = 0.01). Large inter-subject variability existed across all recovery periods for all variables. These findings suggest that trained females can recover within 24 hours following an exhaustive resistance training protocol. Women were able to perform similarly to baseline at all time points despite experiencing a significant level of soreness.

### SEX DIFFERENCES IN RESTING HEMODYNAMICS AND ARTERIAL STIFFNESS FOLLOWING 4 WEEKS OF RESISTANCE VS. AEROBIC EXERCISE TRAINING IN HYPERTENSIVES

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**027** Moderate intensity aerobic exercise training has been shown to reduce systolic and diastolic blood pressures in pre- to stage-one hypertensives. Resistance training has also produced decreases in blood pressures, though not as significantly as aerobic training. However, sex differences exist in the adaptation responses. The purpose of this study is to investigate the differential effects of 4 weeks of aerobic exercise (AE) vs. resistance exercise (RE) on vascular and hemodynamic variables on males and females. METHODS: 20 M and 20 F subjects (AE F 54 ± 1.5, AE M 46 ± 1.5, RE F 52 ± 1.5, RE M 44 ± 1.5 yrs) were randomly divided into AEM, AEF, REM and REF. Each group participated in a 4 week moderate intensity training program consisting of either AE (65% HR determined from VO<sub>2</sub> peak) or RE (65% of 10RM). Vascular and hemodynamic data (systolic blood pressure (SBP), diastolic blood pressure (DBP), pulse wave velocity (PWV) and forearm blood flow (FBF)) was collected pre- and post-intervention. RESULTS: RE increased FBF and decreased resting BP blood pressure in both groups yet greater in females. Males participating in RE saw significant increases in central PWV while females did not. AE decreased PWV and blood pressure in both groups, however F saw an increase in forearm blood flow while males exhibited a decrease. CONCLUSION: Both AE and RE resulted in beneficial decreases in blood pressure in both M and F. However, RE produced increases in PWV indicative of increased arterial stiffness only in males subjects. This suggests RE may be more beneficial for females since it decreases BP without increasing PWV and concomitantly benefits bone mineral density.

### INFLUENCE OF FUNCTIONAL TEST RESULTS ON FITNESS ROUTINES IN CURRENTLY EXERCISING OLDER ADULTS.

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**028** Older adults are motivated to engage in physical activity to prevent functional declines and remain independent (Hardy & Grogan, 2009). Effects of becoming aware of one's physical function have yet to be investigated. The Continuous Scale Physical Functional Performance (CS-PFP10) test provides a numerical score (0-100) where scores of ≥ 57 reflect a greater probability of living independently (Cress & Meyers, 2003). The purpose of this research was to determine functional status and influence of reporting results of the CS-PFP10 test on the exercise routines of older adults engaged in fitness center programs. We hypothesized that participants scoring <57 would indicate that results of functional testing increased motivation to improve fitness and that they plan to modify fitness routines. Using a cross-sectional, mixed method study design, community-dwelling older adults (n=21), 71.5 ± 10 years, performed the CS-PFP10 test and responded to open-ended questions after learning their functional scores and consulting with fitness leaders. Fifteen participants scored <57 and 6 scored ≥ 57, with mean scores of 43.7 ± 12.5 and 66.8 ± 12.4, respectively. Of those scoring <57, 66% stated functional results were unexpected, 66% planned to modify fitness routines, and 76% were motivated to improve fitness. Of those scoring ≥ 57, 33% stated results were unexpected, 50% planned to modify routines, and 83% were motivated to improve fitness. In conclusion, performance-based functional testing can be motivational regardless of functional status, and may increase awareness of modifiable areas for lower functioning older adults.

### THE EFFECTS OF AEROBIC EXERCISE TIMING ON QUALITY OF SLEEP

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029

The quality of sleep has direct effects on the manifestations of disease. Aerobic exercise is known to contribute to numerous health benefits, yet there is limited data examining its effects on sleep stages. There may be important timing considerations due to the physiological responses of exercise. Therefore, the purpose of this study was to examine how exercise timing affects the quality of sleep. **METHODS:** Three subjects, 2 male and 1 female, (mean age 41 years) with no self-reported sleep disorders participated in this study. Subjects reported for 3 pre-determined exercise times at 7am, 1pm, and 7pm in random order to perform a 30 min treadmill protocol at 65% of their  $\dot{V}O_2$ max. A Zeo™ ambulatory sleep EEG monitoring headband transmitted brainwave data to a receiver which was analyzed for sleep stage time and quality of sleep. **RESULTS:** Aerobic exercise at 7 pm invoked the greatest sleep score and the fewest awakenings than exercise in the morning or afternoon. **CONCLUSION:** Exercising at night may be the most beneficial epoch of time for greater quality of sleep.

### REINTEGRATION OF ACCELEROMETER COUNTS FOR PRESCHOOL CHILDREN: COMPARISON USING DIFFERENT EPOCH LENGTHS.

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The purpose of this study was to determine whether accelerometer activity counts collected and reintegrated from shorter epochs (e.g., 60 consecutive 1s epochs - reintegrated) are comparable in relation to activity counts collected at longer epochs (e.g., 60s epoch). Thirty-three preschoolers (3-4yrs) each wore four accelerometers initialized at four epoch lengths (1s, 15s, 30s, and 60s) during a full school day. Activity counts collected at shorter epoch lengths were reintegrated and compared to the counts collected at longer epoch lengths (e.g., consecutive sum of activity counts from 15 1s epochs = activity counts from 1 15s epoch). The following comparisons were made: 1s-15s, 1s-30s, 1s-60s, 15s-30s, 15s-60s, and 30s-60s. Standardized mean effect sizes (ES) and the absolute percent errors were used to compare estimates across epochs. Overall, activity counts collected at 1s epochs reintegrated to larger epochs were higher in comparison to the larger epoch. These differences, however, were trivial with small ES ranging from -.04 to .03. The absolute percent error ranged from 6.2% to 9.0%. The consecutive sum of counts collected at a smaller epoch closely approximate counts collected at a larger epoch in preschool-age children. Therefore, reintegration of smaller epochs into larger epochs appears to be appropriate. When possible, researchers should collect information at the smallest epoch and reintegrate where necessary.

### INFLUENCE OF BODY FATNESS ON THERMOREGULATORY EFFECTOR RESPONSES DURING EXERCISE IN THE HEAT

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**PURPOSE:** To examine thermoregulatory effector responses in lean and overfat individuals exercising at the same absolute exercise intensity. **METHODS:** Eight lean and eight overfat males, matched for aerobic fitness, completed one hour of recumbent cycling at 66W in a hot environment ( $T_a=30^\circ\text{C}$ , relative humidity = 40%). Percent body fat was measured by hydrostatic weighing, using oxygen dilution to determine residual volume. Esophageal temperature (Tes), skin temperatures (Tsk), and local sweat rate (msw) were measured at rest and continuously during exercise. Forearm blood flow (FBF) was measured at rest and every 10 min during exercise using venous occlusion plethysmography. The Tes threshold for forearm sweating was determined as the Tes after the onset of exercise, at which msw increased above resting levels. The slope of msw/Tes (sweating sensitivity) was determined using simple linear regression. **RESULTS:** The lean and overfat groups were successfully matched for aerobic fitness, removing the influence of body fatness, given that  $\dot{V}O_2$ max was  $49.06 \pm 2.34$  and  $49.92 \pm 1.82$  ml/kg lbm/min ( $p>0.05$ ), respectively. There was a significant difference ( $P<.001$ ) in % body fat between the lean ( $11.05 \pm 2.59$  %) and overfat ( $23.45 \pm 3.39$  %) groups. Tes, Tsk, FBF, and msw during exercise were not different between groups. The Tes threshold for forearm sweating and the slope of msw/Tes were not different between lean and overfat individuals. **CONCLUSION:** These data suggest that there is no effect of body fatness on thermoregulatory effector responses during exercise in the heat.

### EFFECT OF HALF-TIME COOLING ON THERMOREGULATORY RESPONSES AND SOCCER-SPECIFIC PERFORMANCE TESTS

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This study examined two simple cooling interventions during half-time rest period on thermoregulatory responses and subsequent exercise performance. Seven participants performed three soccer-simulated exercise trials. After finishing a 45-min intermittent treadmill run in an environmental chamber (32.5=B0C WBGT, 40% RH), participants undertook 15-min recovery with no cooling (NOCL), neck cooling (NKCL) (cold/wet towel), or forearm and hand cooling (FHCL) (12=B0C cold water immersion) in a thermoneutral environment. Immediately after the recovery period, participants performed a 6 =D7 15 m sprint test and Yo-Yo Intermittent Recovery Level 1 test (YYIR1). Neither cooling interventions induced significant difference for rectal temperature, heart rate, nor RPE compared to NOCL. No effect of cooling was found in the repeated sprint test. However, both cooling interventions significantly reduced ( $p<0.05$ ) the thermal sensations (TS), and session TS. Cooling also attenuated the sweat loss (1.1=B10.2 vs. 0.8=B10.1 vs. 0.8=B10.2 l=95h-1, for NOCL, NKCL, and FHCL, respectively,  $p<0.05$ ). For NOCL, elevated sweat rate resulted in 2.0=B10.2% dehydration at the end compared to NKCL (1.5=B10.2%) and FHCL (1.5=B10.4%) ( $p<0.05$ ). YYIR1 was significantly improved ( $p<0.05$ ) following NKCL (868=B1374 m) and FHCL (920=B1348 m) compared to NOCL (724=B1411 m). These results suggest that cooling interventions effectively improved comfort and delayed exercise-heat stress induced performance diminish during a second bout of exercise.

**HYPERTHERMIC EFFECTS ON METABOLISM DURING TREADMILL RUNNING**

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**033**

Exercise professionals often use heart rate (HR) training to prescribe exercise intensities for clients. Generally, recommended heart rate zones (HRTZ) do not change based on differing environmental temperatures. The purpose of the current examination was to examine the effects of ambient temperature on the relationship between HR and metabolic variables. Thirteen acclimatized, fit adults (5 M, 8 F, 31 ± 9.5 years, 51 ± 8.19 ml/kg/min, 67.0 ± 11.1 kg) were initially evaluated for cardiovascular fitness (VO<sub>2</sub>max) and lactate threshold using a maximal graded exercise test. Participants were examined, in random order, under thermoneutral (TN; 21.6 degrees C) and hyperthermic (HT; 36.1 degrees C) conditions at a constant HR determined as the HR elicited at 1 mmol above log-log lactate threshold (LTHR+1) for 45 minutes. To minimize dehydration 0.75 liters of water were consumed. Heart rate was evaluated every 3-min and pace was adjusted as necessary to maintain the LTHR+1. Blood [lactate], oxygen consumption, and body temperature were measured at 15, 30, and 45-min. Results indicated significant difference in body temperature (TN: 98.6 ± 0.65; HT: 100.4 ± 0.69 C), pace (TN: 198.9 ± 26.8; HT: 166.6 ± 34.4 m/min), blood [la] (TN: 2.3 ± 0.7; HT: 1.8 ± 0.8 mmol), and VO<sub>2</sub> (TN: 43.3 ± 5.3; HT: 36.7 ± 7.1 m/min) between conditions. There was no significant difference in HR between conditions. Utilizing heart rate as an indirect measure of metabolic processes is inaccurate when exercising in ambient conditions that result in differences in body temperature.

**INDICES OF DEHYDRATION STATUS DURING SUMMER HEAT WAVE**

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**034**

Although changes in body weight (BW) and urine color (UC) are suggested as field measures, their accuracy to predict static hydration status (HYD) is not clear. PURPOSE: To compare changes in biomarkers of HYD in free-living (FL) sedentary adults followed by imposed euhydration (EU) and 24 hr fluid restriction (FR) during a summer heat wave. METHODS: 22 subjects (13 female) participated in morning (am) and afternoon (pm) visits over three d. After the FL d, EU and FR were imposed on subsequent two d. BW, urine osmolality (UOsm), UC, urine specific gravity (USG), and Visual Analog Scale for thirst (VAS) were recorded each visit. RESULTS: The % of subjects exhibiting dehydration (DE) during am and pm FL were 55 and 45% for USG >1.020; 73 and 46% for UC >4; and 55 and 59% for UOsm > 700 mOsmol/kg, respectively. Three subjects did not meet EU criteria based on UC whereas all subjects met criteria via UOsm and USG. FR at 24 hr resulted in 2.1 ± 0.7 % BW loss from EU (p < .001) for all subjects (females=1.8%; males= 2.2% ). UOsm was the more sensitive measure of DE resulting in progressively higher values at 16 and 24 hr FR (939 ± 114 vs. 1011 ± 105 mOsmol/kg, p < .001). UC and USG were not significantly different between 16 and 24 hr FR despite higher VAS (6.4 ± 1.5 vs. 7.6 ± 1.5 cm). No gender differences were found across time in urine markers. CONCLUSIONS: Urine markers for HYD show inconsistencies in predicting HYD. Ad libitum HYD during a summer heat wave indicates DE as assessed by typical criteria in most individuals. Funded by a grant from The Coca-Cola Company, Atlanta, GA

**PHYSIOLOGIC RESPONSES TO RUNNING WITH A STROLLER**

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**035**

Running with a jogging stroller (JS) allows parents to participate in physical activity with their children. Little research has been conducted to investigate physiologic responses to running with a JS. PURPOSE: To assess the effect of running with a JS on oxygen consumption (VO<sub>2</sub>) and heart rate (HR). METHODS: Twelve subjects (9 females, 3 males) were recruited to complete three visits. On visit #1, a VO<sub>2</sub>max test was conducted using a portable metabolic system in the laboratory. Visits #2 and 3 each consisted of three trials, one mile each and in randomized order, on a paved, urban greenway. Three trials were completed at a predetermined pace (10 minute/mile) without a JS (NoJS), with 11.4 kg in the JS (JS1), and 22.7 kg in the JS (JS2). The other three trials were self-paced and included NoJS, JS1, and JS2. Pace was determined during the first trial and the other two trials were also run at this pace. VO<sub>2</sub> and HR were measured continuously using a portable metabolic system and telemetry. Repeated measures ANOVA was used to examine differences among the three conditions for each running pace. RESULTS: At the predetermined pace, VO<sub>2</sub> during JS1 and JS2 was 9.4% higher than NoJS (P<0.05). During the self-paced trials, VO<sub>2</sub> during JS1 and JS2 was approximately 9% higher than NoJS (P<0.05). No significant differences were found in HR. CONCLUSIONS: The increased VO<sub>2</sub> may be a result of altered stride frequency, rolling resistance, and increased external work associated with pushing the JS. The results indicate that it is feasible to run pushing a JS with minimal increases in exertion.

**SUPERVISED ACTIVITY INCREASES ADOLESCENT FITNESS AND DECREASES RESTING ENERGY EXPENDITURE GREATER THAN UNSUPERVISED SUMMER BREAK**

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**036**

Decreases in resting energy expenditure (REE) and increases in sedentary time contribute to pediatric obesity. It has been shown that being overweight during childhood and adolescence increases the risk of disease. The purpose of this study was to investigate the effects of 4(4wk) and 8 (8wk) weeks of supervised play-based activity vs. an unsupervised summer break (C) on metabolic and cardiovascular indices in preadolescent children. METHODS: 8 to 12 year-old children were divided into 4 wk (n=6) and 8 wk (n=6) activity or control groups (n=10). Supervised activity subjects met 5 days per week/6 hrs per day for play-based activities. Controls received no intervention. RESULTS: There was a significant decrease in resting energy expenditure from pre to post in all groups (C: 1182 ± 57 to 1117 ± 66 Kcal; vs. 4 wk: 1258 ± 68 to 1162 ± 78 Kcal vs. 8 wk: 1230 ± 1 to 1138 ± 93 kcal; p=0.002) while the activity groups lost mass and the unsupervised activity group gained mass. Fitness level significantly increased in the supervised groups and did not change in the unsupervised group (C: 36.01 ± 2.0 to 36.08 ± 1.7 vs. 4 wk: 31 ± 2.5 to 34.4 ± 2; vs. 8 wk: 26.7 ± 3 to 34.8 ± 2.4 ml/kg/min; p=0.001) CONCLUSIONS: These data show that an unsupervised summer break may contribute to the pediatric obesity epidemic since children not involved in supervised summer-break activity increased body mass and decreased energy expenditure while their counterparts improved overall fitness.

**PERCEIVED VERSUS ACTUAL CLASSIFICATION OF CARDIOVASCULAR AND BODY COMPOSITION PARAMETERS**

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037

Perceptions in one's own fitness is subjective and often results in misconceptions regarding exercise frequency and intensity. The purpose of this study was to evaluate the accuracy of individual perception of personal cardiovascular fitness (CVF) and body composition (BC). Trained participants completed a survey to quantify their perceived levels of CVF and BC. CVF and BC were rated on a scale of 0 (well below average) to 10 (well above average). The participants then completed BC testing via 7-site skinfold technique (n = 110, 53 females, 57 males) and a maximal graded exercise test (n = 85, 41 females, 44 males). The output from the laboratory tests were ranked based on percentile values provide by the Institute of Aerobics. Perceived and actual values were analyzed using linear regression analysis. Mean peak oxygen consumption was  $50.4 \pm 9.9$  ml/kg/min and mean body composition was  $19.6 \pm 6.7\%$ . Based on oxygen consumption, the mean CVF rating was  $8.1 \pm 1.5$  and mean perceived CVF was  $6.9 \pm 1.4$  (r = .403). The mean BC rating was  $6.0 \pm 2.7$ , and mean perceived BC was  $5.8 \pm 1.9$  (r = .636). Individuals with higher CVF and lower BC tended to underestimate their fitness capabilities, whereas individuals with lower CVF and higher BC tended to overestimate their fitness level. This indicates that most of the individuals gravitated towards an average level rather than perceiving themselves as fit or unfit. These results may have implications in "undertraining" for the less fit individuals and "overtraining" for the more fit individuals.



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### **LIMB-SPECIFIC TRAINING IMPROVES PEAK VASCULAR CONDUCTANCE**

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P1

**PURPOSE:** To determine the effect of limb-specific training on forearm reactive hyperemic blood flow and vascular conductance. **METHODS:** Thirty men (10 rock climbers, 10 runners, 10 controls) aged 19-30 participated in this cross-sectional study. To estimate peak blood flow, a blood pressure cuff was placed on the forearm and inflated to 250 mmHg to occlude blood to the forearm for 5 minutes and then released. Brachial arterial diameter (Doppler ultrasound) and blood flow (FBF), blood pressure, heart rate and vascular conductance (VC) were measured pre-occlusion, immediately prior to cuff release and for 2 minutes following cuff release. Peak flow and conductance were defined as the highest values obtained. **RESULTS:** Height, weight, and body surface area were lower ( $P<0.05$ ) in runners vs. untrained controls. Forearm volume was greater ( $P<0.05$ ) in climbers and controls than runners. There was no effect of group or time on heart rate or mean arterial pressure during reactive hyperemia. When compared to rest, the increase in FBF and VC to peak levels were not different between groups. Peak absolute FBF and VC were greater ( $P<0.05$ ) in climbers ( $635.78 \pm 253.55$  ml/min,  $6.90 \pm 2.59$  ml/min/mmHg) and controls ( $645.85 \pm 159.33$ ,  $7.01 \pm 1.66$ ) than in runners, respectively ( $376.05 \pm 152.86$ ,  $4.36 \pm 1.70$ ); however, when FBF was indexed to forearm mass (ml/100ml/min), there was no difference between groups. **CONCLUSION:** These data suggest that arm-trained athletes have greater peak vascular conductance during reactive hyperemia than untrained and leg-trained athletes.

### **THE EFFECT OF AEROBIC EXERCISE TRAINING ON ENDOTHELIAL FUNCTION IN AFRICAN AMERICAN AND CAUCASIAN POSTMENOPAUSAL WOMEN**

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P2

Endothelial dysfunction measured via flow mediated dilation (FMD) is an early marker of atherogenesis, and is associated with increased cardiovascular disease risk. Conversely, aerobic exercise training improves FMD in mostly Caucasian (C) populations, but has not been assessed previously in African Americans (AA). We evaluated the effect of aerobic exercise training on FMD in 8 healthy, but sedentary AA (age= 55.8 yrs.  $\pm$  1.7,  $VO_2$  peak=  $21.0 \pm 3.9$  ml/kg/min) and 16 C (age= 57.2 yrs.  $\pm$  5.9,  $VO_2$  peak=  $21.8 \pm 3.7$  ml/kg/min) postmenopausal women. FMD was quantified by comparing B-mode ultrasound images of the brachial artery at rest and following reactive hyperemia after 5-minutes of forearm occlusion. Subjects participated in 12 weeks of aerobic exercise training four times each week, two days below the lactate threshold (RPE=10-12), and two days above the lactate threshold (RPE=15-17). Despite a significant improvement in  $VO_2$  peak (AA=13.5% vs. C=18.3%), exercise training did not significantly improve baseline FMD in AA (5.77% to 5.68%,  $p=0.950$ ) or C subjects (5.68% to 6.64%,  $p=0.267$ ) when all subjects were analyzed. However, in AA and C subjects who had endothelial dysfunction prior to initiating the training program, there was a significant improvement in baseline FMD after exercise training (2.22% to 6.16%,  $p=0.007$ ). This was not the case in subjects with normal endothelial function (7.76% to 6.67%,  $p=0.508$ ). Our results suggest that, independent of race, exercise training improves FMD in postmenopausal women with impaired endothelial function.

### **MULTI-FLAVANOID SUPPLEMENTATION ALONE HAS NO EFFECT ON RESTING CARDIAC AUTONOMIC MODULATION IN YOUNG PRE-HYPERTENSIVE INDIVIDUALS.**

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P3

Antioxidant supplementation has been shown to induce positive benefits on cardiovascular health including reductions in blood pressure mediated by decreases in arterial stiffness. The autonomic nervous system plays a role in regulating blood pressure via changes in vagal tone. Therefore, the purpose of this study was to examine the effects of a unique multi-flavanoid supplement on cardiac autonomic modulation in pre-hypertensive, college-aged individuals. **METHODS:** 20 Pre-hypertensive college students were randomly assigned to either a placebo (P,  $21.6 \pm 0.6$  years  $n=10$ ) or treatment group (trt,  $20.7 \pm 0.3$  years). The antioxidant supplement included 1000 mg quercetin, 120 mg epigallocatechin 3-gallate (EGCG), 400 mg isoquercetin, and 400 mg omega-3 fatty acids. The subjects were asked to report to the lab for baseline measurements and then prior to and following 2 weeks of either P or trt supplementation. Beat to beat blood pressure was measured with their left arm while a 3-lead EKG recorded heart rhythms for 10 minutes during supine rest in a dimly lit room. **RESULTS:** There was a small but statistically insignificant decrease in mean arterial pressure in the trt group, however there were no changes in cardiac autonomic modulation in either the C or trt groups. **CONCLUSION:** The multiflavanoid supplement did not decrease blood pressure and showed no changes in cardiac autonomic function when compared to the placebo group.

### **THE EFFECTS OF 4-WEEKS OF SUPERVISED EXERCISE ON VASCULAR AND HEMODYNAMIC FUNCTION IN ADOLESCENT CHILDREN**

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P4

**BACKGROUND:** Physical activity is recommended for reducing the risk factors of cardiovascular disease. Yet, there are no studies that show if children can improve the elasticity of their vasculature with formal training. **PURPOSE:** The aim of the current study was to examine the effects of 4 weeks of supervised physical activity on central pressures and vascular function in young children. **METHODS:** 6 young subjects (age  $10 \pm 1.5$  years, body fat  $21 \pm 3.6$ ) 3 males and 3 females were recruited after joining a local wellness center program. Each performed supervised aerobic and resistance activity for 5 days per week, 6 hours a day during a summer camp. Pre and post-training measurements included pulse wave velocity (PWV), augmentation index (AIx),  $VO_2$  peak, and seated resting blood pressure. **RESULTS:** AIx decreased significantly ( $p=0.003$ ) following training and arterial stiffness, body fatness and blood pressure showed a physiological decrease yet due to low power was not statistically significant. **CONCLUSION:** These data show 4 weeks of supervised exercise elicit cardioprotective effects on the central pressures and vascular function in adolescent males and females.



**THE EFFECTS OF MAXIMAL EXERCISE ON HEART RATE VARIABILITY**

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Cardiac Autonomic Modulation (CAM) involves the interplay of the parasympathetic (HF) and sympathetic (LF) nervous system which act to insure adequate blood flow during exercise. However, little is known about the modulation of the autonomic nervous system during aerobic exercise due to the difficulty of data collection techniques. The purpose of this study was to investigate alterations in CAM in college aged subjects during an elongated ramped bicycle protocol. **METHODS:** 14 subjects (7 males, 8 females, 19.2 ±1.1 years old) participated in two separate trials. Visit 1 consisted of baseline CAM data via head up tilt (10 min. supine, 10 min head-up tilt to 80° and 10 min. recovery supine) followed by a VO<sub>2</sub> peak test on a cycle ergometer. During visit 2, were asked to pedal at 60 rpm starting at 50w increasing by 50w every 4 minutes. Heart rate variability data was taken via modified 3-lead EKG configuration and Polar heart rate monitors were used to collect heart rate data. **RESULTS:** There was a decrease in parasympathetic tone (HF) from rest throughout stages 1-3 (6295±2612 s1 to 3907±2534 s2 to 2521±1224 m2 s3) and a concomitant increase for 3 stages in sympathetic outflow (4639±2904 s1 to 5092±2844 s2 to 7838±3015 m2 s3). All subjects showed no further increases in HRV following the 3rd stage of exercise. **CONCLUSION:** These data demonstrate that changes in CAM occur to about 75% of VO<sub>2</sub> peak in young normotensives at which point additional cardiovascular control modulates heart function.

P5

**CARDIOVASCULAR RISK AND DISABILITY IN PEOPLE WITH MS BEFORE AND AFTER 16-WEEKS OF STRENGTH TRAINING**

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Multiple Sclerosis (MS) is a neurodegenerative disease of the central nervous system typically resulting in muscle weakness, fatigue and accumulated disability. Consequently, people with MS become increasingly sedentary, resulting in an elevated risk for cardiovascular disease (CVD). Our purpose was to determine whether progressive resistance training (PRT) could decrease disability and reduce CVD risk factors in people with MS. Nineteen ambulatory participants with relapsing remitting (RR) MS (48.2 ± 9.6 yrs, 80.0 ± 22.3 kg, EDSS 3.7 ± 1.8) performed PRT 3 days/wk for 16 weeks. Disability and fatigue status were assessed by questionnaire while mobility was assessed by 25ft (T25-WT) and 6 minute walk tests. With training, self-reported disability and fatigue improved by 17% and 20%, respectively. T25-WT and distance traveled in the 6 minute walk improved by 25% and 13%, respectively. No significant change in cardiovascular risk was observed across the group. Resistance training can promote favorable changes in mobility and perceived disability in the people with RRMS. These data support the notion that PRT may be effective at decreasing disability. Further research to investigate the CVD risk in the MS population is warranted.

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P6

**EFFECT OF EXERCISE TRAINING ON NEUROMUSCULAR PERFORMANCE IN CACHECTIC MICE**

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Cachexia is a condition involved with the loss of body weight, muscle mass, and adipose tissue mass. The ApcMin/+ mouse (Min) is an IL-6 dependant model of cancer cachexia that starts losing weight at 14 weeks of age. We have previously shown that IL-6 overexpression accelerates weight loss in Min mice. The purpose of this study was to determine the effect of treadmill exercise training on functional outcomes related to neuromuscular performance in cachectic mice. Mice were randomly assigned to exercise training (Ex n=12) or cage control (CC n=10) groups. Beginning at 5wks of age, exercised mice ran on a treadmill at a moderate intensity (18 m/min, 1h, 6 days/wk, 5% grade) until sacrifice. At 12wks of age, the mice were electroporated with either a vector (CC n=5, Ex n=6) or IL-6 over-expression plasmid (CC n=5, Ex n=6) in the right quadriceps muscle and at 14wks of age were sacrificed. Grip strength and rotarod performance were at 11 and 14wks. IL-6 was increased with electroporation in the cage control (5±2.5 v 118.5±27.8pg/ml) and exercise (5.8±2.7 v. 83.7±6.7pg/ml) mice. Gastrocnemius muscle mass was decreased 26% with IL-6 overexpression (p=0.01) and exercise attenuated the IL-6 induced loss. IL-6 overexpression decreased grip strength 25% and exercise decreased grip strength 15% (p<0.001); however IL-6 with exercise did not further alter strength. IL-6 decreased time on the wheel 30% (p=0.005). Cachexia reduces neuromuscular performance and treadmill exercise maintains muscle mass, but does not improve neuromuscular performance in ApcMin/+ mice.

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P7

**CHARACTERIZATION OF A MOUSE MODEL OF CANCER RELATED FATIGUE USING MEASURES OF PHYSICAL ACTIVITY**

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Of the myriad of symptoms associated with cancer the most commonly reported is fatigue. Currently there are no available treatment options for cancer related fatigue (CRF) which is not surprising given the lack of animal models to study this complex phenomenon. The purpose of this study was to characterize the APCMin/+ mouse as an animal model to study CRF using five distinct modes of physical activity. Wildtype (WT) and APCMin/+ mice were assigned to groups according to age (6, 10, 14, 18wk) with separate mice used at each time-point. Physical activity measures including, voluntary wheel running (VWR), treadmill running performance (TR), open field activity (OF), rotarod performance (RR) and grip strength (GS) were determined at each time-point. VWR activity (distance, time on wheel, and peak speed), a measure of willingness to be active, was decreased in APCMin/+ mice at 10, 14 and 18wks of age (P<0.05), but not at 6 wks. TR performance, an indicator of performance capability, was decreased in APCMin/+ mice at 14 and 18 wks (P<0.05). At 18wks APCMin/+ mice exhibited less OF than WT mice (P<0.05), and there was a trend toward a decrease at 10 and 14wks. There were no significant decreases in GS and RR in APCMin/+ mice over time. These findings suggest that VWR activity is the most sensitive physical activity model to measure CRF followed by TR and OF. These data provide strong support for further development of the APCMin/+ mouse to study the mechanisms of CRF. Partially supported by a grant from the National Cancer Institute (R21 CA135377).

P8

### RELIABILITY ESTIMATION OF TGMD-2 USING G-THEORY

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TGMD-2 is a well-known measurement tool for its applicability in the field of Adapted Physical Activity (APA). Considering that scoring strategy for each item in TGMD-2 depends on subjective views of raters, biases may be inherent in measurement scores. The purpose of this study was to investigate the magnitude of error variance regarding measurement scores by raters and to determine the optimal measurement protocol needed to achieve reliable scores of TGMD-2 when applied to children with intellectual disabilities. A total of 22 children with intellectual disabilities participated in this study. The test was administered by the APA specialist. Children's performances of each of the 12 subsets of TGMD-2 were recorded via video and scored by three APA specialists who have expertise in TGMD-2. The three facet fully crossed design of Generalizability theory, in which included facets were participants (p), number of raters (r), number of trials (t) and number of items (i), was applied. The results of G-study and D-study were as follows: (1) higher error variances interacted with raters in 'Kick (i x r: 25.06%)', 'Catch (p x r: 18.26%)', 'Horizontal Jump (t x r: 13.55%)', and 'Leap (i x r: 13.36%)'; (2) the deficient reliability coefficients ( $\phi$ ) were observed from 'Kick (.53)', 'Catch (.37)' and 'Leap (.59)'; however, the others were fairly acceptable ( $>.70$ ). The reliabilities of TGMD-2 for children with intellectual disabilities were fairly acceptable except for some subsets. Considering large error variances interacted with raters, efforts should be made to increase agreements among raters prior to scoring.

P9

### BODY COMPOSITION IN BREAST CANCER SURVIVORS: A ONE-YEAR FOLLOW UP

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Breast cancer survivors (BCS) encounter many side effects from cancer treatments that reflect negatively on their body composition. Discrepancies exist concerning whether these side effects worsen or improve over time. Thus, the purpose was to assess 10 female ( $58 \pm 6$  years) BCS at baseline (BL) and after one-year (OY) on the following variables: total body and regional sites (lumbar spine, femur, and forearm) of bone mineral density (BMD) and body composition measured by dual energy X-ray absorptiometry (iDXA). Subjects taking hormone therapies at BL and OY were eight and seven, respectively. Paired t-tests indicated after OY the subjects had significantly lower BMD ( $p < 0.05$ ) for both the left (BL:  $0.94 \pm 0.13$ ; OY:  $0.92 \pm 0.13$  g/cm<sup>2</sup>) and right femur (BL:  $0.94 \pm 0.14$ ; OY:  $0.92 \pm 0.14$  g/cm<sup>2</sup>) and lumbar spine (BL:  $1.08 \pm 0.13$ ; OY:  $1.05 \pm 0.13$  g/cm<sup>2</sup>). Subjects also exhibited a decreased lean-to-fat mass ratio (BL:  $1.69 \pm 0.60$ ; OY:  $1.60 \pm 0.60$ ), increased android-to-gynoid (A/G) fat ratio (BL:  $0.86 \pm 0.24$ ; OY:  $0.93 \pm 0.28$ ), and increased total body fat percent (BL:  $38.3 \pm 6.1$ ; OY:  $39.6 \pm 6.2$  %). No significant differences were found for total body BMD (BL:  $1.11 \pm 0.10$ ; OY:  $1.12 \pm 0.09$  g/cm<sup>2</sup>) or forearm BMD (BL:  $0.46 \pm 0.07$ ; OY:  $0.46 \pm 0.06$  g/cm<sup>2</sup>). BCS exhibited lower femur and lumbar spine BMD and negative body composition changes over the OY. Low femur and lumbar spine BMD may result in an increased fracture risk which may negatively affect quality of life in BCS. Increased A/G fat ratio may increase the risk of abdominal obesity and cardiovascular disease. These results warrant the implementation of interventions aimed at improving BMD and body composition in BCS.

P10

### EVALUATION OF PHYSICAL ACTIVITY, SPASMS, AND DIET AFTER SCI

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People with spinal cord injuries (SCI) are more prone to metabolic and cardiovascular (CV) disease than people without neurological injury. Factors that increase the risk for CV disease include poor diet and reduced physical activity as well as less frequency of spasms. The purpose of this study was to obtain baseline information on physical activity, diet, and spasm activity in people with complete SCI. Participants with chronic, motor complete SCI were recruited from the southeastern United States and completed a food frequency questionnaire, the Physical Activity Recall Assessment for People with Spinal Cord Injury, and the Penn Spasm Frequency Questionnaire. Four of the eight participants exceeded ACSM guidelines for physical activity ( $\sim 30$  min/day), and three had no leisure time activity. The frequency of eating fruits and vegetables was approximately 2 to 12 times a month, which is less than recommended by the Dietary Guidelines for Americans (of at least 5 servings daily). On average, the participants ate  $\sim 18$  prepared/package meals per month. Three participants had mild spasms (Level 1 or 2 on a scale of 4) and five had 10 or more spasms a day (Level 4). This data will be used to design future interventions to improve the health and well being of people with SCI.

P11

### ENERGY EXPENDITURE FROM EXCESS POST OXYGEN CONSUMPTION: A META-ANALYSIS

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Multiple studies have shown a relationship among excess post-exercise oxygen consumption (EPOC), and duration and intensity during a single exercise session. The aim of this study was to estimate the amount of energy expenditure (EE) associated with EPOC based on intensity and duration. A systematic search was conducted to locate peer-reviewed articles that measured EPOC. Studies were included if they used human participants, utilized treadmill or cycle ergometer protocols, and included values for exercise duration, relative intensity of exercise, EPOC assessment length, and net EPOC reported in liters, kilojoules or kilocalories. Relevant articles were obtained using keyword searches on PubMed with additional articles retrieved by examining reference lists from published articles and reviews. In all, 32 articles met the inclusion criteria. Seventy independent estimates were identified from these studies and were included in the final analysis. Studies were conducted on predominantly college-aged men and women (mean (std dev) age:  $23.5(2.5)$  y, BMI  $22.9(2.4)$  kg/m<sup>2</sup>). Overall, findings showed a linear increase in EPOC EE across intensity and duration. A predictive equation was modeled using intensity, duration, and their interaction to estimate EPOC EE (kilocalories (kcal)) =  $-9.8926 + 0.3009 \times (\text{Intensity}) - .3081 \times (\text{Duration}) + 0.01355 \times (\text{Intensity} \times \text{Duration})$ . Based on this model, a 30 minute exercise session at 50% and 70%  $\text{VO}_2\text{max}$  suggests an additional 16.2 and 30.4 kcal, respectively. A one pound weight loss would be realized in 43 and 23 weeks, respectively. EPOC contributed modestly to EE.

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**THE VALIDITY OF MULTI-FREQUENCY BIOELECTRICAL IMPEDANCE MEASURES TO DETECT CHANGES IN THE HYDRATION STATUS OF WRESTLERS DURING ACUTE DEHYDRATION AND REHYDRATION.**

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56 NCAA wrestlers: (mean  $\pm$  SEE); age  $19.5 \pm 0.2$ , height  $1.73 \pm 0.01$  m, body mass (BM)  $82.5 \pm 2.3$  kg were tested in euhydrated, dehydrated (-3%), and a 2-h rehydration conditions using a multi-frequency bioelectrical impedance spectroscopy (MFBIS) to detect changes in hydration status. Hydration status was quantified by measuring changes in plasma osmolality (Posm), urine osmolality (Uosm), urine specific gravity (Usg), BM and MFBIA at 5, 20, 50, 100, and 500 Khz. A new prediction equation provided by the manufacturer to estimate Hydration Index (HI) was able to detect a significant change in hydration status after a 3.5% reduction in body weight. All frequencies significantly increased for HI at the post-dehydration time point, but did not return to baseline at 2-h rehydration. Both Uosm and Usg significantly increased at post-dehydration, but did not return to below baseline until 2-h rehydration. Estimations of extracellular water (ECW) were significantly different throughout the trial, but there were no significant change in estimations of total body water (TBW) or intracellular water (ICW). Results of the present study demonstrate the potential use of MFBIA as a field measure to assess the hydration status of wrestlers for the purpose of minimal weight certification. When employing BIS, results indicate that changes in HI at the frequencies evaluated are sensitive to acute changes in dehydration, but lag behind changes in the standard physiological (plasma and urinary) markers of hydration status after a 2-h rehydration.

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**RELATIONSHIP BETWEEN BODY COMPOSITION, ANAEROBIC CAPACITY, AND AEROBIC CAPACITY**

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**PURPOSE:** The purpose of this study was to investigate the relationships between body composition and measures of aerobic or anaerobic capacity. Investigating what may be the best predictor of aerobic or anaerobic power could be of great use when all exercise capacity measurements cannot be made. **METHODS:** The testing protocol consisted of 19 recreationally active males (age =  $23.6 \pm 3.17$  yrs; height =  $1.79 \pm 0.06$  m; weight =  $82.9 \pm 8.3$ kg; DXA  $18.4 \pm 7.2\%$ ) who underwent DEXA analysis for body composition, performed a graded exercise test to assess  $VO_2$ max, and performed a Wingate test to determine anaerobic capacity. Subjects performed the Wingate and relative  $VO_2$  max in random order. Pearson Correlations were performed between the variables with significance set at  $p < 0.05$  a priori. **RESULTS:** Significant positive correlations existed between the following: total lean mass in legs (kg) and absolute mean power ( $r=.47, p=.04$ ), total lean mass in legs (kg) and relative peak power ( $r=.48, p=.04$ ), and total lean mass in body (kg) and absolute peak power ( $r=.78, p=.00$ ). Significant negative correlations existed between the following: relative  $VO_2$  max and % body fat ( $r=-.60, p=.01$ ), total body fat (kg) and relative  $VO_2$  max ( $r=-.54, p=.02$ ), and % body fat in the legs and relative  $VO_2$  max ( $r=-.50, p=.03$ ). **CONCLUSIONS:** Based on our data, it appears that performance on the Wingate test is most dependent on total lower body muscle mass, whereas aerobic performance is more strongly dependent on having lower amounts of body fat. These data may help stratify individuals when exercise capacity testing cannot be performed.

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**RELATIONSHIP BETWEEN DXA AND 7 SITE SKINFOLDS**

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**PURPOSE:** There are several different ways to assess a subject's body composition. There are several advantages and disadvantages to each method. Body composition can be used to describe the percentages of fat, bone, and muscle in human bodies. The purpose of this study was to compare skin-fold measurements taken by college seniors majoring in exercise science using Lange Calipers and body composition as measured by DXA. **METHODS:** This investigation used 27 recreationally active college aged males, ( $23 \pm 2.9$  years,  $70 \pm 2.5$  inches, and  $83.6 \pm 20.7$  kg). **RESULTS:** Pearson Correlation Coefficients were calculated for the relationship between each DXA and 7 site skinfolds, and significance was set at  $p < 0.05$  a priori. The DEXA Results were (mean  $\pm$  SD)  $18.4 \pm 7.2$  % and 7 site skinfolds were  $17.1 \pm 6.2$  %. The DXA and 7-site skinfolds showed a significant correlation ( $p= 0.00$ ). **CONCLUSIONS:** Since DXA and 7 site skinfolds had a significant correlation, students can continue to use calipers for body composition measurements if DXA is not available in the lab. Although DXA is a gold standard for body fat measurements, the cost and time associated with it may make it impractical for teaching lab situations.

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**BARIATRIC SURGERY AND INSULIN SENSITIVITY IN TYPE 2 DIABETICS: ROLE OF PROXIMAL SMALL INTESTINE BYPASS.**

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Bariatric surgery is an effective, rapid, and durable treatment for obesity and type 2 diabetes (T2DM). Roux-en Y Gastric Bypass (RYGB) resolves T2DM in 80% of cases, while gastric banding (LAGB) resolves T2DM in only 45%. One significant difference between RYGB and LAGB is the bypassing of the proximal small intestine in RYGB. Insulin resistance is a well known contributor to T2DM that improves following RYGB. **PURPOSE:** To determine if RYGB produces greater improvements in insulin sensitivity than LAGB in T2DM. **METHODS:** Obese, T2DM, Caucasian women underwent RYGB (N=8) or LAGB (N=3). Insulin sensitivity (Si) was measured pre- and 1-wk post-surgery by an insulin modified intravenous glucose tolerance test (IVGTT). Post-surgery analysis at 1-wk eliminates the potential contribution of differences in weight loss or food consumption as these are rigorously controlled for 1 wk following both surgical procedures. **RESULTS:** From our very preliminary data, Si improvements may be similar following RYGB (Pre:  $0.85 \pm 0.15$  AU and 1-wk:  $2.30 \pm 0.43$  AU) and LAGB (Pre:  $1.32 \pm 0.26$  AU and 1-wk:  $1.67 \pm 0.60$ AU). **CONCLUSIONS:** Our very preliminary results in obese, T2DM, Caucasian women suggest that insulin sensitivity may be increased similarly in RYGB and LAGB questioning the role of proximal small intestine bypass in the reversal of insulin sensitivity following bariatric surgery. Additional gastric banding patients are required to provide adequate power for statistical analysis.

#### REGRESSION EQUATIONS FOR SKINFOLDS WITH DXA AS STANDARD

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Assessment of body fat (%fat) is an important tool for risk stratification and sport participation. Skinfold assessment of %fat is classified as a “doubly indirect” method because equations were based on hydrostatic (indirect) weighing (HW) as the criterion. The SEE for HW is ~+ 2.5%. Dual X-Ray Absorbsitometry (DXA) is quickly becoming the preferred method for body composition assessment. The SEE for DXA is ~+ 1.8%. In a previous study, we found that skinfolds (SKF) underestimated BF% by ~6.4% when compared to DXA. From this study, we concluded that SKF equations should be developed using DXA as the criterion. The purpose of this study was to determine if a new SKF equation could be developed for Caucasian males utilizing commonly used SKF (ACSM) sites. Methods: 222 Caucasian males participated in the study. DXA %fat was determined using a Lunar Prodigy Advance system. Results: Utilizing regression analysis, an equation was generated using age, tricep, abdomen and thigh SKF measurements. 70% of the variance between the DXA measured and SKF prediction is accounted by the new formula: [%fat = 8.26649 + (0.08539 \* Age) + (0.31724 \* tricep) + (0.28765 \* abdomen) + (0.17599 \* thigh)]. Conclusion: Due to the lower SEE and ease of administration, %fat determined by DXA appears to be preferred over HW, thus SKF regression equations should be developed utilizing DXA as the criterion. The equations we developed estimate %fat using DXA as the criterion measure in normal to moderately overweight middle age males.

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#### THE EFFECTS OF BODY MASS INDEX ON RESTING BLOOD PRESSURE IN RURAL CHILDREN

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The association between blood pressure (BP) and body weight has been documented in pediatric populations, possibly due to the increase of overweight and obese children. This study examined the effects of body mass index (BMI), sex, and age on systolic and diastolic blood pressure. Participants, were 134 children (69 boys and 65 girls; M age = 6.45 yr ± 1.02), enrolled in a rural, low socio-economic elementary school. BMI was assessed through height and weight using standardized procedures. BMI was classified as Normal (73.9%), Overweight (7.5%), and Obese (18.7%) based on the Center for Disease Control Guidelines. An automatic blood pressure cuff was used to assess resting blood pressure three times, with a 2-minute delay between assessments. BP was reassessed the following week for participants' with a difference of 10 mm Hg between the last two BP readings and/or a systolic BP greater than 120 mm Hg. The mean systolic and diastolic BP for the 2nd and 3rd readings were used to classify participants as Normal (79.1%), Pre-hypertension (8.2%), Stage 1 hypertension (11.2%), or Stage 2 hypertension (1.5%) in accordance with the National High Blood Pressure Education Program Working Group guidelines. A MANOVA was used to determine the effect of BMI category, age, and sex on mean systolic and diastolic BP. Results indicate that mean systolic and diastolic BP significantly increased with BMI,  $p < .001$  and  $p = .007$ , respectively. No effect of age and sex were present for systolic and diastolic BP,  $p > .05$ . The current findings revealed an increase prevalence of hypertension to unhealthy BMI status in young children from a rural and low socio-economic area.

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#### IMPACT OF ADIPOSITY AND MUSCLE QUALITY ON PHYSICAL FUNCTION IN COMMUNITY-DWELLING OLDER MEN AND WOMEN

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The aim of this study was to determine if sex influences the relation among adiposity (%Fat), muscle quality (MQ) and lower extremity physical function (LEPF). Adults (n=180, 98 male; 69.2 ± 6.7 yrs) were assessed for body composition by DEXA, leg strength using an isokinetic dynamometer and LEPF via 400m walk (WLK), Timed Up and Go (UpGo) and 5 rep chair stand (CHR). MQ was calculated as upper leg strength normalized for upper leg mineral free lean mass. Tertiles were determined separately for %Fat and MQ, within sex. As expected, males had lower %Fat and better LEPF on all measures, compared to age-matched females (all  $p < 0.05$ ). Males had 56% higher strength ( $p < 0.001$ ), but only 14% greater MQ than females ( $p = 0.03$ ). With no significant interactions (all  $p > 0.05$ ), main effects for sex and %Fat were found for WLK, UpGo and CHR with greater adiposity reducing performance. Similarly, main effects for sex and MQ were determined for WLK, UpGo and CHR with greater MQ having better LEPF, in the absence of any interactions. The ratio of MQ/body mass did not differ by sex ( $p = 0.08$ ); however, it was related to all measures of LEPF in women (r range -0.32 to -0.43, all  $p < 0.01$ ) but not men (r range = -0.10 to -0.15). Our results suggest that: 1) males have higher LEPF than females, which is partially attributable to a higher MQ; 2) %Fat and MQ both impact LEPF; and, 3) the ratio of MQ to body mass may have implications for LEPF, especially in older women.

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#### IL-6 INCREASES IN SKELETAL MUSCLE INTERSTITIUM OF UNTRAINED YOUNG MEN IN RESPONSE TO RESISTANCE EXERCISE

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Skeletal muscle possesses endocrine properties, whereby muscle-derived cytokines (aka. myokines) can be secreted and affect other tissues. High-intensity resistance exercise increases circulating inflammatory cytokine levels and mRNA in skeletal muscle tissue. To determine if these changes in inflammatory cytokines can be detected in the skeletal muscle interstitium in response to resistance exercise (RE), microdialysis probes were inserted into the vastus lateralis muscle of untrained young men. Microdialysis probes (100 kDa) were perfused with sterile saline + 37 g/L of Dextran-70 and 10 mM EtOH using a calibrated syringe pump at a rate of 2  $\mu$ L/min. Skeletal muscle interstitial fluid samples (MIF) were collected at rest and every hour for 6 hours after an acute bout of bilateral leg extension exercise (3 sets of 10 reps at 80% of pre-determined 1-RM). MIF was analyzed for the inflammatory cytokines MCP-1, TNF $\alpha$ , IL-1b, IL-2, IL-4, IL-6, IL-10, MCSF, and GCSF using a multiplex cytokine ELISA assay. IL-6 increased 400% 1 hr post-RE ( $p = 0.02$ ) and peaked at 3 hr post-RE with a 775% increase ( $p < 0.01$ ) in MIF in response to an acute bout of resistance exercise. TNF $\alpha$  and IL-10 did not change in MIF with RE. IL-1b, IL-2, IL-4, MCSF, and GCSF concentrations were below detectable levels in MIF. These findings: 1) demonstrate that changes in inflammatory cytokines can be detected in skeletal muscle interstitial fluid with acute RE and 2) suggest that acute RE increases skeletal muscle interstitial IL-6 in untrained young men.

P20

**EFFECT OF 3.5% AND 10% CONCENTRATION TOPICAL MENTHOL ON PERIPHERAL BLOOD FLOW AND STRENGTH**

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Menthol has been regularly utilized as a treatment in sports related injuries for many years, yet little is known about its physiological interactions or its effect on systemic vasoreactivity. Our previous study indicates that topically applied menthol may cause an acute decrease in local and systemic arterial blood flow. The purpose of this study is to examine the effects of two different concentrations of menthol (3.5% and 10%) on systemic blood flow response in the popliteal arteries, before and after an acute bout of maximal voluntary muscular contraction (MVMC). 16 subjects participated in this 4 week study examining blood flow and vasoreactivity responses to MVMC after application of menthol or control treatment. Arterial blood flow and vasoreactivity were assessed utilizing a commercially available ultrasound Doppler prior to and post MVMC of the treated limb. Maximal voluntary muscular contraction was performed on a Biodex System 3 dynamometer. Results indicate that the 3.5% menthol causes a significant (<.05) decrease in blood flow and arterial diameter in the treated leg, and decreased blood flow in the untreated leg when compared to baseline measurements. 10% menthol treatment attenuates the statistically significant increase in blood flow observed with Control treatment, and significantly decreases arterial diameter in the treated leg. Results indicate that menthol is capable of suppressing arterial blood flow locally and systemically.

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**THE EFFECT PHYSICAL ACTIVITY HAS KNEE OSTEOARTHRITIS WITH GENDER DIFFERENCES**

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Research has shown that knee osteoarthritis (OA) occurs more frequently in women than in men. However, little research has examined the sex differences in hindlimb joint space in lifelong physically active mice. Therefore, the purpose of this project was to examine the effect of physical activity on gender differences and the development of knee OA in mice throughout the lifespan. Eight male and seven female C57Bl/6J mice were monitored beginning at three months of age. Each mouse was individually caged with a running wheel, magnetic sensor and digital odometer, and was provided with standard chow and water *ad libitum*. Daily distance and duration were measured and average running speed was calculated for each week. A diagnostic ultrasound (SONOS 5500 Ultrasound and 15-6L ultrasound probe) was used to measure medial and lateral knee joint space in both hind limbs every month. Right medial (p=0.001), right lateral (p=0.0001), left medial (p=0.0007), and left lateral (p=0.002) knee joint spaces were significantly decreased in physically active C57Bl/6J mice with aging. There was no difference in any of the four joint spaces between physically active male and female mice (p>0.05). Additionally, there was no sex x age interactions (p>0.05). Therefore, although joint space decreased with aging, there was no significant difference in the decrease in hindlimb joint space between physically active male and female C57Bl/6J mice.

**OSTEOARTHRITIS AND THE EXERCISING KNEE**

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Knee osteoarthritis (OA) is known to progressively worsen with aging. However, the benefits of lifelong physical activity warrant investigation to determine the influence of regular exercise on the aging knee. Therefore, the purpose of this project was to examine the effect of lifelong physical activity on the development of knee OA in C57Bl/6J mice. Thirty C57Bl/6J mice were monitored beginning at three months of age, with fifteen mice (eight male and seven female) individually caged with a running wheel, magnetic sensor and digital odometer, and fifteen mice (seven male and eight female) individually housed without a running wheel. Each mouse was provided with standard chow and water *ad libitum*. Daily distance and duration were measured and average running speed was calculated for each week. A diagnostic ultrasound (SONOS 5500 Ultrasound and 15-6L ultrasound probe) was used to measure medial and lateral knee joint space in both hind limbs every month. Right medial (p=0.002), right lateral (p<0.0001), left medial (p=0.01), and left lateral (p=0.007) knee joint spaces were significantly smaller in the physically active C57Bl/6J mice. All hindlimb knee joint spaces significantly declined with aging (p<0.0001). Hindlimb knee joint space were found to be greater in the sedentary mice during the first quarter of the lifespan, but were similar to the hindlimb of the running mice throughout the remainder of the lifespan. Therefore, hindlimb knee joint space decreased with aging and doesn't appear to gain any protective benefits from lifelong physical activity. Funded by University of North Carolina /Charlotte Faculty Research Grants Program.

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**EXERCISE INTERVENTION ON BONE MINERAL DENSITY IN LEAN AND OBESE PREPUBESCENT CHILDREN.**

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Purpose: For adults, weight bearing exercise has long been associated with increases in bone mineral density with regards to the specific regions of the body that are being stressed. Children, on the other hand, are limited in the amount of weight bearing exercise they can perform due to the fact that growth plates have yet to reach maximum potential, therefore the risk of injury is present. With a full list of metabolic disorders that can occur in children due to obesity (diabetes, dislipidemia, sleep apnea); it is important to understand what bone metabolism limitations might exist. Objective: Determine if lean and obese prepubescent children can increase bone mineral density through a 16 week physical activity program consisting of a variety of different physical activities such as basketball, tennis, kickball, etc. Methods: Fifty-one lean (n=18) and overweight (n=33) prepubescent children (age 8-11yr) were scanned using a whole body-DEXA scan at the beginning and end of a 16 week intervention. Results: Lean and obese prepubescent children, assigned to the exercise treatment group, could change total body BMD from pre to post test (lean n=10, P=.001; obese n=23, P<.001). Bone mineral density increased in lean and obese groups by 2.77±1.92%, and 2.32±1.39% respectively. These changes were greater than those observed in a non-exercise, control group. Conclusion: It is apparent that bone mineral density can be increased through physical activities such as the ones performed with the current study. It is important to understand when and how bone mineral density can best be increased in order to prevent bone diseases such as osteopenia and osteoporosis.

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**INJURY AND PHYSICAL LIMITATIONS IN FEMALE DIVISION I ATHLETES: COMPARING COLLEGIATE SOFTBALL AND SOCCER ATHLETES**

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The purpose of this study was to compare incidence of injury between two sports, and to use this information as baseline information to continue the study done by Friery which studied incidence of injury and limitations imposed on physical activity and daily activity years after participating in collegiate athletics. The subjects of this study consisted of 30 (N=30) NCAA Division I female athletes consisting of 14 soccer players and 16 softball players. A questionnaire was distributed to female soccer and softball athletes. The questionnaire asked athletes to identify their history of injury. Minor and major injuries, as well as those requiring surgery were specified, and categorized as chronic or acute injuries. Data was compared between the two sports and was analyzed (SPSS software, Chi-Squared analysis) and a Pearson's correlation was determined. The data shows a significant difference between percentage of injuries of softball players and soccer players, with both major injuries ( $p=.004$ ) as well as chronic injuries ( $p=.000$ ), softball having a higher percentage in both categories. Both teams reported that they had, at some point in their career, played while injured or ill (76.7% for the entire population). This percentage of playing while injured or ill is similar to percentage seen in the study done by Friery. While this information is important in understanding differences between soccer and softball incidence of injury, it is important to understand why certain athletes show more specific types of injuries than others. More research is needed in all areas of female athletics and this study should be used as a baseline.

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**RELATIONSHIP BETWEEN SOCCER SPECIFIC SKILLS AND ANTHROPOMETRIC DATA IN NCAA DIVISION I FEMALE SOCCER ATHLETES**

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The purpose of this study was to determine the relationship of various physiological characteristics to soccer-specific variables, such as kick velocity (KV), knee torque (KT), and body fat percentage (BF%) specifically in female collegiate soccer players. Anthropometric data was collected on 22 Division I female soccer players including height, weight, and %BF. Maximum strength, explosive lower body power, agility, acceleration, speed, and aerobic power were measured. Correlation coefficients were calculated for all variables by utilizing a correlation matrix from raw scores for both the pre and post season data. Statistical analysis indicated significant relationships exist. A correlation was found between KT and KV ( $r=0.89$ ), as well as vertical jump and KV ( $r=0.91$ ). Aerobic power ( $r=0.93$ ), agility ( $r=0.88$ ), and vertical jump ( $r=0.84$ ) were highly correlated to BF%. These data suggest that significant relationships do exist between physiological characteristics and soccer-specific variables. Soccer coaches along with strength and conditioning coaches should work on increasing lean body mass, agility, maximum strength, and explosive power in order to increase kicking velocity in female soccer players.

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**COMPARISON TORQUE PRODUCTION IN BASEBALL PITCHERS AND FOOTBALL QUARTERBACKS USING THE BIODEX**

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With similar overhead throwing styles, it is of interest to see which athlete, pitcher or quarterback, could produce more torque, and who could produce a higher throwing velocity when using both a baseball and a football. Athletes from Louisiana Tech, ten from baseball and two from football volunteered for this study. Participants had their internal rotation (shoulder at 90 degrees and elbow at 90 degrees) as well as their diagonal adduction (shoulder abducted and extended) measured by the Biodex Isokinetic machine. The Biodex was set with parameters of 300 and 450 degrees/second. Participants had their throwing velocities of both a football and baseball measured using the Stalker Pro radar gun. Both implements were thrown from the same distance of sixty feet six inch (standard distance pitcher's mound to home plate) and on flat ground. Subjects participated in 2 separate practice sessions for both throwing implements. Sessions comprised of one hour of practice, throwing both implements until subjects were comfortable throwing. The study showed that quarterbacks produced significantly more torque than the pitchers during diagonal adduction of the shoulder joint ( $p<0.05$ ). Quarterbacks had statistically greater velocity than pitchers when throwing a football, while pitchers had statistically greater velocity than quarterbacks when throwing a baseball. The data obtained through this study could prove valuable in case of injury as a baseline to determine how close an athlete is to returning to play. Data also indicate that throwing an implement with greater velocity requires specific skills and mechanics. It cannot be assumed that because one can throw a baseball hard that they will throw a football hard or vice versa.

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**EFFECT OF ICE BAG RECOVERY ON CLOSED- AND OPEN-HANDED WEIGHT-ASSISTED PULL-UPS**

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The purpose of this study was to test the hypothesis that an ice bag (ICE) applied on the anterior & posterior shoulder and continued to the fingers during recovery attenuates the decrease in performance typically observed after a fatiguing set of weight-assisted pull-ups using either a closed-handed or open-handed grip. Healthy and recreationally-trained male rock climbers ( $n = 9$ ) completed four counterbalanced trials. Each trial was separated by 72 hours and included three sets to failure of closed-handed or open-handed pull-ups assisted by 50% body weight. Sets were separated by approximately 20 minutes of either passive (CON) or ICE recovery. Heart rate (HR), ratings of perceived exertion (RPE), session-RPE (S-RPE), hand grip strength, comfort ratings, and perceived recovery were assessed. Hand grip strength pre- and post-trial was similar between CON and ICE ( $p > 0.05$ ). HR, RPE, perceived recovery, S-RPE, and comfort ratings also did not differ between treatments (all  $p > 0.05$ ). Overall, participants completed significantly fewer open-handed pull-ups (mean  $\pm$  SD,  $19 \pm 5$  repetitions) than closed-handed pull-ups ( $34 \pm 14$ ;  $p < 0.001$ ). ICE attenuated the decrease in open-handed pull-up performance for set three ( $22 \pm 5$  repetitions) relative to set three of CON ( $17 \pm 6$  repetitions;  $p = 0.003$ ). Pull-up repetitions were not different between ICE and CON for closed-handed pull-ups ( $p = 0.31$ ). Results indicate that ice bag recovery after open-handed weight-assisted pull-ups attenuates the decrease in subsequent performance relative to passive recovery, but does not affect closed-handed weight-assisted pull-up performance.

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### EFFECT OF SPECIFIC HIGH INTENSITY INTERVAL TRAINING (HIIT) MODALITIES ON MULTI-EVENT PERFORMANCE

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**PURPOSE.** High Intensity Interval Training (HIIT) is associated with marked increases in physiological and performance variables in a significantly shorter amount of time than is associated with traditional endurance training. The modality specificity of HIIT remains unclear at this time. It is the intent of this study to examine the efficacy of 3 separate HIIT regimens to elicit peak performance and determine sport specificity of HIIT for multiple event athletes. **METHODS.** Nineteen college aged males participated in 2 weeks of HIIT (3 days/wk) after random assignment to 1 of 3 specific regimens: cycling HIIT (CYC), running HIIT (RUN), or combined HIIT (COM; alternating days of cycling/running) regimen. Individual training protocols were determined using the pre-training physiological and performance measurements:  $\text{VO}_2\text{max/peak}$  & Time at Max/peak ( $T_{\text{max}}$  /peak). Before and after 2 weeks of training participants completed  $\text{VO}_2\text{max/peak}$  assessment,  $T_{\text{max/peak}}$  assessment, 20 km cycling time trial, and a 20 minute run for distance test. **RESULTS.** All groups significantly increased distance covered ( $p=.0032$ ) in 20 minute run for distance with no significant difference between groups. CYC significantly increased ( $p < .0001$ ) performance on 20 km cycling time trial after training while RUN and COM groups demonstrated slight non-significant decreases in performance. All groups significantly increased  $\text{VO}_2\text{max}$  ( $p < .0001$ ) and  $\text{VO}_2\text{peak}$  ( $p=.0002$ ) after two weeks of training. **CONCLUSIONS:** Six days, over a 2 week span, of cycling HIIT significantly improved performance in cycling time trial performance and run for distance testing. Using cycling HIIT as a means for eliciting peak performance may be advantageous to multi-event athletes looking to decrease total training volume and increase performance approaching an event. Increases in  $\text{VO}_2\text{max}$  and  $\text{VO}_2\text{peak}$  were not modality specific suggesting that physiological adaptations seen with HIIT are not modality specific.

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### CHANGES IN BODY COMPOSITION FROM YEAR-TO-YEAR IN NCAA DIVISION 1 MALE ATHLETES

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Body composition of collegiate athletes participating in different sports has been studied at single time points within a season as well as over the course of one complete training year. However, few studies have examined body composition over multiple years in male collegiate athletes. Purpose: To examine the year-to-year changes in body weight (BW) and percent fat (%BF) in football (FB), baseball (BA), and basketball (BK) players. **METHODS:** Pre-competition BW and %BF (skinfolds) were measured on 253 NCAA Division 1 male athletes (FB  $n=157$ , BA  $n=54$ , and BK  $n=42$ ) from 2005-2010. Players were grouped according to sport and compared from year-to-year (Y1, Y2, Y3, and Y4) using repeated measures ANOVA. **RESULTS:** Overall, male athletes had increases in BW from Y2 to Y3 (1.5 kg;  $p<0.05$ ). %BF increased for all subjects at every analysis point: Y1 to Y2 (0.8%,  $p<0.05$ ), Y2 to Y3 (1.8%,  $p<0.01$ ) and Y3 to Y4 (1.7%,  $p<0.01$ ). In the FB group, BW increased from Y3 to Y4 (1.4 kg;  $p<0.01$ ) and increased %BF from Y2 to Y3 (1.5%,  $p<0.01$ ) and Y3 to Y4 (0.4%,  $p<0.01$ ). BA increased %BF from Y1 to Y2 (1.7%,  $p<0.05$ ) and Y2 to Y3 (2.1%,  $p<0.05$ ). BK had no change in BW or %BF at any of the time points. **CONCLUSIONS:** Our data indicate that changes in body composition occur over the course of four years in a majority of male collegiate athletes, but are expressed differently based on sport. Further, the third year of athletics participation appears to be an important marker for changes in both BW and %BF in male athletes, suggesting a need for additional physical activity, dietary, and/or behavioral guidance during this year of competition.

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### THE EFFECT OF YEAR IN COLLEGE ON SPEED AND POWER IN FEMALE SOFTBALL ATHLETES

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Speed, muscle power and the ability to change direction quickly and under control are important physical parameters in most sports, including female softball. Strong relationships have been demonstrated between power and the ability to change direction efficiently. Limited research exists which compares year in college and speed, muscle power and the ability to change directions under control. The purpose of the present study was to determine if year in college (Fr., So., Jr., Sr.) would affect specific fitness parameters. Seventy-four female college softball players at a mid-major NCAA college participated in our investigation. Our hypothesis was that athletes in the second, third and fourth years would progressively perform better in the measured tasks. The tasks tested were: time from: home-to-first base, home-to-second base, home-to-home, speed from: home-to-first base, home-to-second base, home-to-home, and power from: home-to-first, home-to-second, and home-to-home. Determination of data normality with Shapiro-Wilk was followed by one-way ANOVA to compare groups across time. No statistical differences were found for body mass (Fr-68.3  $\pm$  9.4; So-69.5  $\pm$  6.7, Jr-65.4  $\pm$  7.8, Sr-67.5  $\pm$  8.2 kg) or any of the variables tested. Home-to-home speed decreased between freshman (4.46  $\pm$  2.1 m/s) and senior years (4.13  $\pm$  0.15 m/s), but was not statistically significant ( $p=0.76$ ). These findings suggest that additional years of playing college softball does not affect traditional field tests for speed and power. Our hypothesis was based on the learning effect of testing and player maturity. Motivation to perform at a high level was not measured, which may have affected the results.

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### EFFECTS OF DIFFERENT TYPES OF WARM-UP ON SWIMMING PERFORMANCE IN MASTERS SWIMMERS

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The purpose of this study was to evaluate the effects of no warm-up, short warm-up, and regular warm-up on swimming performance in Masters Swimmers. Six female and four male active master swimmers, aged 35  $\pm$  9, volunteered to participate in the study. In three trials separated by 48 hours, participants completed each warm-up (no, short - 100 yards freestyle swim, or regular competition warm-up), rested for three minutes and then completed a 50-yard (45.7m) freestyle maximal performance time trial. Rating of perceived exertion (RPE) and heart rate (HR) were measured post warm-up and post 50-yd time trial. No significant mean difference ( $p = 0.99$ ) was found among no, short or regular warm-ups for 50-yd freestyle time (29.0  $\pm$  3.7, 29.0  $\pm$  3.6, and 29.1  $\pm$  3.4 s, respectively). Individual data indicated that 50% ( $N = 5$ ) of the swimmers swam their fastest with no warm-up, and 20% ( $N = 2$ ) with short warm-up compared to 30% ( $N = 3$ ) with regular warm-up. RPE post-warm-up was significantly lower ( $p < 0.001$ ) after no warm-up (6  $\pm$  0) compared to short warm-up (13  $\pm$  2) and regular warm-up (12  $\pm$  2). RPE post 50-yd after no, short and regular warm-up were not significantly different ( $p = 0.76$ ). HR after no warm-up (136  $\pm$  20 b/min) was lower ( $p = 0.001$ ) compared to regular warm-up (148  $\pm$  15 b/min) and approached but did not reach statistical significance ( $p = 0.052$ ) compared to short warm-up (142  $\pm$  17 b/min), but no significant ( $p = 0.08$ ) difference in HR was observed between short and regular warm-ups. In conclusion, some Masters Swimmers may perform better with no or short warm-up compared to regular warm-up, therefore, individual differences should be considered.

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**COMPARISON OF A FIELD BASED TEST TO ESTIMATE FUNCTIONAL THRESHOLD POWER AND POWER AT LACTATE THRESHOLD.**

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It has been proposed that field based tests used to estimate functional threshold power (FTP) result in a power output equivalent to power output at lactate threshold (LT). However, anecdotal evidence from regional cycling teams tested for lactate threshold in our laboratory suggested that power output at lactate threshold underestimated FTP. PURPOSE: It was hypothesized that estimated FTP is not equivalent to power output at lactate threshold. METHODS: FTP was estimated from an 8-min field test and compared to power output at LT using two methods; LTdelta1, a 1 mmol/L or greater rise in blood lactate in response to an increase in workload and LT4.0, blood lactate of 4.0 mmol/L. RESULTS: Estimated FTP was equivalent to power output at LT4.0 and greater than power output at LTdelta1. Maximal oxygen consumption (VO<sub>2</sub>max) explained 93% of the variance in individual power outputs during the 8-min field test. When 8-min field test power output was expressed relative to maximal power output from the VO<sub>2</sub>max test (individual exercise performance), VO<sub>2</sub>max explained 64% of the variance in individual exercise performance. Power output at LT was not related to 8-min field test power output. In conclusion, FTP estimated from an 8-min field test is equivalent to power output at lactate threshold if LT4.0 is used, but is not equivalent for all methods of lactate threshold determination including LTdelta1.

**CHARACTERISTICS OF ATHLETES PARTICIPATING IN SPORTS AT RISK FOR THE FEMALE ATHLETE TRIAD**

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Athletes participating in gymnastics and cross-country are suggested to be at risk for the Female Athlete Triad. PURPOSE: The purpose of this study was to determine if characteristics related to the Triad exist in athletes participating in sports at risk for the Triad. METHODS: Participants included collegiate gymnasts and cross-country runners. Dual energy X-ray absorptiometry (DEXA) was used to assess bone mineral density (BMD). Caloric intake (CAL) was estimated by a 24 hour dietary recall. Menstrual cycle regularity was recorded. Characteristics related to the Triad included: total calories < 2700, relative calories < 37, BMI < 18.5, irregular menstrual cycles, and BMD Z score of -1.0 to -2.0. RESULTS: An independent samples t-test revealed significant differences between groups in total BMD, BMI, and relative CAL. Overall, 51% and 32% of the athletes did not achieve recommended absolute and relative CAL, respectively and 29% reported irregular menstrual cycles. All athletes had a BMI > 18.5 and BMD Z scores above -1.0. Of those with < 37 kcal/kg, only three reported irregular menstrual cycles. Additionally, of the 29% with irregular menstrual cycles, none had low BMD Z scores (-1.0 to -2.0). CONCLUSIONS: Overall, few athletes participating in sports suggested to be at risk for the Female Athlete Triad exhibited characteristics positively related to the Triad.

**HEALTH-FITNESS MEASURES IN DIVISION II FEMALE COLLEGIATE SOCCER PLAYERS**

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Soccer is physically demanding and participants would be expected to possess higher than normal aerobic fitness and desirable anthropometric measures. This study compared female collegiate soccer players to criterion health/fitness measures. Thirteen soccer players were assessed for percent fat, maximal aerobic capacity (VO<sub>2</sub> max) and Body Mass Index (BMI). One sample t-tests (vs. criterion measures) show VO<sub>2</sub> max values (51.9 ± 5.6 ml/kg/min) that were significantly higher than the criterion measure of 37.8 ml/kg/min (50th percentile). Body fat percent (22.5 ± 3.9 %) was not significantly different than the criterion measure of 22.1% (50th percentile) and BMI (23.13 ± 2.65) was significantly lower than the selected criterion of 24.9 (upper value designating normal weight status). Soccer training and competition requires considerable aerobic energy production which explains impressive VO<sub>2</sub> max values. Training should also result in significant caloric expenditure which would be expected to help maintain desirable body fat and BMI. The female collegiate soccer players that participated in this study displayed desirable measures with respect to health/fitness measures suggesting that soccer is an adequate stimulus for high aerobic fitness, desirable body fat percent and BMI. Future research should investigate youth and recreational soccer athletes to determine if similar results are attained.

**RELATIONSHIP OF STRENGTH VARIABLES TO JUMP AND SPRINT PERFORMANCE IN COLLEGIATE (D-1) SPRINTERS**

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The relationship of maximum isometric strength characteristics and sprint times over 15, 30 and 45 M was investigated in 23 D-1 Collegiate sprinters. Body composition was measured by plethysmography. Isometric force-time curves (F-TC) were generated using a mid-thigh pull and force plate. Peak isometric force (IPF), force at 50ms, 90ms, 250 ms and rate of force development (RFD, 0-200ms) were derived from a Force-time curve. Previous work (n = 200+) has consistently resulted in test-retest reliability for IPF of Intra Class Correlation alpha (ICC<sub>α</sub> ≥ 0.99) and RFD, (ICC<sub>α</sub> ≥ 0.9). Forces were expressed in Newton's divided by body mass raised 2/3 (N x Bm<sup>0.67</sup>) in order to partially obviate body mass. Jumps were performed on a force plate and jump height (JH) calculated from flight time, peak power was calculated from impulse. The sprint consisted of a 15 M run-in from a standing start and a 30 M flying sprint (total = 45 M). Timing gates were positioned at 0m, 15m, 30m and 45m. Correlations indicate moderate to very strong relationships between jump height (r = -0.63 to -0.70), power output (r = -0.47 to -0.52) and sprinting ability. Effect size comparisons between the strongest and weakest sprinters and the fastest versus slowest indicate that better sprinters possess greater jumping abilities, greater absolute and relative isometric maximum strength and were more explosive (RFD). The results indicate that stronger sprinters can jump higher and run faster over 25, 30 and 45 M.



### THE BIOAVAILABILITY OF LACTATE DIHYDRATE AND CALCIUM LACTATE MONOHYDRATE

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Athletes are continuously searching for an advantage over their competitors. A new ergogenic aid containing Lactate Dihydrate and Calcium Lactate Monohydrate has recently been touted in the mainstream sports media for performance enhancement. However, there has been no scientific evidence to support or refute these claims. Manufacturers of the supplement claim improved performance through increased energy and a decrease in lactic acid production. While energy is produced through the lactate shuttle system, availability as a substantial source of energy during exercise is questionable and not currently supported by existing research. Also, supplementing with external lactate should not directly affect lactate production in the body. In order for this supplement to increase performance it must be available within the system. The purpose of this study was to evaluate the bioavailability of calcium lactate monohydrate and magnesium lactate dihydrate. Ten subjects (male = 7 and female = 3) participated in this study. Resting blood lactate was measured prior to ingestion of the ergogenic aid utilizing the Lactate Pro and a finger stick. After ingestion of the ergogenic aid subjects remained in a resting state for one hour, per manufacturer's instruction to ingest one hour prior to competition. Upon completion of that hour resting blood lactate levels were measured again. Means for the two measures were compared utilizing a dependent T-test with significance set at  $P < 0.05$ . There was no significant difference ( $P = .235$ ) between pre ( $1.48 \pm 0.47$ ) and post measures ( $1.61 \pm 0.53$ ). Supplementation of lactate does not appear to significantly increase bioavailability.

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### COMPARISON OF EQUATIONS CALCULATING VERTICAL JUMP TESTING IN COLLEGIATE MEN'S BASKETBALL

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This study compared three equations with measured peak power from a force plate platform in college male basketball players. Nine college male basketball players (age,  $20.6 \pm 1.88$  years; mass  $92.78 \pm 15.94$  kg, height,  $189.79 \text{ cm} \pm 9.44 \text{ cm}$ ) volunteered to participate in the study. The average vertical jump for the group was ( $72.95 \text{ cm} \pm 8.69 \text{ cm}$ ). The estimated peak power was equated using the Harman et al., the Sayers countermovement jump, and the Canavan and Vescovi equations. Harman et al., and Sayers countermovement jump both over predicted the actual peak power, while the Canavan and Vescovi under predicted the actual peak power. This contradicts the study done by Duncan et al. which tested elite high school male basketball players actual and predicted peak powers. In the Duncan et al. research all three equations under estimated peak power. The Sayers countermovement jump was the most accurate but none of the three equations produced a significant p-value ( $p < 0.05$ ). This was also found in the Duncan et al. study. Canavan and Vescovi produced the highest Pearson's Correlations, but were not significant enough to be deemed accurate. The data shows that the regression formulas do not accurately estimate peak power in male college basketball players. Having peak power available to coaches and trainers is important in athletics. Specific changes in training programs can be made to improve an athlete's power. While there is currently no accurate equation for peak power estimation when dealing with trained athletes, a sports specific equation may be needed in order to find a more accurate peak power estimation equation

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### VALIDITY AND RELIABILITY OF THE MYOTEST DEVICE: A COMPARISON TO 1 REP MAX TESTING, AND 70% MAX TESTING OF BENCH PRESS OF COLLEGE AGED MALES

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The purpose of this study is to examine the validity and reliability of the Myotest device when compared to 1RM testing and 70% 1RM testing of the bench press. Louisiana Tech University male students in the kinesiology department, ages 18-26 years, ( $n = 25$ ) were recruited and completed this study. The Myotest acceleromometer device was used to measure estimated strength, power, force, and velocity. Participants were instructed to perform an upper body warm-up prior to each test. For 1RM testing, subjects warmed up then progressed their weight on the bench press bar until a maximal weight was completed for one repetition at maximal effort. For 70%RM testing, subjects put 70% of their 1RM on the bench press bar and lifted it as many times as possible until failure. For Myotest device testing, subjects lifted preset amounts of weight, according to the devices protocol until the device equated an estimated maximal lift. A significant correlation was found between 1RM and 70%RM ( $p < .001$ ) and between 1RM and the Myotest ( $p < .001$ ). The correlation between 70%RM and the Myotest was also significant ( $p < .001$ ). Body weight was significantly correlated to 1RM, 70%RM, and the Myotest ( $p < .001$ ). The data shows a significant correlation between the Myotest results and the results from the 1RM and 70%RM. There were several test results completed with the Myotest that resulted in numbers that were significantly below and above actual 1RM and 70%RM. The Myotest was less valid as the amount of the 1RM increased ( $p < 0.01$ ). The Myotest is valid and reliable when used over multiple tests, with multiple participants.

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### THE EFFECTS OF HEAD/NECK FLEXION, EXTENSION AND ROTATION ON SIT AND REACH FLEXIBILITY SCORES

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Background: The implementation of head flexion, extension and rotation movements may improve performance on a sit and reach flexibility assessment. These movements were performed in sequence prior to performing a sit and reach assessment. The head movements are believed to interact with the Golgi tendon organ response allowing further stretch.

Methods: Twenty-four college aged students volunteered to participate in the study ( $n = 24$ , 15 males and 9 females). Each participant performed two sit and reach flexibility tests. The participants engaged in a 5 minute standardized warm-up. Following warm-up the participants performed a traditional sit and reach test using a Flex-Tester Sit and Reach Flexibility Box. Participants were then given a 30 second rest period during which they were given instructions for the next trial. Participants were then asked to perform head movements in each direction for 10 repetitions. Immediately following the last repetition participants were asked to complete another sit and reach stretch. Results: Preliminary results suggest that participants engaging in these head movements prior to the stretch improved their performance on the sit and reach flexibility assessment significantly. Conclusion: Techniques such as head movement implementation can improve overall flexibility if incorporated into daily flexibility routines thus increasing the overall health related benefits of flexibility. The overall health benefits of flexibility include; improved posture, improved athletic performance and decreased incidence of injury (Hales, 2008).

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**ARE THE FITNESS LEVEL OF OUR UPCOMING PHARMACISTS DECREASING?**

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Pharmacists are a first-line health care provider and an emerging source of preventative health care and education for the public. This study's purpose was to compare the cardiovascular fitness and body composition of today's pharmacy students with college students of previous years. For this study the 2009 and 2010 first year Pharm. D. students at the University of Louisiana at Monroe were evaluated and compared to previously reported data of college students. 129 students (78 Male; and 51 Female; age 22 + 3 years) underwent a submaximal cycle test and a body composition test to determine their cardiovascular fitness and percent body fat (BF%). Results showed the students had an BF% average of  $20 \pm 8\%$  BF and an average  $VO_{2peak}$  predicted of  $31.87 \pm 10.14$  mL/kg/min. The current pharmacy students had a slightly higher BF% and a significantly lower  $VO_{2peak}$  compared to other studies. When comparing the two classes, results show the 2009 class had a slightly higher BF% ( $23.00 \pm 8\%$ ) compared to the 2010 class ( $16.74 \pm 6\%$ ) ( $p < .001$ ). The  $VO_{2peak}$  data for each class was relatively the same (2009  $VO_{2peak} = 31.82 \pm 10.64$  mL/kg/min. vs. 2010  $VO_{2peak} = 31.87 \pm 9.69$  mL/kg/min.). We can conclude from this that past college students were more cardiovascular fit and had a better BF% than compared to today's future pharmacists. The poor fitness of the current Pharm.D. students appears to be leveling off since cardiovascular fitness between the 2009 and 2010 classes was the same for the current students. There is a need to evaluate fitness levels of health care students from all areas, as they are supposed to exemplify a healthy lifestyle.

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**METABOLIC COST OF USING WEIGHTED GLOVES DURING BRISK WALKING**

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The training stimulus during walking can be augmented through the use of exercise-assist devices such as walking poles and hand/wrist weights. Hand/wrist weights (typically 3 lbs) increase the energy expenditure of walking by about 35 kcal during a 30-min walk, and increase the heart rate (HR) by 7-13 bpm. QuikHands LLC (Columbus, OH) has developed a fitness glove that allows the insertion of weights (4, 5.5, 7 ounces). Claims are that the gloves allow walkers to exercise without gripping a hand weight while increasing energy expenditure 40% and HR 10-15 bpm. This study measured the metabolic cost of using weighted gloves with 7 ounce weights (0.5 lb/glove total weight). Subjects included 10 moderately trained males (mean  $\pm$  SD, age  $21.9 \pm 4.2$  years; BMI  $24.1 \pm 2.7$  kg/m<sup>2</sup>;  $VO_{2max}$   $51.8 \pm 6.3$  ml/kg/min). Subjects walked at 4 mph ( $39.3 \pm 5.0$  % $VO_{2max}$ ) for 16 min, with 1-min Douglas bags collected every 4 min. Expired gas fractions were analyzed using S-3A oxygen and CD-3A carbon dioxide analyzers (AEI Technologies, Applied Electrochemistry, Pittsburgh, PA). Expired gas volumes were measured with a Tissot spirometer. Subjects walked the first of four 4-min stages either with or without weighted gloves (randomized order), and then alternated walking with or without the gloves at steady state. Results showed no significant differences when comparing brisk walking with or without weighted gloves for HR ( $117 \pm 17.4$  and  $116 \pm 18.3$  bpm, respectively,  $P=0.408$ ), oxygen consumption ( $20.1 \pm 1.1$  and  $20.1 \pm 1.0$  ml/kg/min,  $P=0.738$ ), or ventilation ( $38.8 \pm 6.4$  and  $39.4 \pm 6.7$  L/min,  $P=0.353$ ). In summary, wearing two 0.5 lb gloves is an insufficient stimulus to increase heart rate or oxygen consumption while walking.

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**THE EFFECTS OF AN ACUTE OVERSPEED WARM-UP ON SPRINT PERFORMANCE IN COLLEGIATE ATHLETES**

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**PURPOSE:** To determine whether an acute overspeed warm up before a short sprint can improve time and stride length. It was hypothesized that overspeed warm-ups would decrease time and decrease stride length. **METHODS:** Participants (21) completed two days of counterbalanced testing which consisted of a 10-15 minute warm up of choice followed by one timed and videotaped 60-meter dash. On one of the two days, participants also completed four bungee runs after the warm up but prior to the 60-meter dash. **RESULTS:** A 2 (condition) by 3 (segment; 0-20M, 20-40M, 40-60M) repeated measures GLM for time revealed a significant segment effect but no significant condition effect or condition by segment interaction,  $F(2, 40) = 504.92$ ,  $p < .01$ . Time was significantly greater for the first 20 meters ( $3.36 \pm .05$ ) than the second 20 meters ( $2.41 \pm .03$ ) or the third 20 meters ( $2.46 \pm .05$ ) which were not different. A 2 (condition) by 4 (segment; 0-10M, 10-20M, 25-35M, 45-55M) repeated measures GLM for stride length revealed a significant segment effect but no significant condition effect or condition by segment interaction,  $F(3, 60) = 262.11$ ,  $p < .01$ . Stride length from 0-10M was shorter than that from 10-20M, 25-35M, and 45-55M. Stride length from 10-20M was shorter than that from 25-35M and 45-55M while there was no difference between 25-35M and 45-55M. **CONCLUSION:** While no significant differences were found between the overspeed warm up and the traditional warm up, absolute differences were observed. It is possible that this small difference could have an impact on individual's results. Further research is needed to determine the impact of this absolute difference.

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**COMPARISON OF UNITS FOR EXPRESSING AEROBIC POWER IN CHILDREN**

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Units for the expression of aerobic power ( $VO_{2max}$ ) in children are influenced by age, sex, body fat and fat free mass. The problem becomes how does one compare children with these differing characteristics and know that they are obtaining a true comparison of aerobic power. Thus, the purpose of this study was to explore traditional units for measuring aerobic power in children to determine which units are least related to age and anthropometric measures. Children, ages eight to eighteen year old (boys = 2608; girls 2643), had their heights (cm), weights (kg), and sum of skinfolds measured, and from these measures bodyfat, body surface area (BSA), and body mass index were calculated.  $VO_{2max}$  (mL/min) was estimated from a multi-stage submaximal cycle test and then expressed in units of mL/kg/min, mL/kgFFM/min (fat free mass), allometric scaled to 0.67 power, mL/BSA/min, and mL/cm/min. Multiple regression analysis was performed examining the influence of age, sex, body fat, weight and height on each of the six units for aerobic power. Body fat was the strongest predictor for the units of mL/kg/min ( $R^2 = 0.45$ ); allometric scaled ( $R^2 = 0.28$ ), and mL/BSA/min ( $R^2 = 0.22$ ). FFM was the strongest predictor of mL/min ( $R^2 = 0.65$ ) and mL/cm/min ( $R^2 = 0.47$ ). Sex entered all models but accounted for  $R^2 \leq 0.04$ . In all models age had  $R^2 < 0.0006$ . The unit of mL/kgFFM/min had the lowest total  $R^2$ , being least influenced by age and anthropometric variables (total  $R^2 = 0.13$ ). The results suggest the when comparing children of different ages and anthropometric measures,  $VO_{2max}$  expressed in units of fat free mass may be the most appropriate units.

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**Validity and Accuracy of Submaximal Cycling COMPARED to Maximal Treadmill Exercise Testing on College-Aged Participants**

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**P45** PURPOSE: To investigate the validity and accuracy of the YMCA submaximal cycling test relative to the Astrand treadmill protocol in college-aged participants. METHODS: Twenty-four college students from Louisiana Tech University (LaTech) between the ages of 18-29 years old were recruited for this study, but only twenty (10 males and 10 females) completed both tests. All participants completed the YMCA submaximal cycling test first. Each subject was required to rest at least 48 hours before the second test (Astrand treadmill test). The YMCA submaximal cycling test was used to estimate the VO<sub>2</sub>max. The Astrand treadmill test was used to determine an actual VO<sub>2</sub>max. Correlation coefficients were calculated for the two variables. Interpretation of correlation coefficient was based on the suggestion of Safrit & Wood. Correlations were listed as high ( $\pm 0.80$  - 1.0), moderately high ( $\pm 0.60$  - 0.79), or moderate ( $\pm 0.40$  - 0.59). Statistical significance was set at an alpha level of  $p < 0.05$ . Also, the standard estimate of error was used to determine the accuracy. RESULTS: The correlation coefficients suggest no correlation ( $r = 0.14$ ) between the two tests for men. However, there was a significant, moderate correlation ( $r = 0.57$ ) between the tests for women. DISCUSSION and CONCLUSIONS: The data suggest that the YMCA submax test provides an estimate of VO<sub>2</sub>max which is unreliable and underestimates the true VO<sub>2</sub>max by approximately 16%. It is recommended that health professionals that are designing cardiovascular programs for college-aged clients use an actual VO<sub>2</sub>max instead of an estimated of VO<sub>2</sub>max since the submaximal cycling test did not accurately predicted VO<sub>2</sub>max and would underestimate exercise training intensity.

**EVALUATION OF MODE DEPENDENCY OF THE VE/VCO<sub>2</sub> SLOPE IN OBESE ADOLESCENTS**

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**P46** The most common index of ventilatory efficiency is the VE/VCO<sub>2</sub> slope, which has been previously shown to be increased in obese compared to normal weight children. The purpose of this study was to investigate whether the VE/VCO<sub>2</sub> slope during graded exercise in obese children is mode dependent. Fourteen obese boys (N=4) and girls (N=10) voluntarily participated in the study and completed maximal effort graded exercise tests on both a cycle ergometer (CE) and treadmill (TM). Average subject age and BMI was 13.4 yrs and 36.7 kg/m<sup>2</sup>, respectively. Maximal oxygen consumption (VO<sub>2</sub>peak) and ventilatory threshold (Tvent) were determined during both exercise trials. Subsequently, overall VE/VCO<sub>2</sub> slope and the slope below and above Tvent were compared between the two modes. VO<sub>2</sub>peak was significantly ( $p < 0.05$ ) greater during the TM trial ( $26.6 \pm 5.5$  ml/kg/min) compared to the CE trial ( $22.4 \pm 6.5$  ml/kg/min). The VO<sub>2</sub> at Tvent was significantly ( $p < 0.05$ ) higher during the TM trial, however, the percentage of VO<sub>2</sub>peak at Tvent was not significantly different (TM= $63.3 \pm 6\%$  vs. CE= $65.6 \pm 5.9\%$ ). While there was no significant difference in the overall VE/VCO<sub>2</sub> slope or the VE/VCO<sub>2</sub> slope above Tvent, the VE/VCO<sub>2</sub> slope below Tvent was significantly ( $p < 0.05$ ) higher in the TM trial ( $25.1 \pm 2.2$ ) compared to the CE trial ( $23.3 \pm 1.9$ ). In our small sample of obese adolescents, we observed a greater VE response for a given VCO<sub>2</sub> during TM exercise below the Tvent. The observed differences may be related to the greater energy cost and/or greater activation of muscle afferents during weight bearing exercise in obese adolescents.

**CHANGES IN PRE-SEASON MEASURES OF BODY COMPOSITION, AEROBIC ENDURANCE, AND SPEED IN COLLEGE SOCCER PLAYERS.**

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**P47** The aim of the study was to determine if there was a difference between 2009 and 2010 pre-season measures of body weight (BW), percent body fat (%BF), aerobic endurance, and speed in college soccer players. Fourteen Division I college soccer players participated in this study. The participants performed the forty yard sprint (40yd) and 20-m multistage fitness test (MSFT). Both pre-season testing seasons were conducted early in the morning at the soccer training complex in early August. Participants BW and %BF were collected and a 10-15 minute general and specific warm-up was performed before each test session. Paired-sample t tests revealed a significant increase in 40yd sprint time ( $4.87 \pm 0.23s$  vs.  $4.94s \pm 0.22s$ ;  $p=0.023$ ) and level/shuttle completed during the MSFT ( $11.2 \pm 1.3$  vs.  $12.3 \pm 1.0$ ;  $p=0.010$ ). The results suggest that the off season training program is significantly increasing aerobic endurance; however, this training program may be contributing to slower 40yd sprint times. It appears body composition was not affected by the off season training programs and not related to changes in aerobic endurance and speed.

**THE HEALTH BENEFITS OF RECREATIONAL GOLF**

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**P48** Background: Physical activity has become more prevalent as a means of reducing the risks of chronic health issues such as diabetes, cardiovascular disease and osteoporosis. Many look to find an exercise or sport that fits their personality and functional ability. The 2008 Physical Activity Guidelines state that a minimum of 712.5 kcal/wk are required in order to realize health benefits. Few studies have been conducted to determine if lifetime activities, such as golf, meet these guidelines. Furthermore little is known concerning the potential benefits associated with riding while playing golf, which may be an alternative mode for those with limited functional ability. The purpose of this study was to determine if golf (walk vs ride) provides a significant caloric expenditure to meet the 2008 Physical Activity Guidelines. Methods and Results: Sixteen individuals ( $37.5 \pm 4.0$  yrs) were asked to wear an Actigraph accelerometer while walking and riding 9 holes of golf on separate, non-consecutive days. The results suggest that walking 9 holes of golf yielded a caloric expenditure of  $711 \pm 44$  kcal, which was greater than the caloric expenditure of  $358 \pm 22$  kcal yielded while riding ( $P < .0001$ ). Conclusions: The data indicate that walking 9 holes expends more energy than riding. However, the data suggests that riding 9-holes at least two days a week may also allow individuals of varying functional abilities to meet the minimum caloric expenditure required to elicit health benefits.

#### **PREDICTORS OF FUNCTIONAL CAPACITY AND ABILITY DIFFER AMONG OLDER INDIVIDUALS**

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Major peripheral factors implicated in the accelerated decline in  $VO_2$  peak and functional ability, after the age of 65, include a decrease in muscle mass coupled with a decline in vascular function. **PURPOSE:** To examine the role of body composition and vascular stiffness and reactivity on  $VO_2$  peak and a Senior Fitness Test (SFT). **METHODS:** Fifty-three subjects (Male= 18, Female=35; Age=75±5 yrs) performed a graded exercise test (GXT), and SFT. Body composition (weight (WT), lean mass (LM), and fat mass (FM)) was examined using DEXA. Vascular stiffness (Central pulse pressure (PP), and pulse wave reflection (PWV) were assessed using tonometry. Brachial artery reactivity (BAR) was examined using ultrasound and defined as the change in diameter in response to forearm occlusion and an ice bath. **RESULTS:** Averages for  $VO_2$  peak and the total score for SFT were 16.34±3.57 ml/kg/min-1; and 34.25%. WT, LM, and FM were 80.15±15.29, 49.32±11.18, and 31.05±7.66kg. Central PP, augmentation index, PWV and BAR were 51±13 mmHg, 32.37±8.90%, 10.42±2.17msec-1, and 8.94±4.11%. Regression analyses indicated that LM, age and central PP accounted for 68% of the model to predict  $VO_2$  peak ( $p=0.0002$ ). Regression analyses to predict the SFT score identified BAR, peak rate pressure product on the GXT, and age as the most significant predictors, accounting for 34% of the model ( $p=0.0001$ ). **CONCLUSION:** LM, age and central PP are the strongest predictors for  $VO_2$  peak; whereas BAR, peak rate pressure product, and age appear to be the stronger predictors for functional ability in older individuals.

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#### **EFFECT OF RESISTANCE TRAINING MODE ON PEAK RUNNING VELOCITY IN RECREATIONAL RUNNERS**

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The purpose of this study was to determine the relationship between recreational runners' peak running velocity (PRV) and mode of resistance training undertaken during a ten-week training intervention. It was hypothesized that resistance training would improve recreational runners' peak running velocity, specifically with regard to the use of free weights versus weight machines or a control group. Thirteen subjects randomly assigned to one of three groups: free weight resistance training (FW; 2 male, 3 female), weight machine resistance training (WM; 2 males, 1 female) and control group (CON; 3 males, 2 females). The subjects followed a twice-per-week resistance training intervention based on specific mode of resistance training to which they were assigned. Each runner also completed two tests to determine peak running velocity (PRV), defined as final velocity attained for at least five seconds duration during an incremental running test on a treadmill set at 0% grade. The first test (PRV1) was performed at the beginning of intervention, while the second test (PRV2) was performed upon completion of intervention. Between-groups and within-groups differences were determined by conducting an ANCOVA. To control for potential confounding effects on the dependent variable (PRV2), runners' PRV1 scores were used as the covariate. Data analysis demonstrated that runners' PRV1 scores significantly predicted PRV2 scores in all of the runners,  $F=42.69$ ,  $p<0.001$ . There was also a significant effect of resistance training mode on PRV2, after controlling for the covariate,  $F=4.30$ ,  $p<0.05$ . However, pairwise comparisons of three resistance training modes revealed no significant differences ( $p>0.05$ ). Moreover, while it appears runners' PRV1 scores strongly predict their re-test values, these results suggest no difference in effectiveness among three separate resistance training modes to improve peak running velocity in recreational runners.

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#### **COMPARISON OF TWO FIELD-BASED TESTS TO PREDICT MAXIMAL OXYGEN UPTAKE IN SOCCER AND CROSS-COUNTRY ATHLETES**

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In a counter-balanced design male and female collegiate soccer ( $n=13$ ) and cross-country ( $n=12$ ) athletes performed a 20m Multistage Shuttle Test (MST) and Square Shuttle Test (SST) separated by 3d, followed by direct measurement (criterion) of  $VO_2$  max during an incremental treadmill test. MST and SST commenced at speeds of 8.0 km/h and increased by 0.5 km/h every 60s. Audible cues signal the pace to run "shuttles" back and forth (MST) or around a square (SST) between markers 20m apart. Two-way (sport x test) ANOVA (repeated measures on test) indicated cross-country runners completed more shuttles ( $p<0.01$ ) on MST ( $116 \pm 27$  vs.  $86 \pm 12$ ) and SST ( $168 \pm 46$  vs.  $102 \pm 13$ ), and had a higher measured  $VO_2$  max ( $59.7 \pm 7.2$  vs.  $43.7 \pm 4.1$ ,  $p<0.001$ ) than soccer players. Athletes ran more laps during SST compared to MST ( $p<0.01$ ). Pearson's correlation and linear regression revealed significant ( $p<0.01$ ) correlations and SEE between tests and  $VO_2$  max. Combining sports, correlation coefficients and SEE (mL/kg/min) were 0.89 (4.67) and 0.93 (3.76) for MST and SST versus  $VO_2$  max, respectively. Correlation coefficients between MST and  $VO_2$  max were 0.83 (2.40) and 0.87 (3.68), and between SST and  $VO_2$  max were 0.73 (2.92) and 0.91 (3.17), for soccer and cross-country athletes, respectively. Although differences between correlation coefficients were not statistically significant ( $p>0.05$ ), it may be prudent to use MST (x) to predict  $VO_2$  max (y) for intermittent (soccer) sports ( $y = 0.2764x + 19.924$ ,  $SEE = 2.40$ ) and SST for continuous (cross-country) sports ( $y = 0.1418x + 35.866$ ,  $SEE = 3.17$ ) due to their lower respective SEE and more accurate estimation.

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#### **THE COMPARISON OF CALORIC EXPENDITURE ESTIMATED BY THE WII FIT PLUS TO A METABOLIC CART**

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The purpose of this experiment was to compare actual caloric expenditure to the amount estimated by the Wii Fit Plus during a step aerobic activity. A convenience sample of 17 females aged 19-22 years were selected to perform a 10-minute free step aerobic activity on a Nintendo Wii Fit Plus (Redmond, WA). Participants were connected to the ParvoMedics TrueOne 2400 Metabolic Cart (Sandy, UT) and the number of calories measured was then compared to the number of calories estimated by the Wii Fit Plus. Findings indicated there was not a significant difference ( $p=.16$ ) between calories estimated using the Wii Fit Plus step aerobics ( $33.94 \pm 1.1$  cal) and the calories of the energy expenditure measured by a metabolic cart ( $32.89 \pm 6.18$  cal). The Wii Fit Plus aerobic program is an accurate predictor of calculating the caloric expenditure. Individuals that are trying to accurately track their caloric expenditure can utilize this feature on the Wii Fit Plus. Supported in part by an intramural faculty development grant (RWH)

#### NO RELATIONSHIP BETWEEN FUNCTIONAL EXERCISE ASSESSMENTS AND HIP AND KNEE RUNNING BIOMECHANICS IN TRIATHLETES

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Epidemiological evidence suggests that knee overuse injuries are common in triathletes. Aberrant hip biomechanics have recently been implicated in the etiology of chronic knee pathologies. It is possible that adaptations at the hip occurring during the cycling stage effect hip and knee biomechanics during subsequent running in triathlon and pose an injury risk. The relationship between two functional exercise assessments and the change to hip and knee running biomechanics following a 30min, non-fatiguing, stationary cycling protocol in a group of 28 triathletes was investigated. The Functional Movement Screen (FMS) and a Side-Bridge Suspension Exercise (SE) assessment were performed and scores were non-parametrically correlated with the average absolute changes to stance phase hip and knee peak angles in all three planes of motion between a baseline and a 14min post-cycling run in triathletes. Samples were taken at 2min, 6min, 10min, and 14min post cycling for averaging. Peak Hip Internal Rotation pre= $21.8 \pm 7.2$ , post= $25.2 \pm 9.1$ ) as well as Peak Knee Adduction (pre= $15.5 \pm 5.5$ , post= $17.8 \pm 5.1$ ) were significantly different from baseline. Average change to Hip IR angle was significantly correlated with average change to Knee ABD angle ( $r=0.65$ ). No significant correlations were identified between the FMS and Hip IR change ( $r = -0.13$ ) or Knee ABD change ( $r = -0.16$ ) and SE and Hip IR change ( $r = 0.22$ ) or Knee ABD change ( $r = 0.01$ ). These results suggest that the FMS and SE exercise assessments may not adequately predict triathletes at risk of developing changes to running biomechanics following cycling that may predispose them to overuse injuries.

#### LACTATE THRESHOLD VALUES FOR ANAEROBIC ATHLETES

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This study compared  $VO_2$  max, lactate threshold (LT) and  $VO_2$  at LT ( $VO_2$ LT) among aerobic athletes (ARA) (n=10), anaerobic athletes (ANA) (n=9) and untrained subjects (UTS) (n=7). From a treadmill test to exhaustion,  $VO_2$  max and LT (4 mmol/L blood lactate concentration) were assessed. Results: ANOVA's showed  $VO_2$  max ( $ml/kg \cdot min^{-1}$ ) was significantly greater for ARA ( $67.6 \pm 9.4$ ) than ANA ( $53.4 \pm 6.4$ ) and UTS ( $44.9 \pm 6.9$ ), with ANA significantly greater than UTS. LT for ARA ( $82.9 \pm 6.4$ ) was not significantly different than ANA ( $77.5 \pm 13.1$ ). However, ARA and ANA were significantly greater than UTS ( $66.8 \pm 5.4$ ).  $VO_2$  LT ( $ml/kg \cdot min^{-1}$ ) was significantly greater for ARA ( $55.9 \pm 7.7$ ) and ANA ( $41.5 \pm 8.6$ ) than for UTS ( $29.9 \pm 4.1$ ) with ANA significantly greater than UTS. Although used to establish groups,  $VO_2$  max for ARA (vs. UTS) reflect aerobic training adaptations. Similarly high LT would be expected in ARA. Modest  $VO_2$  max for ANA reflects only a mild stimulus to oxidative pathways (plausibly occurring during recovery from repeated high-intensity efforts). However, anaerobic training appears to provide a stimulus adequate to increase LT. Elevated LT with moderate changes in  $VO_2$  max for ANA provide indirect evidence that differential mechanisms alter  $VO_2$  max and LT. Still,  $VO_2$  at LT may have the greatest implication with regards to aerobic performance. From a practical standpoint, coaches/trainers should consider the impact of anaerobic training on LT. Future research should more directly examine threshold-altering mechanisms between these groups of athletes.

#### FIELD TEST VALIDATION OF THE BORG 15-POINT CATEGORICAL SCALE FOR RATING OF PERCEIVED EXERTION

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The purpose of this investigation was to determine the efficacy of the Borg Ratings of Perceived Exertion scale (RPE) for tetraplegic Rugby athletes. Five, tetraplegic healthy males with cervical spine lesions (C4-C7) were recruited (age  $32.8 \pm 10.83$  years,  $178.82 \pm 2.59$  cm, weight  $74.94 \pm 10.25$  kg). Each participant completed 4 sessions; one was to produce subjective efforts associated with common descriptors, "easy", "moderate", and "maximal". Session two was a validation of session one. Session three was to establish physiological indicators of stress associated with intensities of "11", "13", and "15". Session four was a reproduction trial of session three. A Pearson correlation indicated that RPE had a weak, yet significant correlation to heart rate (HR) ( $r = 0.474$ ,  $P < 0.01$ ) and a moderate and significant relationship to blood lactate (LA) ( $r = 0.624$ ,  $P < 0.01$ ). A 1 X 3 ANOVA indicated no significant difference between trials ( $P > 0.05$ ) for HR LA and RPE. Results indicate that RPE seems to be an effective method of subjective quantification of intensity for tetraplegics physiological (HR & LA) responses.

#### AEROBIC AND ANAEROBIC POWER TEST RESULTS ON NASCAR PIT CREWS

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Pit crew males (N=40) from four cars with Hendrick Motor Sports (#5, 24, 48, 88 cars) were tested for a battery of physical fitness tests including muscular strength (lower back and leg dynamometer), anaerobic peak and sustained power (Wingate 30-second test), treadmill  $VO_2$ max, and percent body fat. The 30-second Wingate test was conducted on a Lode Excalibur Sport cycle ergometer using the Lode Wingate software system (Lode BV, Groningen, The Netherlands). The treadmill  $VO_2$ max test was administered using the Bruce protocol with continuous metabolic measurement through a facemask and the Cosmed Quark CPET metabolic cart (Cosmed, Rome, Italy). Body composition was assessed using the BOD POD Gold Standard Body Composition Tracking System (Life Measurement Inc., Concord, CA). Subjects ranged in age from 22 to 36 years (mean $\pm$ SD,  $28.6 \pm 4.5$  years), and mean height ( $72.1 \pm 2.5$  inches) and weight ( $214 \pm 36.1$  pounds) were above U.S. levels for young adult males. Percent body fat was  $2.1 \pm 6.7\%$  and at the higher end of the acceptable range (6% to 24%). Leg and back dynamometer strength was  $4.7 \pm 1.2$  kg per kg body mass, well above average. Anaerobic peak and sustained power were  $14.5 \pm 2.8$  and  $8.5 \pm 1.1$  Watts per kg body mass, respectively, also well above average.  $VO_2$ max was  $46.5 \pm 6.4$  ml/kg/min which is within the average range for young adult males. In summary, NASCAR pit crew members scored well above average for muscular strength and anaerobic power, and were within the average range for aerobic fitness. Percent body fat was above recommended levels, and serial testing is ongoing with an emphasis on reduced body fat to improve agility, speed, and health.

**ADDITIONAL NEUROMUSCULAR AND PHYSIOLOGICAL HEALTH BENEFITS TO USING DUMBBELLS WITH NINTENDO WII FITNESS GAMES, A PILOT STUDY.**

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Nintendo Wii offers a variety of fitness related games and accessories. A newly added device is a gym quality dumbbell produced by RiiFlex. Fitness video games provide an option for increasing physical activity; therefore, the purpose of this study is to investigate if any physiological differences are produced while incorporating one pair of RiiFlex two-pound dumbbells in Nintendo Wii games. Participation in two, thirty-minute sessions was required; one session incorporated weights, while the other did not. Each session began with a ten minute rest period where baseline heart rate (HR), VO<sub>2</sub>, and energy expenditure (EE) was assessed using a metabolic cart. Participants then began playing the predetermined game. EE, VO<sub>2</sub>, and, HR was then recorded in one-minute intervals. Participation (n=9) with weights produced no significant difference (p>0.05) between HR (98.19±19.2 bpm) and 97.6±17.4 bpm), VO<sub>2</sub> (7.58±1.39 ml/kg/min) and 10.07±5.04 ml/kg/min) and EE (0.038±0.007 kcal) and 0.049±0.026 kcal)) in comparison to participation without weights. Although still early in data collection, there appears to be no statistical significance to incorporating the two pound RiiFlex dumbbells to Wii fitness games. Therefore, there may be no physiological benefits to incorporating the dumbbells in Nintendo Wii games. Nintendo Console, fitness game and accessories provided by RiiFlex

**THE IMPACT OF ALTERED LEAD IN PEDAL TIME DURING THE WINGATE TEST**

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**PURPOSE:** The most commonly used test to assess one's anaerobic power is the Wingate Cycle Ergometer Test. The purpose of this study was to compare the differences in various power measurements when a person's lead in pedal time (6, 3, or 0 s respectively) is altered. Recent unpublished data from our laboratory has identified major discrepancies by altering this parameter that has led to unequivocal results. **METHODS:** Testing consisted of 19 recreationally active males (age = 23.6 ± 3.17 yrs; height = 1.79 ± 0.06 m; weight = 82.9 ± 8.3 kg; body fat 18.4% + 7.2) who performed a randomized lead-in time (6, 3 or 0 sec respectively). A repeated measures ANOVA was used to evaluate differences in anaerobic power output between the three different lead-in times with significance set at p < 0.05 a priori. **RESULTS:** Overall, mean power (484 ± 86 vs. 591 ± 87 vs. 621 ± 104 watts), relative mean power (5.85 ± 1.05 vs. 7.15 ± 1.00 vs. 9.28 ± 7.41 watts/kg), minimum power (263 ± 123 vs. 329 ± 100 vs. 348 ± 130 watts), time to peak power (0.48 ± 0.17 vs. 1.77 ± 0.54 vs. 3.53 ± 0.98 sec) and total anaerobic work (14510 ± 2581 vs. 17721 ± 2620 vs. 18616 ± 3109 J) were significantly different (p < 0.01), respectively. Although not significantly different, peak power did have a tendency to increase with a shortened lead-in time (1126 ± 155 vs. 1180 ± 202 vs. 1181 ± 268; p > 0.07). **CONCLUSION:** It therefore appears the optimal lead in time for a Wingate test is between 0-3 seconds.

**SUSPENSION TRAINING IMPROVES MUSCULAR ENDURANCE, MUSCULAR STRENGTH, CARDIOVASCULAR FITNESS, AND BODY COMPOSITION IN COLLEGE-AGED FEMALES**

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Suspension training is a relatively new mode of exercise that allows individuals to use their own body weight as resistance while performing various exercises in an interval fashion. Twenty college-aged women completed three 60 minute suspension training workouts per week for a period of six weeks. Training and control subjects (n=33) underwent pre and post testing for measures of muscular endurance, muscular strength, cardiovascular fitness, and body composition. The training program resulted in significant (p<0.05) increases in upper and lower body muscular endurance (37.7% and 84.6%, respectively), upper and lower body muscular strength (21.8% and 23.2%, respectively), cardiovascular fitness (8.5%), and lean body mass (4.0%); as well as significant (p<0.05) decreases in body fat (-11.6%) and fat mass (-10.6%). The suspension training program successfully provided both aerobic and resistance training improvements for college-aged women. Suspension training may offer a superior alternative to traditional exercise programs commonly used by this population. Supported by Fitness Anywhere, Inc.

**APPLICATION OF MAXIMAL HEART RATE PREDICTION EQUATIONS IN YOUNGER ADULTS**

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Accurately predicting maximal heart rate (HRmax) has important implications for practitioners administering exercise tests and prescribing exercise regimens. Recent literature has presented a new equation (NE) to predict HRmax [206.9-(0.67-age)] as a more accurate alternative to the traditional 220-age formula (220age). The NE appears to be more precise in older adults; however, little is known about its accuracy in younger adults. **PURPOSE:** To evaluate the accuracy of the NE and 220age in a young, apparently healthy population. **METHODS:** HRmax from 38 young adults (age=25.2 ± 6.6 yrs) who previously completed maximal graded exercise tests (GXT) from 2006-2009 were included in this study. Paired t-tests were used to compare the differences between each prediction equation (220age, NE) and the measured HRmax. Additionally, the data from 29 subjects whose GXT met the criteria for achieving true VO<sub>2</sub>max were analyzed. **RESULTS:** The 220age had a difference from the measured HRmax of 3.6 ± 9.7 bpm (p<0.05). NE and 220age also differed from each other (p<0.01). However, NE did not differ from measured HRmax (-1.2 ± 9.6; p=0.43). When data from individuals whom achieved VO<sub>2</sub>max were analyzed, the differences from HRmax in both formulas were different from each other (220age = 2.8 ± 10.7 bpm, NE=-2.19 ± 10.3 bpm, p<0.01). However, neither NE nor 220age differed from measured HRmax. **CONCLUSIONS:** The results indicate that NE may be more accurate at predicting HRmax in young-adults who exercise to maximal effort. However, after incorporating more stringent VO<sub>2</sub>max criteria, there appears to be no difference in the predictive value of either formula.

### THE EFFECTS OF BIOFREEZE AND ICE ON BLOODFLOW

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The purpose of this study is to compare radial artery blood flow prior to and at 1, 5, 10, 15 and 20 minutes following the application to the right forearm of one of four conditions 1) 3.5 ml Menthol (3.5 %), 2) .5 Kg of ice, 3) 3.5 ml of Menthol (3.5%) and .5 Kg of ice, 4) control of no treatment in 18 subjects. Right radial artery diameter (mm) and blood flow (ml/min) using a Doppler ultra sound, prior to the application of any treatment (baseline) and again at 1, 5, 10 15 & 20 minutes following treatment application. R-ANOVA indicated that blood flow demonstrated a significant treatment, time and interaction effect. The control condition did not change blood flow over the duration of the trial. All three treatments resulted in significant declines in blood flow at 1, 5, 10 and 15 minutes following application of the respective therapy. Peak blood flow reductions with the Menthol treatment (-26%) occurred at 1 minute, with ice (-28%) at 20 minutes and at 15 minutes with the combined (-40%) treatment. Both the ice and combination treatment demonstrated reduced blood flow at the 20 minute point compared to baseline, while blood flow following the Menthol treatment was not different at 20 minutes following application when compared to baseline. At the 5, 10, 15 and 20 minute data collection points the blood flow of the combination treatment was also significantly lower than the Menthol treatment. These findings indicate that Menthol has a significant effect at reducing peripheral blood flow distal to application similar to that of ice and that combining ice with Menthol may have a potentiating effect on reducing blood flow over using Menthol alone.

### INFLUENCE OF FOOTWEAR ON LIMITS OF STABILITY

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As the trend in organic living grows, it is natural for barefoot ambulation to gain popularity. With the notion that nature is better, a number of footwear designs have been developed to simulate barefoot conditions. However, research indicating that minimalist footwear truly emulates barefoot conditions is lacking. This study compared the ability of participants to control and translate the center of gravity (CoG) near the limit of their stability during barefoot (BF), athletic shoe (AS), and articulated toe shoe (ATS) footwear conditions. It was hypothesized that the ATS would provide the most positive results since the toes were free to move. All subjects who volunteered as participants (N=4 males, Mean age: 29.4 ± 5.2 yrs, Mean ht: 1.78 ± 0.05m, Mean weight: 79.11 ± 7.83kg) were assessed on Maximum excursion (MEX), using the Limits of Stability protocol of the NeuroCom Basic Balance Master System. Summed maximum excursion was analyzed by employing 1(MEX) x 3 (footwear) ANOVA with repeated measures on the last factor. No significance was noted between the shoe types (MXE as a percentage of theoretical maximum excursion summed over 8 directions; BF=816.00, AS=825.25, ATS=830.00). The lack of a significant finding was not surprising with such a small number of participants (ATS were donated). However, the results imply that the participants "overshot" the target more in the shod condition than in the BF condition and further research is warranted to determine if even barefoot like shoes alter proprioception.

### THE EFFECT OF FOOTWEAR ON UNILATERAL STANCE SWAY VELOCITY

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A current trend in athletic footwear is to adopt a minimalist design to approximate barefoot conditions. Unfortunately, with this movement, little research exists to validate the claims that minimalist shoes do mimic the performance of a person while barefooted. The purpose of the study was to compare the ability of a participant to stand on either foot with the eyes open or closed during barefoot (BF), athletic shoe (AS) and articulated toe shoe (ATS) footwear conditions. It was hypothesized that the BF and ATS conditions would result in the smallest sway velocity of the center of gravity when compared to AS. Participants (N=5, M=29.4yrs, 78.93kg, 1.78m) were asked to stand comfortably on a NeuroCom Basic Balance Master System. Unilateral stance sway velocity data were collected and analyzed using a repeated measures ANOVA; comparing performance on both right and left legs individually with either eyes opened or closed in BF, AS, and ATS. There was no significant interaction effect between footwear and foot (p=.727), footwear and eyes (p=.180), foot and eyes (p=.083), or footwear, foot, and eyes (p=.766). There was also no main effect of footwear (p=.162), or foot (p=.074); however, there was a main effect of eyes (p=.022). The results suggest that sway velocity is decreased when individuals' eyes are opened versus closed and that footwear did not affect mean sway velocity. In addition, some of the other variables such as foot and the interaction of foot and eyes on mean sway velocity approached statistical significance; however, further research is warranted to determine if ATS are similar to either BF or AS.

### VERTEBRAL COMPRESSION WITH A BACK SQUAT

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The back squat has been used extensively in the strength training of athletes. With the placement of the bar on the vertebral column, it is believed that a significant amount of compression occurs on the vertebrae and supporting structures. The purpose of this study was to determine if the performance of the squat results in the change in spinal column length. Twelve (12) currently training Division I male athletes (19.6 ± 1.15 years, 74.86 ± 13.9 kg) served as participants. Participants were measured (in inches) prior to and after three sets of back squats (ten repetitions each set). Height measurements were taken at the ASIS (anterior superior iliac spine), C7 (vertebrae prominens), and top of the head. The participants were barefoot during measuring and during the back squat lifts. Due to significance of the 2x2x2 repeated measures ANOVA (p = .000), follow up t-tests were performed. Results indicated a significant difference in pre and post measures taken at C7 t(11) = 4.69, p = .001, and of the total body height t(11) = 3.62, p = .004. No significant difference was noted for the ASIS measures t(11) = 1, p = .339. The results imply that during a back squat, there are significant decreases in height of the C7 vertebrae and the overall height of an individual; however, there is no significant change in the height of the ASIS. These results suggest that the changes in height occurred predominantly within the spinal column.

#### PHASE RATIOS AND EFFORT DISTRIBUTION OF AMERICAN COLLEGIATE TRIPLE JUMPERS

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The majority of published research on triple jumpers' techniques is based on elite jumpers and may not be applicable to less developed athletes. The purpose of this study was to examine the percent contribution of the hop, step and jump to the total jump distance (e.g. phase ratios) of collegiate triple jumpers to determine the phase ratio sequence utilized by the majority of participants, and which sequence was favored by those who jumped the longest distance. In addition the relationship between horizontal (X) and vertical (Y) velocities during each phase of the jump and the actual distance jumped was also investigated. Nine participants were filmed (210 fps) during the men's competition at the 2010 Louisiana Classics and Pearson-r correlation analyses were completed to determine relationships with actual jump distance and the forementioned variables. Phase ratios for the longest jumps were 35.04% ± 1.50% (hop), 30.5% ± 1.58% (step), and 34.87% ± 1.85% (jump). There were positive correlations between: the length of the jump and the length of the hop ( $r = 0.68$ ,  $p < 0.05$ ) and step ( $r = 0.90$ ,  $p < 0.01$ ), X velocity during the hop ( $r = 0.59$ ,  $p < 0.05$ ) and step ( $r = 0.74$ ,  $p < 0.05$ ), and Y velocity during the jump ( $r = 0.73$ ,  $p < 0.05$ ). The results of this study showed that jump lengths can be maximized by minimizing losses in X velocity during the hop and step, maximizing Y velocity during the jump, and maximizing the length of the step.

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#### THE EFFECT OF FOOTWEAR ON DUAL STANCE BALANCE

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Barefoot, as a footwear choice has been gaining attention and has encouraged the development of several minimal footwear options. However, the influences of these minimal shoe wear options on static balance have yet to be evaluated. PURPOSE: To compare the bilateral balance performance of individuals during barefoot (BF), athletic shoe (AS) and articulated toe shoe (ATS) conditions. METHODS: Four subjects volunteered as participants (N = 4, M = 29.4 yrs, 78.93 kg, 1.78 m). Sway velocity (deg/sec) data was collected using a NeuroCom Basic Balance Master System and the Clinical Test of Sensory Integration on Balance protocol. Sway velocity was analyzed using a 2 (surface) x 3 (shoe condition) repeated measures ANOVA; comparing performance on a firm and foam surface across the three footwear conditions. RESULTS: Statistical significance was seen for sway velocity between surfaces ( $p = .008$ ), but no statistically significant difference for sway velocity was noted ( $p = .427$ ) across shoes types. However, it is interesting to note that the BF condition did yield the smallest sway velocity on both surfaces. CONCLUSION: The significant difference between surfaces is not surprising and indicates the capability of the foam surface to disrupt static postural control. The lack of a significant finding across shoe types implies that the more active footprint of the ATS did not improve the static postural control as hypothesized.

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#### ACUTE EFFECTS OF WHOLE BODY VIBRATION ON POSTURAL CONTROL MEASURES IN OLDER WOMEN

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Resistance training and chronic whole body vibration (WBV) have been employed to reduce age related attenuation of reflexive postural control measures. Due to differences in study designs, the acute results of WBV have been mixed. The purpose of this project was to analyze the acute effects of WBV on postural control measures in women between the ages of 60-75 years. 15 healthy females (68.3 ± 5.0 yrs), able to complete 3 up and go tests in less than 8.5 seconds, were included in the study. After a standard warm-up, sway velocity and RMS sway measures were obtained using a sensory organization test (SOT) battery, which elicits responses from each of the 3 sensory systems individually or in combination. Following a 5 minute rest, participants were exposed to 3 20 second bouts of WBV (30 Hz, 2-4 mm @ WBV (30 Hz, 2-4 mm @ 135° knee flexion) separated by 1 minute. At the conclusion of the vibration exposure, participants completed the same postural control tests preceded by a 1 minute rest. The study measured analysis of variance independently for the 6 postural stability-testing conditions. Statistically significant within participants main effects were seen in the eyes closed (EC, ECSR) and the eyes open (EOSRVR) conditions in both medial/lateral and anterior/posterior directions. Results of the study suggest that WBV had no significant effects on overall postural control measures in the population. Future research should look to assess balance at distinct time points post vibration exposure to determine the residual effects of exposure to WBV.

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#### EFFECT OF SUSPENSION TRAINING ON FLEXIBILITY AND BALANCE IN COLLEGE-AGED WOMEN

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Suspension training requires an individual to maintain balance while performing various upper and lower body exercises which utilizes the individual's own body mass as resistance. This study evaluated the effects of a six-week suspension training program on measures of flexibility, static and dynamic balance. Twenty college-aged females participated in 18 60 minute training sessions over six weeks while 13 women served as free-range controls. All subjects performed a battery of tests including the Hamstring 90-90, Sit and Reach, Balance Error Scoring System (BESS), and Star Excursion Balance Test (SEBT) before and after the six-week period. The training program resulted in significantly ( $p < 0.05$ ) increased hamstring range of motion (Right: 2%; Left: 5%) and Sit and Reach flexibility (5.3%). Significant increases in dynamic balance were also found with the SEBT within the training group for the left leg stance for five (medial 3.1%, posteromedial 4.3%, posterior 7.3%, posterolateral 7.1%, and lateral 6.9%) of the eight directions. Only the posterior direction was significantly different for the SEBT right leg stance (5.0%). Static balance significantly improved within both the training (-23.3%) and control (-26.5%) groups, with no between group difference ( $p > 0.05$ ) indicating a potential learning effect. Although the suspension training program utilized in this study was not primarily designed to induce changes in flexibility and dynamic balance moderate improvements in these measures were observed. Supported by Fitness Anywhere, Inc.

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**ASSESSMENT OF FOOTBALL PLAYER ANKLE JOINT MOTION DURING VERTICAL STEP DOWN MOVEMENT**

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Lower extremity kinematics have been examined during different motions, these include jumping, landing, squatting, and cutting, primarily among healthy participants. Little research has examined these motions among elite athletes. The purpose of this study was to examine the motion of the ankle during a vertical step down exercise and compare dominant and non-dominant legs among elite level athletes. Eight healthy NCAA Division I football players (height: M=1.87m, SD =.06m; mass: M=99.22kg, SD=18.84kg) completed the testing. The participants performed three repetitions of a vertical step down exercise off a 25.4 cm box for both the dominant and non-dominant leg. The testing leg was placed on the side of the box, with the non-testing leg in slight hip flexion and full knee extension. The participants were instructed to squat down until the heel of the non-testing leg touched the floor, and then return to the starting position. The participants' ankle (talocrural) joint motion in the sagittal plane was recorded during the exercise using a motion capture system. The results revealed a significant difference ( $P < .05$ ) in ankle motion between the dominant and non-dominant legs, with the dominant leg demonstrating 1.54 degrees less sagittal plane ankle motion during the movement than the non-dominant leg. A potential explanation for these differences may be strength imbalances between the dominant and non-dominant leg, and may possibly increase the risk of injury and affect performance.

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**EFFECT OF THERAPEUTIC HORSEBACK RIDING ON GAIT IN A DOWN SYNDROME PARTICIPANT**

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Down syndrome has adverse effects on gait and stability. Therapeutic horseback riding may be prescribed as a form of therapy to persons with disabilities, but its effects on the rider's gait are unknown. The purpose of this study was to examine the effects of therapeutic horseback riding on selected gait parameters in a person with Down syndrome. One female participant (age = 24 years; height = 1.51 m; mass = 50.00 kg) with Down syndrome completed two therapeutic horseback riding programs (fall 2009 and spring 2010), each consisting of six riding sessions. Walking gait was recorded with a Sony™ Handycam digital camcorder and analyzed using Dartfish™ video software solutions immediately before and after each riding session. The following gait characteristics were measured: stride length, stride width, and the ankle angle, knee angle, and hip angle in the sagittal plane at heel strike and toe-off for both legs. Each variable was analyzed with a 2 (test: pre and post) by 2 (program: 2009 and 2010) repeated measures ANOVA. There was a significant decrease in stride length ( $P < .05$ ) of the participant during the 2010 riding program compared to the 2009 program. There were also significant differences ( $P < .05$ ) in hip angle at heel strike, left knee angle at toe off, left ankle angle at toe off, and right ankle angle at toe off. These results reveal that over the course of the two therapeutic horseback riding programs, changes in gait occurred. Therefore, therapeutic horseback riding has the potential to benefit gait characteristics in persons with Down syndrome.

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**ASSESSMENT OF FOOTBALL PLAYER HIP JOINT MOTION DURING VERTICAL STEP DOWN MOVEMENT**

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Lower extremity kinematics have been examined during different motions, these include jumping, landing, squatting, and cutting, primarily among healthy participants. Little research has examined these variables among elite athletes. The purpose of this study was to examine the motion of the hip joint during a vertical step down exercise and compare the dominant to the non-dominant leg among elite level athletes. Eight healthy NCAA Division I football players (height: M=1.87m, SD =.06 m; mass: mean=99.22kg, SD=18.84 kg) completed the testing. The participants performed three repetitions of a vertical step down exercise off a 25.4 cm box for both the dominant and non-dominant leg. The testing leg was placed on the side of the box, with the non-testing leg in slight hip flexion and full knee extension. The participants were instructed to squat down until the heel of the non-testing leg touched the floor, and then return to the starting position. The participants' hip joint motion in the sagittal plane was recorded during the exercise using a motion capture system. The data was analyzed with a 2 (range) by 2 (leg) ANOVA with repeated measures on the last factor. The results revealed a significant difference ( $P < .05$ ) in hip motion between the dominant and non-dominant legs, with the non-dominant leg demonstrating 7.06 degrees less hip sagittal plane motion than the dominant leg. These differences may potentially be caused by strength imbalances between the dominant and non-dominant leg, and may potentially increase the risk for injury and affect performance.

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**ASSESSMENT OF FOOTBALL PLAYER KNEE JOINT MOTION DURING VERTICAL STEP DOWN MOVEMENT**

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Lower extremity kinematics have been examined during different motions, these include jumping, landing, squatting, and cutting, primarily among healthy participants. Little research has examined these variables among elite athletes. These motions are of interest in elite athletes as differences in performance have potential implications for athletic performance and injury. The purpose of this study was to examine the motion of the knee during a vertical step down exercise and compare dominant and non-dominant legs among elite level athletes. Eight healthy NCAA Division I football players (height: M=1.87 m, SD =.06 m; mass: M=99.22 kg, SD=18.84 kg) completed the testing. The participants performed three repetitions of a vertical step down exercise off a 25.4 cm box for both the dominant and non-dominant leg. The testing leg was placed on the side of the box, with the non-testing leg in slight hip flexion and full knee extension. The participants were instructed to squat down until the heel of the non-testing leg touched the floor, and then return to the starting position. The participants' knee joint motion in the sagittal plane was recorded during the exercise using a motion capture system. The data was analyzed with a 2 (range) by 2 (leg) ANOVA with repeated measures on the last factor. The results revealed no significant differences ( $P < .05$ ) in knee motion between the dominant and non-dominant legs. Future research should examine the motion of the knee in the frontal plane, specifically the amount of knee abduction at peak knee flexion.

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**INFLUENCE OF ACTN3 AND IGF2 VARIANTS ON MUSCLE RECOVERY FOLLOWING INTENSE ENDURANCE EXERCISE.**

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Purpose: This study examined the influence of genotypes from the ACTN3 R577X (rs1815739) and IGF2 +C13790G (rs3213221) polymorphisms on short-term muscle recovery following heavy endurance exercise. Methods: Twelve male cyclists ( $65.5 \pm 7.1$  ml/kg/min) completed an exercise trial consisting of 10 min at 60% Wmax, followed by a series of 2 min alternating-intensity intervals (75-95%/50% Wmax) until fatigue. Carbohydrate beverages were consumed immediately and 2-hours post-exercise. Peak isometric quadriceps muscle force (MVC) was assessed pre-exercise (PRE), immediately post-exercise, and 4 hr post-exercise (4PO). Ratings of muscle soreness and physical energy/fatigue were examined PRE and 4PO. Results: PRE MVC and MVC changes immediately post-exercise were not influenced by genotype. Declines in MVC from PRE-4PO were significantly greater ( $p < 0.05$ ) among subjects heterozygous for the IGF2 SNP (CG;  $34 \pm 41$ N;  $n=6$ ) versus those homozygous for the wild-type allele (CC;  $-23 \pm 29$ N;  $n=6$ ). In addition, subjects homozygous for the wild-type allele of ACTN3 SNP (RR;  $66 \pm 57$ N;  $n=2$ ) tended to have greater strength losses versus those with two copies of the rare allele (XX;  $-7 \pm 33$ N;  $n=10$ ;  $p=0.053$ ). These subjects with two copies of the R allele also tended towards greater declines in physical energy ratings from PRE-4PO ( $79 \pm 22$ mm vs.  $33 \pm 37$ mm;  $p=0.13$ ). Conclusions: These findings suggest that genetic variations in ACTN3 and IGF2 may influence recovery from heavy endurance exercise. However, studies examining larger sample sizes are required to confirm these findings.

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**DUODENAL-JEJUNAL BYPASS SURGERY DOES NOT INCREASE LIVER INSULIN SIGNAL TRANSDUCTION OR LIVER INSULIN SENSITIVITY.**

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Duodenal-jejunal bypass (DJB) has been shown to reverse type 2 diabetes (T2DM) in Goto-Kakazaki (GK) rats, a rodent model of non-obese T2DM. Insulin resistance is a hallmark decrement in T2DM. PURPOSE: The aim of the current work was to investigate the effects of DJB on liver insulin signal transduction and fasting insulin sensitivity. It was hypothesized that DJB would increase liver insulin signal transduction and fasting insulin sensitivity in GK rats. METHODS: DJB and Sham operations were performed in GK rats. At two weeks post-surgery, fasting glucose and insulin were measured. At three weeks post-surgery, insulin-induced signal transduction was measured in liver. The homeostasis model assessment (HOMA) was used to assess liver insulin sensitivity using fasting concentrations of glucose and insulin. RESULTS: In GK rats and compared to Sham operation, DJB did not improve: 1) fasting glucose (GK-DJB:  $169 \pm 13$  mg/dl vs. GK-Sham:  $178 \pm 10$  mg/dl) or insulin (GK-DJB:  $114 \pm 18$  pM vs. GK-Sham:  $101 \pm 27$  pM); 2) HOMA (GK-DJB:  $6.3 \pm 1.1$  AU vs. GK-Sham:  $8.5 \pm 1.1$  AU); or 3) liver insulin signal transduction. CONCLUSIONS: Bypassing of the proximal small intestine does not increase liver insulin sensitivity.

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**EXERCISE AND POSTPRANDIAL LIPEMIA: A SYSTEMATIC REVIEW**

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Reducing circulating postprandial triglycerides (TG) can help lower the risk for cardiovascular disease and the metabolic syndrome. A systematic review of the literature was performed using meta-analytic methods in order to summarize the effects of exercise on postprandial lipemia (PPL). The purpose was to gain an overall estimate of the effect based on previous research and to provide direction for future research. A systematic review was done using guidelines set forth in the QUORUM statement. A total of 85 effects were found from 55 studies. The overall weighted mean effect was moderate, Cohen's  $d = -0.544$  (95% confidence interval,  $-0.642$  to  $-0.446$ ;  $z = -10.884$ ;  $P < 0.0001$ ), indicating that performing exercise prior to a high-fat meal ingestion reduces circulating TGs by 0.5 standard deviation compared to a non-exercise control. In studies in which the energy expenditure of the exercise was reported, the correlation between the energy expenditure and the magnitude of the reduction in PPL was moderate ( $r = -0.333$ ,  $p = 0.021$ ) for aerobic exercise and moderate but non-significant ( $r = -0.310$ ,  $p = 0.327$ ) for resistance exercise. We conclude that aerobic and resistance exercises have moderate, similar effects on postprandial lipemia. Although the magnitude of the reduction is modestly related to the energy expended for aerobic exercise, this relation is less consistent for resistance exercise. Additional research with larger samples is needed on the effects of different modes of exercise and variables that may influence the postprandial lipemic response.

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**POSTPRANDIAL LIPEMIA AND PHYSICAL ACTIVITY IN YOUTH: SUGGESTIONS FOR FUTURE RESEARCH AND IMPLICATIONS FOR POLICIES AIMED AT EARLY PREVENTION OF CARDIOVASCULAR DISEASE**

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Dyslipidemia and low physical activity (PA) are important factors in atherosclerotic genesis during the postprandial state, yet little is known about this topic in youth. Sub-clinical indicators of heart disease, such as development of fatty lesions on arterial tissue, have been noted in children. A literature search on the effects of PA on postprandial lipemia (PPL) in youth was conducted, but yielded only three publications on the topic. A similar search for adults yielded 85 publications. A review of the adult and youth literature was conducted and the results are presented. The adult literature unequivocally indicates that PA has a blunting effect on the postprandial lipemic response. Variables such as timing of an exercise bout relative to a meal, training status, and issues of dose response are summarized and presented. Results from the youth literature are summarized and indicate that PA may be helpful in blunting the PPL response. However, the scant nature of the youth literature is insufficient to draw definitive conclusions about the relationship between PA and PPL in this population. Furthermore, inherent physiological differences between adults and youth may preclude the ability to infer results from the adult literature to children. Therefore, recommendations for areas of future research on the relationship between PA and PPL in youth are offered. Additionally, suggestions are made on how results from such research might impact individual level interventions and institutional level policies aimed at early prevention of CVD.

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**SUBSTRATE OXIDATION AND BLOOD LACTATE RESPONSE TO VARYING EXERCISE INTENSITIES IN BREAST CANCER PATIENTS AND HEALTHY CONTROLS**

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The purpose of this study was to investigate substrate oxidation and blood lactate response in breast cancer patients during exercise at various intensities. Seven post-treated breast cancer patients were matched with seven healthy women based on age, physical fitness level and menopausal status. All subjects participated in low, moderate, and high intensity submaximal exercise sessions that corresponded with 40%  $\text{VO}_{2\text{max}}$ , 60%  $\text{VO}_{2\text{max}}$ , and 70%  $\text{VO}_{2\text{max}}$ , respectively. Oxygen uptake and respiratory exchange ratio were measured during the submaximal exercise sessions to determine substrate oxidation. Blood lactate and glucose measurements were taken before and immediately after each submaximal exercise session. The breast cancer patients had a significantly ( $p < 0.05$ ) lower carbohydrate oxidation rate and a significantly ( $p < 0.05$ ) higher fat oxidation rate at all exercise intensities compared to healthy women. The breast cancer patients also had a significantly ( $p < 0.05$ ) lower blood lactate response to exercise compared to the healthy women at low (2.03mmol/L, 2.67mmol/L), moderate (3.23 mmol/L, 4.64mmol/L), and high (4.04mmol/L, 5.64mmol/L) exercise intensities, respectively. No significant differences in glucose were detected. The results indicate that post-treated breast cancer patients have augmented lipid metabolism and an attenuated carbohydrate metabolism during submaximal exercise.

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**EFFECTS OF MULTIVITAMIN SUPPLEMENTATION ON HEART RATE RESPONSE IN AEROBICALLY UNTRAINED COLLEGE AGED STUDENTS**

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Multivitamin use is increasingly prevalent in the US among every population. Yet, previous research noted no performance benefits among individuals following a supplementation period. This study focused on the potential physiological benefits from a three week multivitamin supplementation period using 24 (20.9  $\pm$  2.6 yr) aerobically untrained college aged students. Subjects were divided equally into three groups (placebo = PL, multivitamin = MV, control = CL) and asked to perform separate eight minute bouts of exercise, consisting of six min of moderate (60% $\text{VO}_{2\text{max}}$ ) intensity followed immediately by two min of high (85% $\text{VO}_{2\text{max}}$ ) intensity exercise on a cycle ergometer. Following the supplementation period, participants came back and performed the same exercise bout. Heart rates were measured with a POLAR Heart Rate monitor and recorded every two min. Data analysis, using ANOVA comparing the three groups, indicated a statistically significant HR interaction. Post hoc paired t-tests, comparing the pre/post supplementation tests of all groups, noted significant differences in HR between MV group during the 60%  $\text{VO}_2$  ( $p = 0.04$ ) intensity bout, and approached significance at 85%  $\text{VO}_2$  ( $p = 0.10$ ). No difference occurred for the CL group during either moderate or high intensity exercise. The results indicate that the introduction of a supplement, whether real or placebo, may have a physiological effect on the heart rate of aerobically untrained college students.

**EFFECT OF AN ACUTE BOUT OF RESISTANCE EXERCISE TRAINING ON RESTING ENERGY EXPENDITURE.**

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Acute exercise increases resting energy expenditure for a period of time following the training bout and is influenced by the type, intensity, and duration of exercise. If increases in metabolism can be demonstrated with resistance exercise, this would support the inclusion of resistance training exercise in programs designed to maintain a healthy body weight. PURPOSE: To determine if a single bout of resistance exercise training increases resting energy expenditure (REE) at 15 min and 12 hrs post-exercise. METHODS: Nine college aged untrained males (Age: 18-22 yrs) participated. REE was measured by indirect calorimetry before and at 15 min and 12 hrs post resistance exercise. Acute resistance exercise consisted of 3 sets of 12 repetitions at 70% of 1-repetition maximum for barbell bench press, leg press, and lat pull down. RESULTS: Compared to baseline, REE was increased at 15 min post-exercise, but not at 12 hrs post-exercise (REE baseline: 2197  $\pm$  183 Kcal/day, REE Immediately Post Exercise: 2850  $\pm$  344 kcal/day, REE 12 hrs Post Exercise: 2091  $\pm$  84 Kcal/day). CONCLUSIONS: This study demonstrates that a single bout of resistance training is sufficient to increase resting energy expenditure in the early post-exercise period, but not at 12 hrs post-exercise.

**HALF- AND FULL- MARATHON RUNNERS: 92 PRACTICES AND PERCEPTIONS CONCERNING HYDRATION**

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The purpose of this study was to examine: (1) which beverages runners choose to drink during runs and why, (2) negative performance and health experiences related to inadequate fluid intake, (3) methods used to assess hydration status, and (4) tactics runners use in supplying themselves with fluids. A 23-item questionnaire was completed by runners ( $n = 3D 276$ ) registered for the 2010 Little Rock Half- or Full- Marathon. Faster/higher-training-volume runners reported greater regular consumption of sport beverages in exercise environments ( $p < 0.05$ ) and considered sport beverages superior to water in performance and hydration properties ( $p < 0.05$ ). Runners reported dehydration being linked with high levels of major performance decrements (25% one incident, 44% more than one incident) and heat-related illness symptoms (22% one incident, 23% more than one incident). Of respondents, 20% reported monitoring their hydration status, and urine color was the most utilized method (7%), whereas only 2% reported measuring changes in body mass. Almost all (94%) runners reported drinking at least sometimes during runs in hot outdoor environments. Carrying fluids (e.g., in a bottle) was the most common method to provide fluids. Regardless of expected performance level and training volume, many participants reported negative incidents associated with hypohydration. Greater attention should be placed on informing runners of technique to monitor hydration status and how to develop an appropriate individualized hydration strategy.

### STUDENT ATHLETES KNOWLEDGE OF SPORTS NUTRITION.

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Both the ACSM and ADA indicate athletic performance and recovery is enhanced by optimal nutrition. Previous investigations have evaluated student-athletes' knowledge of sports nutrition, however, two of the largest university level surveys are a decade old and nutrition education and, therefore knowledge, may have changed in that time. Therefore, the purpose of this study was to provide a contemporary survey of student-athletes' knowledge and misconceptions of sports nutrition. During pre-participation physicals, 91 incoming student-athletes independently completed an anonymous online questionnaire of their nutritional knowledge based on previous instruments utilized in the literature. The major misconceptions identified included: 1) the majority of subjects (57.1%) believed vitamin and mineral supplements increase energy, 2) protein is the primary source of fuel for muscle (62.5%), and 3) sweets should not be consumed before an athletic event (64.8%). Encouragingly, the overwhelming majority (90.1%) responded that fluids should be replaced before, during, and after activity as well as understanding that dehydration leads to decreased athletic performance (86.8%). Finally, most respondents (72.5%) did not endorse the misconception that eating carbohydrates makes you fat. Overall, little change was noted from the results of a decade ago in either the misconceptions or overall knowledge. This is surprising, as the vital role proper nutrition plays in athletic performance has been a point of focus over the last decade. Sports Medicine professionals must continue to address nutrition related misconceptions and continue to provide accurate nutrition education.

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### SIX WEEKS OF BLUEBERRY INGESTION PRIOR TO A 2.5-H RUN EXERTS POSITIVE EFFECTS ON NK CELL COUNTS, OXIDATIVE STRESS, AND INFLAMMATION

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Blueberries are rich in antioxidant compounds known as anthocyanins. Strenuous exercise acutely generates oxidative stress and an inflammatory state. This study examined whether blueberry consumption (250 g per day for 6-wks) and 375 g 1-h prior to a 2.5-h run counters oxidative stress and inflammation. Twenty-five subjects were recruited and randomized into blueberry (BB) (N=13) or control (CON) (N=12) groups. Blood, muscle, and urine samples were obtained pre-exercise and immediately post-exercise, and blood and urine 1-h post-exercise. Blood was examined for oxidative stress (F2-isoprostanes, FRAP, and GSH) and inflammation (cortisol, cytokines, and lymphocyte subset cell counts). Muscle biopsy samples were examined for glycogen content and NFkB expression. Urine samples were tested for modified bases of DNA (8-OHdG) and RNA (5-OHmU). A 2 treatment x 3 time (blood and urine measures) and x 2 time (muscle measures) repeated measures ANOVA was used to test main effects. When comparing BB versus CON, post-exercise F2-isoprostanes and 5-OHmU were lower (treatment effects, P=0.016 and P=0.028, respectively), and plasma IL-10 and blood natural killer (NK) cell counts higher (P=0.045 and P=0.003, respectively). Changes in all other markers did not differ from CON. This study indicates that daily blueberry consumption over six weeks coupled with acute ingestion reduces exercise-induced oxidative stress and inflammation and increases circulating numbers of NK cells.

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### RESTING METABOLIC EFFECTS DIFFER FOR ISOCALORIC CAFFEINATED GEL VS. BEVERAGE

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Carbohydrate (CHO) and caffeine (CAF) ingested prior to and/or during exercise can delay fatigue. CHO oxidation is similar when CHO is ingested in either gel or liquid form during exercise; however, whether added CAF alters metabolism and CHO oxidation when ingested prior to exercise is unclear. The aim of the study was to examine if CHO+CAF gel vs. liquid alters metabolic and glycemic responses under resting conditions. Five healthy males completed a resting metabolic test immediately following ingestion of either CHO+CAF gel (GEL) or drink (BEV) in randomized order. Both treatments provided 44 g CHO, 39 mg CAF, and 180 kcal. Significant (p<.05) interactions were observed for all variables (glucose, lactate, CHO oxidation, and RQ). BEV elicited higher blood glucose than GEL (p<.05) at 15 min (7.0±0.3 vs. 4.8±0.6 mmol/L) but lower at 90 (4.2±0.8 vs. 5.1±0.6 mmol/L) and 120 min (3.9±0.6 vs. 4.4±0.6 mmol/L). Blood lactate was higher (p<.05) by 1.1 mmol/L for BEV compared to GEL (1.8±0.2 vs. 0.7±0.2 mmol/L) at 15 min, and remained higher at 30 and 45 min (2.2±0.3 vs. 1.2±0.6 mmol/L; 2.1±0.2 vs. 1.5±0.4 mmol/L). CHO oxidation rates were higher (p<.05) for BEV compared to GEL from 15 to 30 min after ingestion (0.32 vs. 0.1 g/min at 15 min; 0.32 vs. 0.16 g/min at 30 min). RQ was higher (p<.05) for BEV compared to GEL (1.07±0.01 vs. 0.86±0.04) from 10 to 30 min after ingestion. CHO+CAF is oxidized at a higher rate resulting in a greater fluctuation in glycemic response when administered in BEV form compared to GEL at rest. Further investigation regarding the impact of CHO+CAF (drink vs. gel) when ingested 1 hr prior to exercise is warranted.

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### THYROID HORMONAL RESPONSES TO INTERVAL AND STEADY STATE EXERCISE

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Thyroid hormonal responses to high-intensity interval exercise (IE) and steady state endurance exercise (SSE) were compared in 15 highly trained males. The IE session was repeated cycles of 90 seconds treadmill running at 100-110% VO<sub>2</sub>max and 90 seconds active recovery at 40% VO<sub>2</sub>max for 42-47 minutes. The SSE session was a 45-minute run at 60-65% VO<sub>2</sub>max. Total work output was the same for each session. A 45-minute supine rest control session (CON) was also performed. Pre-session (PRE), immediate post-session (POST), and 12-hours post-session (12POST) blood samples were collected and used to determine free (f) T4, fT3, and reverse (r) T3 levels. Time of day and diet were controlled for all sessions. Data were analyzed using repeated measures ANOVA. All PRE hormone levels were within clinical norms and did not differ significantly between sessions. All POST IE and SSE hormone levels were significantly elevated compared to POST CON (p<.05). At 12POST, no significant differences between CON and SSE hormonal levels were observed; however, fT3 was significantly reduced and rT3 was significantly elevated in 12POST IE compared to 12POST SSE and CON (p<.05). Furthermore, at the 12POST IE session, a negative correlation (r = -0.64 p<.01) was found between reduced fT3 and elevated rT3, suggesting IE results in a suppressed peripheral conversion of T4 to T3. These results suggest a longer recovery period is necessary for thyroid hormonal levels to return to normal following IE compared to SSE. Since low thyroid hormone levels are markers for over-reaching and overtraining, the present findings could be useful in the implementation of training regimens.

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**CIRCULATING ADIPOKINES ARE RELATED TO INSULIN SENSITIVITY BUT NOT BMI**

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As relationships between secreted factors from adipose tissue (adipokines), BMI, and insulin sensitivity (SI) are suggested to be linked, yet still not clearly understood, we used multiplexed profiling for circulating adipokines and a specific model (minimal model) to assess SI in order to explore further. Overnight fasted men and women (n=25; 51 ± 6 yr) underwent a 3-hr intravenous glucose tolerance test (IVGTT), yielding an SI index. Comparisons of adipokines (IL-1 $\beta$ , TNF- $\alpha$ , MCP-1, Resistin, and Adiponectin) were on basal blood drawn prior to the IVGTT using a multiplexed Luminex assay. To examine BMI effects on adipokines, subjects were split into Obese and Lean BMI classes (BMI >33.5 and <27.2 kg.m<sup>-2</sup>, respectively). To examine how circulating adipokines could potentially mediate SI irrespective of BMI, Low and High SI index tertiles were examined (SI <3.88 and >6.34 mU.L<sup>-1</sup>.min<sup>-1</sup>, respectively). Comparisons between stratified groups were made with unpaired t-tests, and correlations among circulating adipokines and either BMI or SI were made using Pearson correlation. There were no differences in adipokines between BMI classes (p $\geq$ 0.05), nor any significant correlations observed between BMI and adipokines (p $\geq$ 0.05). Alternatively, adiponectin was increased in the High SI tertile (Low SI: 15.87 ± 5.30 vs. High SI: 30.42 ± 0.30  $\square$ g/mL, p<0.01). Further, SI was positively associated with both adiponectin (r = 0.57, p<0.01) and MCP-1 (r = 0.41, p<0.05). These findings suggest that BMI may not be the best indicator of circulating adipokine profiles. Rather, it appears that circulating adipokines may be more functionally related to insulin sensitivity.

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**EFFECTS OF TRANS-RESVERATROL SUPPLEMENTATION ON SERUM GLUCOSE AND INSULIN LEVELS AND mRNA EXPRESSION OF METABOLICALLY RELEVANT PROTEINS IN RESPONSE TO A GRADED EXERCISE TEST IN OVERWEIGHT FEMALES**

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Since trans-resveratrol supplementation has been shown to improve insulin sensitivity in rodent models, the current study investigated the effects of resveratrol on glucose and insulin changes and mRNA expression of metabolically active genes in response to a graded exercise test (GXT) in sixteen overweight and obese women (27.56±5.99 y; 37.94±8.66 kg/m<sup>2</sup>; 45.86±5.33% body fat). The women were randomized to either a trans-resveratrol (n=8) or cellulose placebo (n=8) group where participants ingested 250 mg capsules of their respective supplements twice daily for 6 days. On day 7, participants ingested 500 mg of their respective supplement prior to donating a baseline blood and muscle sample. A Bruce protocol GXT was then performed by each participant. Subsequent blood samples were taken at 30 min, 1 hr, and 2 hr post-exercise, while an additional muscle sample was taken at 1 hr. Use of repeated measures ANOVA revealed that serum glucose was significantly lower after 1 hr (p = 0.01) and insulin concentrations after 1 hr (p = 0.012) and 2 hr (p = 0.003) compared to baseline with no significant differences between groups. No significant changes were observed in the genes analyzed. Resveratrol supplementation did not affect the changes in glucose or insulin concentrations following a GXT, nor did the supplement or exercise alter expression of the metabolically active genes.

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**SHORT-TERM HIGH INTENSITY INTERVAL TRAINING DOES NOT IMPROVE THE PHYSIOLOGICAL STRESS RESPONSE, MOOD STATE, OR BODY COMPOSITION**

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The influence of short-term high intensity interval training (HIT) on the physiological stress response, mood state, and body composition was investigated. Subjects (n=22) were randomized to a high intensity training group or a no exercise control group. The exercise training consisted of two 5-day phases on a cycle ergometer. Phase 1 was 30-minutes with 30-second high intensity intervals (> 90% HRmax) interspersed throughout. Phase 2 was 20 minutes and consisted of eight, 30-second high intensity intervals separated by 2 minutes of active rest (50-60% HRmax). Before and after the intervention, the Trier Social Stress Test (TSST) was used to induce stress and measures of heart rate variability (HRV), salivary cortisol, mood state, and body composition were taken. HRV, mood state, and body composition were not significantly different among or between groups (p > 0.05) at baseline or following 10-days of training. Additionally, salivary cortisol concentrations in response to the TSST were not different at any time point within or between groups before or after 10 days of intervention. These results suggest that 10-days of short-term, HIT is not sufficient in eliciting physiological changes in stress reactivity, mood state, or body composition. Supported by a Grant from Skidmore College

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**RELATIONSHIP BETWEEN AEROBIC POWER EXPRESSED PER UNIT FAT FREE MASS AND INSULIN SENSITIVITY IN CHILDREN**

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Insulin resistance in children has been shown to be related to adiposity and aerobic power (VO<sub>2</sub>max expressed per kilogram body mass), but this includes fat free mass and fat mass. However, the inclusion of fat mass in the unit of aerobic power (mL/kg/min) can confound its relationship with insulin resistance. When VO<sub>2</sub>max is expressed per unit of fat free mass (mL/kgFFM/min), it can represent aerobic fitness independent of fat mass. Therefore, the purpose of this study was to determine the effect of VO<sub>2</sub>max expressed as mL/kgFFM/min on insulin resistance within each body mass index (BMI) category. Youth were classified into BMI categories based on standard Centers for Disease Control and Prevention BMI percentiles (<85th = normal; 85-94th = overweight;  $\geq$  95th = obese). Fasting morning blood samples were obtained on 1,794 youth (925 girls and 859 boys), aged 8-16 years old. Body fat was estimated from skinfolds and VO<sub>2</sub>max was estimated from a multi-stage, cycle ergometer submaximal test. Insulin resistance was based on Homeostasis Model Assessment of insulin resistance (HOMA) and was adjusted for puberty. HOMA was associated with percent body fat (R<sup>2</sup> = 0.27; p = .0001) and VO<sub>2</sub>max in mL/kg/min (R<sup>2</sup> = 0.11; p = .0001). In contrast, the association between HOMA and VO<sub>2</sub>max in mL/kgFFM/min was weak (R<sup>2</sup> = 0.01; p = .0001). The higher association between insulin resistance and HOMA was driven by adiposity rather than fitness. These findings suggest that the capacity of the muscle to respond to insulin is minimally related to aerobic fitness of youth.

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### PREVALENCE OF RISK FACTORS FOR CARDIOVASCULAR DISEASE IN COLLEGE STUDENTS

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Atherosclerotic CVD remains the leading cause of death, is increasing in prevalence among the general population in South Carolina, and is largely influenced by lifestyle choices. Detection and treatment of controllable risk factors (RF): LDL-C >130 mg/dL; BP >140/90 mmHg; current or recent tobacco use; sedentary lifestyle; BMI  $\geq$  30 kg/m<sup>2</sup>; diabetes mellitus; stressful lifestyle] can prevent or deter the progression of atherosclerotic CVD. The purpose was to determine the prevalence of atherosclerotic CVD RFs in students enrolled in a private liberal arts university in upstate South Carolina. CVD RFs were assessed in undergraduates (N=314; age=18.9±1.1 yrs; Caucasian=90.1%) enrolled in the required Wellness Concepts course. Students were risk stratified as Low Risk (0-2 RFs), Moderate Risk (3-5), or High Risk (6+) according to AHA Guidelines (2009). Data indicated that 93.7% and 6.3% are Low and Moderate Risk, respectively. Of interest were gender differences (p=.006) in BMI [(BMI>25: M=25.4%; F=17.7%) (BMI>30: M=8.3%; F=5.4%)], SBP (M=118.7+8.9 mmHg; F=104.9+14.4mmHg), and HDL-C (M=48.5±11.0 mg/dL; F=57.0±11.2 mg/dL). On a positive note, only 5.4% have elevated LDL-C, 1.2% are hypertensive, <1% are characterized as sedentary, and <3% use tobacco. Students should know that their lifestyle choices can increase their risk for developing CVD and other chronic diseases.

### SHORT AND LONG TERM EFFECTS OF THE COPENHAGEN SCHOOL CHILD INTERVENTION STUDY (CoSCIS) ON CARDIOVASCULAR RISK FACTORS

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This study assessed the short and long term effect of a 3-year school-based intervention focused on increasing physical activity (PA) to reduce cardiovascular disease (CVD) risk factors in children. CoSCIS is a controlled intervention study involving 18 schools (10 intervention and 8 controls). The intervention was conducted from 1st- 3rd grade and consisted of an increase in number of weekly PE lessons, training of PE-teachers, and upgrading of PE and playing facilities. Participants: 695 at Kindergarten class (mean age 6.7 yr), 606 post intervention (mean age 9.5 yr in 3rd grade) and 510 at 4-years follow-up (mean age 13.35 yr in 7th grade). BMI, sum of 4 skinfolds (S4SF) and waist to hip ratio (WHR) were measured. PA was measured using CSA accelerometers for four consecutive days. Aerobic fitness (VO<sub>2</sub>max) was directly measured during a maximal progressive running test on a treadmill. Fasting intravenous blood samples were obtained and subsequently analyzed for CVD risk factors. The intervention group (IG) had a higher increase in S4SF, but a more favorable change in WHR, systolic blood pressure and blood glucose compared to controls (CG). Furthermore IG-boys had a more favorable development in HOMA-IR compared to CG-boys. There were no differences between groups in VO<sub>2</sub>max or PA at any time point. Our results suggest that school-based intervention might have an effect on CVD risk factors even without measurable changes in fitness and fatness.

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### PREVALENCE OF RISK FACTORS FOR METABOLIC SYNDROME IN COLLEGE STUDENTS

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Metabolic syndrome is a cluster of risk factors (RF) that include elevated FBG (>110mg/dL), low HDL-C (M<40 mg/dL; F<50 mg/dL), elevated TG (>150 mg/dL), hypertension (BP>130/85 mmHg), BMI $\geq$ 25 kg/m<sup>2</sup>, excessive abdominal adiposity (waist: M>40 in; F>35 in), race, and family history of diabetes. Patients diagnosed with metabolic syndrome are at increased risk for developing diabetes, CVD, and CVA. Research indicates that there is an increasing prevalence of metabolic syndrome in adults and adolescents and that the disease is largely influenced by lifestyle choices. The purpose was to determine the prevalence of metabolic syndrome RFs in students enrolled in a private liberal arts university in upstate South Carolina. Metabolic syndrome RFs were assessed in undergraduates (N=314; age=18.9±1.1 yrs; caucasian=90.1%) enrolled in the required Wellness Concepts course. Students were risk stratified as Low Risk (0-1 RFs), Moderate Risk (2-3), or High Risk (4+) according to AHA Guidelines (2010). Data indicated that one in four students (M=29.3%; F=22.5%) are at Moderate Risk and 2.7% (M=1.7%; F=3.3%) are at High Risk. Of interest were the number who were overweight (BMI>25: M=25.4%; F=17.7%) or obese (BMI>30: M=8.3%; F=5.4%), gender differences in HDL-C (M=48.5±11.0 mg/dL; F=57.0 ±11.2 mg/dL) (p=.006) and the high percentage (33%) who had a family history of diabetes. On a positive note, only 1.3% of the students are currently diabetic or have elevated FBG, <5% are hypertensive, and only 5.1% carry their excess weight in their abdomen. Students should know that their lifestyle choices can increase their risk for developing Metabolic Syndrome and other chronic diseases.

### PREVALENCE OF RISK FACTORS FOR TYPE 2 DIABETES MELLITUS IN COLLEGE STUDENTS

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There has been an increasing prevalence of Type 2 Diabetes (T2D) among younger populations during the past decade. Detection and treatment of the controllable risk factors (RF) [FBG (>100 mg/dL); HDL-C (M<40 mg/dL; F<50 mg/dL); TG (>150 mg/dL); BMI ( $\geq$ 25 kg/m<sup>2</sup>); hypertension (>130/85 mmHg); sedentary] can prevent or deter the progression of T2D. The purpose was to determine the prevalence of T2D RFs in students enrolled in a private liberal arts university in upstate South Carolina. T2D RFs were assessed in undergraduates (N=314; age=18.9±1.1 yrs; Caucasian=90.1%) enrolled in the required Wellness Concepts course. Students were risk stratified as Low Risk (0-2 RFs), Moderate Risk (3-5), or High Risk (6+) according to ADA Guidelines (2010). Data indicated that 5% of students (M=3.2%; F=6.4%) are at Moderate Risk for developing T2D. Of interest were the number of students who are overweight (BMI>25: M=25.4%; F=17.7%) or obese (BMI>30: M=8.3%; F=5.4%), the high percentage of students (33%) with a family history of T2D, and that ~25% have low HDL-C (M=25.4%; F=24.6%). On a positive note, although there are gender differences, only 1.3% of the students are currently diabetic or have elevated FBG (p=0.13), 1.3% are hypertensive (p=.006), and most are involved in structured exercise programs on a regular basis (p=.006). Students should know that their lifestyle choices, specifically dietary and physical activity habits, could influence their risk for developing T2D and other chronic diseases.

#### **PHYSICAL INACTIVITY AND RISK OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG U.S. ADULTS**

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The relationship between physical activity and cardiovascular disease (CVD) risk factors has been well documented; however, few studies support the link between physical inactivity (PIA) and CVD risk factors. The purpose of this study was to investigate the risk of selected CVD risk factors associated with PIA, among a representative sample of U.S. adults. Data for this study came from the 2009 National Health Interview Survey (NHIS). A total of 27,731 adults ages 18 years and older were included in the analysis. PIA was defined using Healthy People 2010 standards: no reported light-to-moderate or vigorous intensity activity for at least 10 minutes at a time. CVD risk factors were physician diagnosed angina, hypertension, and diabetes; obesity (BMI  $\geq 30$ ); and smoking. The SAS 9.1 SURVEYLOGISTIC procedure was used to compute odds ratios (OR) and 95% confidence intervals (CIs). A total of 33.4 percent (31.0% men, 35.6% women) of adults were considered physically inactive. After controlling for age, race, and income, inactive men were more likely to have angina (OR=1.57, CI: 1.09-2.25), diabetes (OR=1.31, CI: 1.08-1.59), be obese (OR=1.33, CI: 1.17-1.51), and smoke (OR=1.67, CI: 1.42-1.98). Inactive men did not have a significant increase in hypertension, after adjustment. After controlling for age, race, and income, inactive women were more likely to have angina (OR=1.79, CI: 1.29-2.49), hypertension (OR=1.21, CI: 1.10-1.34), diabetes (OR=1.49, CI: 1.26-1.76), be obese (OR=1.37, CI: 1.23-1.52), and smoke (OR=1.75, CI: 1.49-2.06). These results show that PIA is significantly related to important CVD risk factors.

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#### **DOES EXERGAMING ACHIEVE THE SAME LEVELS OF FITNESS INTENSITY AS MENTOR-BASED PHYSICAL ACTIVITY?**

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Childhood obesity is rapidly becoming a problem in developed countries. Exercise games were developed by video game designers to address the issue of sedentary behavior. The purpose of this study was to explore the intensity levels of exergaming in comparison to a mentor-based physical activity program. Sixteen female participants (M age=9.4  $\pm$  1.0) spent twenty minutes in mentor-based physical activity and twenty minutes playing exercise games on the Wii™. The Wii time was divided into ten minutes on the WiiFit and ten minutes on Wii Sports. Heart rate monitors and accelerometers objectively measured exercise intensity while the Rate of Perceived Exertion scale (RPE; Borg, 1998) was used as a subjective measure of intensity. A Repeated Measures General Linear Model (RM GLM) found a significant time, condition and time\*condition interaction ( $p < 0.01$ ) for heart rate. Heart rate significantly increased during and immediately following exercise compared to rest. Heart rate was also found to be highest for the WiiFit condition and this was significantly different from Wii Sports and mentor based physical activity. For RPE, the RM GLM showed a significant time effect with RPE being highest at the end of each condition. Data from the accelerometer found that the participants engaged in activity at moderate intensity or higher 75% and 66% ( $p < 0.001$ ) of the time in mentor-based physical activity and WiiFit, respectively. Only 32% of physical activity was performed at moderate intensity or higher in Wii Sports. Based on our findings, it can be concluded that only the WiiFit exergame can achieve intensity levels comparable to mentor-based activity.

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#### **MP USE INCREASES VO<sub>2</sub>, VCO<sub>2</sub> AND VO<sub>2</sub>/KG DURING STEADY STATE RUNNING**

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Emerging research suggests that performance mouthpieces may benefit athletic performance, though the mechanism(s) of action are yet unknown. This study looked at the effect of a custom fit mouthpiece (MP) on gas exchange during steady state exercise in 13 subjects who completed two 10 minute trials on 2 separate days. Treadmill speed was set at 6.0 mph with 0% elevation and gas exchange parameters were analyzed (ParvoMedics) during each trial. Each subject was instructed to breathe through their mouths during each condition (with and without MP), with the MP group biting down and breathing while the no MP group breathed through an open mouth. Gas exchange parameters were measured with a mask that fit snugly over the subject's mouth and nasal area, with the nose being clamped during all trials. Results showed that there were significant differences in voluntary oxygen consumption per kilogram of body weight (VO<sub>2</sub>/kg), carbon dioxide (VCO<sub>2</sub>), and oxygen (VO<sub>2</sub>) in all conditions with the MP condition eliciting higher VO<sub>2</sub>/kg, VCO<sub>2</sub> and VO<sub>2</sub> versus no MP. VO<sub>2</sub>/kg with a MP was 31.37 ml/kg/min while the no MP condition was 23.95 ml/kg/min. VCO<sub>2</sub> with the MP was 2.23 l/min while the no MP condition was 1.87 l/min. Finally, VO<sub>2</sub> was 2.38 l/min with MP and 1.84 l/min with no MP. These results showed improvements in gas exchange with the MP versus no MP and suggest that MP use during endurance exercise may improve performance by improved CO<sub>2</sub> removal.

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#### **BARIATRIC SURGERY AND INSULIN SENSITIVITY IN OBESITY: ROLE OF PROXIMAL SMALL INTESTINE BYPASS.**

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Bariatric surgery is an effective, rapid, and durable treatment for obesity. Insulin resistance is well known to occur in obesity. Roux-en Y Gastric Bypass (RYGB) and gastric banding (LAGB) improve insulin resistance; however these improvements may be greater following RYGB. One significant difference between RYGB and LAGB is the bypassing of the proximal small intestine in RYGB. Whether differences in the improvement in insulin sensitivity are due to differences in intestinal bypass, food intake, or weight loss following bariatric surgery is unknown. PURPOSE: To determine if RYGB produces greater improvements in insulin sensitivity than LAGB in obese. METHODS: Obese, Caucasian women underwent RYGB (N=8) or LAGB (N=1). Insulin sensitivity (Si) was measured pre-op, 1-wk post-op, and matched for weight loss (Match WL) post-op (3-mo for RYGB and 6-mo for LAGB) by an insulin modified intravenous glucose tolerance test (IVGTT). Post-surgery analysis at 1-wk eliminates the potential contribution of differences in food consumption as this is rigorously controlled for 1 wk following both surgical procedures. RESULTS: From our very preliminary data, Si improvements may be similar following RYGB (Pre: 2.94  $\pm$  1.02 AU; 1-Wk: 2.21  $\pm$  0.42 AU; and Match WL: 3.88  $\pm$  1.12) and LAGB (Pre: 2.11 AU; 1-Wk: 2.30 AU; and Match WL: 8.20). CONCLUSIONS: Our very preliminary results in obese, Caucasian women suggest that insulin sensitivity may be increased similarly in RYGB and LAGB questioning the role of proximal small intestine bypass in the reversal of insulin sensitivity following bariatric surgery.

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**AEROBIC EXERCISE TRAINING IN CHILDREN OF EXTREMELY OBESE AND LEAN PARENTS IMPROVES FAT OXIDATION**

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A reduced rate of fat oxidation has been linked with obesity and weight gain; the purpose of this study was to determine if the children of severely obese parents are predisposed towards a reduction in fat oxidation during submaximal exercise. Fat oxidation rates during submaximal exercise at the same relative and absolute workloads was investigated in children who had at least one extremely obese parent (COP) (N=10, BMI >40 kg/m<sup>2</sup>) and compared to children with relatively lean parents (CLP) (N=10, BMI <28 kg/m<sup>2</sup>). Despite being matched for age (~10 yr), maturity level (Tanner Stage 1.5), body composition (BMI ~20 kg/m<sup>2</sup>), cardiovascular fitness (VO<sub>2</sub>peak 24 ml/kg/min), and physical activity levels, the COP group exhibited a significantly higher RER and a lower fat oxidation rate than the CLP group at an absolute workload of 15 Watts (P<0.05). These differences were not observed at a workload approximating 65% VO<sub>2</sub>peak. A follow-up study was performed to determine if physical activity could correct the reduction in fat oxidation evident in COP. One participant trained for 4 weeks, 3 sessions a week for 30-60 minutes. After training RER was significantly lower and percentage of energy from fat significantly higher compared to pre-training levels. In conclusion, fat oxidation appears to be reduced in children with at least one severely obese parent and this decrement may be rescued with exercise training.

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**GOLF: THE EFFECT OF WALKING VERSUS UTILIZING A PULL-CART ON CARDIOVASCULAR RESPONSES**

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Background: Physical inactivity is a major public health problem that has been associated with the increased risk of several diseases, including cardiovascular disease and hypertension. Golf is a recreational sport that offers great potential for individuals of a wide variety of health levels to increase cardiovascular (CV) responses and elicit improvements in CV health. The aim of this study was to compare the CV responses between walking (W) and using a pull-cart (PC) to play 9 holes of golf. Methods and Results: Eighteen individuals (38.3 ± 3.7 yrs) completed the following measures Pre and Post round: 1) medical history questionnaire, 2) demographic information, 3) blood pressure, 4) heart rate, 5) height, 6) weight, and 7) dietary intake. No significant changes were observed within PC or W groups for Pre vs Post measures of SBP (p=0.428 and 0.476, respectively) or DBP (p=0.768 and 0.982, respectively). However, HR increased from Pre to Post within the PC and W groups (+38bpm ± 11.6, +17.7bpm ± 5.8, respectively; both = p<.05). In addition, the magnitude of HR change was larger in PC vs W (p<.05). Conclusions: Our data indicate that SBP and DBP did not change from Pre to Post in any group. Our data also indicate that HR increased from Pre to Post within and between both groups. Our data suggests that utilizing a pull-cart may elicit greater CV health effects than carrying a bag.

**TEST-RETEST RELIABILITY AND VALIDITY OF THE SENIOR FITNESS TEST**

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The Senior Fitness Test (SFT) measures physical parameters associated with functional ability, and identifies whether an older adult is at risk for loss of physical function. Few studies have examined test-retest reliability of the SFT and its relationship to functional capacity (VO<sub>2</sub>peak), and physiological reserve (Heart Rate Reserve (HRR)). Purpose: To examine test-retest reliability of the SFT and its relationship with VO<sub>2</sub>peak and HRR in individuals between 70 and 85yrs. Methods: Individuals performed the SFT on two separate occasions, and a graded exercise test for determination of VO<sub>2</sub>peak and HRR. Results: Average age was 75±5yrs (47 females; 21 males). Average SFT percent ranking was 34.26±13.20%, VO<sub>2</sub>peak was 16.13±3.47 ml/kg/min<sup>-1</sup> and HRR was 64±16 beats. Test-retest correlations ranged from 0.71 (arm curl) to 0.96 (back scratch). The change in mean score indicated a significant learning effect for the chair stand (1.2±1.6, p=0.001), arm curl (1.7±2.4, p=0.001), and 6 minute walk (21.52±34.57, p=0.001), but not for the sit and reach, back scratch, and up and go tests. VO<sub>2</sub>peak was associated with the SFT percent rank (r=0.28, p=0.04), with strongest associations for the 6 minute walk (r=0.42, p=0.001) and get up and go test (r=0.51, p=0.001). Finally, HRR was directly related to total SFT percent rank (r=0.28, p=0.05). Conclusion: These results indicate that the SFT is a reliable measure of physical function, and associated with measures of VO<sub>2</sub>peak and HRR, even in a relatively frail group of individuals between 70 to 85 yrs.

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**REDUCTIONS IN FUNCTIONAL SYMPATHETIC OVERACTIVITY IN OBESE ADOLESCENTS FOLLOWING A WEIGHT MANAGEMENT PROGRAM**

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Sympathetic overactivity (SO) is associated with several disease states including type 2 diabetes and obesity. The purpose of this study was to evaluate the association of SO, as assessed by an exercise recovery index (ERI; heart rate/VO<sub>2</sub> plateau), with insulin resistance (HOMA-IR), cardiovascular fitness (VO<sub>2</sub>peak), and percent body fat (%FAT) in obese adolescents participating in a three month weight management program. Thirty-eight participants (13.6±1.5 yrs, 36.5±6.3 kg/m<sup>2</sup>) volunteered to participate in this study. %FAT, VO<sub>2</sub>peak, ERI, and the HOMA-IR were assessed at enrollment and after 3-months of program participation. Program components included physical activity, nutrition education, and behavioral support. Using multiple linear regression modeling, there was a significant independent association between ERI and %FAT (r = 0.575, p < 0.001) after controlling for both VO<sub>2</sub>peak per lean tissue and HOMA-IR. However, VO<sub>2</sub>peak per lean tissue (r = -0.321, p = 0.057) and HOMA-IR (r = 0.047, p = 0.784) were not independently associated with ERI. ERI (n = 21; 29.7±7.0 vs. 25.1±8.0, p = 0.014) and %FAT (n = 20; 46.0±9.6 vs. 45.2±10.3, p = 0.025) was significantly reduced after the program. VO<sub>2</sub>peak per lean tissue and HOMA-IR remained unchanged. These results suggest that insulin resistance is distinct and not impacted by SO in young obese adolescents. Additionally, involvement in a weight management program may attenuate the development of pathological risk factors associated with SO.



### ASSESSING ENDURANCE EXERCISE CAPACITY IN MICE USING A FORCED SWIM TEST

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Introduction. Exercising inbred mice is useful for investigating the genetic regulation of many physiological systems. Forced endurance exercise has been used as a model for assessing exercise capacity using treadmill running. However, not all strains of mice are effective treadmill runners. Forced swim tests have been used previously and inhibited limb movement or immobility was reported, suggesting exercise-induced exhaustion. We hypothesized that a forced swim test would be an effect method for assessing endurance exercise capacity using inbred mice. Purpose. To evaluate between strain endurance exercise capacity using a forced swim test. Methods. Five strains (4-8 mice per strain) were individually subjected to a forced swim test. The set endpoint was an inability or unwillingness of a mouse to avoid complete submersion in the water for 2 seconds. Some mice were encouraged to swim by gently tapping their tail at the beginning of the test. Results. Significant differences in the mean swimming time was observed between strains (range of 2mins 1sec  $\pm$  0.005 sec to 9mins 4sec  $\pm$  0.04 sec;  $p < 0.05$ ). Not all mice swam continuously during the test and submersion did not appear to be due to exercise-induced exhaustion as they were still able to swim after repeated voluntary submersions. Conclusion. The difference between strains suggests a genetic component to swimming time. However, our swim test appeared to be a stress-inducing form of physical activity and may not be a useful mouse model for maximum endurance exercise capacity.

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### STEP UP YOUR COMMERCIAL BREAKS

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Modifying sedentary TV watching behaviors by stepping in place during commercials (TV stepping) could increase physical activity (PA) and energy expenditure (EE). PURPOSE: To determine the EE of TV stepping and to quantify the amount of activity (number of steps and minutes) performed during 1 hour of TV stepping. A secondary aim was to determine what activity monitors are useful in measuring TV stepping. METHODS: Twenty-three adults (27.8 $\pm$ 7.0 years) had EE measured at rest, sitting, standing, stepping in place and walking at 3.0 mph on the treadmill, followed by sedentary TV viewing and TV stepping. Adults wore activity monitors on the waist (Yamax Digiwalker, and New Lifestyles 2000), and on the ankle (Omron HJ-303, and StepWatch-3) during the ambulatory activities. Step counts were compared to a hand-tally counter. RESULTS: There were no differences ( $P=0.76$ ) between the caloric requirements of rest (79 $\pm$ 16 kcal/h), and sedentary TV viewing (81 $\pm$ 19 kcal/h). However, TV stepping (148 $\pm$ 40 kcal/h), stepping in place (258 $\pm$ 76 kcal/h), and walking at 3.0 mph on the treadmill (304 $\pm$ 71 kcal/h) had a higher caloric requirement than either rest or sedentary TV viewing ( $P < 0.001$ ). One hour of TV stepping resulted in an average of 25.2  $\pm$  2.6 minutes of PA and 2111 $\pm$ 253 actual steps. During TV stepping, the Digiwalker and New Lifestyles devices counted 72% and 80% of steps, respectively. The Omron and StepWatch counted 100% and 98% of steps, respectively, during TV stepping. CONCLUSION: The EE and amount of activity performed during TV stepping can be measured accurately. The effectiveness and efficacy of interventions focused on increasing the PA levels of sedentary adults through TV stepping should be investigated.

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### ACUTE CARDIOVASCULAR RESPONSES TO PLAYING GOLF: WALKING VS. RIDING

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Golf is a form of physical activity that is both enjoyable and inviting to a large variety of people. Although it is assumed that riding in a cart (R) while playing golf requires minimal physical activity as compared to walking (W), few studies have compared the acute cardiovascular responses of playing golf while W vs. R. PURPOSE: To examine the effects of W and R nine holes of golf on acute blood pressure (BP) and heart rate (HR) responses in recreational golfers. METHODS: Eighteen men and women (38  $\pm$  16 yr; 88.9  $\pm$  17 kg; 28.0  $\pm$  4.2 BMI) played two separate nine-hole rounds on the same course, one W and the other R. Measurements were obtained before and within five minutes of completing each round. All data were analyzed using paired t-tests. Data are presented as mean  $\pm$  S.D. and significance was set at  $p < 0.05$ . RESULTS: Both W and R led to increased HR (W: 70.8  $\pm$  12.0 to 95.3  $\pm$  23.7 bpm; R: 69.1  $\pm$  13.1 to 77.4  $\pm$  13.9 bpm; both  $p \leq 0.01$ ). R also led to an increase in diastolic BP (79.9  $\pm$  10.4 to 84.2  $\pm$  7.9 mmHg;  $p < 0.05$ ). The HR responses to W and R were equivalent to 52.3% and 42.5% of age-predicted maximal HR, respectively. CONCLUSIONS: The data indicate that W leads to greater HR responses than R and that R would be considered a form of light physical activity. The data suggest that beneficial cardiovascular effects may be obtained in some individuals by playing golf while using a riding cart.

### LACK OF CORRELATION BETWEEN IMPORTANCE OF PRO ATTITUDE OF EXERCISE AND OBJECTIVE AND SELF-REPORTED FITNESS MARKERS

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Thirty four college students (mean age=20.85  $\pm$  2.77), were subjects in a research project studying relationships between attitudes toward exercise, self reported amount of activity and markers of physical fitness. It was hypothesized that high self reported positive attitudes (pros) and low negative attitudes (cons) toward exercise would be positively correlated with high self reported physical activity and high levels of physical fitness. The subjects' self reported attitudes toward exercise were collected by Decisional Balance Measure surveys (Ex.DB). Subjects' self reported amount physical activity was collected by the International Physical Activity Questionnaire. Markers of physical fitness included a series of fitness assessments measuring aerobic capacity (VO<sub>2</sub>max estimated), upper/lower/core body strength, flexibility and body composition. The study showed that females high pro-attitudes toward exercise correlated with upper body strength ( $r=.64$ ) and greater differences between pros and cons correlated with minutes of vigorous activity ( $r=.47$ ). Among females, neither pros nor cons toward exercise correlated with any other markers of physical fitness. Among the males, no relationships were detected between positive or negative attitudes toward exercise and physical fitness markers or self reported physical activity. These findings indicate that the Ex.DB survey does not consistently correlate with self reported activity or physical fitness markers among college-age males and females and may not be a valid measure of established cognitive predictors of engaging in physical activity among young adults.

**UNDERGRADUATE STUDENTS' RESIDENCE LOCATION AND ITS RELATIONSHIP TO EXERCISE IN CAMPUS FITNESS FACILITY**

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\* Denotes equal contribution and presenting authors

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The purpose of this study was to determine the relationship between the location of students' residence and the utilization of campus fitness and recreational facilities. Six hundred thirty-four undergraduate students from a small, private university in Birmingham, Alabama participated in the study. Each participant completed a survey regarding residence area and location of physical activity. Results indicated students residing on campus utilized the fitness center significantly more ( $p < .001$ ) than those living off campus. Additionally, the results indicated those living in the residence area nearest the fitness center (0.1mi) utilized it significantly more (74%) than those who lived in the residence area furthest away (54%) from the center (0.59mi,  $p = .011$ ). The results of this study suggest that distance of residence area from the campus fitness center may impact the utilization of that facility. The results demonstrate the importance of location of campus fitness facilities and should be taken into account when planning new campus-based facilities. Consideration should be given to the placement of facilities in areas centrally located to campus residences.

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**ALL A-TWITTER: A NEW MOTIVATIONAL TOOL FOR INCREASING PHYSICAL ACTIVITY**

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The purpose of this pilot project was to evaluate the potential role of phone text messaging via Twitter as a motivational tool to increase physical activity in working adults. Seven subjects received an average of three text messages via Twitter per week for 12 weeks. Messages were motivational, informational and specific to performing or increasing physical activity. Physical activity was measured three times (baseline, six weeks and 12 weeks) with the Omron pedometer for seven days. At the end of the 12 weeks, six subjects provided qualitative feedback on the intervention via interviews. Paired t-tests showed a significant increase ( $p < .05$ ) in step counts from baseline (mean 5,137  $\pm$  1234) to 12 weeks (mean 6,648  $\pm$  1631). Interviews revealed overall satisfaction with the messages and increased motivation to exercise by all subjects. Subjects also reported performing physical activity in response to the messages. These results suggest that text messages sent via Twitter may be a cost effective useful tool to motivate participation in physical activity. Further investigation on the use of text messaging and other social media, to promote physical activity is warranted.

**THE INFLUENCE OF ADVENTURE EXPERIENCE ON ANTICIPATED AND EXPERIENCED ANXIETY LEVELS AMONG PARTICIPANTS.**

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As people continue to participate in outdoor adventures there is growing interest in understanding the influence of participation on psychological measures. The purpose of this study was to compare an individual's predicted level of anxiety to their actual level of anxiety during outdoor adventure experience. The participants ( $n=52$ ; Mean age= 21.9 yrs,  $SD=3.1$ ) were volunteers selected from five different experiences organized by a recreational sports outdoor adventure program. Adventures were hang gliding, challenge course, rock climbing, hiking, and wilderness survival. It is commonly thought participation in adventure experience is associated with foreseeable risks. These risks are thought to attract the participant to the activity. The influence participation has on anxiety level is not clearly understood. As a result, the participant may experience a difference in their predicted and actual anxiety levels relative to the experience. Participants were asked to rate their predicted anxiety level four days prior to participation in the outdoor experience. Upon completion of the experience participants were asked to rate the actual anxiety level experienced. One-way ANOVA for adventure type revealed no ( $p > 0.05$ ) significant differences in anxiety. One-way ANOVA for predicted and actual anxiety experienced revealed no significant ( $p > 0.05$ ) differences. A one-way ANOVA for sex revealed significant ( $p < 0.05$ ) differences between male and female participants. Current results indicate participants accurately predict their experienced anxiety level prior to participation and the anxiety level experienced is different based on sex. This finding should be considered in adventure programs.

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**PERCEIVED SOCIAL SUPPORT IN A REHABILITATION SETTING**

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Social support for physical activity (PA) is believed to play a role in a Person's initiation and continued participation in PA. It is also believed, but not firmly established, that social support from an allied health professional plays a key role in adherence to PA and rehabilitation. The purpose of this study was to investigate the level of physical therapy patients' perceived social support from their rehabilitators in a physical therapy setting. Participants included 88 patients (29 male, 58 female, 1 unknown), aged 19-83 years, who agreed to answer surveys in the clinics where their physical therapy was administered. Participants must have attended physical therapy for a minimum of one month. Results show that physical therapists were perceived to provide social support significantly more than family and friends ( $p < 0.001$ ), with the mean level of social support from family at 23.75  $\pm$  13.77, from friends 22.48  $\pm$  18.19, and from physical therapists 35.12  $\pm$  23.03. A paired samples t-test revealed that there was not a significant difference in perceived social support between family and friends ( $p > 0.564$ ), however, there was a significant difference between family and a physical therapist ( $p < 0.001$ ), and friends and a physical therapist ( $p < 0.001$ ). While social support is received by both the family and friends of a physical therapy patient, physical therapists themselves may have a more significant impact on the patients' compliance, progress, and motivation than originally thought.

**THE INFLUENCE OF CONCUSSION HISTORY ON COGNITIVE PERFORMANCE IN COLLEGE ATHLETES**

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Student-athletes, specifically in sports such as soccer and football, have a high risk of concussions. This study was interested in examining the potential long term decrements that may result from concussions. **MEHTODS:** Fifty student-athletes from football (n = 15), men's soccer (n = 17) and women's soccer (n = 18) participated in the study. Each participant completed the Immediate Post-Concussion Assessment Cognitive Testing (ImPACT). Additionally, EEG was recorded to determine event related potentials (ERPs) during the Eriksen Flanker Task and an auditory oddball task. **RESULTS:** ImPACT found that verbal memory was worse in those who have previously had a concussion versus those with no history (p = 0.043). Some evidence was found that supported that the P3 ERP component was influenced by concussion history with those suffering from a previous concussion to have larger latency at site Fz for the Flanker Task. (p = 0.02). A trend towards significance was found at FCz (p = 0.11). The auditory oddball task provided additional evidence in greater P3 amplitude for those with a concussion history at site Pz (p = 0.01). Non significant trends were found at FCz (p = .07) and Oz (p = 0.08). Both latency and amplitude are thought to represent decrements in cognitive processing of stimuli. **CONCLUSIONS:** The present study found concussion history to have an influence in cognitive processing in student-athletes. These decrements in processing can have an influence on quality of life in those with a concussion and needs to be explored more.

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**IMPROVEMENTS IN QUALITY OF LIFE IN MIDDLE-AGED WOMEN FOLLOWING 8 WEEKS OF PROGRESSIVE RESISTANCE TRAINING**

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Twenty-one overweight (BMI  $29.0 \pm 1.1 \text{ kg/m}^2$ ), centrally obese (waist circumference  $90.8 \pm 2.8 \text{ cm}$ ) women ( $47.6 \pm 1.2 \text{ years}$ ) completed an 8-week progressive resistance training program either 3 or 4 days per week. At baseline and within 24 hours after the last training session they completed the Vitality Plus Scale (VPS), a self-report instrument developed and validated to measure exercise-related changes in quality of life in middle-aged and older adults. Participants scored themselves 1-5 points in each of 10 areas related to health and quality of life, for a total possible score of 50. Greater scores indicated better subjective quality of life. No between-group differences were observed based on weekly training frequency, so data were combined for pre-post analysis. The mean total VPS score was  $33.14 \pm 1.7$  points at baseline. After 8 weeks of resistance training it increased significantly ( $6.24 \pm 1.5$  points,  $p < 0.001$ ), indicating an overall improvement in quality of life. Commensurate improvements were observed in sub-scales for time to fall asleep ( $0.54 \pm 0.2$  points,  $p = 0.02$ ), sleep quality ( $0.76 \pm 0.2$  points,  $p = 0.006$ ), feeling rested during day ( $0.78 \pm 0.3$ ,  $p = 0.018$ ), constipation ( $0.72 \pm 0.2$  points,  $p = 0.007$ ); energy levels ( $1.01 \pm 0.2$ ,  $p < 0.001$ ), morning stiffness ( $0.67 \pm 0.2$  points,  $p = 0.01$ ), and relaxation ( $0.40 \pm 0.2$ ,  $p = 0.43$ ). These results support the efficacy of a relatively short-term resistance training program for improving quality of life in middle-aged women. Such improvements are not influenced by increasing weekly training frequency from 3 to 4 days per week. Further research is needed to identify the threshold training frequency at which improvements in quality of life are evident.

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**FREQUENCY OF EXERCISE TRAINING ON AEROBIC AND STRENGTH FITNESS CHANGES IN OLDER WOMEN**

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The effects of different frequencies of combined aerobic and resistance training on cardiovascular fitness and muscular strength was investigated in 44 elderly women (> 60 yrs of age). Women were randomly assigned to one of three groups (aerobic and resistance training 1day/wk; aerobic and resistance training 2 days/wk; or aerobic and resistance training 3 days/wk). The three groups were matched for age, race, and body composition. 16 wks of exercise training resulted in significant improvements in ease of daily living activities for each exercise group. Training significantly improved both level and graded walking performance.  $\text{VO}_2$  and heart rate (HR) were significantly decreased during level (8% and 9%) and graded treadmill walking (2.6% and 5.8%) after 16 wks of exercise. Significant improvements in muscular strength were also observed following training. Elbow flexion isometric and leg extension 1RM increased 11% and 17% from pre-training values. However, there were no significant differences for any of the cardiovascular or muscular strength outcomes between exercise groups. These results show that exercise training as little as one day per week can significantly improve cardiovascular and skeletal muscle function in elderly women. These data further our understanding of ways to improve well being, quality of life, and independence of an aging population.

NIH 5 R01 AG027084-01

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**COMPARISON BETWEEN ECCENTRIC AND HIGH VELOCITY TRAINING ON FUNCTIONAL PERFORMANCE IN OLDER ADULTS**

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High velocity resistance training has become a popular exercise modality, but little is known about how it compares to eccentric training on measures of function in older adults. Nineteen older adults aged 65+ were divided into two groups; eccentric (ECC) and high velocity (HV). They exercised three times per week for 8 weeks, performing 3 sets of 8-12 repetitions on the seated leg press, seated leg curl, and seated leg extension using pneumatic exercise equipment. The HV group trained at 50% of 1RM. The concentric phase was completed "as quickly as possible" followed by a 2-3 second eccentric phase. The ECC group trained at 75% 1RM completing the concentric in ~ 3 seconds and the eccentric in 3-5 seconds. Participants were tested on maximal walking speed, 8 foot up-and-go, and chair stand. Data were analyzed using a repeated measures analysis of variance, with one within-subject factor and one between-subject factor. Results indicated no significant main effects on measures of function between groups ( $p > .05$ ). However, significant main effects were found for time in both groups. The HV group improved on measures of gait velocity ( $p = .03$ ) and 8 foot up-and-go ( $p = .05$ ), whereas the ECC group improved on chair stand ( $p < .05$ ). These results suggest both training methods can improve measures of function. More importantly, this research suggests a less strenuous training modality such as HV training can have positive effects on function.

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**COMPARISON OF AEROBIC POWER IN UNITS OF TOTAL BODY MASS VERSUS FAT FREE MASS IN ADOLESCENTS.**

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Use of aerobic power per unit fat free mass (FFM) is increasing in the obesity and exercise literature, especially in adolescents. The purpose of this study was one, to compare aerobic power per unit FFM to the more traditional unit per total body mass in a wide variety of adolescents and two, establish normative ranges for  $\text{VO}_2\text{max}$  per unit FFM ( $\text{mL/kgFFM/min}$ ) in adolescence. The sample was a multi-cohort of 5364 youth, 1599 African American, 3340 Caucasians and 333 other, (mean age = 11.7 yrs  $\pm$  3.1; range = 8-18 years), 2646 boys and 2718 girls. Height, weight and skinfold (triceps and subscapular) were measured and  $\text{VO}_2\text{max}$  was estimated. FFM was determined by estimating fat mass via skinfold measure. Mean values of  $\text{VO}_2\text{max}$  by  $\text{mL/kg/min}$  ( $\text{VO}_2\text{max/KG}$ ) and  $\text{mL/kgFFM/min}$  ( $\text{VO}_2\text{max/FFM}$ ) were determined for the 10th, 25th, 50th, 75th, and 90th percentile by sex and age. In girls,  $\text{VO}_2\text{max/KG}$  remained fairly consistent above age 11, while  $\text{VO}_2\text{max/FFM}$  declined throughout adolescence except in the fittest girls, where it tended to increase after age 16. In units of  $\text{VO}_2\text{max/KG}$  the boys were similar in early and late adolescence but the values tended to decline from age 8 to 13 and then increase. In the less fit boys (< 50th %tile) a decrease in  $\text{VO}_2\text{max/KG}$  was noticed at 17-18 years of age.  $\text{VO}_2\text{max/FFM}$  of the highly fit boys followed a similar pattern to the boys in units  $\text{VO}_2\text{max/KG}$ . The  $\text{VO}_2\text{max/FFM}$  for less fit boys varied throughout adolescence. To conclude, differences in  $\text{VO}_2\text{max/KG}$  compared to  $\text{VO}_2\text{max/FFM}$  are apparent in adolescence. Understanding differences in these measures is vital when attempting to link aerobic fitness with lifestyle diseases.

**COMPARISON OF ACTIVE COMMUNITY-DWELLING SENIORS IN A STRUCTURED AND NON-STRUCTURED EXERCISE PROGRAM**

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Participation in physical activity is highly related to healthy aging, as indicated by extensive research. Approximately 25% of older adults exercise on a consistent basis. As individuals age, the number of falls can increase, when balance issues are not resolved. The purpose of this study was to compare the fitness level and balance of older adults over 55 years old in a structured exercise program with adults who exercised on their own. Methods: Two community-dwelling groups were recruited. One group (n=19, mean  $\pm$  SD, age, 69.82  $\pm$  7.1y; height 171.08  $\pm$  9.1cm; weight 83.8  $\pm$  16.9kg) normally attended a three-day week university-based walking and exercise program. The other group (control, n=17, mean  $\pm$  SD, age, 66.0  $\pm$  7.9y; height 167.77  $\pm$  8.79cm; weight 75.95  $\pm$  17.91kg) exercised on their own. Each group was tested using the Senior Fitness Test and the Equi-test's Sensory Organization Balance Assessment. Results: No significant differences existed in balance or Senior Fitness Test measures ( $p > .05$ ) between the two groups. Conclusions: These results suggest certain fitness components and balance are similar in active community-dwelling individuals, whether they are in a structured program or not. For further studies, senior groups may need additional assessments or possibly matched by fitness levels or other factors.

**FAMILIARIZATION OF A CLINICAL TOOL, THE TIMED 25 FOOT WALK TEST, IN INDIVIDUALS WITH RELAPSING REMITTING MULTIPLE SCLEROSIS**

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The timed 25-foot walk (T25-FW) test is a common clinical tool used to evaluate mobility and leg function in response to therapies in people with multiple sclerosis (MS). Recommended test administration procedures include using the mean of two sequential walk trials (single test session). The purpose of our study was to evaluate the T25-FW test across repeated testing sessions to determine whether practice would influence performance outcomes. We hypothesized that T25-FW scores would improve across repeated testing sessions. Thirty six individuals (30 women and 6 men, age 66.8  $\pm$  3.0 yrs) with relapsing remitting (RR) MS and a disability status scale score (EDSS) of  $\leq 6.5$  (ambulatory) completed the T25-FW on two test days separated by a week. During each testing session participants completed two sequential T25-FW trials. Using a laser timing system, mean T25-FW performance improved ( $p < 0.05$ ; 8.5%) from testing session 1 to testing session 2. These findings provide evidence of a practice effect between repeated test sessions of the T25-FW test in individuals with RRMS. When used to evaluate therapeutic efficacy in the clinical setting, a T25-FW familiarization test may minimize performance bias associated with practice effect.

**EFFECT OF LEG COOLING VERSUS ICE VEST COOLING ON TIME TRIAL PACED CYCLING**

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The purpose of this investigation was to test the hypothesis that cooling interventions will enhance performance during a 13-mile simulated time trial in a warm environment. Nine trained male cyclists (peak oxygen uptake = 57.8  $\pm$  5.0  $\text{mL/kg.min}^{-1}$ ) completed 3 simulated 13-mile time trials in a warm environment (26.0  $\pm$  0.5  $^{\circ}\text{C}$ , 43.8  $\pm$  3.0 % relative humidity) separated by 72 hours. On each occasion participants warmed up for 10 min while wearing either an ice vest (VEST) on the torso, cooling packs wrapped around the quadriceps and calves (LEG), or no cooling apparatus (CONTROL). Average core and mean skin temperatures were not significantly different among treatments (all  $p > 0.05$ ). Likewise, time to completion was not significantly different [39.3  $\pm$  5.2 min (VEST), 40.0  $\pm$  5.2 min (LEG), 41.3  $\pm$  4.2 min (CONTROL),  $p = 0.25$ ]. Despite a lack of statistical significance, the time trial was completed faster during VEST compared to CONTROL by 7 out of 9 (78%) participants with an average time 3.2  $\pm$  1.9 min faster. Similarly, 5 out of 9 (55%) participants completed the time trial faster during LEG compared to CONTROL with an average time 5.9  $\pm$  1.9 min faster. These data suggest competitive cyclists may experience a modest benefit while utilizing cooling modalities during an active warm-up before a trial.

#### **SAFETY PERCEPTIONS AND PHYSICAL ACTIVITY DURING PREGNANCY**

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We evaluated whether safety perceptions were related to LTPA participation during pregnancy among 81 women. At their first prenatal care visit, women rated moderate (MOD) and vigorous (VIG) LTPA during pregnancy as safe, unsafe, or unsure (unsafe/unsure combined for analysis). At 18-24 months postpartum, women reported pregnancy outcomes and recalled type, duration, and frequency of LTPA during each trimester. Minutes per week of MOD (3-<6 METs), VIG ( $\geq 6$  METs) and total LTPA were calculated per trimester. Descriptive statistics were calculated. Student's t-tests compared min/wk of LTPA by safety perceptions. Chi-square analyses compared participant characteristics, safety perceptions, and LTPA participation. Overall, 44% met LTPA recommendations (total LTPA >150 min/wk) during pregnancy. The majority (98%) felt MOD LTPA was safe, but only 52% felt VIG LTPA was safe. Minutes per week of light, MOD and/or total LTPA did not differ by MOD or VIG LTPA safety perceptions. Women who felt that VIG LTPA was safe during pregnancy recalled significantly more min/wk of VIG LTPA in the second ( $27.9 \pm 51.1$  vs.  $3.3 \pm 15.2$  min/wk for safe vs. unsafe/unsure) and third ( $12.6 \pm 32.4$  vs.  $0.8 \pm 4.8$  min/wk for safe vs. unsafe/unsure) trimesters ( $p < 0.05$ ). Participant characteristics were unrelated to safety perceptions; however, women who were married ( $p = 0.06$ ), normal weight ( $p = 0.06$ ) and not on Medicaid ( $p = 0.04$ ) tended to be more likely to participate in VIG LTPA. Thus, while reported min/wk of VIG LTPA during pregnancy is low, positive safety perceptions may improve VIG LTPA participation, along with maternal factors.

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#### **HIGH INTENSITY EXERCISE INCREASES CELL DEATH OF B-LYMPHOCYTES (CD19) IN ANAEROBICALLY TRAINED INDIVIDUALS**

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The present study was developed to determine the B-lymphocytes response in terms of migration or apoptosis (cell death) with intense bouts of exercise. Traditional anaerobically trained individuals ( $n = 5$ ) performed 5-minute treadmill runs using 48%, 74%, 96% of their  $VO_2$  max, with 5-minute rest bouts in between each run. Finally a run utilizing an intensity at 110% of  $VO_2$  max was conducted to exhaustion. Blood samples for immune parameters were collected pre-testing, immediate post, 1-hour post exercise, and 24-hour post exercise. Samples were incubated with antibody markers for the B-cell subfraction (CD19), apoptosis (annexin V), and migration (CX3CR1). Data were analyzed using a one-way ANOVA. Supramaximal exercise increased cell death of B-cells compared to resting values ( $P = 0.21$ ). Annexin V positive cells were then significantly decreased at 1h post ( $P = 0.004$ ) and remained depressed at 24h post ( $P = 0.003$ ). No significant changes were noted for CD19 count ( $P = 0.24$ ) or percent migration ( $P = 0.36$ ). Recent studies have failed to observe increases in the cell death of overall lymphocytes, however the results of the present investigation indicate that the B-cell subset is more susceptible in this regard. This finding may have transient implications for antibody production and humoral immunity following exercise.

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**EXERCISE INDUCED CARDIOPROTECTION AGAINST TISSUE NECROSIS**

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**D1**

Ischemic heart disease is the major cause of mortality and morbidity in the US. Exercise preconditioning elicits an ischemic resistant phenotype. The mechanisms of exercise cardioprotection vary as a function of the ischemic insult (eg arrhythmia, stunning, infarct). The mitochondrial ATP sensitive potassium (mito KATP) channel is an essential mediator of cardioprotection against ischemia-reperfusion (IR) induced arrhythmia. However, the function of either the mito KATP or sarcolemmal ATP sensitive potassium (sarc KATP) channel against IR induced necrotic cell death is unknown. The purpose of this study was to examine the effect of the mito KATP and sarc KATP channels on IR induced tissue necrosis. Male rats were treadmill exercise preconditioned at ~70% VO<sub>2</sub>max on 3 consecutive days for 60 minutes. Following day 3 exercise, anesthetized animals received surgically induced IR for a total of 170 minutes (50m I/120m R). Separate groups of exercised rats received pharmacologic inhibitors to the mito KATP channel (5HD) or the sarc KATP (HMR-1098) prior to IR. Evans blue infusions denoted perfused and ischemic tissue and necrotic area was determined by triphenoltetrazoliumchloride staining. Exercise prevented IR-generated necrosis (19% necrosis, p=0.369) compared to sedentary (42% necrosis, p=0.001). In 5HD and HMR-1098 inhibited animals, exercise preconditioning against necrosis was respectively unaffected (16% necrosis, p=0.527) and abolished (42% necrosis, p=0.002). Results indicate the sarc, but not mito, KATP channel is essential for exercise induced cardioprotection against necrotic tissue death.

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**THERAPEUTIC ULTRASOUND AFFECTS IGF-I SPLICE VARIANTS IN HUMAN SKELETAL MUSCLE.**

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**D2**

IGF-IEa, IGF-IEb and mechano growth factor (MGF) gene expression in human skeletal muscle after damage and TUS treatment was examined. Despite their important role in muscle repair, these genes have not been studied in humans in response to therapeutic ultrasound (TUS). Methods: 16 healthy males, physically active, 18- 29 y/o, were randomly assigned to either control (CON) or experimental group (EXP). The EXP group was subjected to 200 eccentric contractions of the quadriceps of both legs, 48h before TUS. Both groups received TUS in one leg. TUS was delivered for 10min on a standardized area of the vastus lateralis (100%, 1.0 MHz, 1.5W/cm<sup>2</sup>). Muscle biopsies were taken from both vastus lateralis of all subjects, 6h after TUS. Total RNA was extracted, qRT-PCR conducted for each IGF-I isoform. Results: Muscle damage was confirmed by significant increase in CK activity levels and 21.2% decrease in MVC 48h post-damage. Following muscle-lengthening contractions gene expression of the three isoforms increased; IGF-IEa, 2.23 ±.31-fold p=.036; MGF, 2.56 ± 0.36-fold p=.012; and IGF-IEb, 1.59 ± 0.22-fold p=.15. The TUS alone induced a significant increase in mRNA expression of IGF-IEb (1.35 ± 0.17 fold p=.009) and MGF (1.48 ± 0.25 fold p=.023). TUS induced no changes in IGF-I isoforms expression in damaged muscle. Conclusion: TUS in damaged muscle induces no change in the gene expression of any of the IGF-I splice variants in humans. In undamaged skeletal muscle TUS significantly increased IGF-IEb and MGF isoforms gene expression. IGF-I isoforms are differentially regulated in human skeletal muscle in response to exercise and TUS treatment.

**EFFECTS OF 5-FLUOROURACIL CHEMOTHERAPY ON VOLUNTARY PHYSICAL ACTIVITY**

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**D3**

Cancer related fatigue is one of the most distressing symptoms reported by cancer patients. It is unclear whether the fatigue is caused by the cancer, the chemotherapy, or their combination. The purpose of this study was to determine the role of chemotherapy alone on fatigue by examining the effect of 5-fluorouracil on 24 hr voluntary wheel running activity in healthy mice. C57BL/6 mice were assigned to one of four treatments: placebo (PBS), low (20 mg/kg), standard (40mg/kg), or high (60 mg/kg) doses of 5-fluorouracil, a common chemotherapy used for colorectal cancer (n = 8-9/group). All mice were given treatments through i.p. injection once per day for 5 days prior to the beginning of the "active" dark cycle. Physical activity was measured throughout the treatment period (day 1-5) as well as during the recovery period (day 6-14) using cages equipped with running wheels that allow for continuous monitoring of running time, peak speed and total distance. Total distance run was significantly reduced in the 40mg/kg group on day 5 and in the 60 mg/kg group on days 5-12 (P<0.05). Similarly, peak speed was decreased in the 40mg/kg group on days 4 and 5 and in the 60 mg/kg group on days 4-12 (P<0.05). Only the 60mg/kg had a significant reduction in time on the wheel which occurred on days 5-12 (P<0.05). There were no significant effects of the 20mg/kg dose on any of the variables. This study provides evidence of the dose-response effect of a standard chemotherapy on fatigue in mice without cancer. Further research is ongoing to better characterize this fatigue and to determine its underlying mechanisms.

**EFFECTS OF FOUR MONTHS OF ELECTRICAL STIMULATION-INDUCED RESISTANCE TRAINING ON PARALYZED MUSCLE.**

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**D4**

Electrical stimulation-induced training of paralyzed muscle has been proposed to have health benefits, including increased muscle glucose tolerance and changes in limb composition. The purpose of this study was to examine the effects of four months of electrically-induced resistance training on muscle metabolism and limb composition in paralyzed muscle. Five subjects with spinal cord injury (SCI) performed electrical stimulation-induced resistance training two times per week for four months. Muscle metabolism of the right vastus lateralis was measured as the rate of PCr resynthesis after electrical stimulation using 31P magnetic resonance spectroscopy with a 10 cm surface coil in a 3 Tesla magnetic resonance spectrometer. PCr depletion to ~50% of resting was accomplished with 60 seconds at 4 Hz. Quadriceps and hamstring muscle composition was determined using T1-weighted images. All subjects showed improvement in weight lifted for a given stimulation current. Muscle mass increased in all subjects while intramuscular fat did not decrease. PCr recovery rate averaged 94.1 ± 31.7 (mean ± SD) and 89.2 ± 45.1 seconds before and after electrical stimulation-induced resistance training, respectively (P > 0.05). Oral glucose tolerance improved in one of the five subjects. In conclusion, four months of electrical stimulation-induced resistance training increased performance and muscle mass, but did not reduce intramuscular fat or improve mitochondrial function as measured by PCr recovery rates. Supported by NIH grant R01 HD039676.

#### **INCREASED EXPRESSION OF BRAIN INFLAMMATORY CYTOKINES FOLLOWING DOWNHILL RUNNING IN MICE**

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While there has been substantial work done to uncover the effects of eccentric exercise on muscle inflammation, there has been relatively little investigation of the effects of this type of exercise on brain inflammation. The purpose of this study was to determine the temporal sequence of inflammatory mediators (MCP-1, IL-1B, IL-6 and TNF-alpha) in the brain following downhill running in mice. Forty C57BL/6 mice, 8 weeks of age, were run on a treadmill at -14% grade and 22m/min for a period of 150 min. Mice were sacrificed at either 0h, 8h, 12h, 24h or 48h following the downhill run. A non-running control group was also sacrificed at the 0h time point. The brain was grossly dissected into cerebellum (CB), cortex (CX), frontal lobe (FL), hippocampus (HC) and hypothalamus (HT). Brain tissue was analyzed for mRNA expression of MCP-1, IL-1B, IL-6 and TNF-alpha. Statistical analysis was performed using a one-way ANOVA with Student-Newman-Keuls post hoc analysis ( $P < 0.05$ ). Gene expression of MCP-1 and TNF-alpha peaked in the CB, CX, FL, HC and HT at 24h following the downhill run ( $P < 0.05$ ). The greatest elevation of IL-1B mRNA expression was observed in the CX, FL, HC and HT at 24h and the CB at 12h ( $P < 0.05$ ). For IL-6, peak elevations were evident in the CX, FL, HC and HT at 24h and in the CB at 0h. These data suggest that a single bout of repetitive eccentric exercise increases mRNA expression of several key inflammatory cytokines in the brain that may contribute to the performance deficits that are associated with this type of exercise.

D5

#### **RESVERATROLÆS EFFECT ON INFLAMMATION ASSOCIATED WITH MUSCLE DEGENERATION/REGENERATION: A DOSAGE TRIAL**

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Damaging exercise results in a process of muscle fiber degeneration and regeneration as well as increased inflammation. The mdx mouse model of Duchenne Muscular Dystrophy constantly undergoes this same process. Resveratrol is a compound found in red wine shown to depress immune cell activation and the subsequent inflammatory response. However, the effects of Resveratrol on the inflammation in this model associated with skeletal muscle degeneration and regeneration have not been studied. Purpose: Examine different doses of resveratrol on inflammation during muscle degeneration/regeneration in the mdx mouse. Methods: Mdx mice were given 0, 10, 100, or 500 mg/kg of resveratrol everyday for ten days. Mice were sacrificed on the eleventh day and the muscles were extracted for analysis of inflammatory markers. Sirt1, IL-6, and TNF-alpha gene expression in the gastrocnemius was analyzed by qRT-PCR. Hydrogen peroxide content in the tibialis anterior was analyzed by fluorescent detection. Results: The 100 mg/kg dose increased Sirt1 gene expression by  $1.57 \pm 0.11$  fold ( $p = 0.00429$ ) and IL-6 gene expression by  $3.52 \pm 0.36$  ( $p < 0.03$ ) compared to 0 mg/kg control. TNF alpha gene expression was not affected in any experimental group. Hydrogen peroxide content was increased in the 100 mg/kg dose by 44% ( $p < 0.02$ ). No significant findings were observed in the other doses. Conclusion: The 100 mg/kg dose of resveratrol showed the greatest change in inflammatory markers in an mdx mouse model of muscle degeneration and regeneration. The likely implication to exercise is that this dose of resveratrol may affect the muscle repair process.

D6

#### **PHYSIOLOGIC TRAINING RESPONSES TO ARM CRANK ERGOMETRY (ACE) AND FUNCTIONAL ELECTRICAL STIMULATION CYCLING (FESC) IN SPINAL CORD INJURED (SCI) PERSONS**

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Purpose: SCI persons often defy textbook physiologic responses. The purposes of this investigation were to elucidate the acute physiologic response to 60 min of ACE or FESC in SCI. Methods: 12 motor complete SCI persons, T4 and below were randomized into either ACE (2 men, 3 women) or FESC (5 men, 2 women) intervention and performed a VO<sub>2</sub> peak (Parvo) test, and % body fat (%BF) determined via DXA (GE Lunar) prior to training. Subjects exercised ~60 min, 5 d/wk for 16 wk using ACE or FESC. HR was continuously monitored (Polar RS 400) and VO<sub>2</sub> (Cosmed k4b2) during sessions 1, 41 and 80, while 5 □ blood lactate was measured (Lactate Scout) from the earlobe at 0, 10, 20, 30, 40 min. Results were analyzed with Jump statistical software (v 8.0, SAS, Inc) and significance level set at  $\leq 0.05$ ; all data are expressed as mean (+ SE). Results: There were no group differences in Age (35 + 3.4 yr), Hgt (168.8 + 2.51 cm) and Wgt (80.2 + 6.3 kg), VO<sub>2</sub> peak (14.7 + 1.3 ml.kg<sup>-1</sup>.min<sup>-1</sup>), or %BF (41.7 + 1.5). Session 1 data indicated FESC produced significantly higher BLC ( $4.2 \pm 0.7$  vs  $2.0 \pm 0.8$  mM), but lower VO<sub>2</sub> ( $412.8 \pm 61.8$  vs  $646.0 \pm 67.7$  ml.kg<sup>-1</sup>.min<sup>-1</sup>) and HR ( $85.3 \pm 7.3$  vs  $106.6 \pm 8.0$  bpm) responses than ACE without differences in RER ( $0.89 \pm 0.04$  vs  $0.95 \pm 0.04$ ). Conclusions: ACE may provide a stronger cardiovascular stress in SCI persons, but FESC appears to produce an uncharacteristically high BLC, suggesting a localized response to FES. These data are early steps to better understand the exercise response and metabolic implications to better prescribe training in persons with SCI.

D7

#### **EFFECTS OF MUSCADINE GRAPE EXTRACT ON INTESTINAL INFLAMMATION IN THE APCMin/+ MOUSE**

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The purpose of this study was to determine the effects of muscadine grape extract (MGE) on inflammation in a mouse model of intestinal tumorigenesis. Female ApcMin/+ mice were randomly assigned to either placebo (P) or MGE (n=12/group) groups. Mice were given P or MGE (5%) diet from 11-18 weeks of age. This treatment regime was designed to determine the effects of MGE on inflammation in mice that already have polyp development (i.e. intervention). Tissues were collected at 18 wks of age and intestines were analyzed for polyp number and size in sections 1, 4 and 5 and for inflammatory cytokine mRNA expression and protein concentration (mucosal tissue and polyps) in section 2. MGE decreased mRNA expression of MCP-1, IL-1Γ, IL-6 and TNF-β in the mucosal tissue ( $P < 0.05$ ) but not in the polyp tissue. There was no effect of MGE on cytokine protein concentration in the mucosal tissue or polyps. As expected there was no effect of MGE on polyp number or size using this treatment regime; ApcMin/+ mice have already developed polyps by 11 wks of age. The data suggest that dietary MGE given as an intervention treatment (i.e. a time when mice already have polyps) can reduce mRNA expression of inflammatory mediators in intestinal mucosal tissue. Further research is needed to determine if this apparent reduction in inflammation translates to a better prognosis with respect to colon cancer progression.

D8

**EXERCISE-INDUCED CARDIOPROTECTION AND APOPTOTIC BEHAVIOR DURING IR INJURY: THE ROLE OF SARCOLEMAL AND MITOCHONDRIAL ATP SENSITIVE POTASSIUM CHANNELS**

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Exercise preconditions the heart against all forms of ischemia reperfusion (IR) injury, arrhythmia, ventricular stunning, and tissue death. The protection is multifaceted and appears to be unique to the different forms of IR injury. The purpose of this study was to examine the role of the mitochondrial ATP sensitive K<sup>+</sup> channel (mitoKATP) and the sarcolemmal ATP sensitive K<sup>+</sup> channel (sarcoKATP) on exercise preconditioning against post IR apoptotic tissue death. Male Sprague Dawley rats (N=41) were assigned to exercise, sedentary and sham treatment groups. Exercised animals underwent 3 days of 60 min treadmill exercise at 30 m/min. Sedentary rats did not exercise. Pharmacological inhibitors for mitoKATP (5HG) and sarcoKATP (HMR-1098) at 10 ml/mg were used to examine protective contributions to tissue death. All animals received either a surgically induced IR insult via a left anterior descending coronary artery (LAD) ligation or a time equivalent sham procedure. Animals were monitored during IR insult (or sham) for cardiac performance. Following surgery and sacrifice, cardiac tissue was analyzed for tissue apoptosis biomarkers using TUNEL assay and Western blotting. Compared to Sham, Sed hearts exhibited a 9.8x increase in apoptotic response (p=0.029), while all exercised groups, including mitoKATP and sarcoKATP inhibited hearts, were similar to Sham. Ex hearts had a 1.6x increase (p>0.05). These data indicate that exercise protects against IR induced apoptosis, and that mitoKATP and sarcoKATP channels are not essential to this protection.

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**LEUCINE SUPPLEMENTATION DOES NOT REDUCE CIRCULATING INFLAMMATORY CYTOKINES FOLLOWING ECCENTRIC EXERCISE**

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Branched-chain amino acids, more specifically leucine, may help preserve skeletal muscle during various catabolic and inflammatory states. To determine the effect of acute leucine supplementation on systemic markers of inflammation following eccentric-based resistance exercise, 27 untrained young men were randomly divided into 3 groups: leucine (L), placebo (P) and control (C). L and P performed 100 depth jumps from 60 cm with 6 sets of 10 reps of eccentric-only leg presses (120% 1-RM) and ingested leucine (250 mg/kg bw) or placebo before, during, and immediately after the exercise protocol, as well as for 4 days following the exercise protocol. C performed only the initial IRM and daily functional testing and ingested no supplement. Blood samples were collected before and at 24, 48, 72, and 96 hrs after the exercise protocol and analyzed for inflammatory cytokines CRP, IL-1b, IL-12p70, IFN $\gamma$ , IL-6, IL-8, IL-10, and TNF $\alpha$  using ELISA-based cytokine assays. Eccentric-based exercise induced significant increases in serum CRP levels in L and P at 24 hrs post-exercise, compared to C. There was no significant difference in CRP levels between L and P for any time point, nor were there significant differences between L and P for the inflammatory cytokines IL-12p70, IL-6, IL-8, IL-10, or TNF $\alpha$ . IL-1b and IFN $\gamma$  concentrations were below detectable limits. These findings suggest that acute leucine supplementation does not reduce systemic markers of inflammation in response to eccentric-based resistance exercise.

**THE RELATIONSHIP BETWEEN SERUM AND SALIVARY CORTISOL LEVELS IN RESPONSE TO DIFFERENT INTENSITIES OF EXERCISE**

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The effect of exercise intensity on the tracking of serum and salivary cortisol responses was examined in endurance-trained males (maximal oxygen uptake [VO<sub>2</sub>max] = 58.2 ± 6.4 ml/kg/min). Subjects (n = 12) rested for 30 minutes (control) and cycled for 30 minutes at low (40%), moderate (60%), and high (80% of VO<sub>2</sub>max) intensities on separate days. Serum and saliva samples were collected pre-trial, immediately post-trial, and 30 minutes into the recovery period. Cortisol responses increased significantly (p < 0.05) for both serum (~40%) and saliva (~105%) in response to high intensity exercise (p < 0.05). However, peak salivary cortisol levels occurred at 30 minutes into recovery, while peak serum cortisol occurred at immediately post-exercise. The association between serum and salivary cortisol across all trials was examined using a concordance correlation (R<sub>c</sub>), yielding a significant overall relationship in all matched pairs (R<sub>c</sub> = 0.728; p < 0.001). The scatter plot of all matched pairs showed that salivary cortisol responses tracked closely to those of serum at lower concentrations, but not as well at higher concentrations. In conclusion, findings suggest that salivary measures of cortisol correlate strongly with serum at rest and in response to low and moderate exercise intensities, but in response to highly intensive exercise, there is a delay in peak salivary responses compared to serum.

M1

M3

**MOTIVATIONAL FACTORS AND BARRIERS TO PHYSICAL ACTIVITY AMONG TRADITIONAL VS. NON-TRADITIONAL COLLEGE STUDENTS.**

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Physical activity (PA) is important for the health and well-being of all individuals, however college students (CS) are a group with inadequate PA levels. Determining what motivates CS to exercise and the barriers that keep them from exercising are key factors to increase PA on campuses. The purpose of this study was to determine the motivational factors and barriers to PA in traditional students (TS) vs. non-traditional students (NTS) and determine if differences exist between these two groups. Participants included 538 TS (19.1 ± 1.2 yrs) and 108 NTS (31.5 ± 8.7 yrs), who voluntarily completed the Barriers to Being Active Quiz and the Exercise Motivation Inventory-2 (EMI-2). Results showed that there was a significant difference between TS and NTS for the following barriers; fear of injury (p = 0.003), lack of resources (p = 0.011), social influence (p = 0.040), and lack of skill (p = 0.002). A linear regression revealed lack of skill accounts for the most variance to predict group assignment (p = 0.002). EMI-2 revealed that TS and NTS differed on many factors including social recognition, challenge, affiliation, and competition (p < 0.001). Stepwise regression revealed 3 significant models (p < 0.05) to predict group assignment, with competition appearing in all 3 models, suggesting that TS are consistently motivated to exercise by this variable. Based on these findings, specific programs can be implemented on college campuses to meet the needs of a varied student population and promote PA.

M2

M4



#### SEX DIFFERENCES IN CARDIAC AUTONOMIC MODULATION DURING MAXIMAL CYCLE ERGOMETER TESTING

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M5

**INTRODUCTION:** Maintained balance between the sympathetic and parasympathetic systems is a vital component to cardiovascular regulation. It has been suggested that differences exist in heart rate variability (HRV) between sexes at rest; however, changes in HRV between sexes during exercise have not yet been investigated. **PURPOSE:** This study was undertaken to determine the possible sex differences in HRV during exercise, between men and women with similar maximum oxygen consumptions (VO<sub>2</sub> max). **METHODS:** Fourteen (7 males 19.2 ± 1.1 years and 7 females 19.7 ± 1.3 years) healthy, normotensive subjects were given a cycle ergometer VO<sub>2</sub> max exercise test on visit 1. During the second visit a stage-elongated, graded exercise test (50w increments for each 4 minute stage) was utilized to evaluate HRV contribution to exercise. **RESULTS:** Both males and females showed significant increases in heart rate (HR) via sympathetic increases through 3 stages of the VO<sub>2</sub> Max test, however men showed significant sympatholysing at stage 4 where women did not show any significant decreases in sympathetic outflow until stage 5. There were no significant sex differences in the vagal responses between sexes during exercise. **CONCLUSIONS:** These data show that differences in sympathetic modulation of HRV do exist between sexes as men decrease sympathetic contribution to HR changes quicker than age-matched women with similar maximum oxygen consumptions.

M6

#### EXERCISE-INDUCED APOPTOSIS OF LYMPHOCYTES DOES NOT DEPEND ON ANAEROBIC TRAINING STATUS

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The lymphocyte apoptotic response is decreased in aerobically trained runners compared to individuals of a lower fitness level. The purpose of this investigation was to assess whether a similar response extended to anaerobic training. Maximal accumulated oxygen deficit (MAOD) tests were performed on 5 anaerobically trained (MAOD=239±102 ml·kg<sup>-1</sup>), and 4 untrained individuals (MAOD=76±19 ml·kg<sup>-1</sup>). Three 5-min submaximal runs on the treadmill were performed with 5-min rest periods between, followed by a supramaximal run to exhaustion at 110%. Blood, for immunological measurements, was collected at baseline, immediately following the supramaximal bout, 1h post, and 24h post exercise. Apoptosis was assessed using annexin V, and cell migration was determined using CX3CR1. Data were analyzed using a 2 x 4 ANOVA with repeated measures on condition. No differences were observed between anaerobically trained and untrained individuals for any variable. When collapsed across groups, a significant increase in lymphocyte count was evident in the immediate post exercise condition compared to all other measurement points (P<0.05). A similar response was observed for lymphocyte migration (P<0.05). No differences were noted across condition for apoptosis. While a difference in the lymphocyte apoptotic response between aerobically trained individuals has been reported, the present results indicate that this response cannot be extended to an anaerobically trained group. As apoptosis can be induced through an oxidative stress mechanism, it is possible that anaerobic exercise does not provide a sufficient stimulus in this regard.

#### THE EFFECTS OF 4 WEEKS OF AEROBIC TRAINING ON ARTERIAL STIFFNESS AND THE RENIN-ANGIOTENSIN AND ALDOSTERONE SYSTEM ON STAGE-1 HYPERTENSIVE, OBESE INDIVIDUALS

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M7

Increases in blood pressure are directly related to increases in body mass and obesity related hypertension is associated with pronounced activity of the renin-angiotensin-aldosterone system (RAAS) and increased pulse wave velocity. Moderate intensity aerobic exercise is known to decrease pulse wave velocity and serves as a valuable option in the treatment of hypertension and obesity. The purpose of this study was to assess RAAS activity and pulse wave velocity prior to and following 4 weeks of aerobic training program in an unmedicated, pre-to-stage one hypertensive population. **METHODS:** (7 men and 3 post-menopausal women, (52±3.2 years old) underwent aerobic training (30 min treadmill exercise, 3 days per week @ 65% VO<sub>2</sub> peak). BMI, VO<sub>2</sub> peak, blood pressure and blood markers were taken at baseline, post 4 week control period, and post 4 week training period. **RESULTS:** There were no significant differences in any descriptive characteristics during the control period, however there was a significant decrease in plasma aldosterone (255.4±75 to 215.8±66 pg/ml, p= 0.001) and significant decreases in central PWV (11.2±0.6 vs.9.8±0.8 m/s; p=0.04) pre-to-post exercise training. **CONCLUSIONS:** These data show that 4 weeks of moderate intensity aerobic training decreases central PWV that may be linked with decreases in plasma aldosterone changes in obese, unmedicated hypertensive individuals.

#### LEFT VENTRICULAR DIASTOLIC PARAMETERS OF ACTIVE AND INACTIVE AGING C57BL/6J MICE.

M. Nicole Chavis, Tricia J. Hubbard, and Michael J. Turner. *Department of Kinesiology, The University of North Carolina at Charlotte, Charlotte, NC. 28223.*

M8

Aging is known to alter left ventricular (LV) diastolic function at rest. The benefit of lifelong physical activity has not been performed to understand the improvements with LV diastolic function. Therefore, the purpose of this study was to determine whether differences exist in left ventricular diastolic parameters across the lifespan in active and inactive male and female C57Bl/6J mice. Fifteen eight week old mice (8 males and 7 females) were housed with a running wheel (RUN group) and fifteen eight week old mice (7 males and 8 females) were housed without a running wheel (SED group). All mice were individually housed with water and standard chow *ad libitum*. Physical activity, as assessed by voluntary running wheel activity, was measured with a sensor and digital odometer. Running wheel distance, duration, and speed were recorded daily. At 13 weeks of age, and every 4 weeks thereafter, Doppler ultrasound was used to measure the passive (E-wave) and the active (A-wave) diastolic filling velocities for the calculation of E:A. The E:A ratio significantly declined with age from 3 to 18 months of age (p < 0.0001). A significantly greater E:A was observed with the RUN group compared to the SED group (p < 0.0001). Additionally there was a significant sex x group x age interaction (p = 0.0252). The results of this study suggest a potential protective mechanism in diastolic filling parameters with lifelong physical activity.

### PHYSICAL ACTIVITY IMPACTS ON VENTRICULAR STRUCTURE AND CHARACTERISTICS IN AGING MICE.

Sophie B Guderian, Tricia J Hubbard, , Michael J Turner. *Department of Kinesiology, University of North Carolina - Charlotte, Charlotte, NC 28223, USA.*

Physical activity is known to promote a beneficial cardiac hypertrophy while a sedentary lifestyle can result in the development of a poorly functioning cardiac hypertrophy. The purpose of this study was to determine the age-related changes in cardiac hypertrophy in aging hearts of physically active and sedentary C57Bl/6J mice. Thirty C57Bl/6J mice, 15 male and 15 female, were placed in individual cages at 8 weeks of age and were monitored through 18 months of life. Fifteen mice (8 males and 7 females) were housed in cages with a running wheel, magnetic sensor and digital odometer. Duration, distance and running velocity were recorded daily and body weight was measured on a weekly basis. The remaining fifteen mice (8 females and 7 males) were placed in individual cages without running wheels. 2D M-mode echocardiography and Doppler ultrasound with a SONOS 5500 ultrasound and 15-6L ultrasound probe imaged the left ventricle every four weeks. LVmass wasn't different between the groups ( $p=0.53$ ) but increased significantly with age ( $p<0.0001$ ). End-Diastolic Diameter was larger in the run group ( $p=0.008$ ) and increased at greater rate with aging when compared to the non-runner mice ( $p=0.02$ ). Posterior wall thickness was larger for the non-runner mice ( $p<0.0001$ ) and increased at a greater rate with aging compared to the runners ( $p=0.04$ ). LV thickness to radius ratio (h/r) was greater for the non-runner mice ( $p<0.0001$ ) and increased more with aging compared to the runners ( $p=0.03$ ). Therefore, lifelong physical activity results in the development of a more efficient cardiac hypertrophy, evident around the second quarter of life.

U1

### MILD/MODERATE CALORIC RESTRICTION IN MICE ALTERS GENE EXPRESSION IN THE STRIATUM AND INCREASES VOLUNTARY WHEEL RUNNING.

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Caloric restriction (CR) is known to decrease cardiovascular risk, and extend life span in both animals and humans. Rodents voluntarily increase physical activity in response to CR. The mechanisms resulting in increased wheel running (WR) are unknown, but central factors (e.g. dopamine system) have been implicated. Nine-week old male C57BL/6J mice were randomized into two groups: Control group ( $n=3D14$ , standard chow *ad libitum*) and caloric restriction group ( $n=3D10$ , CR to achieve a 20% weight loss). WR was assessed in all mice during 10 days of CR once 20% weight loss was achieved. Following CR, expression of the genes Sirt1, Drd1, and Drd2 in the striatum/nucleus accumbens region of the brain were analyzed using real time PCR. An approximate 27% reduction in food intake was necessary to achieve a 20% weight loss in CR mice. CR animals ran significantly farther [CR, 11.8  $\pm$  B1 3.0; Con., 8.2  $\pm$  B1 2.3 Km;  $p=3D0.007$ ] than Controls. Duration [CR, 266.6  $\pm$  B1 57.6; Con., 222.6  $\pm$  B1 62.5 min;  $p=3D0.12$ ] and speed [CR, 2.66  $\pm$  B1 0.43; Con., 2.24  $\pm$  B1 0.52 km/hr;  $p=3D0.07$ ] were not significantly different between groups. Sirt1 was significantly increased (27%) in CR mice ( $p=3D0.0009$ ). No differences in Drd2 expression were detected between groups ( $p=3D0.24$ ); however, Drd1 was significantly increased (55%) in the CR mice compared to Controls ( $p=3D0.007$ ). Given the concurrent changes in wheel running and gene expression (Drd1 and Sirt1), it is likely that CR induces dopaminergic signaling changes, which may be affecting physical activity levels. Supported by University Research Council Funding (ASU).

U2

### THE INFLUENCE OF CARBOHYDRATE-ELECTROLYTE SOLUTION INGESTION ON EXERCISE PERFORMANCE IN A WARM ENVIRONMENT

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In prolonged aerobic exercise, studies have indicated that a chief cause of fatigue is carbohydrate-glycogen depletion and dehydration (Lima-Silva et al., 2009). Consuming carbohydrate-electrolyte solutions (CES) with the goal of delaying fatigue and improving performance is routine among athletes. While the efficacy of this nutritional strategy is well documented, it is likely that drinks of differing formulations may have varied effectiveness. PURPOSE: To assess the effectiveness of ingesting a 6% CES and a 2% CES on exercise performance in a warm environment. METHODS: 6 college-aged males completed 4 testing sessions. During session 1, participants completed a graded exercise test and ventilatory threshold (VT) was identified. A practice 10k time trial on a cycle ergometer was completed in the second session. Sessions 3 & 4 involved completing a 3 hour ride on a cycle ergometer at 60% VT in a heat chamber (32 deg C, 70% humidity). Each participant was given either a 2% or a 6% CES (5 ml/kgbw) every 30 minutes during sessions 3 & 4. Sessions 3 & 4 were randomized and counterbalanced. The administration of the treatments was double-blind. RESULTS: A significant condition effect was seen for core temperature, with the 6% CES showing a 0.3 deg C higher mean core temperature ( $p=.02$ ). All other variables showed no significant condition effects. CONCLUSION: These data suggest that a 6% CES drink and 2% CES drink may have similar effects on prolonged exercise performance in the heat.

U3

### AGE-RELATED CHANGES IN TYPE 1 FIBER GROUPING IN HUMANS

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\*denotes equal contribution and presenting authors

Age-related fiber type grouping characterized by clusters of similar fiber type suggests the presence of denervation and skeletal muscle remodeling. The purpose of this study was to assess the number and size of Type 1 fiber clusters in 89 healthy males and females (20-29yrs,  $n=30$ ; 30-50yrs,  $n=28$ ; 55-64yrs,  $n=18$ ; 65-80yrs,  $n=13$ ). Muscle samples were collected from the vastus lateralis and fiber type distribution determined by myosin heavy chain isoform immunoreactivity. Criteria for determination of a cluster were based upon a statistical algorithm. Data are means and standard errors. The number of clusters of Type I fibers per 1000 fibers was not different between age groups (main age effect,  $p=0.26$ , 8.4 to 9.3 clusters per 1000 fibers); however, the number of fibers per cluster increased with age (main age effect,  $p<0.05$ ; 20-29y, 18.5 $\pm$ 2.9 fibers; 30-50yrs, 18.0 $\pm$ 4.9 fibers; 55-64yrs, 66.5 $\pm$ 30.5 fibers; 65-80yrs, 80.6 $\pm$ 51.3 fibers). The % of total fibers that were part of a cluster also increased with age up to age 64 yrs ( $p<0.05$ , 20-29y, 16.6 $\pm$ 3.3%; 30-50yrs, 11.8 $\pm$ 1.8%; 55-64yrs, 33.0 $\pm$ 7.0%; 65-80yrs, 23.7 $\pm$ 4.7%). Individuals 20-80 yrs have similar number of Type 1 fiber clusters; however, older adults have more fibers per cluster resulting in higher percentages of grouped fibers. Supported by a NIH R01 and VA Merit Grant (MMB).

U4

**COMPARISON OF SKIN TEMPERATURE DIFFERENCES IN ACTIVE VERSUS PASSIVE RECOVERY FOLLOWING SHOULDER AND ANKLE ICING**

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U5

**PURPOSE.** This investigation compared surface temperature changes following icing at two locations (ankle & shoulder) during active and passive recovery. **METHODS.** Fourteen participants (7 females, 7 males) participated in both recovery trials which were counterbalanced for order effect. Dynamic Infrared Thermography (DIRT) provided a non-invasive, non-contact measure of skin surface temperature before and during recovery. Pre treatment temperatures were taken for both trials upon participant arrival. For passive recovery, participants were treated with ice bags at both sites after sitting 15 minutes for thermal equilibration. For active recovery, participants walked (3.5 mph) on a treadmill for 15 minutes, following which, participants underwent a 20-minute ice treatment at both sites. Skin temperature measurements were taken immediately following treatment and every 15 minutes for 75 minutes. Data were analyzed using a repeated ANOVA ( $p \leq 0.05$ ) in a 2 (site: ankle & shoulder) x 2 (condition: active & passive) x 6 (IR image; 15 minute intervals) design. **RESULTS.** The ankle returned to pre treatment temperatures significantly faster than the shoulder for both active and passive recovery conditions. The ankle returned pretreatment temperatures significantly faster in the passive treatment compared to the active, while the shoulder showed no difference between treatments. **CONCLUSIONS.** Passive and active recovery show different treatment effects between different sites (Ankle vs. Shoulder) and within the same sites (Ankle). This suggests that differences in treatment strategies should be taken into consideration for different sites of injury.

**CORE MUSCLE ACTIVATION AND KINETICS OF A PASSE BALANCE.**

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U6

The core muscle activation patterns were examined in 15 college-aged trained dancers and 15 college-aged non-dancers as they performed a series of balances necessary in ballet. The primary focus was on the one-leg passé balance both on a flat foot and a relevé (on the ball of the foot) in order to pinpoint the muscle activity while balancing. The participants performed each balance on the left and right legs as well as a series of standing control protocol in randomized sequence. The left and right abdominals, left and right obliques, and left and right erector spinae were studied using Delsys® surface electromyography equipment and analysis software. Each set of data was put through an absolute value equation and then filtered with a 10Hz, low-pass, 2nd order, Butterworth filter. The trials were then normalized to a percentage of max voluntary contraction. Following a repeated-measures MANOVA, preliminary results show that the two groups are using different balance strategies between right and left legs, particularly during the relevé condition. Specifically, differences were seen in the strength of contraction of the obliques and erector spinae muscles ( $p < .05$ ). The dancers not only held the balance for longer, but they also contracted the muscles more consistently than their non-dancer counterparts. The implications of this research will help dance scientists to better understand the control necessary to maintain a balance. Further more, these findings can help dance instructor implement proper technique during training in order to prevent injuries.

Supported by Elon University Honors Program award to Krysten Malcolm.

**EXERGAMING IN ADULTS: CAN APPROPRIATE INTENSITY LEVELS BE ACHIEVED FOR HEALTH BENEFITS?**

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U7

Over 30% of American adults are now categorized as obese. Major factors contributing to these high levels of obese individuals include an unhealthy diet and a lack of exercise. Exercise games have been created and marketed as a way to incorporate physical activity into previously sedentary video games. The purpose of this study was to compare treadmill walking to exergame play on the Nintendo Wii. 13 males and 17 females participated in this study. Participants spent 30 minutes walking on the treadmill and approximately 30 minutes playing EA Sports Active's "Island Cardio Blast". Heart rate monitors and accelerometers were used as an objective measure of intensity and Rate of Perceived Exertion (RPE) was used as a subjective measure of intensity. Participants also rated themselves on the Feeling Scale (FS) and the Felt Arousal Scale (FAS) and filled out the Physical Activity Enjoyment Scale (PACES) following completion of exercise. Participants had a significantly higher HR, RPE, and minutes spent in moderate or higher-intensity activity during the Wii play ( $p < .001$ ). The Wii also elicited a significantly higher ranking on the PACES ( $p < .01$ ). A significant time ( $p < .001$ ) and time\*condition interaction ( $p = .028$ ) were found for the FS and FAS. This was due to an improvement in FS over time and FS being greater in the Wii condition post exercise. Play on the EA Sports Active game for the Nintendo Wii elicited higher physiological and psychological measures, indicating that it may be a good mode of exercise.

**HELPER T CELL RESPONSE TO SUPRAMAXIMAL EXERCISE IN UNTRAINED INDIVIDUALS**

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U8

Exercise has been shown to modulate lymphocytes. Recently, the ability of exercise to induce cell death (apoptosis) in lymphocytes has been questioned. The purpose of this investigation was to evaluate the effect of supramaximal exercise on both apoptosis and cell migration in helper T cells. Untrained subjects (N=4) completed 5-min treadmill runs at 66%, 84%, and 97% of  $VO_{2max}$  interspersed with 5-min rest periods. After the final rest period, a run to exhaustion was completed at 110% of aerobic capacity. Blood was sampled before, immediately following, 1h, and 24 h following and used for the determination of helper T count (CD4+), early cell death (annexin V), and cell migration (CX3CR1). Data were evaluated as the percent difference compared to rest. Exercise resulted in a 160% increase in CD4+ cell volume compared to the baseline value, but returned to near resting values by 1h post and were not different when measured at 24h post. CX3CR1 on CD4+ increased 260% with exercise but had returned to baseline within 1h following exercise. Annexin V increased with exercise similar to cell volume, but remained elevated at 1h post (212%). The CD4+ cell count response to exercise was similar to what has been reported with overall lymphocytes. The novel finding of this research lies in the decrease in cell volume following exercise. It appears from our results that volume changes immediately following exercise are due primarily to helper T cell migration out of the circulation back into the lymphoid pools. However, a prolonged effect of exercise appears to persist as cell death in this subfraction was noted at 1h post.

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