

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

**February 14-16, 2013
41st Annual Meeting
Hyatt Regency Hotel
Greenville, South Carolina**

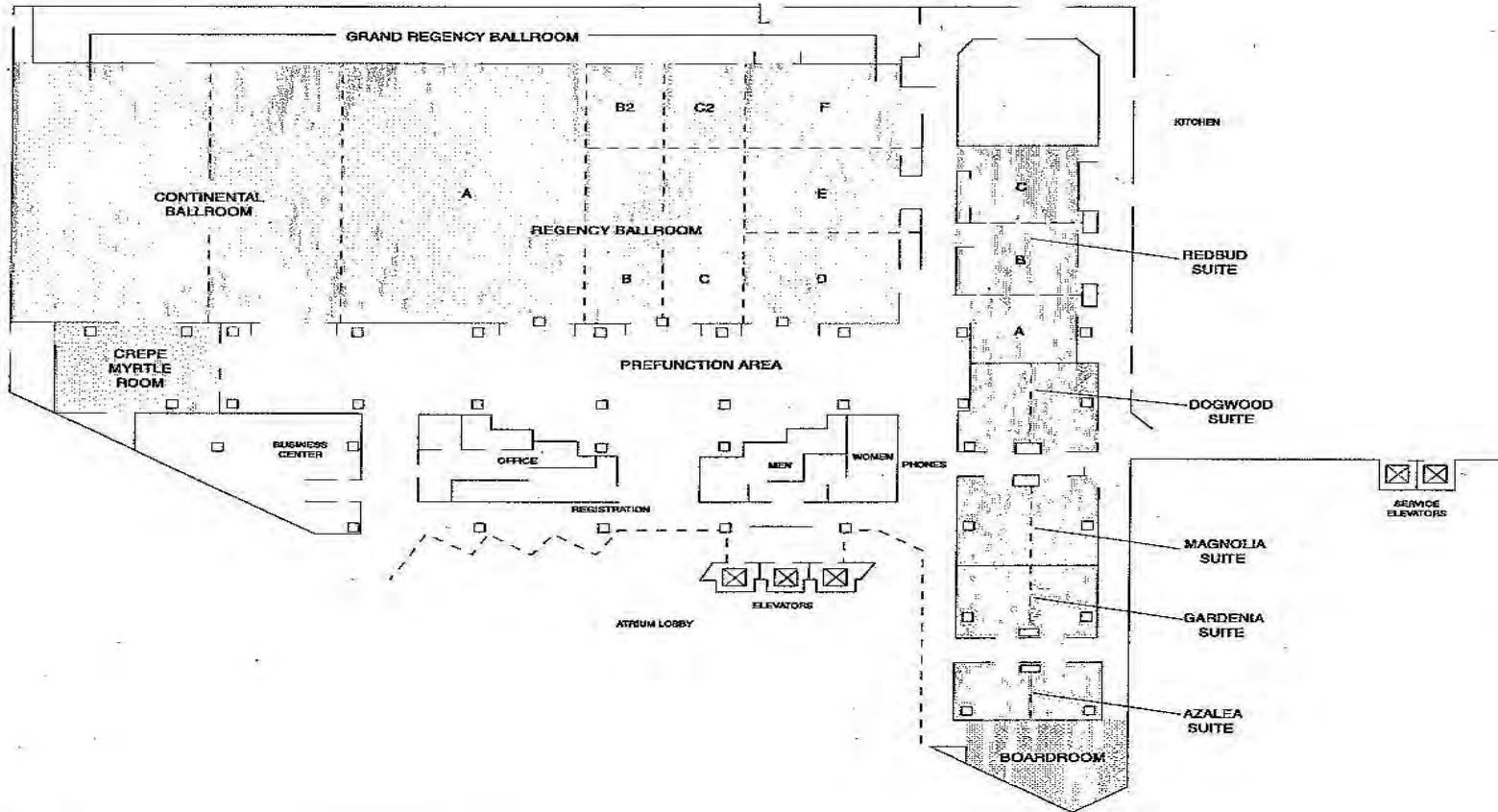
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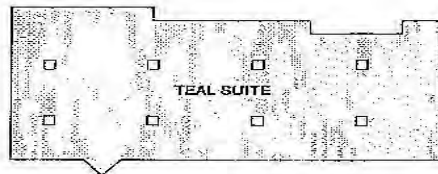
Jointly Sponsored by: The American College of Sports Medicine (ACSM)
and the Southeast Chapter of the American College of Sports Medicine (SEACSM)

2013 SEACSM Meeting: HYATT Regency, Greenville SC Floor Plan

FIRST FLOOR



SECOND FLOOR



Forty-First Annual Meeting

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

**Hyatt Regency Hotel
Greenville, South Carolina
February 14-16, 2013**

Officers

President: Paul Davis, University of North Carolina at Greensboro

Past President: David Pascoe, Auburn University

President-Elect: Edmund Acevedo, Virginia Commonwealth University

Executive Board:

Kyle Cassas, Clinical Representative, Steadman Hawkins Clinic of the Carolinas

Judith A. Flohr, Representative to ACSM, James Madison University

Andy Bosak, At-Large Member, Armstrong Atlantic State University

Matt Green, At-Large Member, University of North Alabama

Michael McKenzie, At-Large Member, Winston Salem State University

Paul Miller, At-Large Member, Elon University

Lindsey Miller, Student Representative, Washington State University

Executive Director:

Carolynn Berry, Winston Salem State University

Exhibits, Sponsorships & Fund Raising:

Michael Berry, Wake Forest University

Publisher and Editor:

Don Torok, Florida Atlantic University



SEACSM Meeting Objective

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

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

Continuing Medical Education Objectives:

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

1. Recognize the limitations of human articular and menisco-cartilage.
2. Identify individuals likely to benefit from early surgical intervention.
3. Effectively manage challenging cartilage abnormalities in the active adult community.

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.

Continuing Medical Education:

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the South Carolina Medical Association through the joint sponsorship of The Hawkins Foundation and the Southeast Chapter of the American College of Sports Medicine.

The Hawkins Foundation designates this live activity for a maximum of 9.25 *AMA PRA Category 1 Credits*[™]. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

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

Acknowledgement of Commercial Support

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges the program support from: Steadman Hawkins Clinic of the Carolinas, Council for Undergraduate Research, Lippincott, Williams and Wilkins, Pfizer Pharmaceuticals, Gatorade Sports Science Institute, American College of Sports Medicine, ActiGraph, AEI Technologies, Biopac, Bioventus, Cosmed USA, DonJoy, Fidia Pharma, Parvo Medics, Proaxis Therapy, and VacuMed..



STEADMAN HAWKINS
CLINIC *of the* CAROLINAS



Council on Undergraduate Research



Lippincott
Williams & Wilkins



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.



**AMERICAN COLLEGE
of SPORTS MEDICINE®**



Planning Committee

Edmund Acevedo, Paul Davis, David Pascoe, Edmund Acevedo, Kyle Cassas, Michael Berry,
Carolynn Berry, Don Torok, Judith A. Flohr,
Matt Green, Michael McKenzie, Andy Bosak, Paul Miller, Lindsey Miller

SEACSM List of Reviewers

Amy Knab, Andy Shanley, Brian Parr, Chun-Jung Huang, Daniel Hollander, David Pascoe, Dawn Coe, Eric Hall,
Elizabeth Holbrook, Gordon Fisher, Greg Martel, Heather Webb, Jay Garner, John Quindry, John Simonsen, Jonathan
Wingo, Katrina DuBose, Leah Robinson, Lee Franco, Lynn Panton, Mark Schafer, Matt Green, Matt Hudson, Matt
Miller, Paul Miller, Phoebe Ajibade, Rebecca Battista, Ronnie Evans, Scott Lyon, Sue Graves, Susan Arthur,
Tim Scheett, Wally Bixby, Wendi Weimar, Will Lyerly, William Barfield

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 Columbia, SC	Mindy Millard-Stafford Jeff Rupp David Nieman	Vaughn Christian (ES) Ted Angelopoulos Linda Chitwood Bruce Gladden (N) Keith DeRuisseau (S) Craig Broeder Liz Dowling George Wortley (MD) Don Torok
30 th	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 st	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 nd	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 rd	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 th	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 th	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 th	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 th	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 th	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 th	Feb. 3-5, 2011 Greenville, SC	Peter Grandjean Alan Utter David Pascoe	Carolynn Berry (ED) Michael Berry James Churilla Mark Loftin Sean Bryan (MD) Cherilyn Hultquist John Quindry Brandon Hollis (S) Beverly Warren (N) Don Torok
40 th	Feb. 9-11, 2012 Jacksonville, FL	David Pascoe Peter Grandjean Paul Davis	Carolynn Berry (ED) Michael Berry Matt Green Micheal McKenzie Kyle Cassas (MD) Cherilyn Hultquist John Quindry Lindsey Miller (S) Beverly Warren (N) Don Torok
41 th	Feb. 14-16, 2013 Greenville, SC	Paul Davis David Pascoe Edmund Acevedo	Carolynn Berry (ED) Michael Berry Andy Bosak Matt Green Kyle Cassas (MD) Michael McKenzie Paul Miller Lindsey Miller (S) Judith Flohr (N) Don Torok

ES = Executive Secretary
N = National Representative

S = Student Representative
MD = Physician Representative

CC = Clinical Consultant
ED = Executive Director

SEACSM Award Winners

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

- 8:00-9:30 **SYMPOSIUM (S4 & S5)**
 S4 THE BENEFICIAL EFFECTS OF EXERCISE IN INDIVIDUALS WITH PARKINSON'S DISEASE (**Crepe Myrtle**)
- S5 LONG TERM INTERDISCIPLINARY ATHLETE DEVELOPMENT AND MONITORING PROGRAMS (**Regency Ballrooms B & C**)
- 8:00-9:00 **TUTORIAL (T4 & T5)**
 T4 HIGH INTENSITY INTERVAL TRAINING: FROM THE SURGEONS TABLE TO THE PLAYING FIELD (**Redbud A & B**)
- T5 SEVERE OBESITY: IS THERE A METABOLIC PHENOTYPE AND CAN EXERCISE HELP? (**Regency Ballroom A**)
- 8:00-9:15 **ORAL FREE COMMUNICATIONS II**
07-011 Body Composition/Energy Balance/Weight Control, Connective Tissue/Bone/Skeletal Muscle (**Regency Ballroom D**)
- 8:00-9:30 **POSTER PRESENTATION I (P1-P27) (Teal)**
 Authors Present 8:00-9:00 AM
 Athletic Care/Trauma/Rehabilitation, Biomechanics/Gait/Balance, Metabolism/Carbohydrate, Lipid, Protein, Endocrinology/Immunology, Environmental Physiology
- 9:30-9:45 **BREAK**
- 9:45-10:45 **ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS (Continental Ballroom)**
"Facts and Fads of Nutrition for High Intensity Sport"
Janet Walberg Rankin, Ph.D., FACSM
 Professor, Human Nutrition, Foods and Exercise
 Associate Dean, Graduate School
 Virginia Polytechnic Institute and State University
- 9:45-12:00 **POSTER PRESENTATION II (P28-P55) (Teal)**
 Authors Present 11:00-12:00
 Body Composition/Energy Balance/Weight Control, Cardiovascular Physiology, Chronic Disease and Disability, Connective Tissue/Bone/Muscle, Motor Control
- 10:45-11:00 **BREAK**
- 11:00-12:30 **SYMPOSIUM (S6)**
 S6 DEFINITION AND MEASUREMENT OF MUSCLE QUALITY IN OLDER ADULTS: SPANNING THE SPECTRUM FROM CLINICAL PRACTICE TO RESEARCH (**Regency Ballroom B & C**)
- 11:00-12:00 **TUTORIAL (T6-T8)**
 T6 EFFECTS OF BRISK WALKING ON CONDITIONS OF THE METABOLIC SYNDROME AND CARDIOVASCULAR DISEASE (**Redbud A & B**)
- T7 ENVIRONMENTAL INFLUENCES ON PHYSICAL ACTIVITY AT CHILD CARE SETTINGS (**Regency Ballrooms E**)
- T8 AUGUST KROGH: THE PHYSIOLOGIST'S PHYSIOLOGIST (**Regency Ballroom A**)
- 11:00-12:30 **ORAL FREE COMMUNICATIONS III**
012-017 Competitive Athletes, Nutrition and Exercise/Sports (**Regency Ballroom D**)
- 12:00-1:15 **PAST PRESIDENT'S LUNCH (Regency Ballroom F)**

12:30-6:15 **CLINICAL TRACK (Crepe Myrtle)**
**Current Concepts and Management of Cartilage Injuries
of the Shoulder, Hip, and Knee**

12:30-12:45 Welcome and Announcements
W. Franklin Sease, MD

12:45-1:15 Cartilage Basic Science
Brad Winter, MD

1:15-1:45 Evaluation of the Hip in the Active Patient

1:45-2:15 Shoulder Evaluation in the Overhead Athlete
Chuck Thigpen PhD, PT, ATC

2:15-2:30 Break

Fellow Case Presentations

2:30-2:50 Case 1

2:50-3:10 Case 2

3:10-3:30 Case 3

3:30-4:15 Labral Tears of the Shoulder
Keith Lonergan, MD

4:15-5:00 Chondral Injuries of the Knee
Doug Wyland, MD

5:00-5:15 Break

5:15-5:45 Diagnostic Musculoskeletal Ultrasound
Kevin Burroughs, MD

5:45-6:30 Discussion

6:30-8:30 Reception (**Redbud**)

1:30-2:30 **BASIC SCIENCE LECTURE (Continental Ballroom)**
"Aerobic Exercise in the Prevention and Treatment of Arterial Aging"
Douglas R. Seals, Ph.D.

College Professor of Distinction
Department of Integrative Physiology
University of Colorado

2:30-2:45 **BREAK**

2:45-4:15 **SYMPOSIUM (S7)**
S7 SPRINT INTERVAL TRAINING: A VIABLE ALTERNATIVE TO IMPROVE HEALTH AND
FITNESS (**Regency Ballroom A**)

2:45-4:15 **TUTORIAL (T9)**
T9 WATER OR SPORTS DRINK DURING ENDURANCE EXERCISE. WHO'S KOOL AID
ARE YOU DRINKING? (**Redbud A & B**)

- 2:45-4:15 **POSTER PRESENTATIONS III (P56-P84) (Teal)**
 Authors Present 2:45-3:45.
 Competitive Athletes, Epidemiology and Preventative Medicine, Exercise
 Evaluation/Clinical, Research Design and Statistics
- 3:00-4:00 **TUTORIAL (T10 & T11)**
 T10 A NEW TOOL TO ENHANCE EXERCISE PRESCRIPTION – THE FEELING SCALE
(Regency Ballroom B & C)
- T11 GO THE DISTANCE: DEVELOP AN EXPERIENTIAL SPORTS PHYSIOLOGY AND
 MARATHON COURSE **(Regency Ballrooms E & F)**
- 3:00-4:15 **ORAL FREE COMMUNICATIONS IV**
O18-O22 Chronic Disease and Disability, Epidemiology & Preventative Medicine
(Regency Ballroom D)
- 4:30-5:30 **STUDENT BOWL (Continental Ballroom)**
 Moderator: Judith Flohr, James Madison University
- 5:45-7:15 **SEACSM GRADUATE STUDENT FAIR (Regency Ballrooms A, B, & C)**

SATURDAY February 16, 2013

- 8:00-9:00 **REGISTRATION (Main Lobby)**
- 8:00-12:00 **EXHIBITS (Prefunction Area)**
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- 7:30-12:15 **CLINICAL TRACK PROGRAM (Crepe Myrtle)**
**Current Concepts and Management of Cartilage Injuries
 of the Shoulder, Hip, and Knee**
- 7:30-7:45 Welcome and Announcements
 W. Franklin Sease, MD
- 7:45-8:45 MRI Imaging of Cartilage Injuries-Knee, Shoulder, Elbow
 Jeff Wienke, MD
- 8:45-9:30 Hip FAI-Labral and Chondral Injuries
 Jason Folk, MD
- Fellow Case Presentations
- 9:30-9:45 Case 4
- 9:45-10:00 Case 5
- 10:00-10:15 Case 6
- 10:15-10:30 Break
- 10:30-11:20 Ultrasound guided Injection Techniques
 Kevin Burroughs, MD
- Fellow Case Presentations
- 11:20-11:35 Case 7
- 11:35-11:50 Case 8
- 11:50-12:10 Case 9
- 12:10-12:15 Voting for Best Case Presentation & Closing Remarks
-

- 8:00-9:00 **TUTORIAL (T12-T14)**
T12 NUTRITIONAL CONSIDERATIONS FOR EXERCISE IN HOT ENVIRONMENTS
(Regency Ballroom A)
- T13 BEYOND THE LECTURE: ACTIVE LEARNING IN EXERCISE SCIENCE
(Regency Ballrooms E & F)
- 8:00-9:15 **ORAL FREE COMMUNICATIONS V**
O23-O27 Psychology/Psychiatry/Behavior (Redbud A & B)
- 8:00-9:45 **POSTER PRESENTATION IV (P85-P116) (Teal)**
Authors present 8:00-9:00
Fitness/Testing/Assessment
- 9:00-10:15 **HENRY J. MONTOYE SCHOLAR LECTURE (Continental Ballroom)**
“Moving Children: Research to Develop Healthy Lives”
Dianne Stanton Ward, EdD, FACSM
Professor Department of Nutrition
Director of Doctoral Program
Associate Director of the Diet, Physical Activity, and Body Composition Core of the
Nutrition Obesity Research Center (NORC)
University of North Carolina at Chapel Hill
- 10:15-10:30 **BREAK**
- 10:30-12:00 **SYMPOSIUM**
S8 FACTORS IMPACTING STRETCH-SHORTNING CYCLE POTENTIATION AND
RUNNING ECONOMY (Regency Ballrooms B & C)
- S9 ACADEMIC MENTORING FOR CAREER DEVELOPMENT
(Redbud A & B)
- 10:30-11:30 **TUTORIAL (T15)**
T14 TRIALS AND TRIBULATIONS OF A SPORTS DIETITIAN
(Regency Ballrooms E & F)
- 10:30-11:30 **ORAL FREE COMMUNICATIONS VI**
O28-O33 Biomechanics/Gait/Balance, Exercise Evaluation (Regency Ballroom D)
- 10:15-12:00 **POSTER PRESENTATION V (P117-P148) (Teal)**
Authors Present 10:15-11:15
Growth, Development & Aging, Psychology/Psychiatry/Behavior, Research Design
and Statistics, Cellular Regulatory Mechanisms
- 12:00-2:00 **SEACSM LUNCHEON AND LECTURE (Continental Ballroom)**
“Stalking the 2 Hour Marathon?”
Michael J. Joyner, M.D.
Professor of Anesthesiology
Deputy Director for Research at the Mayo Clinic
Mayo Clinic
- 2:00-4:00 **SEACSM EXECUTIVE BOARD MEETING (Board Room)**

**SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE
2013 ANNUAL MEETING SCHEDULE (COMPLETE)**

THURSDAY, February 14, 2013

- 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 PERCEPTUAL RESPONSES: SCALE DEVELOPMENT, EXERCISE APPLICATIONS AND
MEDIATING FACTORS
J.M. Green, L.G. Killen, *University of North Alabama, Middle Tennessee State
University*
Chair: Eric Hall, PhD, *Elon University*
(Crepe Myrtle)
- 4:00-5:30 **SYMPOSIUM**
S1 THE FRESHMAN 15: FALLACIES, FINDINGS, FACTORS, AND FIXES
B.M. Das, M.V. Fedewa, E.M. Evans. *University of Georgia*
Chair: Sue Graves, PhD, *Florida Atlantic University*
(Redbud A & B)
- S2 IMPROVING WELLNESS IN PEOPLE WITH DISABILITIES: PAST, PRESENT, AND
FUTURE DIRECTIONS FOR ADAPTIVE FITNESS PROGRAMS
K. McCully, FACSM, M. Erickson, H-J. Young, *University of Georgia, N. Evans,
Shepherd Center, Atlanta, GA*
Chair: Gregory Martel, PhD, *Coastal Carolina University*
(Regency Ballrooms B & C)
- 4:00-5:30 **ORAL FREE COMMUNICATIONS I (O1-O6)**
Athletic Care/Trauma/Rehabilitation, Fitness/Testing/Assessment
Chair: Heather Webb, PhD, *Mississippi State University*
(Regency Ballroom D)
- O1 4:00 EFFECT OF ARM COOLING ON PITCHING PERFORMANCE
S. Bishop, G. Ryan, C. Katica, R. Herron, B. Elbon, and P. Bishop, *Dept. of Health
and Human Performance, Texas A&M University-Commerce, Kinesiology Dept.,
University of Alabama, University of Montana*
- O2 4:15 INVESTIGATION OF A NOVEL THERAPY FOR THE PREVENTION AND TREATMENT
OF MUSCLE CRAMPS
K.A. Zwetsloot, A. Goodman, E. Rabinowitz, J.J. Zwetsloot, M. Morton, and B. Bull
Dept. of Health, Leisure, and Exercise Science, Appalachian State University
- O3 4:30 VALIDATION OF AN ACUTE ANKLE SPRAIN MOUSE MODEL
E.A. Wikstrom, T. Hubbard-Turner, and M. Turner. *Dept. of Kinesiology, University
of North Carolina at Charlotte*
- O4 4:45 CONCUSSION KNOWLEDGE AND ATTITUDE AMONGST COLLEGIATE ATHLETES
T.A. Buckley, B.A. Munasky. *Dept. of Health and Kinesiology, Georgia Southern
University*

- 05 5:00 PARENTAL KNOWLEDGE OF PHYSICAL ACTIVITY RECOMMENDATIONS AND THEIR ABILITY TO ASSES CHILD'S PHYSICAL ACTIVITY
J. I. Flynn, D.P., Coe, D.L., Thompson. *Dept. of Kinesiology, Recreation, and Sport Studies, University of Tennessee*
- 06 5:15 EFFECTS OF WARM-UP DURATION ON VO₂ KINEMATICS AND LACTATE DURING A CYCLING TIME TRIAL
J. A. Bunn, M. Magal, FACSM and L.C. Eschbach, *Campbell University, NC Wesleyan University, Valencell Technologies*
- 4:00-6:00 **STUDENT AWARD POSTER PRESENTATIONS (D1-8, M1-8, UG1-8)**
Authors Present 4:30-6:00
Chair: Dave Pascoe, PhD, Auburn University
(Teal)
- D1 CASE REPORT: MITOCHONDRIAL RESPONSES AFTER ENDURANCE ELECTRICAL STIMULATION TRAINING IN PERSONS WITH SPINAL CORD INJURY
M.L. Erickson, T.E. Ryan, H. Young, and K.K. McCully, FACSM. *Kinesiology Department, University of Georgia*
- D2 OBJECTIVELY MEASURED TOTAL ACCELEROMETER COUNTS AND MVPA: RELATIONSHIP WITH BIOMARKERS USING 2003 – 2006 NHANES
D.L. Wolff, E.C. Fitzhugh, D.R. Bassett, J.R. Churilla. *Department of Kinesiology, Recreation & Sports Studies, University of Tennessee, Department of Clinical & Applied Movement Sciences, University of North Florida*
- D3 ELEVATED NADPH OXIDASE ACTIVITY LINKS ENDOTHELIAL DYSFUNCTION TO ROS IN OBESE HUMAN SKELETAL MUSCLE
J.D. La Favor, E.J. Anderson, and R.C. Hickner, FACSM. *Department of Kinesiology, East Carolina University*
- D4 CACHECTIC SKELETAL MUSCLE RESPONSE TO A NOVEL BOUT OF LOW FREQUENCY STIMULATION
M. Puppa and J. Carson. *Department of Exercise Science, University of South Carolina*
- D5 THE REPRODUCIBILITY OF 31P MRS AND NIRS METHODS TO EVALUATE SKELETAL MUSCLE MITOCHONDRIAL FUNCTION
T.E. Ryan, M.L. Erickson, S.N. Stoddard, J. Chavez, A. Verma, K.K. McCully FACSM. *University of Georgia, Biogen IDEC, Massachusetts*
- D6 EFFECT OF AN ACUTE BOUT OF MODERATE-INTENSITY AEROBIC EXERCISE ON NATURAL KILLER CELL COUNTS IN BREAST CANCER SURVIVORS
E.S. Evans, A.C. Hackney, FACSM, R.G. McMurray, FACSM, S.H. Randell, H.B. Muss, and C.L. Battaglini. *Departments of Exercise and Sport Science, Cell and Molecular Physiology, and Medicine, University of North Carolina at Chapel Hill*
- D7 TREADMILL RUNNING INFLUENCES POLYP BURDEN AND IMMUNE REGULATION IN THE ApcMin/+ MOUSE MODEL OF INTESTINAL TUMORIGENESIS
J.L. McClellan, J.L. Steiner, J.M. Davis, S.D. Day, R.T. Enos, U.P. Singh, E.A. Murphy. *University of South Carolina*

- D8 RAPAMYCIN EXACERBATES STRENGTH DEFICITS AFTER ECCENTRIC CONTRACTION-INDUCED SKELETAL MUSCLE INJURY
C.W. Baumann, N. Gahlot, R.G. Rogers, C.P. Ingalls, FACSM. *Department of Kinesiology and Health, Georgia State University*
- M1 LEFT VENTRICULAR HYPERTROPHY ACROSS THE LIFESPAN IN PHYSICALLY ACTIVE AND SEDENTARY MICE
S.B. Guderian, M.J. Turner, T.H Turner. *Department of Kinesiology, University of North Carolina – Charlotte*
- M2 EXOGENOUS SUPPLEMENTATION OF MELATONIN DOES NOT AFFECT 20 MILE CYCLING TIME TRIAL PERFORMANCE
K.J. Brandenberger, C.P. Ingalls, J.C. Rupp, J.A. Doyle. *Department of Kinesiology and Health, Georgia State University*
- M3 GENDER DIFFERENCES IN HIGH SENSITIVITY C-REACTIVE PROTEIN AND SELF-REPORTED MUSCLE STRENGTHENING ACTIVITY AMONG U.S. ADULTS
M. R. Richardson, W. R. Boyer, J. R. Churilla. *Department of Clinical & Applied Movement Sciences, University of North Florida*
- M4 REPRODUCIBILITY OF SKELETAL MUSCLE OXIDATIVE FUNCTION USING NEAR-INFRARED SPECTROSCOPY
W. M. Southern, M. A. Reynolds, K. K. McCully, FACSM. *Department of Kinesiology, University of Georgia*
- M5 MINIMAL DETECTABLE CHANGE SCORES IN SCAPULA UPWARD ROTATION
R.L. Ingram, B.A. Munkasy, T.A. Buckley. *Department of Health and Kinesiology, Georgia Southern University*
- M6 THE EFFECT OF AD LIBITUM HYDRATION ON COGNITIVE FUNCTION FOLLOWING EXERCISE IN THE HEAT
M.T. Wittbrodt, C.C. Cheatham, R.A. Sherman, and Y. Liu. *Department of Human Performance and Health Ed., Western Michigan University*
- M7 THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND SHOOTING PERFORMANCE IN A TACTICAL PISTOL QUALIFIER
A.G. Thompson, D.P. Swain FACSM, J.D. Branch FACSM, R.J. Spina FACSM, C.R. Grieco. *Department of Human Movement Sciences, Old Dominion University*
- M8 A COMPREHENSIVE AND COORDINATED APPROACH TO INCREASING CHILDREN'S PHYSICAL ACTIVITY IN AFTERSCHOOL PROGRAMS: A PILOT STUDY
M. Hughey, R. Ajja, R. Shah, F. Tilley, RG.Weaver, D. Winnicka, CA. Webster, A. Beighle, RR. Pate, RP. Saunders, MW. Beets. *Department of Exercise Science, The University of South Carolina*
- U1 PHYSICAL ACTIVITY, EXECUTIVE FUNCTION, AND SCHOOL READINESS IN YOUNG CHILDREN
B.D. Wiseman, D.P. Coe, J.T. Fairbrother, J.I. Flynn, *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*
- U2 THE RELATIONSHIP BETWEEN PERCEIVED FITNESS STATUS AND PHYSICAL ACTIVITY LEVEL
L.A. Zdziarski, E.A. Holbrook. *Department of Health and Human Performance, Roanoke College*

- U3 RUNNERS UNDERESTIMATE SWEAT LOSSES IN TEMPERATE ENVIRONMENT RUN
M.C. Stevenson, J.B. Lowe, H.L. Berryman, B.A. Davis, A.D. Horton and E.K.
O’Neal. *Department Health, Physical Education and Recreation, University of North
Alabama*
- U4 THE EFFECTS OF CHOCOLATE SOYMILK ON RECOVERY IN RECREATIONALLY
ACTIVE WOMEN
K. E. Chrismon, P. C. Miller, FACSM, S. Nepocatych, *Department of Exercise
Science, Elon University*
- U5 COMPARISON OF HIP WORN AND WRIST WORN ACTIVITY MONITORS
T.F. Mahar and M.T. Mahar, FACSM. *Department of Kinesiology, East Carolina
University*
- U6 THE EFFECT OF SHOD VERSUS BAREFOOT RUNNING ON LOWER LIMB MUSCLE
ACTIVATION
L. Bauer and C. Inman, *Samford University*
- U7 SEX DIFFERENCES FOLLOWING FOUR WEEKS OF DISCONTINUOUS VERSUS
CONTINUOUS EXERCISE IN CENTRAL PULSE WAVE VELOCITY
M.D. Parsons, M.J. Landram, A.C. Utter, S.R. McAnulty, C. Baldari, L. Guidetti, S.R.
Collier. *Department of Health, Leisure, and Exercise Science, Appalachian State
University*
- U8 THE EFFECTS OF EXERCISE AND DIETARY SUPPLEMENTATION ON AVASCULAR
NECROSIS: A CASE STUDY
K. Thompson, E. Durland, S.R. Collier. *Department of Health, Leisure, and Exercise
Science, Appalachian State University*
- 5:00-6:30 **SYMPOSIUM**
S3 CONTROL OF BLOOD FLOW DURING MUSCLE CONTRACTIONS
H.A. Kluess, L.B. Gladden, B.S. Ferguson, M.J. Rogatzki. *Department of
Kinesiology, Auburn University*
Chair: Ronnie Evans, PhD, Virginia Commonwealth University
(Regency Ballrooms E & F)
- 5:30-6:30 **TUTORIAL**
T2 INCREASING YOUR N: STRATEGIES TO RECRUIT AND RETAIN PARTICIPANTS
FOR YOUR RESEARCH PROJECTS
E.K. O’Neal and C.M. Laurent, *University of North Alabama, Bowling Green State
University*
Chair: Brian Parr, PhD, University of South Carolina Aiken
(Crepe Myrtle)
- T3 GLENOHUMERAL JOINT MOTION INVOLVES THE WHOLE BODY, JUST ASK
DARTFISH
W.H. Weimar, G.D. Oliver and J.H. Patel. *Department of Kinesiology, Auburn
University*
Chair: Bill Barfield, PhD, College of Charleston
(Redbud C)

7:30-9:00 **KEYNOTE ADDRESS (Continental Ballroom)**
“The Genetic Underpinnings of Health Behaviors”
Molly Bray, Ph.D.
Professor, Department of Epidemiology/Genetics
Director, Heflin Center for Genomic Science Core Labs
University of Alabama at Birmingham
Presiding: Paul Davis, University of North Carolina at Greensboro,
SEACSM President
Speaker Introduction: Michael Turner, PhD, University of
North Carolina at Charlotte

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

FRIDAY, February 15, 2013

6:45-7:45 **WOMEN’S BREAKFAST (Registration Required)**
**“Honoring the Founders of the Women’s Breakfast and Exploring
New Opportunities”**
Moderator: Judith Flohr, PhD, James Madison University
Tiffany Esmat, PhD, Kennesaw State University
(Regency Ballrooms E & F)

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

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

8:00-9:30 **SYMPOSIUM**
S4 THE BENEFICIAL EFFECTS OF EXERCISE IN INDIVIDUALS WITH PARKINSON’S
DISEASE
T.A. Buckley, J.R. Nocera, C.J. Hass. *Department of Health and Kinesiology, Georgia
Southern University, School of Medicine, Emory University, Department of Applied
Physiology and Kinesiology, University of Florida*
Chair: Lynn Panton, PhD, Florida State University
(Crepe Myrtle)

S5 **SYMPOSIUM**
LONG TERM INTERDISCIPLINARY ATHLETE DEVELOPMENT AND MONITORING
PROGRAMS
C.J. MacDonald, J.A. Gentles, M.H. Stone. *Department of Exercise and Sport
Sciences, East Tennessee State University*
Chair: Will Lyerly, PhD, Coastal Carolina University
(Regency Ballrooms B & C)

8:00-9:00 **TUTORIAL (T4 & T5)**
T4 HIGH INTENSITY INTERVAL TRAINING: FROM THE SURGEONS TABLE TO THE
PLAYING FIELD
R.H. Laird, D.J. Elmer, D.D. Pascoe. *Department of Kinesiology, Auburn University*
Chair: Peter Magyari, PhD, University of North Florida
(Redbud A & B)

T5 SEVERE OBESITY: IS THERE A METABOLIC PHENOTYPE AND CAN EXERCISE
HELP?
J.A. Houmard, *East Carolina University*
Chair: Allan Goldfarb, PhD, University of North Carolina at Greensboro
(Regency Ballroom A)

- 8:00-9:15 **ORAL FREE COMMUNICATIONS II**
 Body Composition/Energy Balance/Weight Control, Connective
 Tissue/Bone/Skeletal Muscle
 Chair: Laurie Wideman, PhD, University of North Carolina at Greensboro
(Regency Ballroom D)
- 07 8:00 EFFECTS OF BETAINE ON STRENGTH, BODY COMPOSITION, AND HOMOCYSTEINE
 THIOLACTONE
 J. M. Cholewa, V. Paolone, R. Wood, T. Matthews, *University of Kentucky*
- 08 8:15 ADIPOSITY INFLUENCES MUSCLE QUALITY ASSOCIATIONS WITH PHYSICAL
 FUNCTION IN OLDER ADULTS
 C.R. Straight, B.M. Das, D.L. Guest, C.L. Ward, R.J. Valentine, E.M. Evans,
 FACSM, *Dept. of Kinesiology, University of Georgia, University of Illinois*
- 09 8:30 ADIPOSITY IS NEGATIVELY ASSOCIATED WITH BODY IMAGE IN FRESHMAN
 STUDENTS
 M.V. Fedewa, B.M. Das, M.D. Schmidt, P.J. O'Connor, FACSM, E.M. Evans,
 FACSM, *University of Georgia*
- 010 8:45 A COMPARISON BETWEEN YOUNG WOMEN AND PRE-MENOPAUSAL WOMEN'S
 BONE MINERAL DENSITY
 S. Sanderson, M. Benton, *Dept. of Kinesiology and Physical Education, Dept. of
 Nursing, Valdosta State University*
- 011 9:00 POSTMENOPAUSAL WOMEN WHO EXERCISE ONE DAY A WEEK WILL IMPROVE
 BONE PARAMETERS SIMILAR TO THOSE WHO EXERCISE MORE FREQUENTLY
 K.C. Hamilton, G. Fisher, B. Kane and G.R. Hunter, *Dept. of Human Studies,
 University of Alabama, University of Alabama-Birmingham*
- 8:00-9:30 **POSTER PRESENTATION I (P1-P27)**
 Authors Present 8:00-9:00 AM.
 Athletic Care/Trauma/Rehabilitation, Biomechanics/Gait/Balance,
 Metabolism/Carbohydrate, Lipid, Protein, Endocrinology/Immunology,
 Environmental Physiology
 Chair: Chun-Jung Huang, PhD, Florida Atlantic University
(Teal)
- P1 CONCUSSION IMPAIRS SOME GAIT STEPPING CHARACTERISTICS WHEN
 COMPARED TO A HEALTHY GROUP
 T.G. Tapia-Lovler, B.A. Munkasy, T.A. Buckley *Department of Health and
 Kinesiology. Georgia Southern University*
- P2 LOWER-EXTREMITY MOBILITY & QUADRICEPS STRENGTH OF OLDER
 OVERWEIGHT ADULTS: BASELINE DATA FROM THE I'M FIT STUDY
 J.C. McNeill, A.P. Marsh. *Department of Health and Exercise Science, Wake Forest
 University*
- P3 BALANCE ABILITY AND FALL RISK IN FEMALE COLLEGIATE CHEERLEADERS AND
 CROSS COUNTRY RUNNERS
 G.F. Martel, C.M. Carroll, S.L. Taylor, S.L. Beam, G.W. Lyerly. *Department of
 Kinesiology. Coastal Carolina University*

- P4 THE EFFECT OF FATIGUE ON PLANTAR PRESSURE IN A COMPETITIVE COLLEGIATE SOCCER PLAYER
B.A. Gladish, J.A. Davis, PhD, *Elon University* *Elon*, M. E. Russell, MS, M. W. Krzyzewski *Human Performance Research Laboratory at Duke Medical Center*
- P5 IMPACTS ON MUSCLE ACTIVITY WHILE WALKING IN OCCUPATIONAL FOOTWEAR
H. Chander, J.C. Garner, C. Wade, D.E. Waddell, N.C. Dabbs, J. Lundahl & K. Childers. *Applied Biomechanics Laboratory, University of Mississippi*
- P6 A DESCRIPTION OF SEGMENTAL SPEEDS OF THE UPPER EXTREMITY IN THE YOUTH PITCHING: FASTBALL AND CHANGE-UP
S.A. Taylor, H.A. Plummer, G.D. Oliver, T.E. Holt, R. Johnson. *Department of Kinesiology, Auburn University*
- P7 FOOTWEAR AND CADENCE EFFECT ON SPATIOTEMPORAL GAIT PARAMETERS
B. Romer, J.W. Fox, J. M. Rehm, J.H. Patel, W.H. Weimar. *Department. of Kinesiology, Auburn University*
- P8 VERTICAL GROUND REACTION FORCE DURING FOUR LOADING CONDITIONS
J.W. Fox, J.H. Patel, B.H. Romer, J.M. Rehm, and W.H. Weimar. *Department of Kinesiology, Auburn University, Auburn*
- P9 FEMALE DIVISION 1 CROSS COUNTRY RUNNERS: IS BALANCE AN ISSUE?
S.L. Taylor, C.M. Carroll, S.L. Beam, G.W. Lyerly, G.F. Martel. *Department of Kinesiology. Coastal Carolina University*
- P10 ASSESSMENT OF BALANCE ABILITY AND FALL RISK IN FEMALE COLLEGIATE CHEERLEADERS
C.M. Carroll, S.L. Taylor, S.L. Beam, G.W. Lyerly, G.F. Martel. *Department of Kinesiology. Coastal Carolina University*
- P11 EFFECTS OF PREVIOUS LATERAL ANKLE SPRAIN ON BALANCE
A. Comer, M. Adams, A. Abernathy, and A. Knight. *Department of Kinesiology, Mississippi State University*
- P12 EFFECTS OF PREVIOUS LATERAL ANKLE SPRAIN ON ANKLE JOINT LAXITY
M. Adams, A. Abernathy, A. Comer, and A. Knight. *Department of Kinesiology, Mississippi State University*
- P13 EFFECTS OF PREVIOUS LATERAL ANKLE SPRAIN ON LANDING KINETICS AND DYNAMIC BALANCE
A. Abernathy, A. Comer, M. Adams, and A. Knight. *Department of Kinesiology, Mississippi State University*
- P14 COMPARISON OF THE EFFECTS OF ACCUMULATING 150 MINUTES OF MODERATE-INTENSITY AEROBIC EXERCISE IN THREE VS EIGHT WEEKLY SESSIONS ON MARKERS OF GLUCOSE CONTROL IN PERSONS WITH TYPE 2 DIABETES MELLITUS
R. Buresh and S. Jones. *Department of Exercise Science and Sport Management, Kennesaw State University*

- P15 TRAINING STATUS INFLUENCES RECOVERY ENERGY EXPENDITURE AFTER AN ACOUT BOUT OF RESISTANCE EXERCISE
M.J. Benton, PhD, FACSM and G.T. Waggener, PhD, *Valdosta State University, Valdosta, GA, University of West Florida*
- P16 HIGH INTENSITY INTERVAL TRAINING DOES NOT ALTER INSULIN SENSITIVITY IN YOUNG HEALTHY MALES
D.J. Oberlin, J. Smith, L. Wideman. *Department of Kinesiology, University of North Carolina at Greensboro*
- P17 COORDINATED UPREGULATION OF MITOCHONDRIAL GENES IN RESPONSE TO FATTY ACIDS IS DEPRESSED WITH SEVERE OBESITY
J.M. Maples, M.J. Hubal, J.J. Brault, T.M. Weber, I.G. Dubis, L.A. Consit, and J.A. Houmard. *Department of Kinesiology, East Carolina University, Department of Integrative Systems Biology, Children's National Medical Center, Washington D.C., Department of Biomedical Sciences, Ohio University*
- P18 AROMATASE PROTEIN CONTENT IN GLUTEAL AND ABDOMINAL SUBCUTANEOUS ADIPOSE TISSUE IN PREMENOPAUSAL CAUCASIAN AND AFRICAN AMERICAN WOMEN
E.E. Cooper, K.M. Gavin and R.C. Hickner, *Kinesiology, East Carolina University*
- P19 RESPONSE OF TESTOSTERONE TO PROLONGED AEROBIC EXERCISE DURING DIFFERENT PHASES OF THE MENSTRUAL CYCLE
C. O'Leary, C. Lehman, K. Koltun, A. Smith-Ryan, and A.C. Hackney, FACSM. *Department of Exercise and Sport Science, UNC-CH*
- P20 IN VITRO LEPTIN EFFECTS ON INTERLEUKIN-6 PRODUCTION IN OBESE SUBJECTS, INDEPENDENT OF GLUCOCORTICOID SENSITIVITY
Liz S. Pittinger, Y. Shibata, E.O. Acevedo, R.L. Franco, T.L. Jones, and C.J. Huang. *Department of Exercise Science and Health Promotion, Florida Atlantic University*
- P21 INFLUENCE OF ESTROGEN ON CK AND IL-6 RESPONSE TO PROLONGED TREADMILL RUNNING IN ELITE FEMALE RUNNERS
A.L. Meyer, A.C. Hackney FACSM, J.B. Myers, and J.P. Mihalik, *Department of Exercise & Sport Science, University of North Carolina*
- P22 HEAT STRESS OF PERFORMING LIGHT ACTIVITY IN AN EXTREME HOT/HUMID ENVIRONMENT WEARING MILITARY PROTECTIVE GEAR
D.J. Elmer, R.H. Laird, M.D. Barberio, K.A. Lee, and D.D. Pascoe. *Department of Kinesiology, Auburn University*
- P23 EFFECT OF WEARING A COOLING VEST ON THERMOREGULATION AND INTERVAL RUN PERFORMANCE IN THE HEAT
G.S. Wimer, J.T. Good, W.H. Baird, B.L. Riemann. *Armstrong Atlantic State University, Savannah*
- P24 AMBIENT AIR COOLING FOR CONCEALED SOFT BODY ARMOR IN A HOT ENVIRONMENT
B. Elbon, G.A. Ryan, C.P. Katica, S.H. Bishop, R.L. Herron, A. Bosak', and P. Bishop, *University of Alabama, University of Montana – Western, Texas A&M University – Commerce, Armstrong Atlantic State University*

- P25 THE IMPACT OF PRE-COOLING THE UPPER BODY ON TIME TRIAL PACED CYCLING IN THE HEAT
R.L. Herron, C.P. Katica, S.H. Bishop, and J.E. Wingo, *University of Alabama, Texas A&M University – Commerce*
- P26 EFFECT OF HYPOXIC RECOVERY POST-EXERCISE ON BLOOD OXIDATIVE STRESS MARKERS
C. Ballmann, G. McGinnis, B. Peters, D. Slivka, J. Cuddy, W. Hales, C. Dumke, C., B. Ruby, J. Quindry, *Department of Kinesiology Auburn University, Department of Health and Human Performance, University of Montana*
- P27 EFFECTS OF EXERCISING AT A SIMULATED ALTITUDE ON ACCURACY
M.P. Saeler, A.H. Park, and J.E. Schoffstall, *Department of Health Professions, Liberty University*
- 9:30-9:45 **BREAK**
- 9:45-10:45 **ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS**
"Facts and Fads of Nutrition for High Intensity Sport"
Janet Walberg Rankin, Ph.D., FACSM
Professor, Human Nutrition, Foods and Exercise
Associate Dean, Graduate School
Virginia Polytechnic Institute and State University
Chair: Dixie Thompson, PhD, University of Tennessee
(Continental Ballroom)
- 9:45-12:00 **POSTER PRESENTATION II (P28-P55)**
Authors Present 11:00-12:00
Body Composition/Energy Balance/Weight Control, Cardiovascular Physiology, Chronic Disease and Disability, Connective Tissue/Bone/Muscle, Motor Control
Chair: Brian Ferguson, Auburn University
(Teal)
- P28 MARKERS OF HYDRATION STATUS, CARDIOVASCULAR FUNCTION, AND PERFORMANCE IN OCEAN RESCUE EMPLOYEES
S.A. Harper, A.M. Jetton, M.J. Landram, T. Haines, S.R. Collier, Ph.D., FACSM, A.C. Utter Ph.D., M.P.H., FACSM, *Department of HLES, Appalachian State University*
- P29 EFFECTS OF ACUTE HYDRATION ON BODY COMPOSITION
A. MacCreery, K. Cappetta, K. Hewitt, and N. Miller. *School of Health and Applied Human Sciences, University of North Carolina Wilmington*
- P30 OBESITY'S EFFECTS ON FUNCTIONALITY IN LONG TERM CARE REHAB SETTINGS
N. Gilbertson & M. Lockhart. *Department of Kinesiology, Shenandoah University*
- P31 ARE SCHOOL-BASED OBESITY INTERVENTIONS EFFECTIVE IN PRE-ADOLESCENT AND ADOLESCENT AFRICAN-AMERICAN CHILDREN?: A LITERATURE REVIEW
K. Webster, M.Ed., A. Mendoza, M.S., H. Stoops B.S., S. Alhassan, Ph.D., FACSM, & L.E. Robinson, Ph.D., *Auburn University, University of Massachusetts-Amherst*
- P32 EFFICACY OF WEIGHT-LOSS COMPETITION IN CHARLOTTE MECKLENBURG POLICE DEPARTMENT
E.A. Dyer, R.W. Boyce, G.R. Jones, E.L. Boone, SHAHS, *University of North Carolina Wilmington*

- P33 DIETARY AND EXERCISE PREFERENCES OF WOMEN UNDERGOING CHEMOTHERAPY FOR BREAST CANCER
M.S. Haynie, S. Yocke, S. Mihalko. *Department of Exercise Science, Wake Forest University*
- P34 EFFECT OF AN ACUTE ANKLE SPRAIN ON PHYSICAL ACTIVITY AND BODY WEIGHT
K. Correa, M.J. Turner, E.A. Wikstrom, T. Hubbard-Turner. *Department of Kinesiology, University of North Carolina at Charlotte*
- P35 THE COMBINATION OF GREEN TEA, CAFFEINE, CONJUGATED LINOLEIC ACID AND BRANCHED CHAIN AMINO ACIDS DO NOT CHANGE BODY COMPOSITION OR RESTING METABOLISM IN OVERWEIGHT AND OBESE INDIVIDUALS
S.R. Rawal, N.T. Fisher, D. Thomas, A.W. Kinsey, W.E. Eddy, M.L. Elam, M.M. Spicer, M.J. Ormsbee. *Department of Nutrition, Food and Exercise Science, Florida State University*
- P36 HEART RATE VARIABILITY IN EMERGENCY MEDICAL SERVICE PROVIDERS: STRESS RESPONSE TO A 12-HOUR SHIFT
R.L. Simmons, K.J. Kelleran, C.R. Grieco, M.B. Venner, D.P. Swain, Department of Human Movement Sciences, *Old Dominion University, Department of Health & Physical Education, Glenville State College*
- P37 PHYSICAL STRESS AND CARDIAC GENE EXPRESSION: INITIAL RESULTS
J. Hardy, A. Hamilton, C. Gibas, M. Moerdyk-Schauwecker, N. Steuerwald, Y. Huet, and R. Howden. *Department of Kinesiology, Department of Biology and Department of Bioinformatics, UNC at Charlotte, Carolinas Medical Center, Charlotte, NC*
- P38 EXERCISE TRAINING IN THE COLD DOES NOT INCREASE PHYSIOLOGICAL MARKERS OF STRESS IN RATS
L.A. Hixson, B. Feger, J.W. Starnes, *FACSM. University of North Carolina at Greensboro*
- P39 DIFFERENTIAL EFFECTS OF CONTINUOUS VERSUS DISCONTINUOUS AEROBIC EXERCISE ON OXYGEN UPTAKE AND AUGMENTATION INDEX IN YOUNG VERSUS OLDER
M.J. Landram, A.C. Utter, S.R. McAnulty, C. Baldari, L. Guidetti, S.R. Collier. *Department of Health, Leisure, and Exercise Science, Appalachian State University*
- P40 EFFECTS OF 20-WEEK EXERCISE TRAINING ON NON-INVASIVE MARKERS OF CARDIOVASCULAR HEALTH IN BREAST CANCER SURVIVORS
R.C. Mills, E.S. Evans, D.G. Groff, A.C. Hackney *FACSM*, and C.L. Battaglini, *Integrative Exercise Oncology Laboratory, Department of Exercise and Sport Science, University of North Carolina*
- P41 EXAMINATION OF BALANCE IN EARLY-STAGE FEMALE BREAST CANCER SURVIVORS WHO HAVE UNDERGONE CHEMOTHERAPY
C. Shatten, C.L. Battaglini, J.T. Blackburn, J. Register-Mihalik, and A.C. Hackney, *FACSM. Integrative Exercise Oncology Laboratory, Department of Exercise and Sport Science, University of North Carolina*

- P42 IMPROVED CARDIOVASCULAR RISK PROFILE AS A MEASURE OF SUCCESS FOR OBESE ADOLESCENTS PARTICIPATING IN A WEIGHT MANAGEMENT PROGRAM
Z.V. Williams, R.K. Evans, M. Stern, R.L. Franco, E.P. Wickham. *T.E.E.N.S Program. Virginia Commonwealth University*
- P43 THERAPEUTIC ULTRASOUND AFFECTS MUSCLE SATELLITE CELL MYOGENIC PROGRAM AFTER MUSCLE INJURY IN HUMANS
D.C. Delgado-Diaz, B. Gordon, J.A. Carson, M.C. Kostek. *University of South Carolina, Universidad Industrial de Santander, Penn State, Milton S. Hershey Medical Center, PA., Duquesne University*
- P44 INFLUENCES OF HAMSTRING GEOMETRIC AND ARCHITECTURAL CHARACTERISTICS ON MUSCULOTENDINOUS STIFFNESS
D.N. Pamukoff, J.T. Blackburn. *Department of Exercise and Sport Science, The University of North Carolina at Chapel Hill, Chapel Hill*
- P45 RELATIONSHIP BETWEEN THE SARCOPENIC INDEX AND STRENGTH MEASUREMENTS IN BREAST CANCER SURVIVORS
T.A. Madzima, E. Simonavice, P-Y. Liu, J.Z. Ilich, J-S. Kim., M.J. Ormsbee, C.M. Prado, L.B. Panton, *Department of Nutrition, Food & Exercise Sciences, Florida State University*
- P46 THE EFFECT OF CACHEXIA SEVERITY AND RESISTANCE EXERCISE TRAINING ON SKELETAL MUSCLE MASS
J.P. Hardee, M.J. Puppa, A.A. Narsale, S. Gao, and J.A. Carson, FACSM. *Department of Exercise Science, University of South Carolina*
- P47 HIGH-FAT DIET INDUCED OBESITY INCREASES SERUM MYOSTATIN BUT DOES NOT ACCELERATE SKELETAL MUSCLE ATROPHY
S.L. Roseno and J.J. Brault. *Human Performance Lab, Department of Kinesiology, East Carolina University*
- P48 WHOLE BODY, LUMBAR AND HIP BONE MEASUREMENTS OF COMPETITIVE MALE CYCLISTS
C.D. Mojock, B.H. Arjmandi, J.S. Kim, M.J. Ormsbee, C.M. Prado, R.J. Contreras, L.B. Panton *Department of Nutrition, Food and Exercise Sciences, Department of Psychology, Florida State University*
- P49 THE EFFECT OF ACUTE AND REPEATED ECCENTRIC MUSCLE CONTRACTIONS ON CACHECTIC MUSCLE ANABOLIC SIGNALING IN THE FEMALE MOUSE
K.L. Hetzler, S. Sato, M.J. Puppa, S. Gao, and J.A. Carson. *Integrative Muscle Biology Lab, Department of Exercise Science, University of South Carolina*
- P50 EFFECTS OF ELECTRICAL STIMULATION INTENSITY ON NEAR-INFRARED SPECTROSCOPY MEASUREMENTS OF OXYGEN CONSUMPTION AND MITOCHONDRIAL CAPACITY
K.R. Talati, P.K. Dhillon, T.E. Ryan, K.K. McCully FACSM. *Department of Biological Sciences, Department of Kinesiology, University of Georgia*
- P51 THE EFFECT OF IL-6 LOSS ON INITIAL LADDER CLIMBING EXERCISE-INDUCED CHANGES IN STRENGTH AND MUSCLE MASS
A. Engel, K. Velazquez, A. Narsale, M. Puppa, J. Carson. *Department of Exercise Science, University of South Carolina*

- P52 THE PREVALENCE OF SEVERE OR SITE-SPECIFIC SARCOPENIA IN JAPANESE MEN AND WOMEN
T. Abe, M. Loftin. *Department of Health, Exercise Science & Recreation Management, University of Mississippi*
- P53 THERAPETIC ULTRASOUND ENHANCES MUSCULAR PERFORMANCE RECOVERY AFTER EXERCISE INDUCED MUSCLE DAMAGE
M.C. Kostek, D.C. Delgado-Diaz, S. Aaron, *University of South Carolina, Universidad Industrial de Santander, Duquesne University*
- P54 THE ROLE OF CENTRAL MODULATION ON THE STRETCH REFLEX OF THE PERONEUS LONGUS
C.J. Burcal and M.J. Lake. *School of Sports and Exercise Science, Liverpool John Moores University*
- P55 MOTOR PLANNING AND END-STATE COMFORT IN CHILDREN WITH AUTISM SPECTRUM DISORDERS
J.L. Simermeyer and C.J. Ketcham. *Department of Exercise Science, Elon University*
- 10:45-11:00 **BREAK**
- 11:00-12:30 **SYMPOSIUM**
S6 DEFINITION AND MEASUREMENT OF MUSCLE QUALITY IN OLDER ADULTS: SPANNING THE SPECTRUM FROM CLINICAL PRACTICE TO RESEARCH
A.E. O'Brien, PhD, C.R. Straight, MS. *Department of Kinesiology, University of Georgia*
Chair: Elizabeth Holbrook, PhD, Roanoke College
(Regency Ballroom B & C)
- 11:00-12:00 **TUTORIALS**
T6 EFFECTS OF BRISK WALKING ON CONDITIONS OF THE METABOLIC SYNDROME AND CARDIOVASCULAR DISEASE
L.J. Brandon, FACSM. *Department of Kinesiology & Health, Georgia State University*
Chair: James Churilla, PhD, MPH, University of North Florida
(Redbud A & B)
- T7 ENVIRONMENTAL INFLUENCES ON PHYSICAL ACTIVITY AT CHILD CARE SETTINGS
R.A. Battista and D.P. Coe, *Department of Health, Leisure and Exercise Science, Appalachian State University, Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*
Chair: Leah Robinson, PhD, Auburn University
(Regency Ballrooms E)
- T8 AUGUST KROGH: THE PHYSIOLOGIST'S PHYSIOLOGIST
D.R. Bassett Jr. and S. Scott. *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*
Chair: Kevin McCully, PhD, University of Georgia
(Regency Ballroom A)
- 11:00-12:30 **ORAL FREE COMMUNICATIONS III**
Competitive Athletes, Nutrition and Exercise/Sports
Chair: Alan Utter, PhD, Appalachian State University
(Regency Ballroom D)

- O12 11:00 VIGOROUS PHYSICAL ACTIVITY MITIGATES THE ASSOCIATION BETWEEN SEDENTARY TIME AND CARDIORESPIRATORY FITNESS IN MIDDLE SCHOOL YOUTH
J.B. Moore, M.B. Beets, D.J. Barr-Anderson
Depts. of Health Promotion, Education, & Behavior, Exercise Science, and Epidemiology & Biostatistics, University of South Carolina
- O13 11:15 AWARENESS OF THE 2008 PHYSICAL ACTIVITY GUIDELINES FOR AMERICANS AMONG COLLEGE STUDENTS LIVING IN RESIDENCE HALLS
G. Frederick, E.C. Fitzhugh, D.L. Thompson, R. Hardin, D. Wolff.
Dept. of Kinesiology, Recreation, and Sport Studies, University of Tennessee
- O14 11:30 CAN THIRST ACCURATELY PREDICT HYDRATION STATUS IN DAILY LIFE?
M. Millard-Stafford, S. Espinoza, N.K. O’Dea, D.M. Wendland, J. Kressler, M.E. Buyckx, *Georgia Institute of Technology*
- O15 11:45 ASSESSMENT OF DIETARY BEHAVIORS, BODY COMPOSITION, AND CARDIOVASCULAR DISEASE RISK AMONG COLLEGE CLUB RUGBY TEAM
C.R. MacDougall, G. Balilionis, S. Nepocatysh. *Dept. of Exercise Science, Elon University*
- O16 12:00 EFFECT OF 2-WEEKS MILLED CHIA SEED SUPPLEMENTATION ON PERFORMANCE IN ENDURANCE ATHLETES
D.A. Dew, P.G. Krasen, D.C. Nieman, *Appalachian State University*
- O17 12:15 TIME COURSE OF HORMONAL RESPONSES WITH TWO DIFFERENT MODELS OF DAILY UNDULATING PERIODIZATION IN TRAINED POWERLIFTERS
M.C. Zourdos, M.J. Ormsbee, E. Jo, A.V. Khamoui, B.S. Park, S.R. Lee, L.B. Panton, FACSM, D.D. Thomas, E. Ward, R.J. Contreras, and J.S. Kim. *Florida Atlantic University, Florida State University*

12:00-1:15 **PAST PRESIDENT’S LUNCH (Regency Ballroom F)**

12:30-6:15 **CLINICAL TRACK (Crepe Myrtle)**
Current Concepts and Management of Cartilage Injuries of the Shoulder, Hip, and Knee

12:30-12:45 Welcome and Announcements
W. Franklin Sease, MD

12:45-1:15 Cartilage Basic Science
Brad Winter, MD

1:15-1:45 Evaluation of the Hip in the Active Patient

1:45-2:15 Shoulder Evaluation in the Overhead Athlete
Chuck Thigpen PhD, PT, ATC

2:15-2:30 Break

Fellow Case Presentations

2:30-2:50 Case 1

2:50-3:10 Case 2

3:10-3:30 Case 3

- 3:30-4:15 Labral Tears of the Shoulder
Keith Lonergan, MD
- 4:15-5:00 Chondral Injuries of the Knee
Doug Wyland, MD
- 5:00-5:15 Break
- 5:15-5:45 Diagnostic Musculoskeletal Ultrasound
Kevin Burroughs, MD
- 5:45-6:30 Discussion
- 6:30-8:30 Reception (**Redbud**)
-

1:30-2:30 **BASIC SCIENCE LECTURE**
"Aerobic Exercise in the Prevention and Treatment of Arterial Aging"
Douglas R. Seals, Ph.D.
 College Professor of Distinction
 Department of Integrative Physiology
 University of Colorado
 Chair: Larry Durstine, PhD, University of South Carolina
(Continental Ballroom)

2:30-2:45 **BREAK**

2:45-4:15 **SYMPOSIUM**
 S7
 SPRINT INTERVAL TRAINING: A VIABLE ALTERNATIVE TO IMPROVE HEALTH AND FITNESS
 E.C. Freese, N.H. Gist, J.L. Trilk and K.J. Cureton, FACSM. *Department of Kinesiology, University of Georgia, School of Medicine, University of South Carolina*
 Chair: Andy Shanley, PhD, Appalachian State University
(Regency Ballroom A)

2:45-4:15 **TUTORIAL**
 T9
 WATER OR SPORTS DRINK DURING ENDURANCE EXERCISE. WHO'S KOOL AID ARE YOU DRINKING?
 W. S. Black. *Department of Kinesiology and Health Promotion, University of Kentucky*
 Chair: John Petrella, PhD, Samford University
(Redbud A & B)

2:45-4:15 **POSTER PRESENTATIONS III (P56-P84)**
 Authors Present 2:45-3:45
 Competitive Athletes, Epidemiology and Preventative Medicine, Exercise Evaluation/Clinical, Research Design and Statistics
 Chair: Amber Kinsey, Florida State University
(Teal)

P56 EFFECT OF CHALK USE ON OPEN AND PINCH GRIP PULL-UPS
 N.T. Bacon¹, J. Wingo, M. Richardson, T. Pangallo, G. Ryan, and P. Bishop. *Sport Science Department, Belmont University, Department of Kinesiology, University of Alabama*

- P57 THE EFFECTS OF WHOLE-BODY VIBRATION ON VERTICAL JUMP HEIGHT AND PEAK POWER
N.C. Dabbs, H. Chander, J.A. Lundahl, C.R. Allen, & J.C. Garner, *Applied Biomechanics Laboratory, University of Mississippi*
- P58 FORCE PRODUCTION SYMMETRY IN NCAA DIVISION I SOCCER PLAYERS
C.A. Bailey, K. Sato, R.P. Alexander, C.Y. Chiang, H.S. Gray, S. Mizuguchi, & M.H. Stone. *Department of Exercise & Sport Science, East Tennessee State University*
- P59 A COMPARISON OF TWO DIFFERENT TREADMILL PROTOCOLS IN MEASURING MAXIMAL OXYGEN CONSUMPTION IN HIGHLY-TRAINED DISTANCE RUNNERS
R. A. Vanhoy, C.L. Battaglini, E.W. Shields, R.G. McMurray, FACSM. *Department of Exercise and Sport Science, University of North Carolina at Chapel Hill*
- P60 DIFFERENCES IN FACTOR ORGANIZATION BETWEEN MEASURES OF ISOMETRIC STRENGTH IN KEY DEADLIFT POSITIONS
G. K. Beckham, T. J. Suchomel, K. Sato, M. H. Stone *Center of Excellence for Sport Science and Coach Education, Department of Exercise and Sport Sciences, East Tennessee State University*
- P61 THE EFFECTS OF A 10 KM RUN AND 30 KM CYCLING TIME-TRIAL ON VENTILATORY THRESHOLD DURING THE FINAL RUNNING LEG OF AN ITU DUATHLON IN HIGHLY-TRAINED MULTI-SPORT ATHLETES
N. Berry, C.L. Battaglini, E. W. Shields, and A.C. Hackney FACSM. *Department of Exercise and Sport Science, University of North Carolina*
- P62 DETERMINING PHYSIOLOGICAL DEMANDS IN AN OPEN-SKILLED SPORT: A CASE STUDY INVESTIGATING WOMEN'S LACROSSE PRACTICE
A.J. Shreckhise, B. Frost, and MP Rearick. *Department of Health and Human Performance, Roanoke College*
- P63 MOUTHPIECE USE IMPROVES X-FACTOR IN COLLEGIATE GOLFERS
J.C. Tretera, D.P. Garner, T.P. Scheett, E.M. McDivitt, W.D. Dudgeon. *Department of Health, Exercise and Sport Science, The Citadel, Department of Health and Human Performance, College of Charleston*
- P64 ASSESSMENT OF THE EFFECTS OF CONTROLLED FREQUENCY BREATHING ON LACTATE LEVELS IN SWIMMING
M. Key. & J. Bunn, *Campbell University*
- P65 A TWENTY-YEAR EPIDEMIOLOGICAL ANALYSIS OF FITNESS AND CHOLESTEROL DATA TRENDS IN COLLEGE STUDENTS
M.A. Jones, M.S. Beyers, and S.N. Pearman, III. *Department of Health Sciences, Furman University*
- P66 EFFECT OF MEETING PHYSICAL ACTIVITY GUIDELINES AND BODY MASS INDEX ON FASTING PLASMA GLUCOSE LEVEL AMONG U.S. ADULTS
R. Connors, Y. Kim, N. Weatherby, J. Coons, and J. Caputo. *Department of Health and Human Performance, Middle Tennessee State University*

- P67 A SINGLE NUCLEOTIDE POLYMORPHISM (SNP) IN INSULIN-LIKE GROWTH FACTOR (IGF1) WAS ASSOCIATED WITH LEG STRENGTH IN AFRICAN AMERICAN WOMEN
X. He, G.R. Hunter, B.A.Gower, and J.R. Fernandez. *Departments of Nutrition Science, Human Studies, Biostatistics, University of Alabama at Birmingham*
- P68 FACTORS RELATED TO PARTNER INVOLVEMENT IN THE DEVELOPMENT OF THE U.S. NATIONAL PHYSICAL ACTIVITY PLAN
D. Bornstein, C. Carnoske, R. Tabak, J. Maddock, S. Hooker, K. Evenson, R. Pate. *University of South Carolina, Washington University, University of Hawaii, Arizona State University, University of North Carolina Chapel Hill*
- P69 AGREEMENT BETWEEN SELF-REPORTED AND OBJECTIVELY-MEASURED SITTING TIME AMONG COLLEGE FRESHMEN
J.M. Lucas, M.D. Schmidt, B.M. Das, E.M. Evans, FACSM. *Department of Kinesiology, University of Georgia*
- P70 REDUCING SEDENTARY BEHAVIOR IN A UNIVERSITY LIBRARY
H. Maeda and A. Quartiroli. *Department of Kinesiology, East Carolina University*
- P71 KIDS CAN BIKE! A PARKS AND RECREATION PROGRAM TO PROMOTE YOUTH CYCLING
J. Chandler, Dr. D. Bassett Jr, Dr. E. Fitzhugh, Dr. S. Waller, *University of Tennessee*
- P72 HEALTHY LIVING INTERVENTIONS IN A RESIDENTIAL GIRL SCOUT CAMP
S.B. Diehl, C.J. Ketcham, D.M. Duffy, *Elon University*
- P73 PHYSICAL ACTIVITY LEVELS OF 7TH AND 8TH GRADERS PARTICIPATING IN A STUDIO-BASED LEARNING SUMMER CAMP
K.D. Cooksey, M.E. Holmes, D. K. Brocato. *Department of Kinesiology, Department of Leadership and Foundations, Mississippi State University*
- P74 THE STRENGTH ASSESSMENT STUDY: UNDERSTANDING VARIABILITY IN MUSCULAR ENDURANCE IN OLDER ADULTS
G.J. Grosicki, A.P. Marsh. *Department of Health and Exercise Science, Wake Forest University*
- P75 THE EFFECT OF EXCESS BODY MASS ON EXCESS POST-EXERCISE OXYGEN CONSUMPTION AT PREFERRED WALKING PACE
C. Morris, M. Loftin, S. Owens, D. Waddell, and M. Bass. *Department of Health, Exercise Science, and Recreation Management, University of Mississippi*
- P76 THE IMPACT OF LOAD ON PERFORMANCE VARIABLES DURING POWER CLEAN VARIATIONS
T.J. Suchomel, G.K. Beckham, and G.A. Wright. *Center of Excellence for Sport Science and Coach Education, Department of Exercise and Sport Science, East Tennessee State University*
- P77 EXERCISE BLOOD PRESSURE IN ADOLESCENCE AND BLOOD PRESSURE FIVE YEARS LATER IN PERSONS BORN VERY LOW BIRTH WEIGHT
J.L. Crumpler, P.A. Nixon, L.K. Washburn. *Department of Health and Exercise Science and Pediatrics, Wake Forest University*

- P78 IMPORTANCE OF PHYSICAL ACTIVITY AND WEIGHT MANAGEMENT FOR BREAST
CANCER SURVIVORS
S.E. Yocke, S.L. Mihalko, M.S. Haynie, E.G. Levine, G. Russell. *Department of
Health and Exercise Science, Wake Forest University*
- P79 THE EFFECT OF CYCLING EXERCISE INTENSITY ON COGNITIVE FUNCTION
UTILIZING A MODIFIED STROOP TEST
W.J. Perez, K.J. Kellernan, C.R. Grieco, A.G. Thompson, J.D. Branch, D.P. Swain.
*Department of Human Movement Sciences, Old Dominion University, Department of
Health and Physical Education, Glenville State College*
- P80 RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND BLOOD PRESSURE IN YOUNG
ADULTS BORN WITH VERY LOW BIRTH WEIGHT
A. Wichterman, P.A. Nixon, J. Crumpler, L.K. Washburn. *Department of Health and
Exercise Science and Pediatrics, Wake Forest University*
- P81 EMG ACTIVITY OF CLOSED KINETIC CHAIN AND OPEN KINETIC CHAIN
EXERCISES
H. Shore, W. Nabors, A.P. Jung, FACSM, J.K. Petrella, FACSM, *Samford University*
- P82 STRENGTH DIFFERENCES BETWEEN DOMINANT AND NON-DOMINANT LEGS AND
THE EFFECTS ON BALANCE IN ATHLETES VS NON-ATHLETES
J. McCulley, E. Westray, R.W. Hensarling, J.K. Petrella and A.P. Jung. *Department of
Kinesiology and Nutrition Sciences, Samford University*
- P83 FOOD DESERTS: ENVIRONMENTAL ASSESSMENT OF FOOD RETAILERS IN
ROCK HILL, SC
S. Igozee and J.R. Wojcik. *Exercise Science Program, Winthrop University*
- P84 IMPROVING HUMAN ANATOMY AND PHYSIOLOGY GRADES WITH
ELECTRONIC LEARNING
K.A. Young, R.W. Boyce, FACSM, B. Nixon, H. League, *University of North
Carolina Wilmington, Pearson Education*
- 3:00-4:00 **TUTORIAL**
- T10 A NEW TOOL TO ENHANCE EXERCISE PRESCRIPTION – THE FEELING SCALE
W.R. Bixby and E.E. Hall. *Department of Exercise Science, Elon University*
Chair: Danielle Wadsworth, PhD, Auburn University
(Regency Ballroom B & C)
- T11 GO THE DISTANCE: DEVELOP AN EXPERIENTIAL SPORTS PHYSIOLOGY AND
MARATHON COURSE
L.K Stewart and M.G. Flynn. *School of Kinesiology, Louisiana State University,
Department of Health and Human Performance, College of Charleston*
Chair: Lee Franco, PhD, Virginia Commonwealth University
(Regency Ballrooms E & F)
- 3:00-4:15 **ORAL FREE COMMUNICATIONS IV**
Chronic Disease and Disability, Epidemiology & Preventative Medicine
Chair: Heidi Kluess, PhD, Auburn University
(Regency Ballroom D)

- 018 3:00 THE ACUTE EFFECT OF SHORT-TERM BREATHING EXERCISES ON SYMPATHOVAGAL BALANCE IN TYPE 2 DIABETES
C.R. Grieco, S.R. Colberg, C.T. Somma, A.I. Vinik and A.G. Thompson
Dept. of Human Movement Sciences, Old Dominion University, School of Medical Laboratory and Radiation Sciences, Old Dominion University, Strelitz Diabetes Research institute, Norfolk, VA
- 019 3:15 EFFECTS OF RESISTANCE EXERCISE ON LIMB VOLUMES IN BREAST CANCER SURVIVORS WITH OR WITHOUT LYMPHEDEMA
E. Simonavice, P.Y. Liu, J.Z. Ilich, J.S. Kim, B. Arjmandi, L.B. Panton, *Georgia College, Dept. of Nutrition, Food & Exercise Sciences, Florida State University*
- 020 3:30 DISABILITY AWARENESS IN STUDENTS TAKING KINESIOLOGY CLASSES
H.J. Young, M.L. Erickson, M.A. McWhirter, A.D. Goode, and K.K. McCully, FACSM. *Kinesiology Dept., University of Georgia*
- 021 3:45 THE ACCURACY OF SIMULATED INDOOR TIME TRIALS USING A COMPUTRAINER AND GPS DATA
W.W. Peveler, *Northern Kentucky University*
- 022 4:00 VOLUME LOAD AND TRAINING INTENSITY WITH AND WITHOUT EXERCISE DISPLACEMENT
W.G. Hornsby, J.A. Gentles, J.A. Miller and M.H. Stone, *Dept. of Exercise and Sport Sciences, Center of Excellence for Sport Science and Coach Education, East Tennessee State University*
- 4:30-5:30 **STUDENT BOWL**
Moderator: Judith Flohr, James Madison University
(Continental Ballroom)
- 5:45-7:15 **SEACSM GRADUATE STUDENT FAIR (Regency Ballrooms A, B, & C)**

SATURDAY February 16, 2013

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

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

7:30-12:15 **CLINICAL TRACK PROGRAM (Crepe Myrtle)**
Current Concepts and Management of Cartilage Injuries of the Shoulder, Hip, and Knee

7:30-7:45 Welcome and Announcements
W. Franklin Sease, MD

7:45-8:45 MRI Imaging of Cartilage Injuries-Knee, Shoulder, Elbow
Jeff Wienke, MD

8:45-9:30 Hip FAI-Labral and Chondral Injuries
Jason Folk, MD

Fellow Case Presentations

9:30-9:45 Case 4

9:45-10:00 Case 5

10:00-10:15 Case 6

10:15-10:30 Break

10:30-11:20 Ultrasound guided Injection Techniques
Kevin Burroughs, MD

Fellow Case Presentations

11:20-11:35 Case 7

11:35-11:50 Case 8

11:50-12:10 Case 9

12:10-12:15 Voting for Best Case Presentation & Closing Remarks

8:00-9:00 **TUTORIAL**

T12 NUTRITIONAL CONSIDERATIONS FOR EXERCISE IN HOT ENVIRONMENTS
D.M. Morris. *Department of Health Leisure & Exercise Science, Appalachian State University*
Chair: Mark Loftin, PhD, University of Mississippi
(Regency Ballroom A)

T13 BEYOND THE LECTURE: ACTIVE LEARNING IN EXERCISE SCIENCE
Y. Feito, B.B. Parr, K. Reich, *Kennesaw State University, University of South Carolina Aiken, High Point University*
Chair: Chris Harnish, PhD, Virginia Commonwealth University
(Regency Ballrooms E & F)

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

Psychology/Psychiatry/Behavior
Chair: Wally Bixby, PhD, Elon University
(Redbud A & B)

O23 8:00 MOTIVATION FOR PARTICIPATING IN CORPORATE WELLNESS PROGRAMS
R.L. Hardin, R.A. Zakrajsek, and B.F. Powers, *Kinesiology, Recreation, and Sport Studies, University of Tennessee*

O24 8:15 TAILORED TEXT MESSAGING TO SUPPORT PHYSICAL ACTIVITY IN FEMALE UNDERGRADUATE STUDENTS
D.D. Wadsworth, N.M. Gell, and J. Carignan. *Dept. of Kinesiology, Auburn University*

O25 8:30 THE RELATIONSHIP BETWEEN EXECUTIVE FUNCTION, BODY COMPOSITION AND STRENGTH IN OLDER ADULTS: FITNESS OR FATNESS
T.A. Esmat, D.B. Mitchell, and J.R. McLester, FACSM. *Dept. of Exercise Science and Sport Management, Kennesaw State University*

O26 8:45 PHYSICAL ACTIVITY POSITIVELY AFFECTS PHYSICAL DIMENSIONS OF HEALTH RELATED QUALITY OF LIFE IN OLDER ADULTS
C.L. Ward, A.E. O'Brien, E.M. Evans, FACSM. *Dept. of Kinesiology, University of Georgia*

O27 9:00 INDIVIDUAL-AND SOCIAL-LEVEL CORRELATES OF ADOLESCENT PHYSICAL ACTIVITY
J.M. Garcia, J.R. Sirard, and D. Neumark-Sztainer, *University of Virginia*

8:00-9:45

POSTER PRESENTATION IV (P85-P116)

Authors present 8:00-9:00.

Fitness/Testing/Assessment

Chair: Douglas Oberlin, University of North Carolina at Greensboro

(Teal)

- P85 COMPARISON OF ARM ERGOMETRY MAXIMAL OXYGEN CONSUMPTION TO TREADMILL MAXIMAL OXYGEN CONSUMPTION IN FEMALES
C.M. DeWitt, S.O. Dunbar, C.R. Young, R.M. Bagnal, B.A. Gantt, and J.W. Craps. *Exercise Science, University of South Carolina Aiken*
- P86 EFFECTS OF GENDER AND STRETCHING ON ISOKINETIC FORCE OUTPUT
K.M. Eaton, S.B. Mitchell, M.M. Godwin, D.I. Gregg, J.E. Nalley, A.K. Sinka, E.A. Walker, T.J. Leszczak, and L.B. Mize. *Department of Health and Human Performance, Austin Peay State University, Auburn University*
- P87 DIFFERENCES BETWEEN TWO TYPES OF STRETCHING PROTOCOLS ON ISOKINETIC FORCE OUTPUT
A.K. Sinka, E.A. Walker, K.M. Eaton, M.M. Godwin, D.I. Gregg, S.B. Mitchell, J.E. Nalley, T.J. Leszczak and L.B. Mize. *Department of Health and Human Performance, Austin Peay State University, Auburn University*
- P88 IN-SCHOOL PHYSICAL ACTIVITY AMONGST FOURTH-GRADE STUDENTS IN NORTH MISSISSIPPI
N. van Blerk and S.G. Owens. *Department of Health, Exercise Science, and Recreation Management, University of Mississippi*
- P89 THE ACUTE EFFECT OF A PERFORMANCE MOUTHPIECE ON MEASURES OF STRENGTH & POWER
J. Lundahl, C.R. Allen, N.C. Dabbs, H. Chander, & J.C. Garner. *Applied Biomechanics Laboratory, University of Mississippi*
- P90 EFFECTS OF GENDER AND STRETCHING ON HAM/QUAD RATIOS IN COLLEGE-AGE ADULTS
D.I. Gregg, M.M. Godwin, K.M. Eaton, S.B. Mitchell, J.E. Nalley, A.K. Sinka, E.A. Walker, T.J. Leszczak, and L.B. Mize. *Department of Health and Human Performance, Austin Peay State University, Auburn University*
- P91 EVALUATION OF POWER IN CROSSFIT VS. WEIGHT TRAINED INDIVIDUALS
M.A. Schafer, S.W. Arnett, G. Sobrero, T.S. Lyons, J.W. Navalta, W.J. Stone, S.D. Bean, F.T. Esslinger, K. Esslinger. *Department of KRS, Western Kentucky University*
- P92 MUSCULAR ENDURANCE, AGILITY, AND FLEXIBILITY IN CROSSFIT VS. WEIGHT TRAINED INDIVIDUALS
W.J. Stone, M.A. Schafer, G. Sobrero, S.W. Arnett, T.S. Lyons, J.W. Navalta, S.D. Bean, F.T. Esslinger, K. Esslinger. *Department of KRS, Western Kentucky University, Department of Kin & Nutr, University of Nevada*
- P93 ASSESSMENT OF 1RM STRENGTH BETWEEN CROSSFIT AND RESISTANCE TRAINED INDIVIDUALS
S.W. Arnett, G. Sobrero, M.A. Schafer, T.S. Lyons, J.W. Navalta, W.J. Stone, S.D. Bean, F.T. Esslinger, & K. Esslinger. *Department of Kinesiology, Recreation, & Sport, Western Kentucky University, Department of Kinesiology & Nutrition, University of Nevada*

- P94 EFFECTIVENESS OF THE LIFE IMPROVING FUNCTIONAL EXERCISE (LIFE) PROGRAM ON PHYSIOLOGICAL AND PERFORMANCE VARIABLES IN ELDERLY ADULTS
D.G. Falls, T.S. Lyons, M.A. Schafer, K.F. Durham. *Barren River District Health Department, Department of Kinesiology, Recreation, and Sport, Western Kentucky University*
- P95 COMPARISON OF AEROBIC AND ANAEROBIC POWER IN CROSSFIT AND RESISTANCE TRAINED INDIVIDUALS
G. Sobrero, M.A. Schafer, S.W. Arnett, T.S. Lyons, J.W. Navalta, W.J. Stone, S.D. Bean, F.T. Esslinger, K. Esslinger. *Department of KRS, Western Kentucky University, Department of Kin & Nutr, University of Nevada*
- P96 PULMONARY OXYGEN UPTAKE OFF-KINETICS AND FITNESS IN OBESE ADOLESCENTS
M. K. Bowen, R.L. Franco, R. Arena, H.L. Caslin, R.K. Evans, E.P. Wickham. *Health and Human Performance, Virginia Commonwealth University*
- P97 EFFECT OF A WEIGHTED VEST WARM-UP ON ATHLETIC PERFORMANCE IN COLLEGIATE ATHLETES
J. Wolford, S. Thompson, A.P. Jung, FACSM, J.K. Petrella, FACSM, *Samford University*
- P98 EFFECT OF AN ACUTE, DYNAMIC WARM-UP ON IMMEDIATE FLEXIBILITY AND THE ABILITY TO MAINTAIN FLEXIBILITY OVER TIME
R.L. Gahan, S.M. Brandon, J.K. Petrella and A.P. Jung. *Department of Kinesiology and Nutrition Science, Samford University*
- P99 EXERCISE INTENSITY IN COLLEGE STUDENTS PERFORMING WII JUST DANCE
K. Abraham, V.R. Elrod, *Transylvania University*
- P100 VALIDATION OF THE OMRON HJ-151 PEDOMETER DURING FREE-LIVING PHYSICAL ACTIVITY IN YOUTH
S. Ishikawa, J.D. Reece, RMD. Carter, RT. Conners, LL. Killen, M. Kang, FACSM, and D.W. Morgan, FACSM. *Center for Physical Activity and Health in Youth, Middle Tennessee State University*
- P101 THE EFFECT OF CHIROPRACTIC LUMBOSACRAL ADJUSTMENTS ON ISOKINETIC STRENGTH OF THE KNEE EXTENSORS AND FLEXORS
G. Sanders, S. Black, A. Nitz, R. Shapiro, B. Symons and J.W. Yates. *Department of Kinesiology and Health Promotion, University of Kentucky*
- P102 THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND SHOOTING PERFORMANCE IN A TACTICAL PISTOL QUALIFIER
A.G. Thompson, D.P. Swain FACSM, J.D. Branch FACSM, R.J. Spina FACSM, C.R. Grieco. *Department of Human Movement Sciences, Old Dominion University*
- P103 PHYSICAL ACTIVITY AND FITNESS LEVELS OF HIGH SCHOOL STUDENTS PARTICIPATING IN A NOVEL PHYSICAL EDUCATION CLASS
A. Van Grinsven, and D.P. Coe, *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*

- P104 AN EXAMINATION OF MAXIMAL AEROBIC CAPACITY ON A BIKE VERSUS A TREADMILL IN ACTIVE INDIVIDUALS
A.P. Schneider, C.N. Hultquist, M. Seitler, J.R. McLester. *Department of Exercise Science and Sport Management, Kennesaw State University*
- P105 CLASSIFICATION ACCURACY OF THE WRIST-WORN GENEA ACCELEROMETER DURING STRUCTURED ACTIVITY BOUTS
W.A. Welch, D.R. Bassett, FACSM, D.L. Thompson, FACSM, P.S. Freedson, FACSM, J.W. Staudenmayer, D. John, J.A. Steeves, S.A. Conger, T. Ceaser, C.A. Howe, J.E. Sasaki, and E.C. Fitzhugh. *Department of Kinesiology, Recreation, & Sport Studies, University of Tennessee, Department of Kinesiology, University of Massachusetts, Department of Mathematics, University of Massachusetts*
- P106 ASSESSMENT OF PHYSICAL ACTIVITY LEVELS OF ELEMENTARY SCHOOL STUDENTS PARTICIPATING IN THE MORNINGS IN MOTION PROGRAM
A.M. Howard, D.P. Coe, D.R. Bassett, D.L. Thompson. *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*
- P107 RELIABILITY OF A SHORT, HIGH-INTENSITY EXERCISE TEST TO EXHAUSTION
R.K. Beloni and D.M. Morris. *Department of Health, Leisure, and Exercise Science, Appalachian State University*
- P108 EFFECTS OF A 12-WEEK JUST DANCE® TRAINING STUDY ON FITNESS AND HEALTH IN YOUNG ADULTS
T. Moore, J.C. Rupp, W.R. Thompson & L.J. Brandon. *Department of Kinesiology & Health, Georgia State University*
- P109 ELECTROMYORAPHC COMPARISON OF THE PVC PUSHUP AND THE PERFECT PUSHUP
T.L. Norman, J.E. Schoffstall, D.A. Titcomb, and J.M. Lease, *Department of Health Professions, Liberty University*
- P110 ELECTROMYOGRAPHIC COMPARISON OF THE PUSH-UP AND THE RING PUSH-UP
J.M. Lease, J.E. Schoffstall, D.A. Titcomb, and T.L. Norman, *Department of Health Professions, Liberty University*
- P111 THE EFFECTS OF MINIMALISTIC FOOTWEAR ON SPEED AND AGILITY
S. Jones, D. Cecchini, J. Eaton, H. Sutton, S. Magee, and J.E. Schoffstall, *Department of Health Professions, Liberty University*
- P112 INFLUENCE OF FITNESS ON CHILDREN'S PHYSICAL ACTIVITY ACROSS THE SEGMENTED SCHOOL DAY
M.H. Gralla. and B.L. Alderman. *University of South Carolina, Rutgers University*
- P113 ENERGY EXPENDITURE OF A HIGH INTENSITY CROSSFIT WORKOUT COMPARED TO A TRADITIONAL AEROBIC WORKOUT
L.M. Pulliam and M.J. McKenzie. *Department of Human Performance and Sport Sciences, Winston Salem State University*
- P114 NO INFLUENCE OF BAREFOOT RUNNING ON RUNNING ECONOMY
J.T. Repshas, M.M. Koehler, E.E. Hawkins, K.L. Hines and M.G. Flynn. *Department of Health and Human Performance, College of Charleston*

- P115 VARIABILITY IN RESISTANCE TRAINING REPETITIONS ACHIEVED AT SPECIFIC WORKLOADS BY GENDER
M. Anton, C. Johnson, C. Williams and P. Magyari. *Brooks College of Health, University of North Florida*
- P116 THE EFFECTS OF CROSSFIT ON FITNESS COMPARED TO TRADITIONAL SEPARATED CARDIORESPIRATORY AND RESISTANCE TRAINING
J.S. Smalley, P.Y. Van Dyke, J.K. Petrella, A.P. Jung. *Department of Kinesiology and Nutrition Science, Samford University*
- 9:00-10:15 **HENRY J. MONTOYE SCHOLAR LECTURE**
“Moving Children: Research to Develop Healthy Lives”
Dianne Stanton Ward, EdD, FACSM
Professor Department of Nutrition
Director of Doctoral Program
Associate Director of the Diet, Physical Activity, and Body Composition Core of the Nutrition Obesity Research Center (NORC)
University of North Carolina at Chapel Hill
Chair: Dr. Russ Pate, University of South Carolina, Past SEACSM President, 1990 Montoye Scholar
(Continental Ballroom)
- 10:15-10:30 **BREAK**
- 10:30-12:00 **SYMPOSIA**
- S8 FACTORS IMPACTING STRETCH-SHORTNING CYCLE POTENTIATION AND RUNNING ECONOMY
G.R. Hunter, J.P. McCarthy. *University of Alabama at Birmingham*
Chair: Kevin Zwetsloot, PhD, Appalachian State University
(Regency Ballrooms B & C)
- S9 ACADEMIC MENTORING FOR CAREER DEVELOPMENT
A. Bosak, B. Riemann, and D.D. Pascoe. *Department of Health Sciences, Armstrong Atlantic State University, Department of Kinesiology, Auburn University*
Chair: Scott Owens, PhD, University of Mississippi
(Redbud A & B)
- 10:30-11:30 **TUTORIAL**
- T14 TRIALS AND TRIBULATIONS OF A SPORTS DIETITIAN
A. Timberlake MS, RD, CSSD. *Sport Health Science Department, Life University*
Chair: Geoffrey Hudson, PhD, George Washington University
(Regency Ballrooms E & F)
- 10:30-12:00 **ORAL FREE COMMUNICATIONS VI**
028-033 Biomechanics/Gait/Balance, Exercise Evaluation
Chair: Wendi Weimar, Auburn University
(Regency Ballroom D)
- O28 10:30 EFFECTS OF SHOULDER FATIGUE ON SCAPULAR KINEMATICS IN PITCHERS
H.A. Plummer, G.D. Oliver, T.E. Holt. *Dept. of Kinesiology, Auburn University*
- O29 10:45 EFFECT OF FATIGUE ON ELBOW AND SHOULDER KINEMATICS IN YOUTH BASEBALL PITCHERS
T.E. Holt, H.A. Plummer, G.D. Oliver. *Dept. of Kinesiology, Auburn University*

- O30 11:00 HIP AND KNEE JOINT ANGLES AFFECT RECTUS FEMORIS HIP FLEXION TORQUE
M. Reid, D. Landin, and M. Thompson. *School of Kinesiology, Louisiana State University*
- O31 11:15 MUSCLE ACTIVATION TRIGGERS FOR GAIT TRANSITIONS IN UNILATERAL, TRANSTIBIAL AMPUTEES
T.L. Norman, T.K. Evans, and Y-H. Chang, *School of Applied Physiology, Georgia Institute of Technology*
- O32 11:30 ACCURACY OF PHYSICAL ACTIVITY MONITORS IN PERSONS WITH CLASS III OBESITY
M.G. Browning, D.R. Bassett, Jr., D.L. Thompson, E.C. Fitzhugh, and G.C. Petty. *Dept. of Kinesiology, Recreation, and Sport Studies, University of Tennessee*
- O33 11:45 ELEVATED CIRCULATING TNF- α IN OLDER WOMEN WITH NO GAINS IN LEAN MUSCLE MASS FOLLOWING 16-WEEKS OF EXERCISE TRAINING
G. Fisher, J.P. McCarthy, C. S. Bickel and Gary R. Hunter
Dept. of Human Studies, and Dept. of Physical Therapy, University of Alabama at Birmingham
- 10:15-12:00 **POSTER PRESENTATION V (P117-P148)**
Authors Present 10:15-11:15
Growth, Development & Aging, Psychology/Psychiatry/Behavior, Research Design and Statistics, Cellular Regulatory Mechanisms
Chair: Katie Bowen, Virginia Commonwealth University
(Teal)
- P117 THE ACUTE EFFECTS OF DEADLIFTING AND DEADLIFTING WITH RESISTANCE BANDS ON VERTICAL JUMP
J. Lowes, B. Lewellyn, A. Bradley, F. Bah, J. Ferguson, and J. Schoffstall
Department of Health Professions, Liberty University
- P118 THE EFFECTS OF STRETCHING ON VERTICAL JUMP
D. Titcomb, B. Nelson, K. Dahl, M. Dorholt, S. DeCeglie, P. Kelly, and J. Schoffstall,
Department of Health Professions, Liberty University
- P119 CORRELATES OF SCHOOL-DAY PHYSICAL ACTIVITY OF YOUNG CHILDREN
S. W. Logan, L.E. Robinson, K. Palmer. *University of Delaware, Auburn University*
- P120 NUTRITION AND PHYSICAL ACTIVITY PRACTICES AND POLICIES IN RURAL AREA CHILD CARE CENTERS
H. Oakley and R. Battista. *Appalachian State University*
- P121 THE EFFECT OF PHYTOECDYSTEROID TREATMENT ON NOTCH AND WNT SIGNALING IN AGED SKELETAL MUSCLE
S.T. Arthur, K.A. Zwetsloot, M.M. Lawrence, D.C. Nieman, M.A. Lila, M. Grace, I.D. Cooley, C. Worley, A. Gross, R.A. Shanely. *University of North Carolina-Charlotte, Dept of Kinesiology, Laboratory of Systems Physiology, Charlotte, NC, Appalachian State University, Health, Leisure, Exercise Science, Human Performance Laboratory, NC Research Campus, Kannapolis, NC, Plants for Human Health Inst, NC State University, NC Research Campus*
- P122 EFFECT OF LOW VOLUME AEROBIC EXERCISE ON EXECUTIVE FUNCTION IN OLDER ADULTS
K. Grater and J. Davis, *Department of Exercise Science, Elon University*

- P123 DIFFERENTIAL EFFECTS OF CONTINUOUS VERSUS DISCONTINUOUS AEROBIC EXERCISE ON HEMODYNAMICS
M. Clarke, M.J. Landram, A.C. Utter, S.R. McAnulty, C. Baldari, L. Guidetti, S.R. Collier. *Department of Health, Leisure, and Exercise Science, Appalachian State University*
- P124 THE EFFECT OF MUSIC AS A MOTIVATIONAL TOOL ON ISOKINETIC CONCENTRIC PERFORMANCE IN ADULT MALES AND FEMALES
M.M. Godwin, R.M. Hopson, C.K. Newman, and T.J. Leszczak. *Health and Human Performance Department, Austin Peay State University, Department of Kinesiology, Auburn University*
- P125 PSYCHOLOGICAL PREDICTORS OF COMPENSATORY RESPONSES TO A STRUCTURED EXERCISE PROGRAM
R.M. Acitelli, A.D. Gipson, E.M. Evans, P.J. O'Connor, M.D. Schmidt. *Department of Kinesiology, University of Georgia*
- P126 ATTITUDES TOWARD OBESITY AMONG UNDERGRADUATE EXERCISE SCIENCE MAJORS AND NON-MAJORS
D. Melton, K. Smith, T.K. Dail, and B. Swearingin. *Human Performance & Leisure Studies Department, North Carolina A&T State University*
- P127 THE EFFECT OF EXERCISE ON MECHANICAL PRESSURE PAIN THRESHOLD IN THE PRESENCE AND ABSENCE OF DELAYED-ONSET MUSCLE SORENESS
B.K. Tynes, A.R. Gonglach, D.E. Waddell, M. Loftin, and C.D. Black. *Department of Health, Exercise Science, and Recreation Management, University of Mississippi*
- P128 EXAMINING QUALITY OF LIFE AND HEALTH SATISFACTION FACTORS OF A MID-SOUTH UNIVERSITY POPULATION
T.S. Lyons, F.W. Gibson, J.C. Jackson, G. Sobrero Evans, S.W. Arnett, M.A. Schafer. *Department of Kinesiology, Recreation, and Sport, Western Kentucky University, Department of Student Affairs, University of Alabama*
- P129 CHILDREN'S ENJOYMENT OF PHYSICAL ACTIVITY AND PREFERENCE FOR THREE DIFFERENT SOCIAL CONDITIONS
G.J. Sanders, C.A. Peacock, M.L. Williamson, K. Wilson, A. Carnes, J.E. Barkley. *Northern Kentucky University, Nova Southeastern University, Kent State University*
- P130 FITNESS AND HR REACTIVITY TO MENTAL STRESS: IMPACT OF OBESITY
H. Caslin, M.K. Bowen, K. An, E.O. Acevedo, R.L. Franco. *Health and Human Performance, Virginia Commonwealth University*
- P131 FITNESS, FATNESS, AND DEPRESSION
K. Becofsky, X. Sui, D.C. Lee, and S.N. Blair. *Department of Exercise Science and Epidemiology/Biostatistics, University of South Carolina*
- P132 THE EFFECT OF SUBMAXIMAL ISOMETRIC EXERCISE TO FATIGUE ON MECHANICAL PRESSURE PAIN THRESHOLD IN THE FINGER
A.R. Gonglach, B.K. Tynes, D.E. Waddell, M. Loftin, and C.D. Black. *Department of Health, Exercise Science, and Recreation Management, University of Mississippi*

- P133 EXERCISE AND DIET INTERVENTION MAY IMPROVE STRESS CONTROL OVER EXERCISE OR DIET ALONE IN POSTMENOPAUSAL WOMEN
E.S. Edwards, L.E. Eidemiller, C.J. Womack, FACSM and J.A. Flohr, FACSM.
Department of Kinesiology, Morrison Bruce Center, James Madison University
- P134 ETHNIC DIFFERENCES IN THE CONSISTENCY OF ACCURACY OF PERCEIVED EXERTION
S.K. Sweatt, J. Roy, P.C. Chandler-Laney, G. Fisher, D. Brock, G.R. Hunter,
University of Alabama at Birmingham, University of Vermont
- P135 DOSE RESPONSE OF CLASSROOM EXERCISE BREAKS AND EDUCATIONAL OUTCOMES
E.K. Howie, R.R. Pate, *University of South Carolina*
- P136 RELATIONSHIP BETWEEN TEAM EFFICACY AND TEAM PERFORMANCE IN HIGH SCHOOL VOLLEYBALL PLAYERS
L. Shelley, J.R. Wojcik, C. Bowers, J. Marr. *Department of Physical Education, Sport & Human Performance, Winthrop University*
- P137 DIETARY INTAKE, BODY COMPOSITION AND FITNESS AMONG COLLEGE FEMALE ATHLETES DURING IN- AND OFF-SEASON
M. Hughes, C. Dicostanzo, K. Szabo, G. Balilionis, S. Nepocatyck. *Department of Exercise Science, Elon University*
- P138 PHYSICAL ACTIVITY AND HEALTHY EATING ENVIRONMENTAL AUDIT TOOLS IN CHILD AND YOUTH CARE SETTINGS: A SYSTEMATIC REVIEW
R. Ajja, J. Chandler, M. W. Beets. *Department of Exercise Science, University of South Carolina*
- P139 NUTRIENT INTAKE OF FEMALE COLLEGIATE TRACK AND FIELD ATHLETES
Crotts, L.M., Battista, R.A., and Benson, M.J. *Appalachian State University, University of Wisconsin – La Crosse*
- P140 COMMON NUTRITION MISCONCEPTIONS AMONGST NCAA STUDENT-ATHLETES
A.E. Marshall, T.A. Buckley. *Nutritional Feats, LLC, Statesboro, GA. and Department of Health and Kinesiology, Georgia Southern University*
- P141 EFFECTS OF 75 VERSUS 150% FLUID REPLACEMENT ON SUBSEQUENT MORNING HYDRATION STATUS AND 10-KM RUNNING PERFORMANCE
B.A. Davis, L.K. Thigpen, J.H. Hornsby, M.C. Stevenson, P.L. Riethmaier, J.M. Green, E.K. O’Neal. *Department of Health, Physical Education and Recreation, University of North Alabama, Department of Health and Human Performance, Middle Tennessee State University, Department of Kinesiology, University of Alabama, Department Human Movement Sciences, Old Dominion University*
- P142 THE EFFECT OF ACUTE BEETROOT JUICE SUPPLEMENTATION ON MUSCLE FATIGUE IN KNEE EXTENSOR EXERCISE
S.Y. Lee, M. G. Abel, T. B. Symons, D. T. Thomas, J.W. Yates. *Department of Kinesiology and Health Promotion, Department of Clinical Sciences, University of Kentucky*

- P143 EXOGENOUS SUPPLEMENTATION OF MELATONIN DOES NOT AFFECT 20 MILE CYCLING TIME TRIAL PERFORMANCE
K.J. Brandenberger, C.P. Ingalls, J.C. Rupp, J.A. Doyle. *Department of Kinesiology and Health, Georgia State University*
- P144 24-H FLUID BALANCE FOLLOWING A 1 H RUN IN COLLEGE AGE RUNNERS
C.R. Caufield, M.K. Cook, L.K. Thigpen, L.K. Greenhill and E.K. O’Neal.
Department of Health, Physical Education and Recreation, University of North Alabama
- P145 VARARIABILITY OF GLUTATHIONE IN WHOLE BLOOD FROM DAY TO DAY
M. McGuirk, R.S. Garten, A.H. Goldfarb, FACSM, *Kinesiology Department, University of North Carolina at Greensboro*
- P146 THE RELATIONSHIP BETWEEN CHILDREN’S ENVIRONMENTAL ACCESS TO PHYSICAL ACTIVITY OPPORTUNITIES AND PHYSICAL ACTIVITY LEVELS TO WEIGHT STATUS
C.M. Daly, D.D. Wadsworth, L.E. Robinson, A. Girard, *Auburn University, Auburn, Alabama*
- P147 CONDUIT ARTERY ADAPTATIONS TO TRAINING IN NOVICE MARATHON RUNNERS
N. Hafner, N. Luden, C. Greever, E. Albert, C. Womack, & M. Todd, *James Madison University, Harrisonburg, VA*
- P148 ASSOCIATION BETWEEN SERUM - SALIVARY CORTISOL RESPONSES TO VARYING INTENSITIES OF EXERCISE IN ENDURANCE-TRAINED MALES
J.M. Allen, C. Pearson, M.D. VanBruggen, C.L. Battaglini and A.C. Hackney,
Department of Exercise and Sport Science, University of North Carolina at Chapel Hill
- 12:00-2:00 **SEACSM LUNCHEON AND LECTURE**
“Stalking the 2 Hour Marathon?”
Michael J. Joyner, M.D.
Professor of Anesthesiology
Deputy Director for Research at the Mayo Clinic
Mayo Clinic
Presiding: Paul Davis, PhD, University of North Carolina at Greensboro,
SEACSM President
Speaker Introduction: Ed Acevedo, PhD, Virginia Commonwealth University,
SEACSM President-Elect
(Continental Ballroom)

*Tickets must be purchased by 5:00 PM on Friday.
- 2:00-4:00 **SEACSM EXECUTIVE BOARD MEETING (Board Room)**

PERCEPTUAL RESPONSES: SCALE DEVELOPMENT, EXERCISE APPLICATIONS AND MEDIATING FACTORS

J.M. Green, L.G. Killen, *University of North Alabama, Middle Tennessee State University*

T1

Perceived exertion involves subjective responses surrounding exercise. Perceptual responses represent a Gestalt with integrated sensory feedback, principally from the periphery, dictating the subjective estimation. Multiple variables are linked with perceptual responses and no single factor is universally dominant. RPE use reduces the necessity for monitoring objective physiological criteria during daily training. This tutorial will briefly introduce scale development from Borg's original RPE scale, and then applications of RPE. The principle uses of RPE include estimation of exercise intensity, of particular use for identifying impending fatigue during graded testing, and the RPE estimation-production paradigm, used for intensity prescription/regulation. With Session RPE, participants estimate overall exertion of an exercise bout ~20min into recovery. This tutorial will examine use of Session RPE for assessing overtraining. The recently developed Perceived Recovery Status scale allows an exerciser to estimate feelings of preparedness for a pending bout. This tutorial will discuss the factors which mediate perceptual responses before, during and after exercise; and examine Session RPE and Perceived Recovery Status for assessing overtraining/recovery; effectiveness and inconsistencies. The session will close with an overview of potential future research and discussion of concepts.

INCREASING YOUR N: STRATEGIES TO RECRUIT AND RETAIN PARTICIPANTS FOR YOUR RESEARCH PROJECTS

E.K. O'Neal and C.M. Laurent, *University of North Alabama, Bowling Green State University*

T2

Determining statistical power for an upcoming project is fairly simple process. However, finding enough reliable participants that fit your inclusion criterion is often another matter and at times a difficult and frustrating obstacle to overcome. These impediments often result in studies incorporating a sample of convenience that is comprised of graduate or undergraduate students within the investigator's department. Young investigators or experienced researchers working in a new location may often be unaware of avenues they can explore to maximize time spent recruiting participants. Long term research success can be greatly enhanced by creating a strong networking foundation and building a culture in your laboratory that promotes participation incorporating community and athletic team members. The purpose of this tutorial is to disseminate tips on how to recruit and manage your research participants. Emphasis will be placed on both general population and NCAA athletes. Topics will include; places to look off-campus, social media networking, creating an inviting laboratory environment, non-monetary compensation ideas, approaching and communicating with coaches and conducting research within NCAA guidelines.

GLENOHUMERAL JOINT MOTION INVOLVES THE WHOLE BODY, JUST ASK DARTFISH

W.H. Weimar, G.D. Oliver and J.H. Patel. *Department of Kinesiology, Auburn University*

T3

The glenohumeral joint is a unique structure that is a conduit for velocity from the lower extremity and torso to the forearm/hand. Dartfish is a powerful software tool for analyzing motion and can be invaluable in analyzing and assessing shoulder motions. While it is well understood that many motions of the upper extremity are actually whole body movements, recently attention has been paid to muscular synergies and sequencing of the whole body contributions to these motions. Therefore, the purpose of this tutorial is to provide the attendee with an overview of the basic techniques of movement analysis of upper extremity movements, and the muscular relationships between the lower extremity, torso and upper extremity during running, swimming and throwing motions. The beginning of the tutorial will focus on the muscular sequencing of throwing, swimming and running. Dartfish software will be employed as a teaching and research tool to analyze throwing, swimming and running with special attention on the influence of the lower extremity, pelvic girdle and trunk motions on upper extremity movement.

HIGH INTENSITY INTERVAL TRAINING: FROM THE SURGEONS TABLE TO THE PLAYING FIELD

R.H. Laird, D.J. Elmer, D.D. Pascoe. *Department of Kinesiology, Auburn University*

T4

Over the past 20 years interest in high intensity interval training (HIIT) and research examining its effects on various physiological variables has increased greatly. HIIT has been utilized by athletes and coaches to maintain, improve, and peak performance long before it was examined in the lab. HIIT is a broad classification encompassing training bouts lasting from 4 to 45 continuous minutes with work intervals lasting 5 seconds to 5 minutes with passive and active rest intervals of varying lengths and intensities. HIIT has been shown to elicit improvements in physiological variables traditionally associated with long steady state exercise with only a fraction of the time and total volume needed. Variables to be examined include: VO2 max, maximal lactate steady state, lactate threshold, time trial performance, peak running velocity where VO2 max is reached, and maximal aerobic power accomplished via peripheral and central adaptations. Over the last 10 years the safety, efficacy, and appropriateness of HIIT protocols and their application to "at risk" populations has been examined. This research has focused more on the effect of HIIT on health related outcomes. These include markers of endothelial function, cardiac function, and quality of life measurements. This tutorial will review the body of literature on the history of HIIT, variations that have been successful at causing positive adaptation and performance improvements as well as examine the efficacy of HIIT in health and rehabilitation settings.

SEVERE OBESITY: IS THERE A METABOLIC PHENOTYPE AND CAN EXERCISE HELP?

J.A. Houmard, *East Carolina University*

T5

Severe obesity (BMI > 40 kg/m²) is associated with multiple defects in skeletal muscle which contribute to insulin resistance and a reduction in fatty acid oxidation (FAO) in this tissue. These metabolic derangements are retained in human skeletal muscle cells raised in culture. Together, these findings are indicative of a global metabolic program with severe obesity which is of an epigenetic or genetic origin. Weight loss via gastric bypass surgery can “turn off” components of this metabolic program as insulin sensitivity is restored; however, the impairment in FAO in skeletal muscle remains evident. Physical activity can improve FAO and insulin action, indicating that this patient population is not exercise resistant. Findings presented in this review will hopefully increase the understanding of and aid in preventing and/or treating the severely obese condition.

EFFECTS OF BRISK WALKING ON CONDITIONS OF THE METABOLIC SYNDROME AND CARDIOVASCULAR DISEASE

L.J. Brandon, FACS. *Department of Kinesiology & Health, Georgia State University*

T6

Individuals are encouraged to take greater responsibility for their health in the new United States Health Care Reform initiative. This will require, among other things, effective lifestyle choices that can readily be adopted by the general population to help manage chronic diseases such as cardiovascular disease (CVD). The American College of Sports Medicine -Exercise is Medicine-initiative points out the health benefits of exercise. One such exercise is brisk walking which can reduce or slow the development of chronic diseases such as CVD. This presentation is design to discuss current literature and data from out lab on the effects of brisk walking on the conditions of the metabolic syndrome (MetS). The MetS is used to predict the development of CVD. Brisk walking (3 to 5 mph) provides benefits for each condition of the MetS when one meets the “Physical Activity Guidelines for Americans” (DHHS, 2008) of exercising 500 to 1000 MET-minutes per week. A brisk walk at 3.5 mph is equal to 3.85 METs. If one brisk walks 30 minutes a day, five days a week for a total of 150 minutes they would exceed 575 Met-minutes per week. Brisk walking is an exercise that most individuals can physically tolerate and it does not require equipment. The benefits it provides for each MetS condition will be discussed. While metabolic benefits provided by brisk walking are not large (typically 2% to 8% for each of the different conditions), they are large enough to, in many cases, reverse detrimental processes and stabilize MetS conditions, thus reducing the likelihood or slowing the developing of CVD. This is important as CVD is the leading cause of mortality in the United States.

ENVIRONMENTAL INFLUENCES ON PHYSICAL ACTIVITY AT CHILD CARE SETTINGS

R.A. Battista and D.P. Coe, *Department of Health, Leisure and Exercise Science Appalachian State University, Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*

T7

Childhood obesity continues to be a health concern in the United States, even among young children (ages 0-5y). In order to develop adequate interventions to address healthy behaviors in young children, there needs to be sufficient information concerning the environment in which the children interact that may relate to physical activity. Recent evidence suggests child care environments are an important setting to reduce childhood obesity (Benjamin et al, 2007). Children spend more time in child care centers and less time in unstructured play (Sturm, 2005); therefore, the child care center may be an effective place to improve physical activity levels among children. This tutorial will discuss the child care environment and address two environmental influences in child care settings that impact physical activity: the child care staff and the physical setting (classroom and outdoor play areas). Reviews of these environmental influences specific to areas (e.g., southeast region, low income children, rural areas) with high rates of childhood obesity will be presented. Objectives include understanding environmental changes that may influence children’s physical activity levels and summarizing the various ways that may help to decrease childhood obesity rates.

AUGUST KROGH: THE PHYSIOLOGIST’S PHYSIOLOGIST

D.R. Bassett Jr. and S. Scott. *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*

T8

August Krogh (1874-1949) was a pre-eminent Danish scientist who did important research in respiratory physiology, comparative physiology, and exercise physiology. He enrolled in the University of Copenhagen in 1893, where he studied mathematics, physics, chemistry and zoology. He later completed his doctorate in zoology there, under Professor Christian Bohr. His doctoral dissertation was on “the study of cutaneous and pulmonary respiration of the frog”. After graduation, he continued to work in Bohr’s lab, studying the transport of O₂ from the lungs to the blood. Bohr maintained that the lung secreted O₂ into the blood. However, August Krogh and his wife, Marie, conducted experiments showing that the transport of O₂ from alveoli to pulmonary capillary was due to diffusion. They published these findings in a series of papers they called “the seven little devils”, because they directly conflicted with Bohr’s theory of oxygen secretion. In 1904-1906, August completed work that resulted in him being awarded the Seegen prize, for the finding that N₂ gas is not excreted in respiration in a number of animal species. Together with Johannes Lindhard, he conducted studies in exercise physiology, which greatly accelerated the progress of this field in Scandinavia. In 1920, August was awarded the Nobel Prize “for his discovery of the capillary motor regulating mechanism”. He showed that blood flow through capillaries was regulated by a mechanism that caused them to open and shut in accordance with their need for oxygen. Despite his introverted personality, August Krogh made important discoveries that shaped the emerging field of exercise physiology.

WATER OR SPORTS DRINK DURING ENDURANCE EXERCISE. WHO'S KOOL AID ARE YOU DRINKING?

W. S. Black. *Department of Kinesiology and Health Promotion, University of Kentucky*

T9

Recommendations for fluid consumption during endurance exercise have evolved over the past several years. Despite recent updates, there remains significant disagreement regarding the optimal hydration strategy. The purpose of this tutorial is to review, compare, and contrast the current positions on fluid replacement. The initial 10 minutes of the tutorial will be devoted to reviewing the distribution of total body water and electrolytes as well as fluid dynamics during exercise. The next 10 minutes will involve a review of the current recommendations from different authors regarding volume of fluid consumption during exercise and composition of the fluid ingested. The next 20 minutes will provide a historical review of the literature supporting the various recommendations. Included in this will be a discussion of fluid as a delivery vehicle for carbohydrate during exercise. The final 10 minutes will involve a discussion of hydration status as a performance limiter. Ten minutes will be left at the end of the presentation for open discussion.

A NEW TOOL TO ENHANCE EXERCISE PRESCRIPTION – THE FEELING SCALE

W.R. Bixby (FACSM) and E.E. Hall (FACSM). *Department of Exercise Science, Elon University*

T10

The latest position stand published by the American College of Sports Medicine related to exercise prescription (Garber, CE, et al., 2011) included a section on using perceived exercise intensity and affective valence to modulate or refine exercise prescription. While the stand makes clear that current evidence does not support the use of these scales as the primary means to prescribe exercise, it does suggest that these scales can be used as an adjunct to traditional exercise prescription strategies. Of particular interest is the section related to the use of pleasantness/unpleasantness; “Measures of the pleasantness/unpleasantness of exercise (i.e., affective valence) hold promise as a means to regulate and monitor exercise intensity because they can accurately identify the transition across the lactate threshold during cardiorespiratory exercise (Ekkkekakis, Hall, & Petruzzello, 2004 & 2008). The Feeling Scale (Hardy & Rejeski, 1989), one measure of affective valence, seems to be an effective way for an individual to self-regulate exercise intensity, particularly during walking exercise (Rose & Parfitt, 2008).” This is an encouraging development in relation to new tools for exercise prescription; however, limited research is presented in support of the feeling scale and no advice is given on how to use this measure to assist in prescribing exercise. Therefore, the purpose of this tutorial is to: 1) introduce the current research supporting the use of the feeling scale as a supplementary tool in exercise prescription, 2) discuss how to use the feeling scale when prescribing exercise, and 3) to introduce other potential measures that could be of use to the practitioner to better prescribe exercise to clients.

GO THE DISTANCE: DEVELOP AN EXPERIENTIAL SPORTS PHYSIOLOGY AND MARATHON COURSE

L.K Stewart and M.G. Flynn. *School of Kinesiology, Louisiana State University, Department of Health and Human Performance, College of Charleston*

T11

BACKGROUND: A Sports Physiology and Marathon training course is geared toward a different type of learning—experiential learning. Involvement in the training and preparation for the marathon makes learning fun, cements otherwise difficult physiological concepts, and makes it more likely that the theoretical information will be absorbed because of its inherent relevance. This course has been successfully administered at three different universities with over 200 undergraduate and graduate students completing the course content. The courses and several others like it being taught around the U.S. were featured in Runner’s World. The presenters typically enroll about 30 students per class, but have enough student interest to enroll nearly three times that number. **PURPOSE:** The purpose of this tutorial lecture will be to provide information that will allow others to develop the course. The presenters will highlight their experiences, successes and potential pitfalls. After presenting a brief history of the course, we will address topics including course design and content, training plan development and supervision, student enrollment and risk assessment, the incorporation of research into the course, and philanthropic activities. This will be accomplished in two, twenty-minute presentations followed by a twenty-minute discussion period. Our primary objective is to provide information that will both inspire and give confidence for attendees to design their own sport physiology and marathon courses, fostering meaningful and long-lasting learning experiences.

Supported by Louisiana State University and the College of Charleston

NUTRITIONAL CONSIDERATIONS FOR EXERCISE IN HOT ENVIRONMENTS

D.M. Morris. *Department of Health Leisure & Exercise Science, Appalachian State University*

T12

Exercise in hot environments can result in profuse sweating and dehydration. Low levels of dehydration can result in substantial decrements in exercise performance, especially in hot environments. Maximum sweat rates can exceed maximum rates of gastric emptying for water meaning that dehydration can be inevitable during long-term exercise in the heat. The body attempts to preserve plasma volume and hydration status through renal and endocrine responses. Briefly, the hormones renin-angiotensin, aldosterone, and vasopressin all increase in response to dehydration and play roles in enhancing fluid retention and intake. Hydration status can also be manipulated by nutritional strategies employed before, during and following exercise. Numerous investigations have demonstrated increased fluid retention and exercise performance following co-ingestion of water with sodium or glycerol. We recently investigated a novel dietary strategy designed to enhance thirst, fluid intake and retention, hydration status, and exercise performance in hot environments. The proposed tutorial will review the renal-endocrine responses to dehydration and recent investigations of the effects of nutritional strategies on hydration status and exercise performance in the heat.

BEYOND THE LECTURE: ACTIVE LEARNING IN EXERCISE SCIENCE

Y. Feito, B.B. Parr, K. Reich, *Kennesaw State University, University of South Carolina Aiken, High Point University*

T13

Teaching strategies that require students to take an active role in the learning process can improve critical thinking, self direction, and teamwork skills. This is important for success as students and as exercise science professionals. The purpose of this tutorial is to provide a rationale for and examples of incorporating active learning strategies inside and outside the classroom. Brian Parr will discuss methods of active learning including critical inquiry, team-based learning, and self-directed learning. Yuri Feito will share strategies to promote active involvement in and outside the classroom through the use of social media. Kimberly Reich will share examples of incorporating course activities that take learning outside the traditional boundaries of the classroom and the laboratory. Time for questions and discussion will be included.



TRIALS AND TRIBULATIONS OF A SPORTS DIETITIAN

Amanda Timberlake MS, RD, CSSD. *Sport Health Science Department, Life University*

T14

There is a great dichotomy between evidence based dietary recommendations for the athlete and those nutritional endorsements from mainstream media. Major issues facing collegiate athletes, leading to suboptimal performance, include insufficient carbohydrates and / or kilocalories. Many athletes have difficulty with weight loss/gain/maintenance but often worry more about protein and supplement intake. Using examples from an elite rugby squad (both super league and college premier division) the presenter will share some of her successes and failures with the nutritional counseling of these competitors. A step by step approach to dietary prescription will be given and suggestions for improving the diets of collegiate athletes will be given.



THE FRESHMAN 15: FALLACIES, FINDINGS, FACTORS, AND FIXES

B.M. Das, PhD, MPH, M.V. Fedewa, MS, E.M. Evans, PhD. *University of Georgia*

Young adults, (18-29 y/o), experienced the largest increase (~96%) in obesity prevalence from 1988-2006 compared to other cohorts. This period of life is marked by adolescents leaving the parental home, often to attend college, and often invokes stress due to the many changes inherent in establishing personal independence including adaptation to a new physical environment, altered social networks, increased social competition, and additional financial responsibilities. Young adulthood is also a pivotal time for establishing salient lifelong health behaviors. Despite being an active area of research interest, it is incompletely characterized how environmental, societal, and behavioral factors independently or interactively influence college students' health status. Moreover, little research has focused on determining effective interventions to promote healthy lifestyles among this sector of the population, which will undoubtedly be a challenging and multifaceted issue due to the unique characteristics of the population. Specifically, additional research is needed to develop effective, sustainable, and translatable weight management interventions for college students. The aims of this symposium are to: a) provide a brief review, quantitative and qualitative, of the impact of campus life on the weight and health status of college students in the US; b) summarize research regarding weight management in this cohort; c) highlight existing university-based student centered interventions targeting weight management; and, d) present a working paradigm for a weight management program that integrates student affairs and academic units using a sustainable model. The target audience for this symposium includes students, educators, researchers, and practitioners with an interest in the college population and weight management issues.

S1

IMPROVING WELLNESS IN PEOPLE WITH DISABILITIES: PAST, PRESENT, AND FUTURE DIRECTIONS FOR ADAPTIVE FITNESS PROGRAMS

K. McCully, FACSM, M. Erickson, H-J. Young, *University of Georgia*, Nicholas Evans, *Shepherd Center, Atlanta, GA*

Obesity is on the rise and this is increasingly true in people with disabilities. The opportunities for people with disabilities to improve fitness and wellness are limited, and this puts them at a disadvantage. This symposium will cover four components of establishing wellness programs for people with disabilities.

- Addressing the present state: Review statistics on people with disabilities and the health complications associated with obesity.
- Programs for people with physical disabilities: The different models, evidence for success, and potential sustainability.
- Programs for people with intellectual disabilities: The different models, evidence for success, and potential sustainability.
- Professional development: Job opportunities, recommended training, and available certifications.

The aim of this symposium is to stimulate awareness of the health needs of people with disabilities as well as how new and creative approaches can be used to address this important problem.

S2

CONTROL OF BLOOD FLOW DURING MUSCLE CONTRACTIONS

H.A. Kluess, L.B. Gladden, B.S. Ferguson, M.J. Rogatzki. *Department of Kinesiology, Auburn University*

During skeletal muscle contractions/exercise, there is a dramatic increase in energy demand, much of which is ultimately met by oxidative phosphorylation. Adequate oxygen levels within muscle cells are necessary for oxidative phosphorylation. To meet the increased oxygen requirements within muscle cells there is a dramatic increase in convective oxygen delivery via blood flow during contractions as compared to rest. In 1887, Chaveau and Kaufmann (CR Acad Sci Paris 104:1126, 1887) reported a large increase in blood flow to the lip muscles of a horse while it chewed (Rowell, *The Cardiovascular System*, pp. 98-137 in *Exercise Physiology: People and Ideas*, edited by Tipton, 2003). Since those early studies, there has been great curiosity about the mechanisms that underlie the matching of blood flow to metabolism. Key questions have revolved around the roles of mechanical muscle activity (the muscle pump) and vascular dilation, and their relative contributions to the early, rapid increase in blood flow at the onset of contractions. Mechanisms for this may include mechanical compression of the muscle vascular bed and ATP release from the skeletal muscle, vascular bed and/or red blood cells. This symposium will a) review the historical highlights of blood flow control during increased muscular activity, b) discuss the role of the muscle pump in local blood flow control, c) review mechanical compression as a vasodilatory mechanism, and d) examine the actions of the sympathetic nervous system in the control of muscle blood flow. This symposium should appeal to a broad audience from students, to basic scientists to those with applied interests.

S3

THE BENEFICIAL EFFECTS OF EXERCISE IN INDIVIDUALS WITH PARKINSON'S DISEASE.

T.A. Buckley, J.R. Nocera, C.J. Hass. *Department of Health and Kinesiology, Georgia Southern University, School of Medicine, Emory University, Department of Applied Physiology and Kinesiology, University of Florida*

Functionally, individuals with Parkinson's disease (PD) are characterized by poverty of movement and loss of both muscular strength and endurance. Further, despite the advancement in medical, pharmacological, and surgical treatment of PD, the disease remains progressive and degenerative resulting with reduced independence, increased risk of falls, and an overall impaired quality of life. However, recent investigations have suggested that exercise may ameliorate the disease progression and improve overall quality of life. Therefore, the purpose of this symposium is to provide a contemporary overview of the beneficial effects of exercise for people with PD. Dr. Buckley will provide an overview of both his published studies and the literature as it relates to resistance training and activities of daily living; including, but not limited to, gait, gait initiation, sit-to-stand, and sit-to-walk, as well as appropriate exercise prescription for PD patients. Dr. Nocera will review the literature as it relates to cognitive impairments associated with PD. Additionally, Dr. Nocera will present the findings of his recent published investigations and some preliminary data suggesting aerobic exercise may be an effective facilitator of cognitive improvement in patients with PD. Finally, Dr. Hass will present on their novel exercise intervention utilizing a split belt treadmill to target locomotor adaptations to improve gait asymmetry, likely through improved neurological control, within the PD population. At the conclusion of this symposium, attendees will be able to recognize the potential benefits of exercise, identify effective exercise interventions for PD patients, and apply, if appropriate, the presented techniques to their patients population.

S4

LONG TERM INTERDISCIPLINARY ATHLETE DEVELOPMENT AND MONITORING PROGRAMS

C.J. MacDonald, J.A. Gentles, M.H. Stone. *Department of Exercise and Sport Sciences, East Tennessee State University*

The status of long term athlete development and monitoring programs (ADMP) in the United States is unsatisfactory. In part, this is due to a lack of coaching staff who possess a basic scientific background and a dearth of properly trained sport scientists. Additionally, it is rare to find sports medicine, sport science and strength and conditioning departments who sufficiently coordinate their efforts to develop athletes via scientifically grounded principles, monitor athletes with objective measures of performance, manage fatigue, reduce injuries and ultimately improve sport performance. As a result, there are few ADMPs in the U.S. at any level of competition. The goal of this symposium is twofold. First, describe the components of an ADMP which has been successfully implemented at the collegiate level. Second, advance the cause of sport science and provide a framework from which other institutions can develop similar programs. This symposium will be presented in four sections; 1) Organization - provide some historical perspective and detail roles for each department, 2) Lab testing - provide information regarding the frequency and type of testing (body composition, force plate measurements, biochemical analysis, etc.), 3) Field testing - detail on field testing procedures, describe how to quantify on field and weight room workloads (session RPE, heart rate workloads and volume loads) and discuss how this should influence the future direction of injury prevention research, 4) Data return and research - this will describe the process utilized to return data to coaching staff and how results are used to publish research.

S5

DEFINITION AND MEASUREMENT OF MUSCLE QUALITY IN OLDER ADULTS: SPANNING THE SPECTRUM FROM CLINICAL PRACTICE TO RESEARCH

A.E. O'Brien, PhD, C.R. Straight, MS. *Department of Kinesiology, University of Georgia*

Sarcopenia, the age-related reduction in skeletal muscle mass and a hallmark of the aging process, is associated with functional limitations and physical disability. However, concurrent age-related declines in muscle strength and muscle power occur at a higher rate than the loss of muscle mass. Taken together, these findings suggest a progressive decrease in the overall quality of muscle in older adults. Although several studies have investigated muscle quality in older adults, a universal definition has not been established and the optimal index of muscle quality for predicting physical function in this population remains unclear. Because adequate muscle strength and muscle power are critical for performance of many functional tasks, developing an index of muscle quality that accounts for these dimensions may have important clinical implications. Moreover, measurement techniques for muscle quality vary with regard to feasibility, cost, and ease of administration and thus may vary for practitioners and researchers. The purposes of this symposium targeting the older adult population are to highlight the contemporary literature regarding: a) definitions of muscle quality; b) innovative techniques to assess muscle quality in various settings ranging from the clinic to a research laboratory; c) results from recent studies relating muscle quality to physical function in older adults; and d) anticipated future directions in this developing area. This topic will be of interest to students, scholars, and practitioners with an interest in older adults and novel muscle quality assessment techniques.

S6

SPRINT INTERVAL TRAINING: A VIABLE ALTERNATIVE TO IMPROVE HEALTH AND FITNESS

E.C. Freese, N.H. Gist, J.L. Trilk and K.J. Cureton, FACSM. *Department of Kinesiology, University of Georgia, School of Medicine, University of South Carolina*

Lack of time is the most frequently cited reason for Americans not meeting physical activity guidelines. Sprint interval training (SIT), most recently researched as alternating bouts of 'all-out' 30-s sprints with 4-min active recovery, has been shown to be a time-efficient training modality that confers favorable metabolic and cardiorespiratory adaptations. A single bout of SIT requires as little as 2-min of effort yet elicits near-maximal cardiorespiratory strain while improving postprandial metabolism and increasing 24-hour oxygen consumption. Chronic SIT conducted during six sessions across two weeks increases skeletal muscle oxidative capacity and elicits physiological adaptations similar to more prolonged, moderate-intensity aerobic exercise. Significant improvements have been reported for aerobic capacity, circulatory function, mitochondrial enzyme activity, insulin sensitivity, mean power output, and endurance performance. In an unpublished meta-analysis examining the effects of SIT on aerobic capacity, the aggregated findings revealed a moderate mean effect ($\Delta=0.50$). Studies in our laboratory indicate a single bout of SIT elicits ~80% VO_{2peak} and ~87% HR_{peak} and lowers the postprandial lipemic response by 21% the following day. Furthermore, a 4-wk SIT intervention significantly improved insulin sensitivity, central circulatory function, and maximal oxygen uptake in overweight women. In this symposium, we will present recent research showing the potential physiological adaptations, positive health outcomes and performance improvements conferred by this low-volume, time-efficient training modality.

S7

FACTORS IMPACTING STRETCH-SHORTNING CYCLE POTENTIATION AND RUNNING ECONOMY

G.R. Hunter, J.P. McCarthy. *University of Alabama at Birmingham*

Purpose: Locomotion economy has implications for sport performance, free living physical activity and weight gain. Muscle fiber type is related to cycling and walking economy while Achilles tendon length is related to walking and running economy. Purpose of the symposium is to report findings concerning factors that impact running economy and attempt to incorporate these findings into a model that addresses these disparate new findings. Methods: Experiments were undertaken to identify factors that impact exercise economy. Indirect calorimetry was used to measure exercise economy, MRI/MRS to measure tendon length/thickness and muscle size & muscle tissue economy, muscle biopsy to measure fiber type & titin filament isoforms, jumps and leg press sled throws to measure stretch shortening cycle potentiation & 1 RM to measure strength. Results: Type II fiber type, long Achilles tendon length, strength of the knee extensors/hip extensors/ plantar flexors and reduced flexibility of the knee extensors and plantar flexors all were independently related to locomotion economy. Conclusion: Although we have previously shown that type I myofiber type is positively related to walking and muscle economy and others that type I myofiber type is positively related to cycling efficiency, our current results show that type II myofiber type is positively related to stretch shortening cycle potentiation and running economy. In the symposium we will propose a model that incorporates these disparate and at times confusing observations that influence running economy.

S8

ACADEMIC MENTORING FOR CAREER DEVELOPMENT

A. Bosak, B. Riemann, and D.D. Pascoe. *Department of Health Sciences, Armstrong Atlantic State University, Department of Kinesiology, Auburn University*

S9

The focus of Kinesiology on movement, health, and performance through scientific inquiry has sustained growth in our discipline, increased enrollments in academic programs at the college level, and expanded the number of professional opportunities. In order for students to meet their career goals, they must align themselves with a program and mentor(s) that will guide their academic growth and provide experiences that prepare them for their future endeavors. This can be a daunting task as Kinesiology is a multi-faceted discipline with specialized areas that follow different academic paths and lead to a wide spectrum of professional careers. The direction or path a student takes is based upon their talents, interests, goals, ambitions, and academic preparation. Therefore, the purpose of this symposium is to acquaint students with the professional opportunities, degree paths, and careers stemming from a Kinesiology major. Furthermore, the symposium will discuss the student's academic decisions that formulate and contribute to their career preparations and mentoring. The format of this symposium will trace career choices that guide the development of a student's undergraduate academic major, examine the choice to pursue a Master's degree or enter the job market, and evaluate the decision making process in deciding to commit to a Doctorate program and/or seek Post-Doctoral studies. Presenters will also discuss how students can focus on maximizing their efforts in teaching, research, service, internships, certifications, interview skills, and job preparation.



STEADMAN HAWKINS
 CLINIC *of the* CAROLINAS

WELCOME TO THE STEADMAN | HAWKINS CLINIC

EFFECT OF ARM COOLING ON PITCHING PERFORMANCE

S.H. Bishop, G.A. Ryan, C.P. Katica, R.L. Herron, B. Elbon, P. Bishop.
*Department of Health and Human Performance, Texas A&M University-
Commerce, Kinesiology Department, University of Alabama, University of
Montana – Western*

01

PURPOSE: The throwing arm of a baseball pitcher is subjected to high stress as a result of the repetitive activity of pitching. Intermittent cryotherapy may facilitate recovery from this high stress, but this has not been tested. This study investigated the effect of cryotherapy on pitching velocity and subjective recovery and exertion. METHODS: Trained college-aged male baseball pitchers (n = 8) threw 12 pitches (1 pitch every 20 s) per inning for five total innings of a simulated game. Pitchers received arm cooling (AC) between innings or no cooling (NC) in a randomized counter-balanced study design. Pitch speeds were averaged for participants at the end of each inning and overall for five innings. Perceived exertion (RPE) and perceived recovery (PRS) were recorded each simulated inning. Mean pitching velocity for all-innings was significantly faster ($p = 0.04$) for AC ($31.2 \pm 2 \text{ m}\cdot\text{s}^{-1}$) than NC trial ($30.6 \pm 2 \text{ m}\cdot\text{s}^{-1}$). Average pitch speed in the 4th and 5th innings was significantly higher in AC ($31.3 \pm 2 \text{ m}\cdot\text{s}^{-1}$ for both innings) compared to NC ($30.0 \pm 2 \text{ m}\cdot\text{s}^{-1}$ and $30.4 \pm 2 \text{ m}\cdot\text{s}^{-1}$, for the 4th and 5th innings, respectively, $p = 0.01$). AC resulted in a significantly lower RPE ($p \leq 0.01$) and improved PRS ($p = 0.01$) compared to NC. CONCLUSIONS: Intermittent cryotherapy attenuated velocity loss in baseball pitching, decreased RPE, and facilitated subjective recovery during a 5-inning simulated game.

INVESTIGATION OF A NOVEL THERAPY FOR THE PREVENTION AND TREATMENT OF MUSCLE CRAMPS

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and B. Bull. *Department of Health, Leisure, and Exercise Science,
Appalachian State University*

02

PURPOSE: The efficacy of an all-natural, anti-microbial skin cleanser on the prevention and treatment of muscle cramps was investigated in young, recreationally active individuals. METHODS: Initially, 72 subjects were screened for their ability to induce a muscle cramp (within 60 sec) by performing a maximal voluntary contraction of the calf musculature with the knee in 60 degrees of flexion. Of those 72 individuals screened, 10 (6 M and 4 F, 20.3 ± 0.3 yrs) successfully cramped in their calf musculature and were enrolled in the randomized, controlled, double blind crossover design part of the study. Subjects returned for 2 additional visits, one week apart, to test the skin cleanser or placebo (fragranced water) on the incidence of muscle cramping. At the first visit, treatments were randomized such that the skin cleanser was sprayed on the skin over the calf muscles of one leg and the placebo on the other. Treatments were applied to the opposite leg for the second visit. Subjects performed the same cramping protocol as before and the incidence of muscle cramping was evaluated at 1, 5, 10, and 20 min after the application of treatment. RESULTS: While it appears that the skin cleanser may reduce the incidence of muscle cramping at the 5- and 10-min time points ($p = 0.136$), further testing is required to determine its efficacy. There was no difference in incidence of cramping between skin cleanser and placebo at the 1- and 20-min time points ($p > 0.50$). CONCLUSIONS: Despite overwhelming anecdotal evidence supporting the efficacy of this skin-cleansing product to prevent and treat muscle cramps in the field, findings from this controlled clinical trial thus far may suggest otherwise.

VALIDATION OF AN ACUTE ANKLE SPRAIN MOUSE MODEL

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Kinesiology, University of North Carolina at Charlotte*

03

PURPOSE: To develop and test an acute ankle sprain model in mice. METHODS: Thirty male mice (CBA/2J), underwent gait and balance testing at four time points: before surgery, 3-days post-surgery, 1-week post-surgery, and 4-weeks post-surgery. Balance outcomes include the time needed and number of right hindfoot slips that occurred while crossing a 19cm round beam 1m in length. Gait was assessed using the footprint test which assessed left and right stride length (cm) along a 0.5m walkway. Following baseline testing, mice were randomly allocated to one of three surgery conditions: Sham surgery (SHAM), transection of the anterior talofibular and calcaneofibular ligaments (ATF/CFL), or transection of the calcaneofibular ligament only (CFL). After a 3-day recovery period which included ad libitum analgesia, daily running wheel measurements of duration (min) and distance (km) were recorded to capture physical activity levels. RESULTS: Both the ATF/CFL and CFL group had significantly more slips than the SHAM group at 3-days and 1-week post-surgery. The ATF/CFL group (2.4 ± 1.4) also had more slips than the SHAM group (1.3 ± 1.1) at 4-weeks post-surgery. Similarly, right limb stride length was reduced in the ATF/CFL group (6.00 ± 0.83 cm) relative to the CFL (6.53 ± 1.07 cm) and the SHAM group (6.98 ± 0.49 cm) at 3-days post-injury. This deficit resolved at 1-week post injury. Running duration ($p = 0.02$) and distance ($p = 0.01$) were reduced in the ATF/CFL group relative to the SHAM group during week one. During weeks two and three, the ATFL/CFL group had reduced running distance ($p < 0.01$) and duration ($p < 0.01$) compared to the SHAM and CFL group. No other differences were noted ($p > 0.05$). CONCLUSIONS: These results indicate that the mouse acute ankle sprain model is valid and results in similar sensorimotor and physical activity impairments as those seen in humans.

CONCUSSION KNOWLEDGE AND ATTITUDE AMONGST COLLEGIATE ATHLETES

T.A. Buckley, B.A. Munasky. *Department of Health and Kinesiology,
Georgia Southern University.*

04

Recently there has been increased interest in the education of student-athletes as it relates to concussion knowledge. However, there has been limited investigation on how the knowledge impacts the individual's attitude as it relates to concussion management. PURPOSE: The purpose of this study was to assess student-athletes concussion knowledge and attitudes using the previously established valid and reliable RoCKAS-ST instrument. METHODS: 520 participants (54.3% male, age: 18.4 ± 1.2 years old) from 14 sports completed the RoCKAS-ST survey during preparticipation physicals between 2009 – 2012; however, 5 responses were removed for failing the validity scale questions. The survey contained 17 true/false concussion knowledge (CK) questions which were scored as 1 point for the correct answer resulting in a potential range of 0 – 17. There were also 15 concussion attitude (CA) questions scored on a 1 – 5 Likert scale for a potential range of 15 – 75 with higher scores indicating greater concussion knowledge and a safer attitude. RESULTS: The CK mean score was 12.37 ± 1.63 (mode: 12, median 12) and the CA mean score was 32.1 ± 8.9 (mode: 38, median: 32). The most common concussion knowledge misconceptions included MRI/CT ability to identify a concussion (80.1% incorrect) and most concussions resolve within 10 days (52.4% incorrect). The most common "least safe" answers included a willingness to continue participating despite a head injury related headache, that concussions are less serious than other athletic injuries, and an athlete with a concussion should return to play in the same game if it is an important game. CONCLUSION: While state laws and NCAA regulations attempt to target student-athletes concussion knowledge, the results of this study suggest that knowledge may be improving over earlier studies; however, respondents overwhelmingly endorsed potentially dangerous attitudes.

PARENTAL KNOWLEDGE OF PHYSICAL ACTIVITY RECOMMENDATIONS AND THEIR ABILITY TO ASSESS CHILD'S PHYSICAL ACTIVITY

J.I. Flynn, D.P. Coe, D.L. Thompson, *Department of Kinesiology, Recreation, and Sport Studies, University of Tennessee*

05

Little research exists assessing parent and child physical activity (PA) in relation to parental knowledge of PA recommendations. **PURPOSE:** To subjectively and objectively assess parent and child PA and parental knowledge of the moderate-to-vigorous physical activity (MVPA) guidelines for adults and children. **METHODS:** Participants were 20 parent-child pairs (child age 8.9 ± 1.9 y). The ActiGraph GT3X was used to assess PA. Participants were asked to wear the monitor for 7 days. The GT3X was set to 15-s epochs for children and 60-s epochs for adults. Cut points determined by Evenson et al. (children) and Freedson et al. (parents) were used to classify time spent in MVPA. In addition to objectively measured PA, parents self-reported their own PA using the International PA Questionnaire (short form) and their child's PA using the Children's PA Questionnaire. Pairwise t-tests and independent samples t-tests were used to determine differences among parent and child average daily MVPA. **RESULTS:** Parents' self-reported (50 ± 51 min-d⁻¹) and objectively measured (38 ± 22 min-d⁻¹) MVPA were not statistically different ($p = 0.255$). Parents' estimates of their children's MVPA were significantly higher than measured values (161 ± 148 min-d⁻¹ vs. 46 ± 18 min-d⁻¹; $p = 0.002$). In this sample, 50% of parents were knowledgeable of adult PA guidelines and 40% were knowledgeable of child PA guidelines. Children of parents knowledgeable of PA guidelines had similar MVPA levels to children of parents who did not know the guidelines (49 ± 20 min vs. 43 ± 15 min; $p = 0.464$). **CONCLUSIONS:** Parental assessment of their children's PA is different from objectively measured values. Future research should explore ways to increase parental knowledge and use of PA guidelines and help parents accurately monitor the PA levels of their children.

EFFECTS OF WARM-UP DURATION ON VO₂ KINEMATICS AND LACTATE DURING A CYCLING TIME TRIAL

J. A. Bunn, M. Magal, FACSM, and L.C. Eschbach, *Campbell University, NC Wesleyan University, Valencell Technologies*

06

PURPOSE: The purpose of this study was to evaluate if the duration of a warm-up affects VO₂ kinematics and lactate during a 5K cycling time trial (TT). **METHODS:** Sixteen trained cyclists (41.0 ± 7.7 years, 76.5 ± 13.5 kg, 1.75 ± 0.11 m, 50.5 ± 11.7 ml/kg/min) completed three testing sessions with different warm-ups prior to a 5K cycling time trial. The warm-up protocols were selected in randomized order and included: 1) a short duration 3-minute warm-up at 60% max power (SW), 2) a long duration warm-up 10-minute warm-up at 60% max power (LW), and 3) no warm-up (NW). All cycle testing was completed using a stationary cycle simulator, and testing sessions were completed approximately one week apart. Data were analyzed to address differences amongst type of warm-up for VO₂, TT time, and lactate at the 1K split and the entire 5K. **RESULTS:** There was no difference between type of warm-up ($p > 0.05$) for VO₂ (SW: 50.1 ± 9.0 , LW: 49.5 ± 9.4 , NW: 50.6 ± 9.0 ml/kg/min), post-TT lactate levels (SW: 9.0 ± 2.9 , LW: 7.9 ± 3.2 , NW: 8.0 ± 3.2 mmol/l), or TT completion time. There was also no difference between warm-ups ($p > 0.05$) after completion of 1K for VO₂ (SW: 41.5 ± 7.6 , LW: 46.1 ± 10.3 , NW: 37.4 ± 5.2 ml/kg/min) or 1K split time. **CONCLUSION:** This data conflicts current evidence that a warm-up may be beneficial during the initial phase of an endurance activity, but agrees with research that indicates no difference amongst warm-up types for the entire performance. This study limited the warm-up sessions to steady state exercise, but future research should address variations in intensity during the warm-up in addition to the duration.

EFFECTS OF BETAINE ON STRENGTH, BODY COMPOSITION, AND HOMOCYSTEINE THIOLACTONE

J. Cholewa, V. Paolone, R. Wood, T. Matthews, *University of Kentucky Department of Kinesiology and Health Promotion, Springfield College Department of Exercise Science and Sport Studies*

07

This study investigated the effects of betaine supplementation on strength, body composition, and homocysteine thiolactone (HCTL) in experienced strength trained men. 23 subjects were matched for training experience (4.8 ± 2.3 years) and body fat percentage (BF%: $16.9 \pm 8.0\%$), randomly assigned to either a placebo (PL; $n = 12$) or betaine group (BET; $n = 11$; 2.5 g/day), and completed a 6 week periodized training program. Bench press (BP) and back squat (BS) training volumes were recorded weekly. Fasting urine was collected at baseline (BL), weeks 2, 4 and 6, and assayed for HCTL. Subjects were tested prior to and following 6 weeks of treatment. Arm and thigh cross sectional area (CSA) were estimated with girth measurements and skin fold calipers. Body density was estimated via skin fold calipers and used to estimate BF%, fat mass (FM), and lean body mass (LBM). Performance was assessed via vertical jump (VJ), 1 RM BP, and 1 RM BS. A significant ($p < .05$) main effect for HCTL was found: weeks 2 and 4 were greater than BL or week 6; however, no significant ($p = .07$) interaction existed between group and time. BP and BS training volume increased significantly for both groups; however, the increase in BP training volume was significantly greater in Bet. Arm CSA increased significantly ($p < .05$) in BET but not PL. No differences existed for changes in thigh CSA. Body composition (BF%, FM, LBM) improved significantly ($p < .05$) in BET but not PL. No differences were found in performance variables (VJ, 1 RM BP or BS) between groups. Six-weeks of betaine supplementation appeared to improve body composition, arm size and bench press work capacity, but not strength, power, or HCTL.

ADIPOSIY INFLUENCES MUSCLE QUALITY ASSOCIATIONS WITH PHYSICAL FUNCTION IN OLDER ADULTS

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08

PURPOSE: Different dimensions of muscle capacity (i.e. strength) and muscle quality (MQ; i.e. strength per unit of lean or muscle mass) are known to influence lower-extremity physical function (LEPF) in older adults and the magnitude is likely impacted by the load (i.e. body or fat mass) to be moved. The aim of this study was to determine if adiposity influences the associations between indices of MQ and LEPF. **METHODS:** Community-dwelling older adults ($n=212$, 88 male; 68.4 ± 6.7 years) were assessed for body composition via dual-energy X-ray absorptiometry, maximal muscle strength (MVC) using an isokinetic dynamometer, and LEPF via the timed up-and-go test (UPGO) and 30-second chair stand test (CHR). MQ was defined as MVC normalized for upper-leg mineral free lean mass (MQ). An additional MQ index was defined as MVC adjusted for total body mass (MVC/LOAD). **RESULTS:** Adjusting for age and sex, MQ was associated with the UPGO ($r=-0.17$, $p<0.05$) but not the CHR ($r=0.12$, $p>0.05$) and MVC/LOAD was associated with the UPGO ($r=-0.25$, $p<0.01$) and CHR ($r=0.25$, $p<0.01$). However, these correlations were all attenuated after adjustment for percent body fat and only the association with UPGO remained significant ($r=-0.15$, $p<0.05$). **CONCLUSIONS:** Incorporating adiposity into a definition of MQ may provide a more robust prediction of LEPF than conventional measures. Future research is needed to elucidate the importance of adiposity in mediating the relationship between MQ and physical function in older adults. Supported by NIH-HL090455.

ADIPOSIITY IS NEGATIVELY ASSOCIATED WITH BODY IMAGE IN FRESHMAN STUDENTS

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09

PURPOSE: The aim of this study was to assess the potential independent and interactive influences of adiposity (%Fat) and physical activity (PA) on perceived body image (BI) in college freshmen. **METHODS:** Freshmen (n=238; 18.5±0.5y, 67.2% female, 65.2% Caucasian) were assessed for %Fat via DXA, objective PA (steps per day, minimum of 4 days, 10-hr per day) using a piezoelectric pedometer (NL-1000) & body image using the 12-item version of the Social Physique Anxiety Scale (SPAS). **RESULTS:** Regression analysis revealed a positive quadratic curve with %Fat accounting for 27.2% of the SPAS scores (F(229,1)=86.8, p<0.001, R=0.52). The addition of physical activity, lean body mass, & %Fat X PA interaction %Fat × PA interaction did not significantly improve the prediction of SPAS, as R-squared for the model improved by only 1.4% (all p>0.05). Although females had 22.3% higher SPAS scores than males (35.7±9.8 & 29.2±10.1, respectively, (F(232,1)=21.5), p<0.001), the relationship between %Fat and SPAS scores did not differ by sex. **CONCLUSION:** Adiposity, but not PA, appears to impact BI. Higher adiposity is associated with a less favorable BI as evidenced by higher scores on the SPAS. Freshman with lower SPAS scores were of average %Fat. The sex disparity in SPAS scores with the similar relation between %Fat & SPAS in college freshmen men & women warrants further investigation. Grant Support: USDA 2008-55215-18825

A COMPARISON BETWEEN YOUNG WOMEN AND PRE-MENOPAUSAL WOMEN'S BONE MINERAL DENSITY

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010

PURPOSE: Historically, age has been considered a primary risk factor for osteoporosis. However, recent trends for decreased dairy consumption and physical activity may place younger women at greater risk than previously anticipated. **METHODS:** This study evaluated the effect of age on BMD in a group of women between 18-50 years old (30.01 ± 0.6). BMD was assessed with the Alara MetriScan. **RESULTS:** Correlation analysis identified a positive association between age and BMD (r = 0.12, P = 0.02), body weight (r = 0.31, P < 0.001), and BMI (r = 0.34, P < 0.001). Younger women (18-24 years) had lower mean BMD compared to older (25-50 years) women (T Score: -0.601 ± 0.34 versus 0.102 ± 0.09, P = 0.05), lower body weight (68.1 ± 1.0 kg versus 79.1 ± 1.6 kg, P < 0.001), and lower BMI (24.5 ± 0.37 versus 29.0 ± 0.59 kg/m², P < 0.001). Analysis of behavioral risks revealed that younger women were less likely to report daily calcium supplementation and more likely to participate in moderate-high intensity exercise for at least 4 hours per week. **CONCLUSIONS:** Based on these data, younger women are at greater risk for loss of BMD and early onset osteoporosis than their older counterparts. No grant nor funding was sought for this research. Both researchers completed CITI. All participants signed a consent form before any testing began.

POSTMENOPAUSAL WOMEN WHO EXERCISE ONE DAY A WEEK WILL IMPROVE BONE PARAMETERS SIMILAR TO THOSE WHO EXERCISE MORE FREQUENTLY

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011

PURPOSE: This study sought to determine the optimal exercise frequency needed to maintain or improve BMD of the hip and spine in postmenopausal women. **METHODS:** Subjects participated in a combined aerobic and resistance exercise program either 1 day a week (n=18), 2 days a week (n=20), or 3 days a week (n=18). DEXA was used to assess bone parameters of the hip and spine at baseline, at 16 weeks of training, and at 32 weeks of training. **RESULTS:** Total hip(+0.107±0.029,P=0.002)and lumbar spine(+0.142±0.055,P=0.036)BMD Z-Scores were significantly increased by the end of 32 weeks of training. Lumbar spine BMC(+0.222±0.079 g/cm², P=0.021) also significantly increased.Among the different exercise frequencies performed,there were no significant differences in bone parameter changes. **CONCLUSIONS:** These results suggest that postmenopausal women who engage in aerobic and resistance training one day a week improve hip and spine BMD similar to those women who train more frequently.

VIGOROUS PHYSICAL ACTIVITY MITIGATES THE ASSOCIATION BETWEEN SEDENTARY TIME AND CARDIORESPIRATORY FITNESS IN MIDDLE SCHOOL YOUTH

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012

PURPOSE: To determine if the relationship between sedentary time and cardiorespiratory fitness is independent of time spent in vigorous physical activity in middle school aged youth. **METHODS:** Youth (N=280, 44% male, 48% African American) completed a 3-minute step test and wore an accelerometer for seven days. The influence of time spent sedentary and vigorously active were examined with cardiorespiratory fitness by classifying children into four distinct groups – 1) high sedentary/low vigorous; 2) low sedentary/low vigorous; 3) low sedentary/high vigorous; and 4) high sedentary/high vigorous. High and low groups were defined by the median split. Analysis of covariance, controlling for demographic characteristics and moderate physical activity was conducted to determine the impact of sedentary and vigorous activity levels groupings on cardiorespiratory fitness. **RESULTS:** The ANCOVA main effect of grouping on cardiorespiratory fitness was significant (F = 8.41, p < .001). Follow-up pairwise comparisons indicated that the high sedentary/low vigorous group had higher beats/minute (BPM) than the low sedentary/high vigorous (-8.6 BPM; 95% CI: -15.8 to -1.1) and high sedentary/high vigorous (-10.2 BPM; 95% CI -15.7 to -4.6) groups. **CONCLUSIONS:** Modest amounts of vigorous physical activity may be effective to mitigate the negative association between sedentary behaviors and cardiorespiratory fitness in young adolescents. SUPPORTED BY A GRANT FROM THE CENTERS FOR DISEASE CONTROL AND PREVENTION (K01 DP001126).

AWARENESS OF THE 2008 PHYSICAL ACTIVITY GUIDELINES FOR AMERICANS AMONG COLLEGE STUDENTS LIVING IN RESIDENCE HALLS

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013 PURPOSE: To determine the level of awareness of the 2008 Physical Activity Guidelines for Americans (PAG) among college students living in residence halls. METHODS: Students at a large southern university living in one of four residence halls (n = 407, 19.3% response rate) completed an online questionnaire asking them to identify the six main aspects of the PAG. These aspects included minute thresholds of moderate- and vigorous-intensity aerobic activity and recommended frequency of muscle-strengthening activity. For each correct response, individuals received one point (scores ranged from 0-6). Demographic information and past-week physical activity (PA) were also reported. RESULTS: The average awareness score was 2.5 ± 1.2 and did not vary by any demographic variable. Most students were aware of muscle-strengthening recommendations, and that both moderate- and vigorous-intensity PA are beneficial. However, less than one-third (29%) of respondents were aware of the specific minute thresholds of PA recommended to achieve health benefits. CONCLUSION: Efforts should be made to increase awareness of minute thresholds of aerobic PA recommendations in this population.

CAN THIRST ACCURATELY PREDICT HYDRATION STATUS IN DAILY LIFE?

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014 Hydration status is assessed via body fluids since "thirst" is not considered objective. PURPOSE: To compare the accuracy of perceived thirst with other biomarkers to classify hydration status. METHODS: Forty-six, non-exercising healthy adults (23 men, 23 women) were examined over two consecutive 24 h periods of euhydration (3.5 L fluid intake) and dehydration (fluid restriction). Logistic regression models were built for: urine osmolality (Uosm), urine specific gravity (Usg), plasma osmolality (Posm), perceived thirst by 10 point Likert scale (CS) and 10 cm visual analog scale (VAS). Predictive accuracy of the models was compared using the area under the receiver operating characteristic curve (AUC). RESULTS: Mean (\pm SD) values for dehydration were: Δ body mass $-2.1 \pm 0.7\%$; Usg 1.027 ± 0.003 , Posm 292.8 ± 5.2 , Uosm 1033.5 ± 96.1 mosmol/kg; and thirst by VAS and CS 7.3 ± 1.8 cm, 7.5 ± 1.4 , respectively. AUC for Posm and thirst VAS was 0.92 and 0.95, respectively, and lower ($p < 0.05$) than Uosm and Usg (AUC=1.00). AUC for thirst CS (0.97) was not different compared to Uosm or Usg. Uosm and Usg yielded 100% sensitivity (detecting dehydration) compared to 89.1, 93.5 and 95.7% for Posm, thirst by VAS and CS respectively. CONCLUSIONS: Hydration status for non-exercising individuals who ingest insufficient fluid is more accurately assessed with urine compared to plasma. Although less sensitive to detect dehydration compared to Uosm and Usg in daily life, perceived thirst can be a useful tool to assess dehydration with CS.
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ASSESSMENT OF DIETARY BEHAVIORS, BODY COMPOSITION, AND CARDIOVASCULAR DISEASE RISK AMONG COLLEGE CLUB RUGBY TEAM

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015 The purpose of this study was to evaluate dietary behaviors, body composition, and potential cardiovascular disease (CVD) risk factors among college club rugby team players. Ten college-aged male participants completed demographics and dietary supplement survey, three 24-hour dietary recalls (two for weekdays and one for weekend day), body composition and blood lipid profile assessments following an overnight fast. Mean age of participants was 20 ± 1 years; weight 81 ± 16 kg; BMI 25.7 ± 3.2 ; body fat $13 \pm 5\%$; waist-to-hip ratio 0.82 ± 0.04 ; total cholesterol 133 ± 37 mg/dl; high-density lipoprotein 49 ± 18 mg/dl; low-density lipoproteins 85 ± 30 mg/dl; triglycerides 86 ± 34 mg/dl. The results of dietary analysis indicated that carbohydrates comprise $44 \pm 1\%$ (3.8 ± 0.1 g/kg), proteins $21 \pm 4\%$ (1.4 ± 0.3 g/kg), and fats $36 \pm 2\%$ of the total calories. Mean intake of total fat and saturated fat exceeded recommendations of the Acceptable Macronutrient Distribution Range (AMDR). Recommended Dietary Allowances (RDA) were met for most of the micronutrients excluding deficiencies for vitamin A 612 ± 200 mcg/dl ($< 32\%$), vitamin E 5 ± 1 mcg/dl ($< 66\%$), and potassium 2268 ± 2339 mcg/dl ($< 52\%$) while mean intake for sodium 4275 ± 540 mg/dl was 2.85 times higher than recommended. In addition, mean intake of fiber 17 ± 4 g was 55% below that recommended by Institute of Medicine. In conclusion, most of the participants did not show any CVD risk factors. However, continuous high intake of total and saturated fat, sodium and low fiber may lead to increased risk for hypertension and hyperlipidemia later in life, thus leading to CVD. Therefore, better education regarding diet is needed not only for improving athletic performance but also long-term health.

EFFECT OF 2-WEEKS MILLED CHIA SEED SUPPLEMENTATION ON PERFORMANCE IN ENDURANCE ATHLETES

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016 Chia seed is an oilseed that was once a major food source for the Aztecs. Chia means "strength" and was considered running food for Aztec messengers. Milled chia seed has 4.4 grams of α -linolenic acid (ALA; 18:3n-3) per 25 gram serving, and previous research in our laboratory indicates that plasma ALA increases significantly within 2.5 h after ingestion, and chronically within the first week of regular intake. Human studies suggest that 60-85% of ALA is utilized by tissues for energy, higher than the 50% conversion shown for other plant oils. No one has yet tested the influence of increased intake of ALA from milled chia seed on prolonged endurance performance. The purpose of this project (randomized, crossover) was to study the effects of increased ALA intake through 2-weeks supplementation of 25 gm/day milled chia seed compared to no chia seed on exercise performance in endurance athletes. Subjects (mean \pm SD age, 34.9 ± 6.8 y, 58.1 ± 5.7 mL \cdot kg $^{-1}$ \cdot min $^{-1}$) included 18 well trained male cyclists who cycled on their own bicycles on CompuTrainers for 2 h (3:00-5:00 pm) at 60% Wattmax with a 15-km time trial inserted after 1.75-h cycling. When randomized to chia seed, subjects consumed 15 gm with breakfast, 10 gm at noon, 15 gm immediately before, and 10 gm after 1 hour of the cycling time trial (thus 50 total grams milled chia seed). For the noon meal, subjects consumed Slim Fast at 10 kcal/kg. After the 1.75-h pre-load at 60% Wattmax, the time to complete the 15-km trial and the average power output did not differ between the milled chia seed and no chia seed treatments (28.32 ± 2.22 and 28.30 ± 2.29 min; 251 ± 39.7 and 247 ± 55.2 Watts, respectively ($P=0.970$, 0.641)). In summary, these data do not support that 2-wk supplementation with 25 gm/d milled chia seed has an influence on 15-km cycling time trial performance.

TIME COURSE OF HORMONAL RESPONSES WITH TWO DIFFERENT MODELS OF DAILY UNDULATING PERIODIZATION IN TRAINED POWERLIFTERS

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Daily Undulating Periodization (DUP) has demonstrated greater muscular performance adaptations than linear periodization. However, the time course of anabolic and catabolic hormonal responses has not yet been investigated in DUP. PURPOSE: To compare temporal hormonal responses of two DUP groups. One group had a weekly training order of hypertrophy, strength, and power (HSP), while the other had a weekly training order of hypertrophy, power, and strength (HPS). METHODS: Eighteen trained powerlifters (age: 21.1±1.9 yrs.; body fat: 9.3±3.2%) were assigned to one of two DUP groups for six wks.: 1) HSP (n=9): hypertrophy (Mon), strength (Wed), and power (Fri) or 2) HPS (n=9): hypertrophy (Mon), power (Wed), and strength (Fri). Participants performed the squat and bench press each session with the addition of the deadlift during the strength session. Blood was drawn at pre- and post-testing sessions as well as 30 minutes before strength sessions each week. A 2x8 repeated measures ANOVA was used with significance set at $p < 0.05$. RESULTS: Main time effects noted decreases in testosterone from baseline (13.1±7.7ng/mL) to 5 (9.0±4.9ng/mL) and 6 wks (8.6±5.4ng/mL), and in cortisol from baseline (41.7±26.0ng/mL) to 3 (31.0±25.0ng/mL) and 4 wks (28.2±15.8ng/mL) with no group differences. CONCLUSION: Both DUP training protocols resulted in similar intra-week hormonal decreases.

017

THE ACUTE EFFECT OF SHORT-TERM BREATHING EXERCISES ON SYMPATHOVAGAL BALANCE IN TYPE 2 DIABETES

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Type 2 diabetes (T2D) is associated with autonomic nervous system damage resulting in reduced heart rate variability (HRV). Limited evidence suggests yogic breathing exercises may improve sympathovagal balance. PURPOSE: Evaluate the effect of a bout of yogic breathing exercise on HRV in T2D vs. an age-matched normoglycemic (CON) population. METHODS: 12 subjects with T2D (7 female, 5 male; 54.9±7.4 years) and 14 CON subjects (12 female, 2 male; 54.7±6.8 years) participated in a 39 min. breathing protocol consisting of two 10 min. bouts of randomly assigned uni-nostril breathing (UNB). UNB bouts were preceded and followed by 5 min. washout periods of dual nostril breathing. HRV was measured by standard deviation of normal-to-normal consecutive heart beats (SDNN), square root of the mean squared differences in successive normal heart beats (RMSSD) and total spectral power (TP). All data (except instantaneous heart rate) were log transformed to induce normality. Within group comparisons were analyzed using ANOVA with repeated measures, between group comparisons were analyzed using independent samples t-test. RESULTS: Between groups comparisons revealed significant reductions in all measures of HRV at nearly all time points in the T2D compared to CON. Within group comparison demonstrated no significant effect on HRV in CON. In the T2D group, however, left UNB significantly reduced mean HR (-1.2 bpm, $p < 0.05$). CONCLUSION: In summary, 2 bouts of UNB had no impact upon HRV in a healthy older population, and only a minimal impact in T2D.

018

EFFECTS OF RESISTANCE EXERCISE ON LIMB VOLUMES IN BREAST CANCER SURVIVORS WITH OR WITHOUT LYMPHEDEMA

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Lymphedema (swelling due to a blockage of the lymph passages) is a common side effect of the treatment of breast cancer that is estimated to effect 157,000 breast cancer survivors (BCS) annually. The fear of developing lymphedema has kept many BCS from engaging in resistance training (RT). Recently, studies have shown that RT does not induce or exacerbate lymphedema. PURPOSE/METHODS: To assess 27 BCS, pre-mid-and post-intervention (6 mo) on the following variables: limb volumes of the cancer involved and uninvolved arms (circumference measures every 4cm beginning at the styloid process and ending at the axillary line), percent difference (%D) in volume between arms, and muscular strength [chest press and leg extension 1-repetition maximum (1RM)]. Lymph nodes removed from the BCS ranged from 1-42. Three BCS had been previously diagnosed with lymphedema at baseline. RT consisted of two days/wk of ten exercises including two sets of 8-12 repetitions at ~60-80% of 1RM. RESULTS: Repeated measures analysis of variance revealed no changes over time in volume of the involved arm (Pre: 2477±525; Mid: 2467±528; Post: 2463±508cm) or the uninvolved arm (Pre: 2456±557; Mid: 2464±552; Post: 2462±533cm), nor was there a change over time in %D between arms (Pre: 1.3±6.2; Mid: 0.5±6.5, Post: 0.6±6.6%). BCS significantly ($p < 0.05$) increased upper (70±22 to 88±22kg) and lower (71±23 to 89±30kg) body strength. CONCLUSIONS: Results suggest that RT is a safe and effective way to improve the muscular strength of BCS without causing adverse lymphedema events. Supported by a grant from the California Dried Plum Board.

019

DISABILITY AWARENESS IN STUDENTS TAKING KINESIOLOGY CLASSES

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INTRODUCTION: People with disabilities are often overweight or obese. A cost-effective model to improve the health of this population is to use university students as wellness coaches in a wellness class for participants with various physical and intellectual disabilities. The purpose of this study is to evaluate disability awareness in student wellness coaches (experimental) and students in other Kinesiology classes (control). The hypothesis is that student wellness coaches will enhance their awareness of health issues faced by people with disabilities. METHOD: A disability awareness questionnaire that contained 16 multiple-choice questions and 3 short answers was developed and distributed to students in the experimental group at both the beginning and mid-semester (n= 10). The control group received the questionnaire at mid-semester (n=30). RESULTS: There was a significant difference between the experimental group (mean= 48.0) and the control group (mean= 43.2) on the disability awareness score ($p = 0.03$). Student wellness coaches also showed improvements in their disability awareness comparing their initial score at the beginning (mean = 43.9), which approached statistical significance ($p = 0.07$). CONCLUSION: Students serving as wellness coaches had significantly higher disability awareness scores compared to students taking other Kinesiology classes, which appeared to be due to changes during the course. The sensitivity of the disability awareness questionnaire needs to be evaluated, as demonstrate of educational benefits of wellness courses for people with disabilities is necessary if such courses are to be sustained. Supported by the UGA Obesity Initiative and the Vice President for Instruction.

020

THE ACCURACY OF SIMULATED INDOOR TIME TRIALS USING A COMPUTRAINER AND GPS DATA

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021

The CompuTrainer is commonly used to measure cycling time trial performance in a laboratory setting. Previous research has demonstrated that the CompuTrainer tends toward underestimating power output at higher workloads, but provides reliable measures. The extent to which the CompuTrainer is capable of simulating outdoor time trials in a laboratory setting has yet to be examined. The purpose of this study was to examine the effectiveness of replicating an outdoor time trial course indoors on the CompuTrainer by comparing completion times between the actual time trial course and the replicated outdoor time trial course on the CompuTrainer. A global positioning system was used to collect data points along a local outdoor time trail course. The data was then downloaded and converted into a time trial course for the CompuTrainer. Eleven recreational to highly trained cyclists participated in this study. To participate in this study subjects had to have completed a minimum of two of the local Cleves time trial races. Subjects completed two simulated indoor time trials on the CompuTrainer. Mean finishing times for the indoor performance trial (34.37±8.76) were significantly slower in relation to the mean outdoor performance time (26.11±3.17). Cyclists' finish times increased (performance decreased) by 24% on the indoor time trials in relation to the mean outdoor times. There were no significant differences between CompuTrainer trial one (34.77±8.54) and CompuTrainer trial two (34.37±8.76). Due to the significant differences in times between the indoor and outdoor time trials meaningful comparisons of performance times cannot be made between the two. However, there were no significant differences found between the two CompuTrainer trials and therefore the CompuTrainer can still be recommended for laboratory testing between trials.

VOLUME LOAD AND TRAINING INTENSITY WITH AND WITHOUT EXERCISE DISPLACEMENT

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022

PURPOSE: Controlling and monitoring volume load (VL) and training intensity (TI) is essential to managing injuries, fatigue and the recovery-adaptation process in competitive athletes. Conventional calculations of VL (sets x reps x load) and TI (VL/reps) give no consideration to barbell displacement during resistance training exercises. The purpose of this investigation was to determine whether the inclusion of displacement in VL and TI calculations would provide substantial benefits over conventional calculations of VL and TI. METHODS: Eight trained weightlifters (5 male, 3 females, 173.6 cm and 88.6 kg), 7 of which were national level, participated in the study. For each subject, a V-scope 120 was used to measure the concentric phase displacement of 24 different exercises performed during the study. VL, TI, VL with displacement (VLwD) and TI with displacement (TIwD) were calculated on a daily basis (VLwD = VL x displacement, TIwD = VLwD/reps). Loads and repetition counts were recorded for each exercise performed over 21 weeks of training which allowed for the calculation of VL, VLwD, TI and TIwD across several training phases. RESULTS: VL correlated strongly to VLwD ($r=0.98$) while TI also correlated strongly with TIwD ($r=0.88$). CONCLUSIONS: Results suggest that if exercise selection remains consistent, measuring VL and TI without displacement can illustrate workloads similar to measuring VL and TI while factoring in displacement.

MOTIVATION FOR PARTICIPATING IN CORPORATE WELLNESS PROGRAMS

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023

PURPOSE: This research examines employee motivations for participating in corporate wellness programs. Program participation can be beneficial to both employees and employers as benefits from physical activity include increased energy, reduced stress, and increased general overall health. Therefore, employers have a more productive workforce because they are healthier both physically and emotionally. A challenge for health and fitness professionals is to increase participation in these corporate wellness programs. METHODS: The Exercise Motivation Inventory (EMI-2; Markland & Hardy, 1997) was used to assess motivation of employees at a Fortune 500 company with 1,400 employees. The company has a health and fitness center on site and offers a variety of wellness programming. A total of 107 respondents completed questionnaire items assessing exercise motivations and participation in wellness programs. RESULTS: Mean scores were calculated for the dimensions measured in the EMI-2. The dimensions with the highest mean scores were 1) positive health, 2) ill-health avoidance, 3) strength and endurance, and 4) weight management. The dimensions with the lowest mean scores were 1) affiliation, 2) competition, 3) health pressures, and 4) social recognition. The most popular programming activities were intramurals and group fitness activities. CONCLUSIONS: The results revealed that intrinsic motivation factors (e.g., health and lifestyle benefits) are most important to participants. Corporate wellness professionals can use this information to develop marketing strategies to increase program participation and also ensure that the benefits of a healthy and active lifestyle are effectively communicated to employees. Knowing the most popular programming options can also assist in meeting the interests of employees thus not only increasing participating but also retaining current participants.

TAILORED TEXT MESSAGING TO SUPPORT PHYSICAL ACTIVITY IN FEMALE UNDERGRADUATE STUDENTS

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024

The purpose of this study was to evaluate the effects of tailored text messages on physical activity (PA) levels in undergraduate females. Thirty-four undergraduate females at a university in the Southeast were randomly assigned to an intervention (n=17) or control (n=19) group. The intervention group received an average of three text messages per week for 12 weeks. Texts were tailored to each participant based on preferred options and available times to perform PA, as well as preferences for message content (e.g. motivational quote, gentle encouragement, voice of authority). Physical activity was measured for seven consecutive days with the Omron pedometer at baseline and again at 8 weeks. Subjects provided qualitative feedback via surveys. The control group had a higher mean number of step counts at baseline (7672.5 ±2258.0 vs. 6426.3 ±1412.9, $p=.06$) compared to the intervention group as well as significantly lower BMI (22.7 ±3.3 vs. 29.8 ±8.6, $p=.002$). There was no significant change in step counts between groups after 8 weeks. Analysis showed a decrease in steps for the control group and an increase in steps for the intervention group but these differences were not significant. Ninety-four percent of the intervention subjects were satisfied or very satisfied with the content of the texts. While PA levels did not change significantly over the intervention, the control subjects followed a typical trend in activity levels (decreasing as the semester progressed) while the intervention group showed a trend toward increasing activity levels. The results may be limited by the sample size and dissimilarities between groups. The positive responses to the messages indicate further evaluation of physical activity promotion through text messaging in undergraduate females is warranted.

THE RELATIONSHIP BETWEEN EXECUTIVE FUNCTION, BODY COMPOSITION AND STRENGTH IN OLDER ADULTS: FITNESS OR FATNESS

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025

PURPOSE: The purpose of the investigation was to assess the relationship between executive function, body composition and strength in community dwelling older adults without cognitive impairments. **METHODS:** Twenty-three females and eight males (61.41 ± 1.7 y) completed the investigation. DXA (Lunar Prodigy) was used to assess lean mass (LM), fat mass (FM) percent body fat (BF) and bone mineral density (BMD). Strength was measured using the Senior Fitness Test chair stand and arm curl test. Executive function was assessed using the Trail Making Test and Stroop Task. **RESULTS:** Pearson correlations (r) were analyzed between BMI, LM, FM, percent BF, BMD, strength and measures of executive function. No significant relationships were found with BMI, LM, FM or percent BF and executive function measures (Trail Making tests and Stroop Task). The analyses indicated a significant relationship between the Trail Making tests, BMD and strength measures (r range -0.39 to -0.47, p < 0.05). The only Stroop Task demonstrating a significant relationship was time to name neutral words (r range -0.40 to -0.47, p < 0.05). **CONCLUSIONS:** In conclusion, the results of the investigation suggest fitness (i.e., strength and BMD) may be more relevant than fatness (BMI, and BF) in relation to executive function in older adults. Further investigation is warranted.

PHYSICAL ACTIVITY POSITIVELY AFFECTS PHYSICAL DIMENSIONS OF HEALTH RELATED QUALITY OF LIFE IN OLDER ADULTS

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026

PURPOSE: The influence of adiposity (%Fat) and physical activity (PA) on health related quality of life (HR-QOL) in older adults remains incompletely characterized. The aim was to evaluate the independent effects of %Fat and PA on HR-QOL. **METHODS:** Older adults (n=128, 75.0±6.3 y; 30% male) were assessed for %Fat via DXA, PA using questionnaire (MET/hours per week of moderate intensity activity) and HR-QOL using the SF-36 subscales [1. physical function (FUNC), 2. role physical (PHYS), 3. bodily pain, 4. general health, 5. vitality (VIT), 6. social function, 7. role emotional, 8. mental health, 9. physical health component (PHC), 10. mental health component]. **RESULTS:** As expected, PA and %Fat were related (r = -0.28, p < 0.01). Men were leaner and engaged in 60% more PA compared to women (p < 0.05); however, they did not differ in aspects of HR-QOL (all p > 0.05). PA and %Fat did not influence pain, general, social, emotional or mental health aspects of HR-QOL. Lower %Fat was associated with better FUNC (r = -0.24, p < 0.01). Greater PA was positively associated with FUNC (r = 0.35), PHYS (r = 0.19), VIT (r = 0.26) and PHC (r = 0.24) (all p < 0.05). Regression analyses, controlling for sex, revealed that PA independently explained variance in FUNC (11%), PHYS (4.5%), VIT (7%) and PHC (6%) (all p < 0.05), whereas %Fat did not independently contribute to these aspects of HR-QOL. **CONCLUSIONS:** Adiposity and PA impact physical dimensions of HR-QOL; however, the effects of PA are more robust; the relative and independent effects of PA on HR-QOL warrants further study.

INDIVIDUAL- AND SOCIAL- LEVEL CORRELATES OF ADOLESCENT PHYSICAL ACTIVITY

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027

PURPOSE: To examine the association between adolescent physical activity (PA) and individual-psychosocial factors as well as peer and parent support. **METHODS:** Data were from the 2010 Eating and Activity among Teens (EAT), a large cross-sectional study conducted in 20 middle schools and high schools in Minnesota. Self-report PA was calculated into total hours of PA per week. Parental support and peer support were derived from questions inquiring about the extent parents and friends encouraged and supported the individual to be active. Individual-level factors were assessed using separate scales for PA enjoyment, PA self-efficacy, and PA barriers. **RESULTS:** The sample consisted of 2580 participants (14.5 ± 2 yrs, 54% female, 70% non-white). When all the predictor variables were entered simultaneously into the regression model, controlling for age, sex, race, and SES, only peer support (p < .001), PA enjoyment (p < .0001), and PA self-efficacy (p < .0001) remained significantly associated with total PA per week. A Williams-Hotelling t-test indicated that PA self-efficacy had a significantly stronger (p < .0005) association with total PA per week compared to either peer support or PA enjoyment. **CONCLUSIONS:** Peer support, PA enjoyment, and PA self-efficacy were significant correlates of self-report PA in adolescents, with PA self-efficacy having the strongest association. Supported by NIH NHLBI and NICHD.

EFFECTS OF SHOULDER FATIGUE ON SCAPULAR KINEMATICS IN PITCHERS

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028

PURPOSE: The purpose of this study was to identify changes in scapular kinematics during the cocking and acceleration phases of pitching following shoulder fatigue. **METHODS:** Four male baseball pitchers (13.3 ± 1.1 years; 58.7 ± 20.0 kg; 160.8 ± 8.5 cm) volunteered. Participants threw 5 fastballs for strikes and then threw a 2 kg ball into a rebounder until they reached maximum perceived fatigue based on a 0-3 scale. Following fatigue, 5 more fastballs for strikes were thrown and the fastest pitch pre and post fatigue were selected for analysis. **RESULTS:** Scapula external/internal during the cocking phase was (-0.3 ± 16.3 to 7.5 ± 30.1 degrees) and during the acceleration phase (0.9 ± 14.1 to -0.2 ± 71.7 degrees). Scapula upward/downward rotation was (-17.8 ± 24.6 to -39.2 ± 23.9 degrees) during cocking and (-15.7 ± 31.7 to -32.7 ± 27.8 degrees) during acceleration. Scapula anterior/posterior tilt during cocking was (-4.4 ± 27.3 to 32.3 ± 12.0 degrees) and during the acceleration phase (-5.0 ± 22.3 to 9.1 ± 29.0 degrees). **CONCLUSION:** During arm elevation the scapula must rotate upward, externally rotate, and posteriorly tilt to maximize subacromial space and prevent impingement of the rotator cuff musculature. These motions were all increased following fatigue in pitchers possibly indicating increased subacromial space is needed due to altered glenohumeral kinematics or muscle activation. Further research is needed to better understand the importance of the scapula in overhead activities.

EFFECT OF FATIGUE ON ELBOW AND SHOULDER KINEMATICS IN YOUTH BASEBALL PITCHERS

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029

PURPOSE: The purpose of this study was to examine the effect of fatigue on shoulder and elbow kinematics in the cocking and acceleration phases during different types of baseball pitches. **METHODS:** Six male baseball pitchers (12.8 ± 1.3 years; 50.5 ± 22.0 kg; 155.3 ± 11.2 cm) volunteered. Each participant threw, in a randomized order, three maximal effort fastballs, curveballs, and changeups for strikes pre and post a fatiguing protocol. The fatiguing protocol consisted of throwing a 2-kg medicine ball against a rebounder until the subject reported a 3 for their perceived fatigue (scale 0-3). Three-dimensional motion capture data were collected using a Flock of Birds (Ascension Technology, Burlington, VT). **RESULTS:** MANOVA revealed no significant elbow or shoulder kinematic differences ($p < 0.05$). **CONCLUSIONS:** Altered throwing mechanics at the elbow and shoulder have been shown to be injury predictors in baseball pitchers. Improper mechanics, seen particularly in youth, can cause excess forces at the elbow and shoulder as the musculature functions to deliver the ball with the proper velocity and spin. However, our results suggest that fatigue had no effect on elbow flexion, shoulder plane of elevation, shoulder elevation, or shoulder rotation across the three pitches thrown. It should be noted that a limitation of this study is the examination of a small sample size. Further research should examine upper extremity kinematics and kinetics post fatigue, in a larger sample size, to better understand fatigue effects and implications for injury.

HIP AND KNEE JOINT ANGLES AFFECT RECTUS FEMORIS HIP FLEXION TORQUE

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030

PURPOSE: The rectus femoris (RF) acts as a knee extensor and a hip flexor. The angles of the two joints alter the length of the muscle and affect the torque it can exert in various positions. The purpose of this study was to investigate the influence of knee and hip angles on the RF's ability to produce a hip joint flexor moment. **METHODS:** The hip flexion moment of 16 female subjects 20.6 (2.2) years, 1.7 (0.1) height and 64.2 (13.0) weight, was tested with selective RF stimulation using a monophasic surface electrical generator. The hip flexion torque in the sagittal plane was measured at hip joint angles of 850, 700, 550, 400, 250, 100 crossed with four knee angles (00, 300, 600, 900). The peak torque (Nm) of each trial was recorded by an isokinetic dynamometer. **RESULTS:** A significant main effect was found for the knee ($p = .03$). The mean torque of 10.44 Nm at 00 knee flexion rose to 14.12 Nm at 900 knee flexion. The greatest torque (15.27 Nm) was obtained at the 900/100 (knee/hip) joint combination, and the least (9.94 Nm) was found at the 00/700 joint combination ($p < .05$). **CONCLUSION:** The more acute the knee angle, the greater the hip flexion moment produced by the RF. More specifically, to maximize the RF role in hip flexion, these data suggest that the knee should be flexed to at least 600.

MUSCLE ACTIVATION TRIGGERS FOR GAIT TRANSITIONS IN UNILATERAL, TRANSTIBIAL AMPUTEES

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031

PURPOSE: Determine how the reduced propulsive abilities of unilateral, transtibial amputees (TT) affect gait transition speed (GTS) and which muscles potentially trigger this transition. **METHODS:** Subjects: 5 TT and 5 matched controls (CON). Protocol Day 1: GTS determined by an incremental protocol of increasing and decreasing treadmill speeds. Day 2: Subjects walked and ran for 30s trials on a dual belt treadmill at 10% increments from 50-130% of their GTS. Electromyographic data (1080Hz, Noraxon) was collected from lower extremity muscles. Data from 10 strides was averaged and normalized to peak activation of walking at 130% GTS. These activations for each subject were plotted for running and walking [mean activation vs. % GTS (50-130)]. The normalized speed where the fit third order polynomials for walking and running intersect was identified as the "crossover point," where one gait required more activation/exertion than the other. **RESULTS:** TT transitioned between gaits at significantly lower absolute speeds ($1.72\text{m/s} \pm 0.10$) than CON ($2.08\text{m/s} \pm 0.10$) ($p < .01$). CON crossover points for TA, BFL, & RF (walk-run transition) as well as the SO & MG (run-walk transition) were not significantly different from 100 ($p < .05$). TT crossover points for BFL* (123.4 ± 8.8) & RF (107.0 ± 22.1) were higher than the GTS ($p < .05$) and therefore unlikely to trigger the walk-run gait transition. TA (82.1 ± 8.8) and SO (109.5 ± 12.2)/MG (111.6 ± 13.5) most likely trigger walk-run transitions and run-walk transitions respectively in TT. **CONCLUSIONS:** TT transition between gaits at lower speeds than CON. Gait transitions most likely triggered by TA, SOL, and MG activations.

ACCURACY OF PHYSICAL ACTIVITY MONITORS IN PERSONS WITH CLASS III OBESITY

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032

BACKGROUND: Small, wearable monitors are widely used to assess physical activity (PA) in obesity treatment programs ranging from lifestyle interventions to post-bariatric surgical programs. Although wearable monitors can overcome the recall biases often associated with self-reports, the accuracy of these devices may be impacted by anthropometric measures, mode of PA, and wear location. Thus, it is important to examine the accuracy of objective PA monitors during commonly performed activities such as walking. **METHODS:** Fifteen individuals with class III obesity completed a self-paced 6-minute walk while wearing the StepWatch 3 (SW3), Omron, Digiwalker (DW), SenseWear Pro 2 Armband (SWA), and Fitbit objective PA monitors. Simultaneously, energy expenditure (EE) was measured using a portable indirect calorimeter. Height, weight, hip circumference, and waist circumference were also measured. Monitor values for step counts and Calories were compared to hand tally counts and indirect calorimetry (IC), respectively. **RESULTS:** Step-counting percent errors (PE) were not significantly different among the SW3 (PE=0.56%), Omron (PE=5.53%), and Fitbit (PE=4.33%). The DW significantly undercounted steps by 28% ($p = 0.037$). The SWA overestimated EE by 71.6% ($p = 0.003$), while the Fitbit's 10% overestimate did not differ significantly from IC ($p = 0.114$). **CONCLUSION:** Objective monitors are useful for step counting and estimating energy expenditure, but consideration should be given to device accuracy when selecting evaluative tools for the bariatric population.

ELEVATED CIRCULATING TNF- α IN OLDER WOMEN WITH NO GAINS IN LEAN MUSCLE MASS FOLLOWING 16-WEEKS OF EXERCISE TRAINING

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**AMERICAN COLLEGE
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O33

We previously showed that three different protocols of combined resistance and aerobic training (RET/AET) led to similar improvements in muscle strength and endurance in older women. Cross-sectional studies have demonstrated that higher levels of inflammatory cytokines are associated with lower muscle mass and strength. Therefore, the objective of this study was to examine whether circulating inflammatory cytokines were associated with lean muscle mass responses to 16-wks of combined (RET/AET) training in a cohort of older women. Subjects were 50 postmenopausal women over 60 yrs of age, mean BMI 27 ± 4 , and physically untrained. Body composition, muscle strength, and serum concentrations of tumor necrosis factor (TNF- α), C-reactive protein (CRP), and interleukin 6 (IL-6) were measured at baseline and 16-wks post. Individuals were grouped as responders (positive gain in fat-free mass, n=30) and non-responders (no gain in fat-free mass, n=20). Comparisons of changes in body composition, strength, and inflammatory markers were performed using repeated measures ANOVA. Both groups significantly improved muscle strength (1-RM chest press, shoulder press, leg press; $P < 0.001$). A group interaction was observed for TNF- α ($P < 0.05$). Results from one-way ANOVA revealed that circulating TNF- α was significantly higher in non-responders at baseline ($P < 0.05$) and 16-wks post ($P < 0.01$) as compared to responders. Furthermore, these differences remained after adjusting for baseline fat mass or change in fat mass ($P < 0.05$). In conclusion, these results showed that older women that do not gain lean muscle mass following 16-wks of combined AET/RET had significantly higher circulating serum TNF- α concentrations compared to women that did increase lean muscle mass, suggesting that TNF- α may interfere with skeletal muscle hypertrophy to combined RET/AET in older women.
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CONCUSSION IMPAIRS SOME GAIT STEPPING CHARACTERISTICS WHEN COMPARED TO A HEALTHY GROUP

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Postural instability is a cardinal symptom of concussion and impairments persist for 3 – 5 days post injury often despite the continued presence of symptoms. Conversely, the neurometabolic cascade is theorized to persist for 7 – 10 days. **PURPOSE:** The purpose of this study was compare gait stepping characteristics between acute concussed individuals and healthy control subject's pre-injury, Day 1 and Day 10 post-injury. **METHODS:** 18 subjects were recruited; 9 were concussed (age: 19.8 + 1.5 years; height: 172.7 + 15.5cm; weight: 79.6 + 24.3kg; Grade II Cantu Evidence Based grading scale) and 9 controls (age: 20.3+ 1.4 years; height: 168.0 + 11.2cm; weight: 79.0 + 20.7kg) subjects. All subjects performed 10 trials of gait on the specified days (Pre-injury, Day 1, Day 10) utilizing a valid and reliable instrumented walkway. The primary outcomes measures were the mean step velocity, and length, Heel- Heel Base of Support (HH-BOS), and percentage of the gait cycle in Swing phase (Swing). Analysis was done using a 2 x 3 repeated measures ANOVA. **RESULTS:** All concussion participants had reached baseline values on all clinical tests (BESS, SAC, neuropsychological testing, and self-report symptom free) by Day 10 post-injury. There was a significant interaction for step velocity ($F=5.291$, $p=.010$) and step length ($F=11.344$, $p=0.004$), but not for HH-BOS ($F=.067$, $p=.881$) or Swing ($F=.061$, $p=.881$). Post-hoc independent T-Test identified between group differences for Step Velocity Day 1 ($P=0.007$) and Day 10 ($P=0.05$). **CONCLUSION:** The results of this study indicate that step velocity is impaired at least 10 days post-concussion, despite full resolution of clinical tests. These results further recent findings that dynamic assessments of postural control may identify lingering and persistent impairments in postural control post-concussion despite apparent clinical recovery. Supported by a grant from the NIH/NINDS.

P1

LOWER-EXTREMITY MOBILITY & QUADRICEPS STRENGTH OF OLDER OVERWEIGHT ADULTS: BASELINE DATA FROM THE I'M FIT STUDY

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PURPOSE: The primary aim was to investigate the correlation between lower-extremity mobility and quadriceps strength in overweight older adults. **METHODS:** Baseline data from the I'M FIT study was examined for 13 males and 23 females ($n=36$) aged 65-79 years with BMI of 27-34.9 kg/m². Lower-extremity mobility was assessed by the Short Physical Performance Battery (SPPB) and 400m Walk Test. Quadriceps strength was represented by maximum torque during knee extension using an isokinetic dynamometer, then normalized by BMI. We examined its relationship with five tasks: 400m walk speed, total SPPB score, balance score, 4m gait speed, and chair stand time. **RESULTS:** Quadriceps strength and 400m walk speed were positively correlated for both males ($r= 0.73$, $p<0.05$) and females ($r= 0.73$, $p<0.01$). Females exhibited a significant correlation between quadriceps strength and total SPPB score ($r= 0.50$, $p<0.05$) as well as chair stand time ($r= -0.62$, $p<0.01$). We found no other significant correlations for males or females. **CONCLUSIONS:** These data suggest that quadriceps strength is a significant component of lower-extremity mobility in older, overweight adults when walking longer distances. Funded by the National Institute On Aging R01AG020583.

P2

BALANCE ABILITY AND FALL RISK IN FEMALE COLLEGIATE CHEERLEADERS AND CROSS COUNTRY RUNNERS

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Cheerleaders (CH) and cross country runners (CC) are inherently exposed to increased fall risk and fall-related injuries while participating in their sport. However, little research exists regarding balance ability and fall risk in these athletes. **PURPOSE:** To compare balance ability and fall risk in female CH and CC. **METHODS:** CC ($n=6$; 20 ± 1 yr) and CH ($n=11$; 20 ± 1 yr) provided information regarding recent falls and injuries, then underwent the "timed up and go" (TUG) and "five times sit to stand" (FTSS) tests, and computerized fall risk (FR) and limits of stability (LOS) tests. Data were analyzed using independent samples t-tests and correlational analyses (significance = $p\leq 0.05$). **RESULTS:** 76% of subjects reported a fall within the past year, with 18% of those reporting an injury from the fall. 59% reported lower extremity (LE) injuries within the past year resulting from participation in their sport. TUG times were correlated with LOS times ($r=0.566$; $p<0.05$) and inversely correlated with recent injuries ($r=-0.488$; $p<0.05$). CC had better FR scores than CH (0.41 vs. 0.68 for CC and CH, respectively; $p<0.05$). **CONCLUSIONS:** Our data indicate that CC and CH are at high risk for falls, and TUG times are related to recent LE injury and performance on the LOS test. Despite CC having better FR scores than CH, 100% of CC had fallen in the past year. This suggests that conditioning programs should not only focus on muscle strength and cardiovascular endurance, but also balance ability.

P3

THE EFFECT OF FATIGUE ON PLANTAR PRESSURE IN A COMPETITIVE COLLEGIATE SOCCER PLAYER

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Soccer is a popular recreational activity that has been linked to higher rates of 5th metatarsal stress fractures in male soccer players as compared to females. More soccer injuries occur at the ends of halves, which may be explained by fatigue. Metatarsal loading patterns can be studied through plantar pressure measurements, though there is little research investigating the influence of fatigue on plantar pressure in cleated sports. **PURPOSE:** The purpose of this study was to investigate the effect of fatigue on plantar loading patterns in a male soccer player. **METHODS:** This case study utilized a pretest/posttest design to compare plantar pressure data collected while the subject performed soccer cutting maneuvers before and after a fatiguing intervention. Levels of fatigue were measured using the Borg scale and validated using blood lactate measures. Initial fatigue levels were recorded and plantar pressure data were recorded during an agility course consisting of side and cross-cuts. A modified Loughborough Intermittent Shuttle Test was utilized as the fatiguing intervention. Fatigue levels and plantar pressure data were again collected during the agility course. **RESULTS:** A fatigued condition resulted in a 38% increase in peak pressure, a 34% increase in maximum force, a 10% reduction in foot contact time, and no substantial change was found in contact area in the lateral aspect of the foot, where the 5th metatarsal is located. **CONCLUSIONS:** Several aspects of plantar pressure appear to substantially change with fatigue and further research should be conducted to see if these trends are replicated in larger populations of male soccer players to determine significance.

P4

IMPACTS ON MUSCLE ACTIVITY WHILE WALKING IN OCCUPATIONAL FOOTWEAR

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P5 INTRODUCTION: Workplace fatigue is typically induced over a prolonged time period at a very low rate due to maintenance of posture throughout the work period. The deleterious effects of prolonged standing may be more pronounced while donning industry standard footwear. PURPOSE: The purpose of this study was to analyze the effect of three industry standard occupational footwear on lower extremity muscle activity when exposed to prolonged durations of standing and walking. METHODS: Fourteen healthy adult males (age: 23.6±1.2 yrs; ht: 181±5.3 cm; mass: 89.2±14.6 kg) completed this study. The experimental session included an extended duration of walking (4 hours) with muscle activity measured at 30min intervals (Pre, 30, 60, 90, 120, 150, 180, 210 & 240 min) in three occupational footwear; Work Boots (WB), Tactical Boots (TB) and Low Top Shoes (LT). Participants' MVC of the medial gastrocnemius (PF) and tibialis anterior (DF) were tested using surface electromyography. EMG peak and mean were evaluated using a 3x9 RMANOVA to identify any differences within exposure time and footwear types at an alpha level of 0.1. RESULTS: Significant differences in EMG peak for PF and in EMG mean for PF and DF was found between footwear with no significant differences over time and time-footwear interaction. Pairwise comparison between footwear revealed LT having significantly greater MVCs compared to WB and TB. CONCLUSIONS: Although the mean and peak EMG for PF and DF decreased over time, the workload placed on the lower extremities over the 4 hour exposure to standing and walking was not sufficient to cause a significant decrement in the MVCs to suggest the presence of fatigue. However, footwear differences were seen, with WB and TB having significantly lower MVCs for both PF and DF compared to LT, which may be attributed to the restricted range of motion around the ankle joint due to their elevated boot shafts.

A DESCRIPTION OF SEGMENTAL SPEEDS OF THE UPPER EXTREMITY IN THE YOUTH PITCHING: FASTBALL AND CHANGE-UP

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P6 PURPOSE: The purpose of the study was to quantitatively examine segmental speeds of the upper extremity in youth while throwing the fastball and change-up. METHODS: Eight male baseball pitchers (12.5 ± 1.6 years; 54.0 ± 20.3 kg; 157.4 ± 13.5 cm) volunteered. Kinematic data were collected using the MotionMonitor™ (Innovative Sports Training, Chicago IL) electromagnetic tracking system. Participants threw 5 fastballs and change-ups for strikes, in a randomized order. The fastest fastball and change-up pitch was chosen for detailed analysis. The acceleration phase was defined as maximal external rotation to ball release. RESULTS: The fastball pitch revealed humeral and forearm speed of 1431.7 ± 345.3 and 2184.8 ± 562.9 degrees/sec, respectively. The change-up pitch displayed humeral and forearm speeds of 1410.3 ± 330.3 and 2298 ± 390.7 degrees per second respectively. CONCLUSION: The two different pitches followed the summation of speed principle with the most distal segment displaying the greatest velocity. The change-up, which is an off speed pitch, exhibited the greatest distal segment speed. This finding leads the authors to question the mechanics of the change-up pitch thrown in these youth. A limitation of this study was a low sample size, thus only descriptive data were reported. Further research is warranted in attempt to thoroughly understand youth mechanics when throwing different types of pitches.

FOOTWEAR AND CADENCE EFFECT ON SPATIOTEMPORAL GAIT PARAMETERS

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P7 PURPOSE: To investigate the effects of standard, non-running athletic footwear and barefoot gait mechanics on spatiotemporal gait parameters in response to fixed, matching cadences. METHODS: Twenty (10 female, 10 male) healthy participants volunteered for the study. Participants walked on an instrumented walkway (GAITRite, CIR Systems, Inc., Havertown, PA, USA) during six conditions, with each condition including six trials. Data was averaged across the six trials. The six included conditions were: participants walking at a self-selected pace while shod (SHF), self-selected pace while barefoot (BFFW), shod while walking faster than self-selected (SHF), barefoot while walking faster than self-selected (BFF), shod while walking at a 150 steps per minute (SH150), and barefoot while walking at 150 steps per minute (BF150). During the SHF and BFF conditions, participants were provided the verbal instructions that they were to imagine they were late to a meeting. During the fixed cadence trials, participants were provided an audible metronome matching the desired cadence and asked to match it. RESULTS: A 1 (Participant) x 6 (Condition) repeated measures ANOVA was completed with dependence on walking velocity, stride length, and cadence. Results indicate there were significant main effects for walking velocity, cadence, and stride length ($p < 0.001$). CONCLUSIONS: The results of the present study indicate that there are significant differences in shod and barefoot walking mechanics, even when performed under controlled conditions. Resulting differences in spatiotemporal variables may be caused by differences in joint kinematics at footstrike. Future research should be directed towards understanding the causative factors for these changes.

VERTICAL GROUND REACTION FORCE DURING FOUR LOADING CONDITIONS

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P8 PURPOSE: Previous research demonstrates the efficacy of countermovement (CM) versus no CM (Arakawa, Nagano, Yoshioka, & Fukahsiro, 2010). Given that canines lift their paws 4-8 cm before performing a CM in the canine sprint start (Angle, 2009), it should be considered that alternative loading configurations may improve performance. METHODS: Ten male participants (mass, 84.9±8.9kg; height, 1.8±0.07m) were recruited. The ground reaction force (GRF) was measured during plyometric pushups from the modified position under 4 conditions (A, B, C, and D). Condition A was performed from a pre-determined elbow flexed position. Condition B, similar to a CM jump, involved beginning in the modified push-up position then lowering and pushing vertically. Condition C involved standing on one's knees with arms positioned anteriorly. The participant fell forward into a CM, similar to a depth jump. The novel condition, condition D, began from the modified push-up position. Each participant lifted his hands from the ground and fell into a CM. RESULTS: A 1 (Participant) x 4 (Condition) repeated measures ANOVA was used to analyze difference in peak GRF during the concentric phase. The analysis indicated that significant differences exist between conditions ($F = 30.157, p < .001$). Significant differences were found between condition A and all other conditions ($p < .001$). CONCLUSION: The statistics suggest that force production is impacted by the loading configuration. This study augments research stating that a CM is better than no CM.

FEMALE DIVISION 1 CROSS COUNTRY RUNNERS: IS BALANCE AN ISSUE?

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Cross country runners (CC) often train on terrain that is uneven, unstable, and physically challenging. These conditions could potentially lead to increased fall risk; however, little is known about balance ability and fall risk in CC. **PURPOSE:** To examine recent fall and injury history and their relationships with balance ability in female Division I CC. **METHODS:** During the peak of CC season, six female (20±2 yr, 20.5±1 BMI) CC members completed a health history questionnaire including information regarding recent injuries and falls. They also underwent two series of balance tests on separate days, but within a one week time period. The tests included a “timed up and go” (TUG), “five times sit to stand” (FTSS), and computerized limits of stability (LOS) and fall risk (FR) tests. Data from the second day of testing were analyzed using Pearson r or Spearman’s Rho correlational analyses where appropriate; significance was set at $p < 0.05$. **RESULTS:** 100% of CC had experienced a fall within the past year, while 83% had suffered a lower extremity injury within the same period. Also, there was a significant negative correlation between FR and FTSS tests ($r = -0.812$; $p = 0.05$). **CONCLUSIONS:** Although CC scored well in the FR test (as compared to predicted normative data), all runners had fallen within the past year, and the FR scores were inversely related to FTSS times. Slower FTSS times suggest possible leg weakness due to the high percentage of recent injuries, insufficient balance and strength training, or even choice of training shoes. The data also suggest that the Biodex FR test alone should not be used to assess fall risk in young CC

P9

Undergraduate Research

ASSESSMENT OF BALANCE ABILITY AND FALL RISK IN FEMALE COLLEGIATE CHEERLEADERS

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Due to the nature of the activity, competitive cheerleaders (CH) are susceptible to falls, which can lead to injury. However, CH that get put into the air (“flyers”; F), may have better balance ability as compared to CH that hold or support flyers (“bases”; B). However, no previous research could be located comparing balance ability and fall risk (FR) between F and B. **PURPOSE:** To assess balance ability and FR in female, collegiate CH. **METHODS:** CH ($n=11$; 20±1 yr) completed a health history questionnaire regarding recent falls and injuries, then were grouped by position (B: $n=6$; F: $n=5$). Subjects then completed the “timed up and go” (TUG), the “five times sit to stand” (FTSS), and computerized FR and limits of stability (LOS) tests. Data were analyzed using correlational analyses and independent samples t-tests; significance was set at $p < 0.05$. **RESULTS:** Within the past year, 63.6% of CH experienced a fall while 45% reported lower extremity injuries due to participation in their sport. There were significant correlations between FR scores and both FTSS ($r=0.752$; $p<0.01$) and recent injury ($r=-0.752$; $p<0.01$). There were also significant correlations between TUG and both LOS times ($r=0.741$; $p<0.01$) and FR ($r=0.657$; $p<0.05$). F had better FR scores than B (0.60 vs. 0.74; $p<0.05$). **CONCLUSIONS:** Our data indicate that both CH positions are at high risk for falls, despite F having significantly lower FR than B. The data also indicate that FR is related to recent injury and indices of leg strength. This suggests that conditioning programs should also focus on balance ability along with muscle strength.

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Undergraduate Research

EFFECTS OF PREVIOUS LATERAL ANKLE SPRAIN ON BALANCE

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PURPOSE: The lateral ankle sprain is the most common athletic injury. Some people who suffer a lateral ankle sprain develop chronic ankle instability (CAI), while others have no residual problems and are known as ankle sprain copers. Balance deficits have been previously reported among participants with CAI. The purpose of the project was to measure the participants’ postural sway while standing on one leg and determine the influence of a previous ankle sprain on postural sway. **METHODS:** Twenty one participants completed the study, including ten participants had no history of a lateral ankle sprain, five participants with a history of a lateral ankle sprain but with no residual symptoms that were ankle sprain copers, and six participants with CAI. Postural sway, as indicated by radial displacement, 95% ellipse area, and average velocity of the center of pressure (COP) was measured using an AMTI force platform. The participants single leg balance was assessed with the eyes open, eyes closed, and on a foam surface. The order of trials was randomized. **RESULTS:** There were no significant differences ($P>.05$) between groups for any condition; however across all groups there was a significantly greater ($P>.05$) sway velocity (EC=3.66+1.43 in/s; EO=2.15+.75 in/s; FO=2.44+.61 in/s) and radial displacement (EC=.89+1.15 in; EO=.50+.31 in; FO=.57+.53 in) during the trials with the eyes closed. **CONCLUSIONS:** A previous ankle sprain did not effect static balance. The differences in sway during the eyes closed trials is likely due to the absence of the visual component.

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Undergraduate Research

EFFECTS OF PREVIOUS LATERAL ANKLE SPRAIN ON ANKLE JOINT LAXITY

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PURPOSE: The lateral ankle sprain is the most common athletic injury, and many people who suffer an ankle sprain develop chronic ankle instability (CAI), while some people do not develop residual symptoms and are considered ankle sprain copers. Often times a result of CAI is an increased amount of ankle joint laxity. The purpose of this study was to examine ankle joint laxity using an instrumented arthrometer among participants with no history of ankle injury, those with CAI, and an ankle sprain copers group. **METHODS:** Twenty-four participants, which included 11 with no previous ankle injury (NI), 5 ankle sprain copers, and 8 with CAI, had their lateral ankle joint laxity assessed using the LigMaster instrumented arthrometer. Three trials of the Talar Inversion test were performed on the previously injured leg of the CAI and copers group and on a matched leg of the NI group. Testing consisted of applying 150 N of force to the medial malleolus while lateral displacement was measured in millimeters (mm). **RESULTS:** No significant differences in laxity were found between the groups ($P>.05$). The mean displacement of the NI group was 25.68 + 4.23 mm. The mean displacement of the ankle sprain copers group was 24.07 + 1.83 mm. The mean displacement of the CAI group was 26.60 + 5.88 mm. **CONCLUSIONS:** In the present study, CAI did not cause a significant increase in joint laxity. Future research is needed to determine the specific clinical implications of this finding.

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Undergraduate Research

EFFECTS OF PREVIOUS LATERAL ANKLE SPRAIN ON LANDING KINETICS AND DYNAMIC BALANCE

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P13 PURPOSE: Many people who suffer a lateral ankle sprain develop chronic ankle instability (CAI), while others have no residual problems and are known as ankle sprain copers. Lateral ankle sprains commonly occur when landing from a jump. The purpose of the project was to measure the landing kinetics and dynamic postural control after landing from a drop jump. METHODS: The participants performed a drop landing off a 45.72 cm high box and were instructed to balance on the landing leg for 3 seconds. Five successful trials were completed. Peak vertical ground reaction force, standardized by multiples of body weight (BW), time to peak vertical force (ms), and dynamic postural sway, as indicated by radial displacement, 95% ellipse area, and average velocity of the center of pressure (COP) was measured using an AMTI force platform. Twenty two participants completed the study, including ten participants had no history of a lateral ankle sprain (NI), five participants that had a previous lateral ankle sprain but were ankle sprain copers, and seven participants that had CAI. RESULTS: There were no significant differences ($P > .05$) between groups for any variable. The means and SD for the peak vertical force were: NI $3.54 \pm .50$ BW; ankle sprain copers = $3.44 \pm .20$ BW; and CAI = $3.24 \pm .80$ BW. CONCLUSIONS: The current finding of no difference between groups may be due to small sample size. Further research is needed in order to infer a relationship between previous ankle sprains and landing kinetics.

Undergraduate Research

COMPARISON OF THE EFFECTS OF ACCUMULATING 150 MINUTES OF MODERATE-INTENSITY AEROBIC EXERCISE IN THREE VS EIGHT WEEKLY SESSIONS ON MARKERS OF GLUCOSE CONTROL IN PERSONS WITH TYPE 2 DIABETES MELLITUS

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P14 PURPOSE: The purpose of this pilot study was to compare the effects acquiring 150-160 min per week of moderate aerobic exercise in three vs eight weekly sessions on markers of GLU control in persons with T2DM. METHODS: Eight subjects with T2DM underwent assessments of GLU control, fasting lipids, and anthropometric and physiologic measures before and after 12 weeks of exercise. Four people (55.5 \pm 10.8 yrs old) performed 50-55 min of moderate-intensity Nordic walking three days per week (group 3X1), and four people (55.5 \pm 7.9 yrs old) performed 20-22 min of moderate-intensity treadmill walking, two times per day, four days per week (group 4X2). RESULTS: 3X1 experienced a trend toward improvement in body weight (94.5 \pm 18.2 to 92.9 \pm 17.3 kg, $p = 0.14$). 4X2 experienced improvement in body weight (103.1 \pm 18.1 to 101.4 \pm 18.3 kg, $p = 0.02$), and a trend towards improvement in fasting GLU (10.2 \pm 4.3 to 8.5 \pm 2.5 mmol-L-1, $p = 0.08$), 2-hr OGTT GLU (16.4 \pm 2.4 to 13.3 \pm 4.2 mmol-L-1, $p = 0.13$), homeostasis model assessment for insulin resistance (5.59 \pm 1.6 to 3.4 \pm 1.1, $p = 0.12$), and insulin sensitivity index (0.12 \pm 0.02 to 0.18 \pm 0.05, $p = 0.14$). CONCLUSIONS: Accumulating a dose of exercise across eight weekly sessions may be more efficacious in improving GLU control in persons with T2DM than accumulating that dose of exercise in just three weekly sessions

TRAINING STATUS INFLUENCES RECOVERY ENERGY EXPENDITURE AFTER AN ACOUT BOUT OF RESISTANCE EXERCISE

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P15 To evaluate the effect of training status on energy expenditure (EE) after resistance exercise (RE), 10 trained (TW) women (45.6 \pm 1.4 years, BMI 29.1 \pm 1.6 kg/m²) were pair matched with 10 untrained (UTW) women based on age (45.7 \pm 1.5 years) and BMI (28.4 \pm 1.3 kg/m²). All completed a single RE bout consisting of 3 sets of 8 exercises at 50-80% 1RM. There were no differences in exercise duration or training volume-load. EE (VO₂ ml/min) was measured before RE and at times 0, 20, 40, 60, 90, and 120 minutes of recovery. Immediately after cessation of RE, VO₂ increased in both TW and UTW, and remained significantly above baseline through 60 minutes post exercise ($P < 0.001$). A between-group difference was observed only at time 0 when TW demonstrated significantly greater VO₂ consumption (427 \pm 20.9 ml/min) than UTW (316.0 \pm 16.5 ml/min; $P < 0.001$), although during recovery, total EE was significantly greater for TW (VO₂ 32.0 \pm 1.7 L) compared to UTW (VO₂ 20.1 \pm 1.0 L; $P < 0.001$). In TW, EE was strongly related to absolute lean mass ($r = 0.73-0.92$; $P < 0.05$) and duration of exercise ($r = 0.70-0.80$, $P < 0.05$) at every time point during recovery, while in UTW only volume-load was related to EE ($r = 0.60-0.75$; $P < 0.05$). Our findings suggest that training status exerts a strong effect on recovery EE in women, primarily through the influence of lean mass and duration of exercise. Training experience may well influence the intrinsic properties of muscle (lean mass) such that it becomes more metabolically active and energy costs of RE are determined by exercise duration rather than absolute work (volume-load) performed.

HIGH INTENSITY INTERVAL TRAINING DOES NOT ALTER INSULIN SENSITIVITY IN YOUNG HEALTHY MALES

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P16 Exercise has been shown to be effective at improving or maintaining insulin sensitivity, a cardio-metabolic risk factor. PURPOSE: To determine if three weeks of high-intensity interval training (HIT) improves insulin sensitivity in healthy males. METHODS: Participants were recreationally active (≥ 10 hours per week) men between 18 and 35 years of age [Ht; 180 \pm 1.44 cm, Wt; 85 \pm 2.95 kg, BMI: 26.1 \pm 0.59 kg/m², Body fat: 19.7 \pm 1.76%]. HIT training occurred 3 days each week for 3 weeks, at an intensity equivalent to 7.5% of body mass. The volume of training increased each week as follows: three sprints per session (week 1), four sprints per session (week 2), and five sprints per session (week 3). Fasting blood samples were collected at baseline and on non-training days at the end of each week and tested for glucose, insulin, and non-esterified fatty acids (NEFAs). A one way repeated measures ANOVA was used to measure changes in these markers. HOMA(IR) and QUICKI were used to estimate insulin sensitivity. RESULTS: There were no significant improvements in glucose ($p=0.80$), insulin ($p=0.83$), NEFAs ($p=0.08$), HOMA ($p=0.56$), or QUICKI ($p=0.63$), during the 3 weeks of training. All values were within the normal range. CONCLUSION: While HIT may be useful in maintaining insulin sensitivity in healthy males, 3-weeks of HIT does not improve insulin sensitivity.

COORDINATED UPREGULATION OF MITOCHONDRIAL GENES IN RESPONSE TO FATTY ACIDS IS DEPRESSED WITH SEVERE OBESITY

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Purpose: Skeletal muscle of severely obese individuals cannot increase fatty acid oxidation (FAO) and mitochondrial proliferation in response to dietary lipid, which likely contributes to positive lipid balance and weight gain. The purpose of this study was to determine whether the coordinated expression of metabolic genes in response to lipids differs between human skeletal muscle cell cultures (HSkMC) from lean and severely obese women. Methods: Total RNA in HSkMC from 12 lean (BMI= 23.0 kg/m² ±1.8) and 12 severely obese (BMI= 41.3 kg/m² ±4.6) Caucasian women following a 48hr incubation in 1) lipid (250µM oleate:palmitate) or 2) 5% BSA (control) was isolated and genome-wide expression profiling was done using the Illumina HumanHT-12 v4.0 Expression BeadChip. Network and pathway generation was done using Ingenuity Pathway Analysis software. Results: Lipid-induced responses of critical genes in FAO and mitochondrial proliferation were significantly dampened (from -1.1 to -1.7-fold, p<0.04) with obesity including components of the oxidative phosphorylation pathway (NDUFA7, NDUFB2, NDUFS1, ATP1A4, ATP1B4, ATP5J2, ATP5S) and mitochondrial protein synthesis/assembly (MTIF3, MRP63, MRPS24, TIMM8B, TOMM7). Conclusions: The inability to upregulate these critical genes during periods of increased lipid presence could contribute to depressed FAO with severe obesity. Funding support provided by NIH Grant AG025205.

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AROMATASE PROTEIN CONTENT IN GLUTEAL AND ABDOMINAL SUBCUTANEOUS ADIPOSE TISSUE IN PREMENOPAUSAL CAUCASIAN AND AFRICAN AMERICAN WOMEN

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Distribution of subcutaneous adipose tissue (SAT) may have an effect on the severity of disease associated with obesity and race. Estrogen, produced by enzymes in adipose tissue such as aromatase, has been shown to directly influence lipolysis. Unpublished pilot data from our lab show significant regional and racial differences in in-vivo lipolysis between overweight-to-obese premenopausal women when estradiol is infused into abdominal SAT (an increase in lipolysis for C and a decrease for AA), and a trend toward significance when infused into gluteal SAT. Aromatase mRNA expression has been shown to vary by region. The purpose of the present study was to investigate if aromatase protein content may also differ between region and race. Participants for this study [C (n=7; age 27.2 ± 2.92 years; BMI 29.3 ± .63 kg/m²) and AA (n=9; age 27.6 ± 2.78 years; BMI 30.3 ± .92 kg/m²)] received an abdominal and gluteal adipose tissue biopsy to be analyzed for aromatase protein expression via western blot analysis. Data are normalized to beta actin and presented as mean ± standard error. Aromatase protein content was not different between races or regions: C abdominal 0.25±0.06, C gluteal 0.25±0.12, AA abdominal 0.35±0.08, AA gluteal 0.32±0.09 arbitrary units (2-way ANOVA; race x region p=0.73, race p=0.46, region p=0.71). It is possible that other estrogen producing enzymes, such as 17βHSD may vary by region and race, thereby influencing SAT estrogen exposure. Research supported by ACSM Foundation Research Grant from ACSM Foundation

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RESPONSE OF TESTOSTERONE TO PROLONGED AEROBIC EXERCISE DURING DIFFERENT PHASES OF THE MENSTRUAL CYCLE

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PURPOSE: To examine the androgen response to exercise in women under conditions of high (H) and low (L) estrogen (E2) levels. METHODS: Ten exercise trained eumenorrheic women (20±2.2 y, 58.7±8.3 kg, 22.3±4.9 %body fat, VO₂max = 50.7±9.0 ml/kg/min) completed a 60 min submaximal treadmill run during both the mid-follicular (L-E2, 69.7±7.3 %VO₂max) and mid-luteal (H-E2, 67.6±7.9 %VO₂max) phases of their menstrual cycle. Blood samples were taken pre, immediately post and 30 min into recovery (30R) and analyzed for total testosterone (TT) using ELISA assays. Results were analyzed using repeated measures ANOVA. RESULTS: TT responses were (mean±SE): L-E2, pre= 1.41 ±0.21, post= 1.86±0.21, 30R= 1.75±0.32 nmol/L; H-E2, pre= 1.27±0.23, post= 2.43 ±0.56, 30R= 1.69±0.34 nmol/L. Statistical analysis indicated no significant interaction existed between H-E2 and L-E2 conditions across the blood sampling times (p=0.13). However, a main effect occurred for exercise (p<0.004) with the post TT concentration being greater than pre, although pre vs. 30R were not different (p>0.05). All TT concentrations immediately post exercise greatly exceeded the level of hemoconcentration observed during the L-E2 and H-E2 sessions. CONCLUSIONS: Prolonged aerobic exercise induces short-term elevations in TT in trained eumenorrheic women, which appears unrelated to E2. These increases may occur due to increased androgen production or decreased hormonal degradation rates, and are not solely the result of exercise plasma shifts.

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IN VITRO LEPTIN EFFECTS ON INTERLEUKIN-6 PRODUCTION IN OBESE SUBJECTS, INDEPENDENT OF GLUCOCORTICOID SENSITIVITY

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PURPOSE: Obesity-related diseases are associated with an increased adipocyte-derived leptin hormone, which plays an integral role in appetite regulation, immunity, and inflammation. The purpose of this study was to examine whether leptin-induced anti-obese IL-6 production by peripheral blood mononuclear cells (PBMCs) is more sensitive to glucocorticoid (GC) treatment in obese than non-obese subjects. METHOD: Blood samples were drawn from 29 subjects who were classified as either obese (N=14; BMI > 30 kg/m²) or non-obese (N=15; BMI < 30 kg/m²). PBMCs (106 cells/ml) were stimulated with leptin at 18.75 and 250 ng/ml in the presence of synthetic GC dexamethasone (DEX; 0, 10⁻⁸, 10⁻⁷, and 10⁻⁶ M) for 24 h at 37°C in 5% CO₂. RESULTS: Leptin at the higher level induced greater IL-6 production in the obese than non-obese subjects. IL-6 production was inhibited by DEX in a dose-dependent manner, but the IC₅₀ of DEX was unchanged between the two groups. CONCLUSION: The effect of leptin on the release of IL-6 is exacerbated in obese subjects, but the GC sensitivity to the IL-6 production cannot discriminate between obese and non-obese groups.

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INFLUENCE OF ESTROGEN ON CK AND IL-6 RESPONSE TO PROLONGED TREADMILL RUNNING IN ELITE FEMALE RUNNERS

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PURPOSE: Assess the influence of estrogen (E2) on creatine kinase (CK) and interleukin-6 (IL-6) responses to prolonged aerobic exercise in six highly trained eumenorrheic women runners. **METHODS:** Subjects completed a 90-minute treadmill running bout at 67% VO₂peak during low E2 (LE2) and high E2 (HE2) hormonal conditions as based upon menstrual cycle phases. Blood samples were collected before (rest) and after exercise (immediately post, 24-hr, and 72-hr post) to determine changes in CK and IL-6. Data were analyzed using repeated measures ANOVA. **RESULTS:** Resting blood samples for E2 confirmed appropriate hormonal status for both running bouts. Resting CK values did not differ between conditions ($p > 0.05$). All post-exercise CK values were significantly elevated from rest ($p < 0.05$) and levels were significantly greater at 24-hr and 72-hr post in the LE2 vs. HE2 condition ($p = 0.02$). No significant effects were observed for IL-6 between the hormonal conditions; however, the overall concentration of IL-6 tended to be higher in LE2 vs. HE2 ($p = 0.08$). **CONCLUSIONS:** These results suggest the influence of E2 status on IL-6 response to prolonged exercise remains uncertain and additional research is needed. However, CK findings do suggest highly trained female runners may experience a greater degree of muscle damage during LE2 conditions, which may prompt training changes designed to prevent unnecessary musculoskeletal injuries.

HEAT STRESS OF PERFORMING LIGHT ACTIVITY IN AN EXTREME HOT/HUMID ENVIRONMENT WEARING MILITARY PROTECTIVE GEAR

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The purpose of this study was to mimic the duties of an active soldier in an extremely hot and humid environment and examine the physiological responses to this thermal challenge, allowing us to characterize the heat stress normally placed on these individuals. Ten healthy (determined via PAR-Q) men were recruited and signed the IRB-approved informed consent document before beginning the study. After 5 days of active heat acclimation, each participant completed a trial consisting of light walking (2.2-3.1 mph, 1% grade) in an environmental chamber maintained at 45 deg C (113 deg F) and 40% relative humidity wearing traditional military protective gear. The test was terminated once core temperature reached 39.5 deg C, after 120 min, or at volitional exhaustion, whichever came first. Measures included heart rate, core temperature, mean skin temperature, rating of perceived exertion (RPE) on the traditional Borg scale, sweat rate, and physiological strain index (PSI), recorded every 15 min. Average trial time was 97.46 min, with an average increase in core temperature of 2.11 deg C. The increase in skin temperature averaged 7.2 deg C. Final average PSI was 8.61, with one participant scoring above 10, off the scale (10.75). Average sweat rate, increase in heart rate, and final RPE were 2.1 L/h, 69 bpm, and 17, respectively. These results help characterize the thermal load placed on soldiers, and could be used to refine guidelines for the duration and intensity of the duties required of them. These findings also highlight the need to develop equipment or techniques to improve the cooling capabilities of soldiers in the field.

EFFECT OF WEARING A COOLING VEST ON THERMOREGULATION AND INTERVAL RUN PERFORMANCE IN THE HEAT

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PURPOSE: To determine the effect of wearing a cooling vest during the rest periods of a 5x1-mile interval session in a warm environment on thermoregulation and run performance. **METHODS:** Five male and two female trained runners completed two experimental sessions consisting of 5x1-mile running intervals with a run:rest of 1:0.8 in the heat (30°C, 50% relative humidity) wearing (VEST) or not wearing (NOVEST) an ice water-cooled vest during the rest periods. The first 3 1-mile intervals were run at 80% VO₂max while miles 4 and 5 were completed at a maximal self-selected pace, to assess run performance. Thermoregulation was assessed by measuring rectal temperature (Tre), skin temperatures (Tsk) and whole-body sweat loss. Perceptual responses were evaluated using rating of perceived exertion (RPE), thermal sensation of the body and of the torso. **RESULTS:** There were no differences in Tsk, Tre, whole-body sweat loss, RPE, thermal sensation of the body, or interval run performance between treatments. When compared to NOVEST, ratings of thermal sensation of the torso were lower for VEST during the interval session (interaction effect; $P < 0.05$). When compared to NOVEST, stepwise post-hoc comparisons yielded lower ratings ($P < 0.05$) for thermal sensation of the torso during VEST for rest periods 1 and 5 and miles 2, 3 and 4. **CONCLUSION:** Trained runners wearing a cooling vest during the rest periods of interval training in a warm environment perceived a cooling effect in their torso that persisted during the run segments, but these perceptions were not paralleled by differences in rectal or skin temperatures nor did they lead to enhanced interval run performance.

AMBIENT AIR COOLING FOR CONCEALED SOFT BODY ARMOR IN A HOT ENVIRONMENT

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INTRO: Law enforcement and military personnel rely on soft body armor (SBA) for safety and protection. However, in hot environments the SBA inhibits convective and evaporative heat loss and increases heat storage, raising core body temperature. One way possibly to mitigate this excess heat storage is to promote air flow under the SBA. **PURPOSE:** We evaluated the effect of ambient air induction on heat strain for participants wearing concealed SBA in a hot environment (WBGT = 30 °C). **METHODS:** A counterbalanced, repeated measures protocol was performed with 9 participants (27 ± 4 yrs). Participants were fitted with either a traditional or modified Level II concealed SBA. The SBA was modified with 1.27 cm rubber standoffs and an ambient air induction system (~100 L · min⁻¹). Participants performed cycles of 12-min of walking (1.25 L · min⁻¹) and 3-min of arm curls (0.6 L · min⁻¹) with a 5-min rest after 30-min for a total of 60-min. **RESULTS:** The modified SBA led to an improvement in RPE after 30-min ($p \leq 0.05$) and a reduction in microclimate compared to the control trial. However, the air induction system did not attenuate the rise in rectal temperature ($p = 0.182$) or heart rate ($p = 0.306$). **CONCLUSION:** These data suggest that the air induction system may provide small benefits while wearing a concealed Level II SBA in the heat, though improvements are needed to lessen physiological strain.

THE IMPACT OF PRE-COOLING THE UPPER BODY ON TIME TRIAL PACED CYCLING IN THE HEAT

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PURPOSE: Test the hypothesis that a cooling intervention administered during warm-up enhances performance during a subsequent 16.1-km simulated cycling time trial in a hot environment. **METHODS:** Nine trained male cyclists (26 ± 3 years; 182.5 ± 7.9 cm; 78.3 ± 8.1 kg; $11.7 \pm 2.6\%$ body fat; 50.2 ± 7.2 mL/kg/min VO_{2peak}) completed 2, counterbalanced, simulated 16.1-km time trials in a hot environment (35.1 ± 0.2 °C and $36.4 \pm 2.8\%$ relative humidity) separated by 72 hours. On each occasion participants warmed up for 20 min while wearing either an ice vest, neck collar and head piece (COOLING), or no cooling apparatus (CONTROL). **RESULTS:** Core and mean skin temperatures were not significantly different between treatments ($P > 0.05$). Likewise, time to completion was not significantly different between trials. However, while not statistically different, finishing times after the cooling intervention were shorter compared to control [CONTROL = 30.28 ± 3.51 min vs. COOLING = 29.32 ± 4.01 min, $P = 0.093$], which may have practical significance. **CONCLUSION:** Despite the lack of statistical differences, some results may be physiologically and practically meaningful. The ~1-min faster finishing times and 15.7-W higher average power outputs after COOLING indicate competitive cyclists may experience a modest benefit while utilizing cooling modalities during an active warm-up before a time trial.

EFFECT OF HYPOXIC RECOVERY POST-EXERCISE ON BLOOD OXIDATIVE STRESS MARKERS

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Blood oxidative stress responses are influenced by exercise and high altitude exposure. However, the effect of high altitude exercise recovery on blood redox balance remains unknown. This study investigated effects of hypobaric-hypoxia during exercise recovery on blood oxidative stress. Active males ($n=12$) performed exercise on a cycle ergometer in 10 intervals: 2 min at 80% VO_{2max} followed by 4 min at 50% VO_{2max} . Subjects then completed 8 min at 60% VO_{2max} followed by 12 min at 50% VO_{2max} . In a randomized counter-balanced cross-over design, subjects recovered for 6 hrs at 975 m or 5000 m (hypobaric chamber). O_2 sat. was monitored during exercise and recovery via finger pulse oximeter. Blood samples were obtained pre- (PRE), post- (POST), 2 hr post- (2HR), 4 hrs post- (4HR), and 6 hrs post-exercise (6HR). Samples were assayed for FRAP, TEAC, and PCs. Results show modest blood oxidative stress responses for TEAC, FRAP, and PCs. TEAC plasma antioxidant capacity was significantly elevated in the normoxic but not hypoxic recovery. Plasma FRAP values were numerically higher in normoxic versus hypoxic recovery but were non-significant. Past data indicate that a post-ex rise in TEAC reflects purine metabolism and oxidative stress during exercise. These data suggest that hypoxic recovery alters blood oxidative stress response to acute exercise. Grant funded.

EFFECTS OF EXERCISING AT A SIMULATED ALTITUDE ON ACCURACY

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PURPOSE: The purpose of this study was to examine the impact of exercising at a simulated altitude on the accuracy of participants when completing putting and free throw activities. **METHODS:** Twenty subjects performed submaximal YMCA cycle ergometer test and followed by two bouts (golf ball putting and basketball free throws) of 50 trials for accuracy at varying levels of simulated altitude [base (20.9% O_2) and 3000 m (14.2% O_2)]. **RESULTS:** No significant differences in accuracy were noted for either the putting (21.1 ± 5.8 made attempts @ 20.9 O_2 and 19.7 ± 6.5 made attempts @ 14.2% O_2) or the free throws (35.6 ± 11.1 made attempts @ 20.9 O_2 and 34.8 ± 9.5 made attempts @ 14.2% O_2) between the different simulated altitudes. **CONCLUSION:** The results demonstrate that the simulated altitude had a negligible impact on the accuracy of the participants.

Undergraduate Research

MARKERS OF HYDRATION STATUS, CARDIOVASCULAR FUNCTION, AND PERFORMANCE IN OCEAN RESCUE EMPLOYEES

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PURPOSE: Dehydration can have systemic detrimental effects by decreasing physical work and muscular performance and increasing myocardial work when exercising in the heat. The objective was to examine markers of hydration status, cardiovascular function, and performance of ocean rescue employees when exposed to extended periods of heat and humidity. **METHODS:** 19 ocean rescue employees underwent two testing sessions separated by approximately 8 hr. at the beginning and end of a typical work shift. Hydration status was assessed by measuring the specific gravity of urine (USG) using a refractometer. Cardiovascular function was determined by measuring resting blood pressure and augmentation index. Physical performance was timed using a simulated dry land obstacle test for ocean rescue. **RESULTS:** Body mass significantly increased from (81.46 ± 8.54 kg) to (81.80 ± 8.73 kg) in pre- to post-testing. The pre-test hydration assessment indicated that 37% of the subjects were dehydrated and the prevalence improved to 25% at the post-session. USG significantly decreased ($P < 0.001$) from ($1.018 \pm .005$ USG) in the pre-test to ($1.012 \pm .009$ USG) in the post-test. Normalized augmentation index significantly ($P < 0.05$) improved from pre- to post-test evaluation (4.79 ± 10.17 to 0.58 ± 9.53). There were no significant differences found in the physical performance test. **CONCLUSIONS:** These results suggest that the ocean rescue employees were minimally dehydrated at the beginning of day and were able to maintain performance while significantly improving cardiovascular function, hydration status and body weight throughout the day.

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EFFECTS OF ACUTE HYDRATION ON BODY COMPOSITION

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PURPOSE: To assess the influence of acute hydration on body composition analyses. **METHODS:** Fifty-six male and 44 female volunteers (N = 100; age = 24.2 ± 6.7 yrs; height = 175.8 ± 12.1 cm; body mass = 76.1 ± 16.5 kg) provided informed consent prior to participation. Immediately after the initial DEXA analyses, subjects ingested 16.9oz of water and then were re-analyzed via DEXA. **RESULTS:** Sample t-test analyses revealed a significant increase in body mass of 0.46 ± 0.1 kg [t(99) = 42.6, $p < .0001$]. There were no significant changes in fat mass (-10.6 ± 493.4 g). In contrast, there was a significant increase in lean mass (524.9 ± 615.1 g) [t(99) = 8.5, $p < .001$]. Overall, there was a significant decrease in percent body fat of -0.16% [t(99) = 2.4, $p = .02$]. **CONCLUSIONS:** Consuming 16.9oz of water prior to the DEXA analyses adds body mass and that body mass is quantified as lean mass instead of fat mass, which subsequently, will lead to changes in percent body fat. From a practical perspective, in an effort to attain accurate body composition results via DEXA, participants should be instructed to refrain from consuming liquids prior to the analyses.

OBESITY'S EFFECTS ON FUNCTIONALITY IN LONG TERM CARE REHAB SETTINGS

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PURPOSE: The present observational study explored the geriatric population living in a long term care rehab setting with BMI over 30 kg/m² to determine if increase in BMI causes the functionality of an individual, specifically in activities of daily of living (ADL), to decrease. **METHODS:** Twenty-two females and ten males ADL scores provided by the nursing team and BMI/weight were correlated for specific dates. Correlation was determined by r² values. **RESULTS:** The results showed that functionality of a patient does not decrease due to an increase in BMI or weight. The r² of weight vs. ADL was .0213 and the r² of BMI vs. ADL was .07843. An attempt was made to individualize scores with no further statistical significance. **CONCLUSION:** ADL scores compared to BMI or weight do not correlate. A repeat study in a similar setting with an ADL score beginning at total functionality would be beneficial as the individuals decline would be more decisive.

Thanks to HCR-Manor Care Nursing Home in Carlisle, PA.

ARE SCHOOL-BASED OBESITY INTERVENTIONS EFFECTIVE IN PRE-ADOLESCENT AND ADOLESCENT AFRICAN-AMERICAN CHILDREN?: A LITERATURE REVIEW

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PURPOSE: The purpose of this review was to assess the effectiveness of school-based obesity prevention programs in middle and secondary school settings for African-American children. **METHODS:** Systematic keyword searches were conducted for English printed original research articles published between January 1980 and June 2012. The inclusion criteria for this review were: experimental studies conducted in the United States that targeted $\geq 80\%$ African-American and/or those whose results were stratified for this population. Participants had to be between the ages of 10 – 18 years or the mean age within this range. Studies taken place in after-school programs were excluded. **RESULTS:** The initial search yielded 14 studies; five were excluded due to a low percentage ($< 80\%$) of African-American participants or due to the lack of results stratification by race/ethnicity. Of the nine included studies, one study used an established commercial-based curriculum. Five studies focus on nutrition and dietary outcomes, and the remaining four studies investigated the effects on body mass index and physical activity and health outcomes (e.g., blood pressure, cardiovascular fitness, and exercise behaviors). Overall, the studies found a marginal to no significant intervention effect in African-American children. **CONCLUSION:** The current scientific literature does not provide enough evidence to evaluate the effectiveness of school-based interventions designed to impact obesity and obesity-related behaviors in African-American children. Additionally, researchers need to be more cognizant of data reporting (e.g., stratification by race/ethnicity) in order to better understand the effect of these programs in diverse population.

EFFICACY OF WEIGHT-LOSS COMPETITION IN CHARLOTTE MECKLENBURG POLICE DEPARTMENT

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PURPOSE: To report the efficacy of a police department weight-loss competition comparing differences between genders, first-timers versus repeaters, civilians versus sworn officers, and age groups over a twelve week period. **METHODS:** For a second year, a twelve week weight-loss competition was held with weigh-ins every two weeks. The 409 volunteers were in teams of 3-5. Overall changes in mass were observed each two weeks. Tests were run to see if masses were significantly different from previous weigh-in. All subjects were present for the first six weeks, with only 1% absent by the eighth week. An increase in absenteeism was seen the last 2 two-week periods, 7.3% and 11%, respectively. Subgroup comparisons were made with respect to genders, first-timers versus repeaters, civilians versus sworn officers, and age groups. **RESULTS:** There was a significant overall change in mean mass from the initial weigh-in, 99.1 ± 22.0 kg, to the final weigh-in, 96.1 ± 21.5 kg. Sworn officers had a significantly ($P < .001$) greater percent mass lost from starting mass, $3.6\% \pm 3.7$, than civilians, $1.7\% \pm 3.4$ and participants ≥ 40 years experienced a significantly ($P < .01$) greater percent mass lost from starting mass, $3.6\% \pm 3.8$, than those < 40 years, $2.5\% \pm 3.5$. **CONCLUSIONS:** This weight loss competition was effective while certain groups may respond better to competition than others.

DIETARY AND EXERCISE PREFERENCES OF WOMEN UNDERGOING CHEMOTHERAPY FOR BREAST CANCER

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Research has indicated that weight gain during treatment for breast cancer is a common problem among breast cancer patients, with over 50% experiencing weight gain and consequently increasing their risk of relapse and death (Goodwin et al., 1999., Irwin et al., 2005). The objective of this study was to determine the dietary, exercise, and intervention timing preferences of women undergoing chemotherapy for breast cancer. Currently, 13 women diagnosed with breast cancer have been recruited from the Breast Cancer Care clinic at the Comprehensive Cancer Center to participate in a preference survey. Seventy-seven percent of women indicated that they were interested in learning more about physical activity and weight management. Eighty percent of the women interested in learning more felt that the best time to start a physical activity and nutrition program was immediately after chemotherapy, with 80% indicating willingness to participate in a program at an outside exercise and rehabilitation center. When presented with several factors that could limit regular participation in physical activity on a scale of 1 'not at all limiting' to 5 'extremely limiting' for each, the top three limiting factors were time constraints ($M=3.1$), motivation ($M=2.6$), and fatigue ($M=2.5$). The results of this survey provide information that is useful in helping researchers and clinicians to create feasible and effective weight management intervention programs for breast cancer patients.

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EFFECT OF AN ACUTE ANKLE SPRAIN ON PHYSICAL ACTIVITY AND BODY WEIGHT

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PURPOSE: To determine the effect of an acute lateral ankle sprain on physical activity levels, body mass and food intake in mice. **METHODS:** Thirty male mice (CBA/J), were randomly allocated to one of three surgery conditions: Sham surgery (SHAM), transection of the anterior talofibular (ATF) and calcaneofibular (CF) ligaments (ATF/CFL), or transection of the CF ligament only (CFL). After a 3-day recovery period which included ad libitum analgesia, mice were placed in cages with running wheels. Daily running wheel measurements of duration (min) and distance (km) were recorded to capture physical activity levels for four weeks. Additionally, each week body weight and food weight were recorded. **RESULTS:** The mice in the ATF/CFL group had significantly decreased duration ($p = .0239$) and distance ($p = .0130$) of wheel running compared to the SHAM group during weeks one to three. Although not statistically significant, mice in both of the ankle sprain groups ran less than the SHAM group at four weeks. Although not significantly different, the mice with an ankle sprain weighed more than the mice in the SHAM group. **CONCLUSIONS:** As expected an acute lateral ankle sprain will decrease short term physical activity levels. The short term changes in activity level did not significantly alter body weight or food consumption. Further research is needed to examine the effect of an ankle sprain on long term physical activity levels and body weight.

Undergraduate Research

THE COMBINATION OF GREEN TEA, CAFFEINE, CONJUGATED LINOLEIC ACID AND BRANCHED CHAIN AMINO ACIDS DO NOT CHANGE BODY COMPOSITION OR RESTING METABOLISM IN OVERWEIGHT AND OBESE INDIVIDUALS

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Caffeine, conjugated linoleic acid (CLA), green tea and branched chain amino acids (BCAA) have been shown individually to improve body composition and resting metabolic rate (RMR). **PURPOSE:** To investigate the effects of consuming a supplement containing a combination of these ingredients on body composition and RMR. **METHODS:** Eight healthy men ($N=1$) and women ($N=7$) were stratified and randomly assigned to 1) a soybean oil placebo (PL; $n=5$; age, 33 ± 11 yrs; body fat, $46.8\pm 6.1\%$; BMI, 33.4 ± 5.4) or 2) a dietary supplement (DS; $n=3$; age, 35 ± 7.7 yrs; body fat, $35.8\pm 5.5\%$; BMI, 27.9 ± 1.0) containing 99 mg of caffeine and a proprietary blend containing 1510 mg of CLA, green tea extract (45% EGCG), and BCAAs. Both groups consumed the PL or DS with breakfast and lunch. Body composition and RMR were measured before and after 8 wks of supplementation. Data was analyzed using JMP 9 Pro (Cary, NC) and significance was set to $p < 0.05$. A two-way RMANOVA was used to evaluate changes over time. A Tukey test was used for post hoc comparisons. **RESULTS:** No significant changes were measured in body mass for PL (94.7 ± 0.5 vs 96.1 ± 0.5 kg) or DS (82.3 ± 0.7 vs 83.1 ± 0.7 kg) or body fat % for PL (46.8 ± 0.2 vs 46.3 ± 0.2 %) or DS (35.8 ± 0.2 vs 35.9 ± 0.2 %). No changes were measured for RMR for PL (1265 ± 90 vs 1368 ± 90 kcal/d) or DS (1370 ± 116 vs 1545 ± 116 kcal/d). **CONCLUSION:** Eight wks of supplementation with a combination of caffeine, CLA, green tea and BCAAs did not significantly change body composition or RMR in overweight and obese individuals. Further research with different doses and exercise combinations are needed.

This study was supported by a grant from the International Society of Sports Nutrition.

HEART RATE VARIABILITY IN EMERGENCY MEDICAL SERVICE PROVIDERS: STRESS RESPONSE TO A 12-HOUR SHIFT

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PURPOSE: Stress has been linked to a reduction in heart rate variability (HRV) and an increase in sympathetic nervous system activation. Decreased HRV has been linked to cardiovascular disease, which represents the highest risk factor for death in EMS providers. The purpose of this study is to identify the relationship between stress during a 12-hour shift and HRV in EMS personnel. **METHODS:** Seven certified Emergency Medical Technicians (2 female, 5 male, age 44.4 ± 5.9 yr) participated. HRV was measured pre- and post-shift under resting conditions. During testing subjects were supine, rhythmically breathing (in 4 s, out 6 s) for 10 min (5 min acclimation, 5 min recording). **RESULTS:** HRV variables analyzed were low frequency (LF), high frequency (HF), LF/HF ratio, and mean R-R interval. Data were analyzed through paired t-tests for significance. No significant results were found in differences in LF or HF, pre and post 12-hour shift. LF was 6.8 ± 24.693 normalized units (n.u.), HF was -7.23 ± 19.78 n.u., and the LF/HF ratio was 4.88 ± 6.39 . **CONCLUSION:** A 12-hour shift did not affect resting measures of HRV in EMS providers. Further research to investigate HRV during the shift is needed to establish physiological stress levels of EMS providers while on duty.

PHYSICAL STRESS AND CARDIAC GENE EXPRESSION: INITIAL RESULTS

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P37 PURPOSE: While genetic regulation of cardiac function is likely complex, it is possible that a small group of genes are responsible for ‘orchestrating’ genetic cardiac regulation under different environmental conditions. We have initiated a study to investigate cardiac gene expression following different physiological stressors to identify common cardiac gene expression changes. We sought to identify genes that are differentially expressed in the myocardium in response to physical stress. METHODS: DBA/2J and NZB/BINJ (n=8 per strain, 10-11wks, 27.6 ± 0.8g) mice were forced to swim until they were not able or unwilling to avoid fully body submersion for 2 full seconds, while ECG was recorded continuously. A second group of age matched mice from each strain acted as controls. Whole hearts were harvested for RNA isolation. Illumina BeadChip Microarrays were analyzed using CLC Main Workbench 6. RESULTS: Expression changes in GLP1R, PRKCA, MYLA and NOS1 met t-test: fold change criteria of \neq NaN and $-2 < x < 2$ and have been reported to be involved in cardiac regulation. CONCLUSION: Previous reports suggested that GLP1R, PRKCA, MYLA and NOS1 are important in the regulation of cardiac contraction, with PRKCA and MYLA specifically regulating the force of cardiac contraction. Regulation of blood pressure and calcium ion transport by GLP1R and cardiac muscle hypertrophy and muscle contraction by PRKCA have also been demonstrated. These initial results will be combined with future cardiac gene expression profiles in response to different physiological stressors to assess the role of these genes under different conditions.

EXERCISE TRAINING IN THE COLD DOES NOT INCREASE PHYSIOLOGICAL MARKERS OF STRESS IN RATS

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P38 PURPOSE: Treadmill running is commonly used to stimulate exercise-induced performance adaptations and cardioprotective mechanisms in the rat. Exercise at room temperature raises rats’ core temperatures (TC) and has been shown to alter physiological stress markers, specifically adrenal gland hypertrophy. The purpose of this study was to investigate if exercise in an environment that prevented an increase in TC would show positive physiological adaptations and a reduction in changes indicative of heat stress. METHODS: Female, Sprague-Dawley rats were divided into 3 groups: sedentary; exercise trained in the cold (8C); or at room temperature (22C). Exercise training included 1 hr/day at a speed of 30 m/min up a 6% grade for 5 wks. Twenty-four hrs. after the last exercise bout, animals were sacrificed, trunk blood was collected, and adrenal and heart mass was recorded. RESULTS: Exercise training at both temperatures produced a significant ($p < 0.01$) increase in heart mass (HW) and HW to body weight. Adrenal gland mass relative to body weight was similar among all groups ($p > 0.05$). CONCLUSION: Exercise training in a cold environment does not result in physiological markers of stress.

DIFFERENTIAL EFFECTS OF CONTINUOUS VERSUS DISCONTINUOUS AEROBIC EXERCISE ON OXYGEN UPTAKE AND AUGMENTATION INDEX IN YOUNG VERSUS OLDER

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P39 Introduction: The speed at which the reflected wave within the aorta travels is directly correlated with cardiovascular disease (CVD). Exercise has shown to be an effective prophylactic to prevent and treat CVD, however many aging adults have difficulty with continuous exercise. Recently, discontinuous exercise has shown benefits comparable to continuous exercise yet direct clinical comparisons between modes have been neglected. Therefore, the purpose of this study was to examine the oxygen uptake and augmentation index (AIx) differences in continuous versus discontinuous exercise in young versus older populations. Methods: 45 male and female subjects (young = 21.65±0.4 years; older 48.29±0.8 years) were randomly assigned to a group prior to baseline testing. At baseline, subjects underwent VO₂max and AIx, then following four weeks of a control period the subjects returned to the lab for reassessment. Subjects were then supervised throughout their four week continuous aerobic (30 minutes at 70-75% HRmax) or discontinuous (3 bouts of 10 minutes of exercise at 70-75% HRmax) exercise protocol. Results: Both continuous and discontinuous groups demonstrated a significant improvement in VO₂max ($p < 0.001$) and heart rate max ($p < 0.05$). Group differences were greater in the older population for AIx yet failed to reach statistical significance ($p = 0.069$). Conclusion: Of clinical importance, AIx improved to a greater degree in the middle aged population when compared to the younger subjects regardless of training mode.

EFFECTS OF 20-WEEK EXERCISE TRAINING ON NON-INVASIVE MARKERS OF CARDIOVASCULAR HEALTH IN BREAST CANCER SURVIVORS

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P40 PURPOSE: This study examined the effect of a 20-week exercise intervention on non-invasive markers of cardiovascular health in breast cancer survivors. The relationships between non-invasive markers of cardiovascular health and commonly used markers of overall health were also explored. METHODS: Fifty-two survivors who completed the exercise training at the UNC-CH Get REAL & HEEL Breast Cancer Program between the years 2008-2011 were evaluated. All survivors completed a combined aerobic and resistance exercise intervention (3 times/week for 1h) at intensities progressing from low (40%) to moderate (65-70% of VO₂max) for aerobic and 1-3, 12 repetitions max for the resistance exercise which followed the recommendations from the American College of Sports Medicine. RESULTS: A major finding in the study was a significant reduction in mean arterial pressure (MAP) was observed from baseline to final assessment (91±10 and 86±10 mmHg; $p = 0.001$). Additionally, a significant inverse correlation was found between MAP and Body Mass Index (BMI) ($p = 0.036$, $r = -0.291$), indicating that an increase in BMI accounted for a reduction in MAP of approximately 8.5%. Analyses revealed that the increase in BMI was attributed to a significant gain in body mass from baseline to completion of the exercise program (75.4 ± 15.4 kg and 76.1 ± 15.5 kg respectively, $p < 0.05$), along with significant gain in percent fat free body (70.1 ± 5.9 and 71.9 ± 4.6, $p < 0.05$) and reduction in percent body fat (29.8 ± 5.9 and 28.0 ± 4.6, $p < 0.05$). CONCLUSIONS: A 20-week combined aerobic and resistance exercise intervention positively improved MAP in breast cancer survivors, which may be, in part, attributed to changes in BMI. Supported by the Petro Kulynych Foundation.

EXAMINATION OF BALANCE IN EARLY-STAGE FEMALE BREAST CANCER SURVIVORS WHO HAVE UNDERGONE CHEMOTHERAPY

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P41 PURPOSE: To compare breast cancer survivors (BCS) and apparently healthy, sedentary age-matched controls (CNT) on clinical and laboratory measures of static balance. METHODS: Balance was assessed during single leg stance (SLS) with the eyes open and closed. Laboratory (center of pressure sway speed (SS) and sway path (SP)) and clinical (timed SLS) measures of balance were assessed simultaneously in 10 BCS and 10 CNT. The NeuroCom Sensory Organization Test and vibratory sensation were assessed to identify vestibular and somatosensory contributions to potential balance deficits. Dependent t-tests were used to compare each variable between groups. RESULTS: No significant group differences were identified between clinical and laboratory balance measures ($p>0.05$). However, vibration sensation threshold of the first metatarsophalangeal joint was greater in BCS vs. CNT for the right foot (19.43 ± 11.34 vs. 10.16 ± 2.32 V, $p=0.03$) and approached significance on left foot (16.86 ± 8.26 vs. 11.53 ± 4.22 V, $p=0.07$). CONCLUSION: Although no significant differences in static balance were observed between groups, significant differences in vibration sensation, an assessment of peripheral sensory function, suggest that neuromuscular dysfunction is present in BCS patients. Future research is necessary to determine if the lack of an influence on balance is due to compensatory mechanisms and if balance deficits in these individuals, which are frequently anecdotally reported, are more evident during assessments of dynamic balance (e.g. during walking).

IMPROVED CARDIOVASCULAR RISK PROFILE AS A MEASURE OF SUCCESS FOR OBESE ADOLESCENTS PARTICIPATING IN A WEIGHT MANAGEMENT PROGRAM

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P42 The purpose of this study was to assess CV risk factors across varying levels of weight loss following a 3-month weight management program in obese adolescents. Participants ($N = 138$; 13.5 ± 1.7 y and 36.7 ± 6.1 kg/m²) attended biweekly nutritional and behavioral meetings and participated in physical activity 3 d/wk. Subjects were grouped into quartiles based on body weight change at 3-months as follows: ≥ -2.5 kg ($n=35$), -2.49 - -0.25 kg ($n=34$), -0.24 - $+2.00$ kg ($n=35$), and $> +2.00$ kg ($n=34$). The Bogalusa Heart Study risk thresholds were used to determine CV risk factors from TRIG, TC, LDL, HDL, GLU, SBP and DBP values. Repeated measures MANCOVA revealed no significant ($p>0.05$) group differences across the two time points. Chi-Square analysis revealed no significant group differences in the presence of baseline risk factors ($p=.636$). Fifty-five percent of subjects lost at least one risk factor while 10% lost at least 2 risk factors by 3 months. There was no significant difference ($p=.542$) in risk factor reduction among the groups. These data support that even in the absence of weight loss, participation in a comprehensive weight management program has desirable effects on the CV risk profiles of obese adolescents. Support: Virginia Premier Inc; NIH (K23-HD053742:EPW; UL1RR031990:VCU)

THERAPEUTIC ULTRASOUND AFFECTS MUSCLE SATELLITE CELL MYOGENIC PROGRAM AFTER MUSCLE INJURY IN HUMANS

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P43 Purpose: To examine the effect of therapeutic ultrasound (TUS) on the satellite cell (SC) myogenic program of injured skeletal muscle. Methods: 18 healthy males (18-29 y/o), were randomized to either control (C) or exercise group (E). The E group underwent 200 lengthening contractions of the quadriceps, 48h before TUS. Both groups received TUS on a standardized area of the vastus lateralis of only one leg (~ 95 J/cm²). Bilateral muscle biopsies were taken from all subjects, 6h post-TUS. qRT-PCR was conducted for muscle specific genes and cell cycle regulators. Immunofluorescence analysis was performed to determine pax-7 and MyoD-positive cells (SC). Results: Following exercise, MGF gene expression increased (2.2 ± 0.3 -fold; $p=0.01$), and Cyclin-D1 expression decreased (1.9 ± 0.2 -fold, $p=0.03$); the number of Pax7 and MyoD positive-cells increased by 43% ($p=0.03$) and 87% ($p=0.01$), respectively. TUS alone, was sufficient to increase p21 mRNA expression (1.7 ± 0.5 -fold, $p=0.4$), which coincided with an increase in the number of Pax7 (37%, $p=0.03$) and MyoD positive-cells (122%, $p=0.001$). In E+TUS muscle Cyclin-D1 mRNA expression increased (1.4 ± 0.1 -fold; $p=0.03$), while no difference in satellite number was detected. Conclusions: TUS in damaged muscle reversed the effect of exercise. In contrast, in undamaged skeletal muscle TUS increased the number of activated SCs and increased p21 gene expression. These findings suggest that TUS alone is sufficient to induce SC activity.

INFLUENCES OF HAMSTRING GEOMETRIC AND ARCHITECTURAL CHARACTERISTICS ON MUSCULOTENDINOUS STIFFNESS

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P44 PURPOSE: Individuals with greater hamstring stiffness display more stable knee joints and landing biomechanics consistent with lesser anterior cruciate ligament injury risk. However, it is unclear what contributes to between-subject variability in hamstring stiffness. METHODS: Musculotendinous hamstring stiffness was measured in 30 healthy college-aged subjects (15 male, 15 female) from the damping effect of the hamstrings on oscillatory knee flexion-extension following perturbation. Ultrasound imaging of the long head of the biceps femoris was used to measure cross sectional area, pennation angle, fascicle length, and subcutaneous fat thickness. Multiple linear regression was used to determine if hamstring architecture, geometry, and fat thickness predict musculotendinous stiffness. RESULTS: The results of the regression indicated that the linear combination of cross sectional area, pennation angle, fascicle length, and subcutaneous fat thickness explained 61% of the variance in musculotendinous stiffness ($p<0.01$). However, only cross sectional area ($\beta=0.53$, $p<0.01$) and subcutaneous fat thickness ($\beta=-0.31$, $p=0.03$) were significant predictors of musculotendinous stiffness. CONCLUSIONS: Differences in musculotendinous stiffness are primarily attributable to variability in cross sectional area and subcutaneous fat thickness. Interventions aimed to modify these variables may augment the influence of muscle stiffness on anterior cruciate ligament injury risk.

RELATIONSHIP BETWEEN THE SARCOPENIC INDEX AND STRENGTH MEASUREMENTS IN BREAST CANCER SURVIVORS

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Breast cancer survivors (BCS) encounter side effects from cancer treatments that negatively affect body composition, particularly muscle loss which may lead to sarcopenia. Appendicular skeletal muscle adjusted by height (ASM index; kg/m²) has been used to define sarcopenia. The purpose was to evaluate the relationships between the ASM index and strength in BCS. Forty-four (60±9 yrs) BCS participated. Body composition was measured by DXA. Upper and lower body strength was measured via one repetition maximums (1RM) on chest press and leg extension machines. Handgrip (HG) strength was assessed using a HG dynamometer and physical function via the continuous scale physical functional performance test. Physical activity was assessed by pedometers. The BCS were separated into two groups comprised of those that fell above and below the median ASM index of 6.39 kg/m². ANOVAs and Pearson product moment correlations were used to analyze the data. All significance was accepted at p<0.05. Upper body 1RM (77.1±19.7kg) and HG (51.2±6.2kg) were significantly greater in the group above the median ASM index than the group below (61.8±15.6 kg and 46.2±5.8kg, respectively). Lower body 1RM, physical function, and number of steps/day were not different between groups. The ASM index was significantly associated with both upper body strength (r=0.597) and HG (r=0.459). Our findings suggest that the upper body 1RM and HG tests may be a cost effective and valid method of assessing diminished muscle mass in BCS, and may further assist clinicians to identify individuals at risk for sarcopenia.

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THE EFFECT OF CACHEXIA SEVERITY AND RESISTANCE EXERCISE TRAINING ON SKELETAL MUSCLE MASS

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Cancer cachexia is a complex wasting syndrome characterized by the progressive loss of skeletal muscle mass. Resistance exercise training's ability to increase muscle mass and strength make it a potential candidate for non-pharmacological treatments in muscle wasting conditions. The purpose of this study was to determine if the severity of cachexia altered resistance exercise training improvements in skeletal muscle mass. At ~17 weeks of age, male ApcMin/+ mice were subjected to 7 bouts of resistance exercise over a period of 2 weeks. Following the completion of training, mice were stratified based on the percentage of body weight change from peak to post measurements [mild (<10%) and intermediate (>10%)]. Body weight, tibialis anterior (TA) muscle mass, and testes size decreased during the progression of cachexia. Resistance exercise increased TA muscle mass (10%; p < 0.01) in mice with intermediate cachexia, however this response was not observed with mild cachexia. There was an inverse relationship between training-induced TA mass change and body weight (R² = -0.60, p = 0.02). In addition, there was an inverse relationship between training-induced TA mass change and testes size (R² = -0.72, p = 0.007). Our results demonstrate that during the progression of cancer cachexia skeletal muscle has the ability to respond to resistance training that consists of eccentric muscle contractions. Additionally, contraction-induced muscle growth was independent of testes size, which emphasizes that these changes can occur while the cachectic environment is present. Resistance exercise training appears to be a potential treatment to attenuate skeletal muscle loss during cancer cachexia.

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HIGH-FAT DIET INDUCED OBESITY INCREASES SERUM MYOSTATIN BUT DOES NOT ACCELERATE SKELETAL MUSCLE ATROPHY

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Myostatin is a circulating negative regulator of muscle mass, and its expression is higher in both severely obese humans and in obese mice. The aim of this study was to determine if obesity induced by a high-fat diet leads to a decrease in muscle mass or increases loss of mass caused by surgical denervation in mice, a model of nerve damage. Thirty male C57BL/6 mice were divided into three groups; 12-wk control diet (CD), 9-wk control diet then 3-wk high-fat diet (CHF), and 12-wk high-fat diet (HF). At 10 weeks, the left sciatic nerve was cut, and contralateral sham operated. At 12 weeks, EDL, soleus, tibialis anterior, plantaris, and gastrocnemius muscles were excised and weighed; body composition was measured by MRI; and serum myostatin was measured by ELISA. Over 12 weeks, the HF resulted in a profound increase in fat mass (800%), with less in CHF (470%) and CD (240%). The concentration of myostatin was significantly higher (P < 0.05) in the HF group (657 pg/ml ± 85) than both the CHF (455 ± 46) and CD (311 ± 29). In spite of this, there were no differences in muscle mass of the innervated muscles among groups. While the percent atrophy ranged from 15 to 39%, depending on the muscle, there were no differences among diet groups, with the exception of greater atrophy (P < 0.05) of the soleus in the CHF group (26% versus 16% for CD and 15% for HF). In conclusion, muscles of mice on a 12-week high-fat diet are exposed to higher myostatin but have the same mass and atrophy at the same rate as mice fed a control diet. This suggests that obesity may cause muscles to become resistant to the catabolic actions of myostatin.

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WHOLE BODY, LUMBAR AND HIP BONE MEASUREMENTS OF COMPETITIVE MALE CYCLISTS

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PURPOSE: To determine whether competitive cyclists exhibit low bone mineral density (BMD) due to their non-weight bearing activity. A group of ten, male cyclists riding at least 6 hrs/wk participated in the study. **METHODS:** Maximal exercise testing and 40-k time trials (TT) were performed on an electronically braked cycle ergometer. BMD of the whole body, lumbar spine (L1-L4) and both hips were measured using a Hologic Discovery-W (Hologic, Waltham, MA, USA). Pearson product moment correlations were run on the dependent variables of BMD and performance. **RESULTS:** The ten cyclists (37±10 yrs, 76±10 kg, 24.1±2.1 kg/m², 54.9±6.4 ml/kg/min) had low/normal BMD at the whole body (1.166±0.100 g/cm³), lumbar (0.976±0.111 g/cm³), right hip (0.910±0.082 g/cm³) and left hip (0.900±0.090 g/cm³). T-scores calculated from the mean BMD of the whole body, lumbar spine, right and left hip were -0.340, -0.995, -0.780 and -0.890, respectively. When evaluated individually, lumbar spine scans identified five cyclists as osteopenic (T-scores -1.5 to -2.2). Significant (p<0.05) correlations were found between the BMD of right hip and speed (r=-0.829), power (r=-0.875) and time to completion (r=0.830) of the TT. **CONCLUSION:** Further research is needed to determine whether low BMD compromises strength of bones in male cyclists. Funded in part by the Institute of Sports Sciences and Medicine.

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THE EFFECT OF ACUTE AND REPEATED ECCENTRIC MUSCLE CONTRACTIONS ON CACHECTIC MUSCLE ANABOLIC SIGNALING IN THE FEMALE MOUSE

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Cachexia is characterized by muscle mass loss caused by disrupted protein turnover, including suppression of anabolic signaling. Eccentric muscle contraction (EC) stimulates MPS and muscle hypertrophy. The purpose of this study was to determine if female cachectic tibialis anterior (TA) muscle maintains acute and training-induced anabolic plasticity during the progression of cachexia. Female C57BL/6 (WT) (n=25) and ApcMin/+ (Min) mice (n=40) performed a well-described EC protocol by stimulating the sciatic nerve (10 sets of 6 repetitions). Mice performed one acute session of stimulation or chronic stimulation consisting of 7 sessions over 14 days. The TA muscle from one leg was stimulated while the other served as the control. The TA muscle was dissected at 3h, 14h, or 24h after a novel acute bout of EC or 48 hours after the last chronic bout. TA muscle mass and type IIA and IIB mean fiber cross-sectional area (CSA) were reduced by cachexia. Preliminary analysis shows that MPS was induced by EC, though it was significantly lower in cachectic Min mice than WT mice. Acute EC increased 4EBP1 and p70S6K phosphorylation, but this induction was attenuated by cachexia. Acute EC also attenuated cachexia-induced AMPK phosphorylation. Cachectic female Min mice subjected to repeated bouts of EC had showed no more weight loss than WT mice. Our data suggests that both acute and chronic EC can induce anabolic signaling in female cachectic muscle. Funded by NIH Grant RO1CA121249-01.

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EFFECTS OF ELECTRICAL STIMULATION INTENSITY ON NEAR-INFRARED SPECTROSCOPY MEASUREMENTS OF OXYGEN CONSUMPTION AND MITOCHONDRIAL CAPACITY

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Near infrared spectroscopy (NIRS) can be used to measure muscle oxygen consumption (mVO₂). Repeated arterial occlusions after exercise provide an index of skeletal muscle mitochondrial function. The purpose of this study was to examine the effects of electrical stimulation (ES) intensity (i.e. current amplitude) on mVO₂ and the recovery rate of mVO₂ after exercise. Ten healthy subjects (age = 21.2 ± 1.4 years) were tested at three levels of ES current. Twitch ES (4 Hz) of the medial gastrocnemius/soleus muscles was used to increase mVO₂. Repeated measures of mVO₂ were fit to a monoexponential curve and rate constants were calculated. A force transducer was used to measure the time-tension integral (TTI) of ES exercises. Average currents used in this study were 45 ± 11, 61 ± 12, and 82 ± 14 mA for the low, medium, and high currents. Normalized TTI for low, medium, and high current trials were 54 ± 11, 82 ± 7, and 100 ± 0 % (p < 0.001). The initial (end-exercise) mVO₂ were 2.56 ± 1.44, 3.64 ± 0.85, and 3.79 ± 0.60 % sec⁻¹ for low, medium, and high current trials. NIRS rate constants were not different between trials (2.02 ± 0.54, 1.95 ± 0.44, 2.02 ± 0.46 min⁻¹ for low, medium, and high current trials; F(2,9) = 0.264, p = 0.771, η² = 0.028). In summary, changes in ES intensity influence measurements of mVO₂, but the recovery of mVO₂ represents only the activated tissue and was independent of the ES intensity.

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Undergraduate Research

THE EFFECT OF IL-6 LOSS ON INITIAL LADDER CLIMBING EXERCISE-INDUCED CHANGES IN STRENGTH AND MUSCLE MASS

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IL-6 contributes to skeletal muscle and systemic responses to exercise. It has been previously shown that mice lacking IL-6 have decreased endurance capacity, an altered response to chronic overload, and have a prolonged recovery period after atrophy. PURPOSE: The purpose of this study was to determine the initial effects of repeated weighted ladder climbing exercise on mice lacking IL-6. METHODS: Wild type (WT) (control: n = 3, trained: n = 5) and IL-6 KO (KO) (control: n = 3, trained: n = 4) mice started weighted ladder training (WLT) at 18-20 weeks of age. They were trained every other day for 6 days, with progressively increasing weights. RESULTS: WT mice had a 1.2 fold increase (p= 0.04) in tibialis anterior weight with WLT (con: 61.7 ± 2.2 mg, WLT: 73.0 ± 3.2 mg); whereas, no increase (p= 0.66) was seen in the KO, (con: 56.2 ± 3.8 mg, WLT: 53.8 ± 3.5 mg). WLT increased volitional grip strength in both the WT, (p= 0.03; con: 2.37 ± 0.08 N, WLT: 2.59 ± 0.10 N), and in KO (p< 0.01; con: 2.35 ± 0.05 N, WLT: 2.57 ± 0.05 N). CONCLUSION: Our results suggest that initial changes in volitional strength with ladder training are independent of IL-6, while IL-6 may be important for initial changes in ladder exercise-induced muscle mass.

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Undergraduate Research

THE PREVALENCE OF SEVERE OR SITE-SPECIFIC SARCOPENIA IN JAPANESE MEN AND WOMEN

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PURPOSE: To compare the prevalence of severe sarcopenia, total muscle mass and site-specific thigh sarcopenia was measured for 6 different age groups. METHODS: Japanese men and women aged 20 to 85 (n=2014, 55% women) had muscle thickness (MTH) measured by ultrasound at 6 sites on the anterior and posterior aspects of the body (upper arm, trunk, and thigh). Total muscle mass (SM) was estimated using an ultrasound-derived prediction equation. Using anterior and posterior thigh MTH, a MTH ratio (A50:P50 MTH) was calculated to assess the site-specific thigh sarcopenia. Severe sarcopenia was defined as a SM index (SM divided by height squared) of <2 standard deviation (SD) below the young adult mean. Site-specific thigh sarcopenia was defined as A50:P50 MTH ratio of <2 SD below the young adult mean. RESULTS: Age was inversely correlated (p<0.001) to SM index and A50:P50 MTH in men (r=-0.480 and r=-0.522) and women (r=-0.243 and r=-0.516). The prevalence of sarcopenia was less than 3% for women under the age of 60, 7% for ages 60-69 and 24% for ages 70-80 in women. In men, the prevalence of sarcopenia was less than 7% for men under the age of 50, 18% for ages 50-59, 33% for ages 60-69, and 47% for ages 70-85. Compared to severe sarcopenia estimated by SM, there was a higher prevalence of site-specific thigh sarcopenia that was observed in both men (9% for ages 30-39, 41% for ages 50-59, and 58% for ages 70-85) and women (24% for ages 30-39, 58% for ages 50-59, and 75% for ages 70-80). CONCLUSION: These results suggest that site-specific thigh sarcopenia appears before it is able to be detected at the whole body level.

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THERAPEUTIC ULTRASOUND ENHANCES MUSCULAR PERFORMANCE RECOVERY AFTER EXERCISE INDUCED MUSCLE DAMAGE

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Background: Animal models of skeletal muscle damage show that Therapeutic Ultrasound (TUS) enhances muscle force recovery after damage. Results in humans are controversial and the examination of TUS effects is limited to maximal voluntary force production. Purpose: To examine the effect of TUS treatment on three components of muscular performance (MP) on healing human skeletal muscle. Design: Double-blind, randomized study. Methods: 16 healthy individuals (18-29 y/o), physically active, were randomized to either Sham (S) or experimental group (TUS). All subjects performed 50 maximal isokinetic lengthening contractions (muscle damage) of elbow flexors of their non-dominant arm after baseline measurements of MP. Both groups received either TUS or Sham treatment, beginning 24h post-exercise during 7 consecutive days. TUS was delivered on a standardized area of the non-dominant biceps brachii (continuous, 1.0 MHz, 60J/cm²). MP measurements were performed in a dynamometer isokinetic, dependent variables were peak torque, time to peak, and work during isometric and concentric isokinetic contractions at 30°/sec and 180°/sec. MP were performed at baseline, day 1, 2, 4, 6 and 8 after exercise. Data was adjusted by gender and analyzed by repeated measures analysis. Results: Muscle damage was confirmed by a decline in peak torque, increase CK levels and decrease in active range of motion of elbow flexion ($p < 0.01$). No differences between groups were detected for peak torque and time to peak ($p > 0.05$). Differences between TUS and S group were detected for work during a maximal concentric contraction at 30°/sec ($p = 0.04$) and 180°/sec ($p = 0.02$). Comparisons at each time point showed differences between groups as early as day 6 (after 5 consecutive TUS treatments) ($p = 0.03$).

THE ROLE OF CENTRAL MODULATION ON THE STRETCH REFLEX OF THE PERONEUS LONGUS

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PURPOSE: To investigate the effects of anticipation and cognitive task loading on the functional stability and reactivity of the ankle musculature to sudden inversion. **METHODS:** Using a custom built inversion platform, 10 healthy subjects were exposed to a rapid inversion stimulus (35 degrees) under 2 two-level testing conditions. Subjects completed 60 total trials and would either be informed or uninformed (anticipation) along with performing either a control balance task of sway minimization or backwards counting by 3's or 7's (cognitive/dual-task). Normalized surface electromyographic signals from the peroneus longus were integrated (iEMG) within three windows: t100, the 100 milliseconds(ms) immediately after the onset of the inversion stimulus(t0); tmid, the period from 100ms to 200ms after t0; and t200, the 200ms following t0. The iEMG represents the total amount of measured muscular activity within its respective window. **RESULTS:** Anticipation of the inversion stimulus resulted in significantly lower overall iEMG values for all three windows (t100, $p = 0.001$; tmid, $p = 0.005$; t200, $p = 0.001$; 2 tailed 95% CI). Only one significant difference was identified with the task condition ($p = 0.014$), with tmid being lower in dual-task trials. **CONCLUSIONS:** These results suggest that supraspinal structures play a role in modulating a monosynaptic stretch reflex, and anticipation of a stretch reflex stimulus may result in inhibitory modulation.

MOTOR PLANNING AND END-STATE COMFORT IN CHILDREN WITH AUTISM SPECTRUM DISORDERS

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PURPOSE: Autism Spectrum Disorders are a cluster of disorders that effect communication, behavior, and social ability. The CDC recently released that Autism affects 1 in 88 U.S. children (2012). The increasing prevalence of Autism has led to an increase in the body of research regarding Autism, however, there has not been extensive investigation into how movement and motor skills may play a role in this population. Those that have looked into movement and Autism have found that children with Autism Spectrum Disorders may show impairments in motor planning and coordination (Hughes, 1996; Smyth & Mason, 1997; Van Sweiten et al., 2010). **METHODS:** This study investigates motor planning and ability in children with Autism Spectrum Disorders through a battery of fine and gross motor tasks, as well as postural components through alteration of sensory input. The study includes 13 children, 9 with a diagnosis of an Autism Spectrum Disorder, as well as 4 typically developing children, between the ages of 5-13. The battery of tasks consisted of a dial-turning task to test end-state comfort; a "Simon-Says" imitation task to assess gross motor planning; and a drawing task and beading task to assess fine motor skills. **RESULTS:** Preliminary findings have shown that children with Autism Spectrum Disorders show greater variability in hand selection and tendency to choose an uncomfortable position during the dial turning task and those that indicated a diagnosis of Autism or general Autism Spectrum Disorder showed the lowest confidence on the drawing task. The importance of this research is to better understand the differences in motor planning and how they relate to the symptoms of this disorder.

Undergraduate Research

EFFECT OF CHALK USE ON OPEN AND PINCH GRIP PULL-UPS

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The purpose of this study was to determine if open-handed and pinch- grip weight-assisted pull-up (WAPU) performance was affected by the use of chalk (100% magnesium carbonate) in recreationally-trained rock climbers. Male volunteers ($n = 9$) completed four counterbalanced trials performing open-handed and pinch-grip pull-ups assisted by 50% reduction of body weight until failure using chalk or no chalk. When compared to the non-chalked trials, chalk improved both open-handed (mean = 22.8 ± 4.5 vs. mean no chalk = 19.7 ± 4.4 reps; $p = 0.006$), and pinch-grip (mean = 14.4 ± 4.5 vs. mean no chalk = 9.1 ± 4.8 reps; $p = 0.007$) WAPU. Heart rate, ratings of perceived exertion, perceived recovery and session-RPE were not significantly different (all $p > 0.05$) among trials. Perceived overall comfort for the two grips were also assessed using 100-mm scales. Overall comfort was significantly greater ($p = 0.013$) for chalked-open-handed (mean = 71.6 ± 24.2) vs. chalked-pinch grip (mean = 57.8 ± 29.8) WAPU. In conclusion, chalk improved performance for both open-handed and pinch grip WAPU when compared to no chalk trials. Future research should investigate utilizing chalk on a variety of indoor climbing holds and rocks.

THE EFFECTS OF WHOLE-BODY VIBRATION ON VERTICAL JUMP HEIGHT AND PEAK POWER

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Whole-body vibration (WBV) has been shown to potentiate vertical jump performance. Purpose: The purpose of this study was to evaluate the influence of different rest intervals following WBV in jumping performance in varsity and recreationally trained females. Methods: 16 varsity and recreationally trained females completed the study using four visits. Visit one acted as a familiarization visit and visits 2-4 involved two randomized conditions, each with a 10min washout period between conditions. WBV was administered on a tri-axial platform (frequency =30Hz, amplitude=2-4mm) while performing four bouts of 30s of quarter squats. WBV was followed by 3 countermovement vertical jump (CMVJ) with five different rest intervals; 0s, 30s, 1min, 2min, 4min. A non-vibration control and collapsed maximum condition were also incorporated. Dependent variables of interest were jump height (VJH) and peak power output (PPO)(Sayers). Results: Differences in PPO and VJH were analyzed with a 2(status) x 7(conditions) mixed factor ANOVA. No significant ($p > 0.05$) interaction of training status by condition was found for either variable. There was a main effect for training status for both variables demonstrating greater values for varsity athletes compared to recreationally trained individuals. There was a main effect for condition for PPO and VJH. This was followed up with an LSD pairwise comparison demonstrating that collapsed maximum values, regardless of rest interval, were significantly ($p < 0.05$) greater than the control condition in both PPO and VJH. Conclusions: This indicates that participants are positively influenced by exposure to vibration; with the improvement being revealed at different rest intervals. This suggests strong individual differences in optimal rest times for both varsity and recreationally trained athletes.

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FORCE PRODUCTION SYMMETRY IN NCAA DIVISION I SOCCER PLAYERS

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PURPOSE: Assessments of symmetry are often utilized in various sports and rehabilitation settings as previous research has indicated that athletic performance detriments may occur in the presence of asymmetries. The purpose of this study was to determine if differences exist in levels of bilateral force production symmetry between male and female collegiate soccer players across several force production variables. METHODS: Athletes for this study included NCAA Division I soccer players (36 male, 35 female). Force production symmetry was determined via the isometric mid-thigh pull (IMTP), a maximal effort multi-joint isometric contraction. Force data was obtained from a custom power rack and a dual force plate set up. Force variables included peak force (PF), rate of force development (RFD), and instantaneous forces at 50 ms (F@50), 90 ms (F@90) and 250 ms (F@250). Variables were further analyzed to calculate symmetry index (SI) scores. Independent samples T-test were used to determine statistical difference between male and female soccer players. RESULTS: Female SI mean scores and standard deviations were higher than male SI scores for all variables. Statistically significant differences ($p < 0.05$) between male and female SI scores were observed for all dependent variables. CONCLUSIONS: The results of this study indicate that female soccer players may be more likely to possess more severe bilateral strength asymmetries than their male counterparts. Special consideration may be necessary for athletes involved in sports where strength symmetry is associated with better performance as well as for potential injury prevention.

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A COMPARISON OF TWO DIFFERENT TREADMILL PROTOCOLS IN MEASURING MAXIMAL OXYGEN CONSUMPTION IN HIGHLY-TRAINED DISTANCE RUNNERS

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PURPOSE: To investigate the effect of two different treadmill protocols on attainment of maximal oxygen uptake (VO₂max) in highly-trained distance runners (n=16). The secondary purpose was to determine if the ventilatory threshold (VT) attained during different protocols occurred at the same percent of VO₂max (%VO₂max @ VT). METHODS: After a familiarization session performing the Bruce Protocol, VO₂max was evaluated on separate days using 1) a horizontal, increment in speed only protocol (SOVO₂max) and 2) inclined, constant speed with increment in grade only protocol (GOVO₂max). RESULTS: VO₂max values were significantly higher from the GOVO₂max in comparison to the SOVO₂max protocol (76.1 vs. 71.2 mL/kg/min, $p = 0.005$). Although the oxygen uptake values for VO₂ at the VT were higher for the GOVO₂max trials, the %VO₂max @ VT was not significantly different between the two protocols ($p = 0.825$) occurring at $77.5 \pm 5.7\%$ VO₂max and $77.2 \pm 7.1\%$ VO₂max, respectively. CONCLUSION: The results indicate that, either SOVO₂max or GOVO₂max protocols could be used to determine the % VO₂max @ VT in highly-trained distance runners. Thus in highly-trained runners, protocol preference by the runner could be taken into consideration when selecting the protocol for the determination of training thresholds, keeping in mind that the VO₂max values may differ and may not be comparable.

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DIFFERENCES IN FACTOR ORGANIZATION BETWEEN MEASURES OF ISOMETRIC STRENGTH IN KEY DEADLIFT POSITIONS

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PURPOSE: The relationship between anthropometric factors and isometric performance in key positions of the deadlift were assessed. METHODS: A variety of anthropometric measures were obtained from 14 powerlifters using simple lab techniques. Lifters performed isometric pulls in a custom power rack while standing on a force plate at 3 deadlift-specific positions and the mid-thigh pull position. Principal component analysis was used to group variables into factors and to assign factor scores to each lifter. Relationships between factor scores and peak force generated at each position were assessed using Pearson's r . RESULTS: Scores for factor 1, made up of shank length, arm length, body mass, seated height, waist circumference and height were significantly correlated to peak force at bar heights 21.5cm from the floor and just above the patella ($r=0.574, 0.551$, respectively). R-values for lifter scores for factor 2, made up of thigh circumference and thigh length, were trivial or minor. CONCLUSION: The anthropometric characteristics related to isometric strength in low bar positions appears to be related to measures of body size, while the relationships between those same characteristics to a high deadlift-specific bar position and the mid-thigh pull are less clear.

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THE EFFECTS OF A 10 KM RUN AND 30 KM CYCLING TIME-TRIAL ON VENTILATORY THRESHOLD DURING THE FINAL RUNNING LEG OF AN ITU DUATHLON IN HIGHLY-TRAINED MULTI-SPORT ATHLETES

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P61 PURPOSE: This study investigated the effects of a 10 km run and 30 km cycling time-trial on maximal oxygen uptake (VO₂max) and ventilatory threshold (VT) during the subsequent running of an ITU Duathlon simulation. METHODS: Highly-trained multi-sport subjects (n=6) completed three trials; Trial-1: a speed only VO₂max (SOVO₂max) protocol to determine VO₂max and VT during a single-bout run; Trial-2: a 10 km run at 95-98% of VT followed by a cycle ergometer VO₂max test to determine VO₂max and VT; Trial-3: a 10 km run and 30 km cycling time-trial, each performed at 95-98% of VT, and followed by a SOVO₂max protocol to determine VO₂max and VT. RESULTS: The decline in VO₂max observed on Trial-3 (60.9± 3.1 mL/kg/min) when compared to Trial-1 (66.8± 6.6 mL/kg/min) approached significance (p=0.06); but, no significant change in VT at %VO₂max was observed. There was, however, a significant decline in VO₂ at VT between Trial-1 (50.6± 4.5 mL/kg/min) and Trial-3 (47.2± 6.2 mL/kg/min) p=0.01, representative of a 1.6 km/h decline in running speed at VT and 2 min 18 sec decline in 5 km running time. CONCLUSION: There was a downward trend in VO₂max and a significant decrease in relative VO₂ at VT during a maximal treadmill test following a 10 km run and 30 km cycling time-trial compared to a single-bout maximal treadmill protocol. Findings suggest that an individual would not be able to perform the final 5 km run during an ITU Duathlon (laboratory setting) at the same intensity at which one performs the initial 10 km run.

DETERMINING PHYSIOLOGICAL DEMANDS IN AN OPEN-SKILLED SPORT: A CASE STUDY INVESTIGATING WOMEN'S LACROSSE PRACTICE

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P62 PURPOSE: The aim of this investigation was to determine the physiological demands of women's lacrosse (LAX) practice. METHODS: Beat-by-beat heart rate as well as distance, pace, and energy expenditure were collected during four practices of varying intensities in one Division III female lacrosse player; all practice activities and corresponding times were recorded for comparison purposes. Analysis was carried out using the Polar ProTrainer 5 software. RESULTS: Across four practices, averages were as follows: practice time - 1 hour and 55 minutes; heart rate - 116.5 beats per minute (bpm); maximum heart rate -177.5 bpm; distance covered - 1.85 miles; pace (minutes per mile) - 21 minutes 13 seconds (or approximately 3 miles per hour); maximal pace - 5 min 29 seconds or approximately 11 mph; energy expenditure - 714 kcals. CONCLUSIONS: Results indicate that the Polar RS800CX Heart Rate Monitor and GPS device can be used to determine the physiological demands of an open-skilled sport such as women's LAX. With data of this type, more specific and better aligned training regimens can be developed for open-skilled sports comprised of unpredictable movements and playing environments.

Undergraduate Research

MOUTHPIECE USE IMPROVES X-FACTOR IN COLLEGIATE GOLFERS

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P63 Introduction: The X-Factor is the separation of the hips and shoulders at the top of the backswing, and a larger X-Factor results in greater club head velocity. Flexibility, stability, and core strength are the major contributing factors in loading certain torso muscles to maximize the torso-pelvic separation. The ArmorBite mouthpiece (MP) has been shown to positively affect human performance such as driving distance and accuracy, thus it may influence the X-Factor. Purpose: The purpose of this study was to determine the effects of ArmorBite MP use on the X-Factor. Methods: Ten collegiate male golfers (20.9±0.8 years) performed 10 drives (5 with and 5 without MP), with random treatment order, while wearing the iClub Motion Capture System which is integrated to a PC providing results from each swing. After data collection was completed, results were analyzed using paired t-tests. Results: MP use showed a significant improvement (p<0.05) in the following variables compared to the no MP condition: X-factor (42.7±9.6 vs. 41.6±9.5), Max X-factor (46.5±11.9 vs. 45.3±10.7), X-Factor Stretch (4.0±5.2 vs. 3.4±3.9), Shoulder Rotation at Top of Back Swing (-90.0±7.5 vs. -80.0±7.1), Total Hip Rotation (105.0±13.4 vs. 102.4±14.9) and Max Hip Speed (452.1±74.9 vs. 443.7±69.3). No differences were seen in Total Shoulder Rotation, Hip Rotation at Top of Back Swing or Max Shoulder Speed. Conclusion: Data suggests that MP use may be effective at improving the X-Factor and thus the power of the golf swing. Funding was provided by BiteTech, Inc.

Undergraduate Research

ASSESSMENT OF THE EFFECTS OF CONTROLLED FREQUENCY BREATHING ON LACTATE LEVELS IN SWIMMING

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P64 It has been suggested that reducing the breathing rate in a swimming race actually lowers the lactic acid production in the body. PURPOSE: To assess differences in post-swim lactate levels, heart rate (HR), and time of a maximal 100-yard freestyle swim in normal breathing (NB) and controlled-frequency breathing (CFB) conditions. METHODS: Twenty-one Division 1 female swimmers completed two randomly assigned testing sessions consisting of a 500-yard warm-up, followed by a 100-yard all-out swim trial utilizing either NB (breathing every 2-4 strokes) or CFB (breathing every 7 strokes). Blood samples were taken from the earlobe at rest and 0, 1.5, 3, and 5 minutes after each trial. Heart rate (HR) was measured at rest and immediately after swim completion. The subject's tempo, cycle count, velocity, finish time, and splits were calculated. RESULTS: The study showed no significant difference between NB and CFB on blood lactate, velocity, stroke count, distance per cycle, cycle rate, or time. Post-exercise HR was significantly higher (p = 0.02) in NB trial (184.9 ± 12.0 bpm) than the CFB trial (174.8 ± 14.8 bpm). CONCLUSIONS: The lower HR in CFB could be explained by the decrease in ventilation which would cause the HR to slow, even during exercise. Although the time difference between NB (60.23 ± 2.44 s) and CFB (61.36 ± 2.83 s) trials was not statistically significant, the participants swam an average of 1.13 s slower with the CFB pattern, which would pose significance to elite competitive swimmers.

Undergraduate Research

A TWENTY-YEAR EPIDEMIOLOGICAL ANALYSIS OF FITNESS AND CHOLESTEROL DATA TRENDS IN COLLEGE STUDENTS

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P65 PURPOSE: This study examined trends in fitness and cholesterol data in college age students for two decades. METHODS: A cross sectional study was conducted analyzing trends in fitness data (n=801) and blood cholesterol data (n=236) in college age students from a private liberal arts college over the span of twenty years (1990-2010). RESULTS: A college-level wellness course had a positive impact on students' blood pressure, lung function, and VO2 estimates in pre and post course measurements ($p < .10$) despite seeing a decline in entry level measurements over the past decade. In addition, nutritional behaviors were also positively impacted with reports of higher caloric expenditure and a decrease in dietary fat and protein intake as well as in increase in complex carbohydrate intake ($p < .05$). Blood chemistry analysis showed that entry-level total cholesterol revealed that 27% of students have a total cholesterol value higher than 175. Women students had higher total cholesterol, low-density lipoprotein cholesterol, and very-low-density lipoprotein cholesterol than their men student counterparts ($p < .05$). CONCLUSION: While students' fitness and cholesterol data is a concern at the outset of the course for about one-fourth of students, a college wellness course has a positive impact on a variety of physical wellness health behaviors.

EFFECT OF MEETING PHYSICAL ACTIVITY GUIDELINES AND BODY MASS INDEX ON FASTING PLASMA GLUCOSE LEVEL AMONG U.S. ADULTS

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P66 PURPOSE: To examine the effects of physical activity (PA) and body mass index (BMI) on fasting plasma glucose (FPG) among U.S. adults. METHODS: Data from the 2007-2008 National Health and Nutrition Examination Survey (NHANES) were analyzed. The study sample included 2,640 participants over the age of 18 years who had valid responses for BMI, FPG, race, age, sex, and moderate and vigorous PA questions. A logistic regression model was used to analyze the data. RESULTS: The full model (N = 2,640) was significant and showed a PA level-by-BMI interaction ($P < .001$). For the normal BMI (18.5 - 24.9 kg/m²) model (N = 816), PA level, race, sex, and age were significantly related to FPG level, $P < .001$, RN2 = .252. For the overweight BMI (25.0 - 29.9 kg/m²) model (N = 918), PA level, race, sex, and age were significantly related to FPG level, $P < .001$, RN2 = .194. For the obese BMI (≥ 30 kg/m²) model (N = 906), PA level, race, sex, and age were significantly related to FPG, $P < .001$, RN2 = .210. CONCLUSIONS: Adults who have a normal BMI and do not meet U.S. PA guidelines are more likely to have a prediabetic FPG level than adults who have a normal BMI and are physically inactive. When using the normal FPG level as a reference group, adults who have an overweight BMI and meet the U.S. guidelines for PA are less likely to have a diabetic FPG level compared to adults that have an overweight BMI and are physically inactive. Lastly, adults who have an obese BMI and meet the U.S. guidelines for PA are less likely to have a diabetic FPG level compared to adults that have an obese BMI and are physically inactive. Therefore, fasting plasma glucose levels associated with diabetes can be reduced if people that are of normal weight, overweight, or obese meet U.S. guidelines for physical activity.

A SINGLE NUCLEOTIDE POLYMORPHISM (SNP) IN INSULIN-LIKE GROWTH FACTOR (IGF1) WAS ASSOCIATED WITH LEG STRENGTH IN AFRICAN AMERICAN WOMEN

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P67 PURPOSE: To investigate the contributions of IGF1 genetic variants on muscular fitness and body composition in European American (EA) and African American (AA) sedentary premenopausal women. METHODS: 116 AA and 109 EA women were genotyped for six IGF1 single nucleotide polymorphisms (SNPs). Genetic association analyses were conducted between each SNP and isometric knee extension strength, adjusted by lean leg mass. Lean leg mass was derived from leg tissue and leg percent tissue fat measured by dual energy x-ray absorptiometry (DXA). All genetic association analyses were controlled for population stratification using genetic admixture estimates. RESULTS: In AA women, SNP rs9919733 was significantly associated with knee extension strength independent of lean leg mass ($p = 0.0078$) in a regression model. CC carriers of this SNP had significantly lower leg specific strength compared to TT carriers ($p < 0.05$). Also, in AA, Presence of allele C of the rs9919733 significantly increased the odds for decreased leg strength (OR=9.928, 95% CI: 1.137-86.18). No association was observed in EA, probably due to a lower frequency of the C allele. CONCLUSIONS: Our data suggest that an IGF1 SNP may affect knee extension strength in AA women, independent of lean leg mass.

FACTORS RELATED TO PARTNER INVOLVEMENT IN THE DEVELOPMENT OF THE U.S. NATIONAL PHYSICAL ACTIVITY PLAN

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P68 PURPOSE: Physical activity coalitions (PACs) are increasingly forming to meet the demands associated with increasing population levels of physical activity. Little is known about what makes PACs successful, however some evidence suggests that factors related to each organization that joins a coalition may explain coalition success/ failure. The purpose of this study was to employ qualitative methods to understand the factors related to organizations' decisions to commit to the coalition that developed the U.S. National Physical Activity Plan (NPAP). METHODS: Qualitative semi-structured interviews were conducted with key informants from NPAP's partner organizations. The interview guide was designed to elucidate the key factors explaining why and how partner organizations decided to commit to the NPAP coalition. Interviews were transcribed verbatim and were coded separately by two members of the research team. RESULTS: Five primary factors emerged: (1) Strategic Alignment; (2) Organizational Alignment; (3) Provide Input; (4) Seminal Event; (5) Cost/Benefit Ratio. CONCLUSION: Building and maintaining a PAC with highly committed partners may hinge upon the ability to fully understand how each current or prospective partner believes it could benefit from the five factors identified in this study.

AGREEMENT BETWEEN SELF-REPORTED AND OBJECTIVELY-MEASURED SITTING TIME AMONG COLLEGE FRESHMEN

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P69 PURPOSE: The deleterious effects of sedentary behavior (SED) have become increasingly evident, but SED remains largely undescribed among college students. Valid and reliable self-report measures of SED are desirable due to cost and feasibility concerns of objective monitors. The aim of this analysis was to examine the agreement between self-reported and objectively-measured sitting time among college freshmen. METHODS: Subjects (n=38, 55% females) wore the criterion monitor, the activPAL (AP), for 7 consecutive days and completed the International Physical Activity Questionnaire (IPAQ). AP sit/lie time and the total sitting time on weekday and weekend IPAQ questions were used for analyses. AP minimal wear requirements were set at 10 hours per day for 3 weekdays and 1 weekend day. RESULTS: Self-reported sitting time was significantly correlated with objectively-measured sitting time on weekend days ($r=0.43$) but not on weekdays ($r=0.01$). IPAQ sitting times were 3.9 hrs and 2.7 hrs less, on average, than AP times for weekdays and weekends, respectively. Bland-Altman plots demonstrated a positive trend between the difference of self-report and AP sitting times and the average of these two measures, with the less sedentary subjects tending to underreport their SED more than those who sat most. CONCLUSIONS: College freshmen inaccurately report their weekday sitting time, with the least sedentary underreporting the most. SED is a contemporary public health priority, necessitating further assessment of self-report instruments. Grant Support: USDA 2008-55215-18825.

REDUCING SEDENTARY BEHAVIOR IN A UNIVERSITY LIBRARY

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P70 PURPOSE: Sedentary behavior is a wide-spread health risk distinct from the lack of moderate-to-vigorous physical activity. Novel intervention approaches to reduce sedentary behavior are needed. The aim of the present study was to evaluate a strategy to reduce sedentary behaviors among college students in a university library. METHODS: For 7 days, 8 portable pedal machines were placed in a distinct prominent area inside the main library at a university in southeastern United States. The pedal machines automatically collected data on total pedal time and distance. Number of visits in the building was measured with the gate counter. Pedal machine use was observed for a total of 28 hours at different times of the day in 15 sessions. RESULTS: The pedal machines recorded 16.6 hours and 261.4 kilometers of total use during the 7 days. The total number of visits in the building was 26,707. During observations, 194 visitors sat in the observation area (females n = 102; Caucasian n = 140; African American n = 25; other ethnicity n = 29), 25 of whom pedaled the machines (13%). No gender ($\chi^2 = 1.82, p = .18$) or ethnicity ($\chi^2 = 0.04, p = .98$) effects on the proportion of pedalers were seen among those who sat in the observation area. Number of visitors to the building ($r = .77, p < .001$) and the number of those who sat in the observation area ($r = .78, p < .001$) during an observation period were highly related to the number of observed pedalers in that time frame. This suggested that pedal machine use increases as library traffic increases. CONCLUSIONS: The intervention was moderately effective, reaching about 13% of visitors to the operational area. Data and insights could be used to design a larger scale intervention evaluation study.

KIDS CAN BIKE! A PARKS AND RECREATION PROGRAM TO PROMOTE YOUTH CYCLING

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P71 PURPOSE: The purpose of this study was to evaluate the effects of a youth bicycle-sharing pilot program on: 1) attitudes towards the program, and 2) changes in bicycle safety and skill knowledge. METHODS: The Knoxville Area Coalition on Childhood Obesity launched a 'Kids Can BIKE!' program in 2012. The program lasts seven weeks and is designed to increase physical activity, teach safe cycling skills, and explore Knoxville's parks and greenways. The program targeted children in grades 4 and 5 who were already enrolled in an afterschool program. Once a week, the children were transported to a location where they could safely ride. The city Department of Parks and Recreation transported the bicycles to the site and provided staffing. The instructors were trained to deliver a safe cycling curriculum as well as fit bicycles and helmets to the children. The children (N = 13) were surveyed at the beginning and end of the program to determine the impact of the program on changes in bicycle knowledge and to evaluate their attitudes towards the program as a whole. RESULTS: There was a significant increase in the percentage of correct answers for all items combined (80% vs. 91%). The majority (> 85 %) of children indicated high levels of satisfaction with the program. CONCLUSION: Bicycle education programs can be successfully integrated into existing afterschool and summer programs and may help children acquire the skills and knowledge to become lifelong bicyclists. Supported by a Grant from Ronald McDonald House Charities

HEALTHY LIVING INTERVENTIONS IN A RESIDENTIAL GIRL SCOUT CAMP

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P72 BACKGROUND: Childhood obesity is becoming an increasingly prominent concern in the field of health. It has been shown that lifestyle habits developed in childhood often carry over into adulthood and that developing healthy habits at a young age can help prevent weight-related health problems later in life. PURPOSE: To develop and implement an intervention curriculum based around fitness, nutrition, and self-concept in adolescent girls to promote the development of healthy lifestyle habits. METHODS: Ten girls (11- to 14-years-old) were recruited to participate in a five-day Girl Scout camp during which this research took place. Baseline measures of body composition, cardiac fitness/endurance, muscular strength/endurance, flexibility, and coordination/balance were taken and each participant filled out a questionnaire regarding eating habits, nutritional knowledge, self-concept, and physical activity. Educational curriculum surrounding nutrition, physical activity, and self-concept was incorporated each day in addition to activities including learning to correlate heart rates with physical activity, a grocery store scavenger hunt, and cooking with healthier substitutes. Participants were guided in setting goals for healthy lifestyle changes over the coming months and provided with journals to track their progress. RESULTS: It was found that 60% of participants had a BMI percentile above the 85th percentile. In addition, a majority ate sweets multiple times per day and ate at fast food restaurants at least 2-3 times per week. A significant negative correlation was found between baseline strength measures and BMI ($r = -0.746, p < 0.05$). All participants scored high on a subset of the Physical Self-Description Questionnaire. Participants were enthusiastic and responsive during the 5-day intervention, but post-data could not be collected. CONCLUSIONS: More effective measures of collecting post-data and reaching the population of adolescent girls must be developed for improvement upon this intervention.

Undergraduate Research

PHYSICAL ACTIVITY LEVELS OF 7TH AND 8TH GRADERS PARTICIPATING IN A STUDIO-BASED LEARNING SUMMER CAMP

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Given that schools are viewed as optimal settings for intervention efforts aimed at reducing childhood obesity, identification of mechanisms of increasing physical activity through curriculum or physical environment is an important public health issue. **PURPOSE:** The purpose of this study was to examine the physical activity levels of campers participating in a studio-based learning summer camp. **METHODS:** Twelve 7th and 8th grade students who were identified as being “at-risk” for dropout were invited to participate in an educational service project aimed at developing areas of core curriculum by working on design problems. The studio environment utilizes the “propose, critique, iterate” cycle of repetitive thinking and learning that comes from the system of training used by designers across many professional fields. Campers were issued the same Actigraph GT3X+ when they arrived at camp and monitors were collected at the end of each day. Camp hours were 8 AM until noon (240 minutes) during the first two weeks of June. **RESULTS:** Height approximated the 50th percentile for both boys and girls. Weight and BMI approximated the 90th percentile for boys and the 75th percentile for girls. Campers participated in 23.2 and 7.4 minutes of moderate and vigorous physical activity, respectively. **CONCLUSIONS:** Studio-based learning may provide a viable option for increasing physical activity levels while addressing academic performance. This is particularly important for students classified as “at-risk” for dropout as they are often the same population affected by health disparities.

Supported by Appalachian Regional Commission, City of Starkville, and Starkville Public School District.

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THE STRENGTH ASSESSMENT STUDY: UNDERSTANDING VARIABILITY IN MUSCULAR ENDURANCE IN OLDER ADULTS

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PURPOSE: The purpose of this investigation was to assess the individual variability in the capacity to lift submaximal loads in younger and older adults in both single- and multi-joint resistance training exercises. **METHODS:** We recruited 16 younger (8 female, 22.8±1.8 yrs) and 18 older (8 female, 74.8±6.3 yrs). The study involved four visits. One repetition maximum (1RM) was measured on two days for all participants using three different exercises: leg extensions (LE), bicep curl (BC), and leg press (LP). On days three and four, participants performed repetitions to failure at 60% 1RM or 80% 1RM, the order of which was randomized. **RESULTS:** At 60% 1RM, younger adults performed (mean±SD) 28±14, 13±4, and 13±4 repetitions and older adults performed 20±13, 20±23, and 11±3 for LE, BC, and LP respectively while at 80% 1RM younger adults did 16±7, 6±2, and 8±2 repetitions and older adults did 11±8, 7±5, and 7±2. None of these differences were significant. **CONCLUSIONS:** At a given percent of 1RM, the number of repetitions can vary substantially. Age, per se, does not appear to affect the number of repetitions.

Supported by a Science Research Fund grant at Wake Forest University

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THE EFFECT OF EXCESS BODY MASS ON EXCESS POST-EXERCISE OXYGEN CONSUMPTION AT PREFERRED WALKING PACE

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PURPOSE: When participants perform the same relative amount of work there is no significant difference in excess post-exercise oxygen consumption (EPOC). Studies typically have used either identical exercise duration for each group or completion of a pre-determined workload. Limited research has evaluated EPOC between normal weight walkers (NWW) and overweight walkers (OW) when walking at preferred pace. **METHODS:** Participants consisted of 10 NWW, 10 OW, and 10 distance runners (DR). Participants walked or ran for 5 minutes at their preferred pace. Participants stood for an additional 5 minutes following exercise to assess EPOC. **RESULTS:** EE and EPOC for the DR was found to be significantly greater ($p < 0.05$) than both the NWW and OW groups. No significant difference was seen in EE during the 5-min walk between the NWW and OW. Additionally, no significant difference was found in EPOC between the NWW and OW. NWW and OW were found to prefer to walk at similar paces as well. **CONCLUSIONS:** These results suggest that regardless of normal weight or overweight status, when walking at one’s preferred pace EPOC yields a similar response. Results support findings of previous research.

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THE IMPACT OF LOAD ON PERFORMANCE VARIABLES DURING POWER CLEAN VARIATIONS

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PURPOSE: Examine the impact of load on the performance variables associated with lower body power development during power clean variations. **METHODS:** Subjects included 17 athletic men with a minimum of 2 years training experience with the hang clean (HC). During 3 separate testing sessions, each subject completed 3 maximal effort repetitions each of either the HC, jump shrug (JS), or high pull (HP) exercise at relative loads of 30%, 45%, 65%, and 80% of their 1 repetition maximum (1RM) HC on a portable force platform. Vertical ground reaction forces of the lifter plus bar system were taken directly from the force platform. Peak power (PP) and other performance variables were calculated using a forward dynamics approach. **RESULTS:** HC PP occurred at 65% 1RM, but there were no statistically significant differences within the loads examined ($p = 0.133$). Statistically significant differences existed between the JS PP that occurred at 30% 1RM, and the values that occurred at 65% ($p = 0.001$) and 80% 1RM ($p < 0.001$). Statistically significant differences existed between the HP PP that occurred at 45% 1RM, and the values that occurred at 65% ($p = 0.018$) and 80% 1RM ($p = 0.008$). **CONCLUSIONS:** Despite being similar exercises that train lower body power, the load that optimizes PP varies for each exercise. A practitioner should prescribe loads at or near 65%, 30%, and 45% 1RM HC for the HC, JS, and HP, respectively, to optimally train lower body power.

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EXERCISE BLOOD PRESSURE IN ADOLESCENCE AND BLOOD PRESSURE FIVE YEARS LATER IN PERSONS BORN VERY LOW BIRTH WEIGHT

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PURPOSE: To examine the relationships between blood pressure (BP) response to exercise during adolescence and blood pressure five years later in a cohort of very low birth weight (VLBW) young adults. **METHODS:** At age 14 years, subjects performed a graded exercise test to exhaustion during which expired gases were measured continuously to determine oxygen consumption (VO₂). Systolic (SBP) and diastolic (DBP) BP were measured manually every 2 min during and at peak exercise. The slopes of SBP and DBP in relation to VO₂ (ml/kg/min) during exercise were calculated. Five years later, resting BP was measured in triplicate and averaged. Ambulatory BP (ABP) was monitored for 24-hours, from which mean 24-hour, awake, and asleep SBP and DBP were calculated. **RESULTS:** 43 participants (31 F) had both exercise data at 14 years of age and resting BP five years later. Six participants had resting BP in the prehypertensive range. SBP at peak exercise was correlated ($p < .05$) with resting SBP at follow-up ($r = .398$). In 26 participants with valid ABP data, SBP at peak exercise was also correlated with mean 24-hour and awake SBP ($r = .434$ and $r = .436$, respectively). In contrast, inverse correlations were found between SBP slope and awake DBP ($r = -.466$), and DBP slope and resting SBP at follow-up ($r = -.437$). **CONCLUSION:** Higher SBP at peak exercise, but not SBP slope, was associated with higher resting and ambulatory SBP five years later, and may help identify VLBW adolescents who are at risk for developing hypertension.

IMPORTANCE OF PHYSICAL ACTIVITY AND WEIGHT MANAGEMENT FOR BREAST CANCER SURVIVORS

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PURPOSE: In 2011, the American Cancer Society estimated that 230,480 women will join the 2.6 million women currently living with breast cancer in the United States. Diagnosis and recurrence could be influenced by modifiable risk factors, such as physical activity and body weight (Neilson, 2009). Few longitudinal studies have examined pre- and post-surgery physical activity (PA) levels and BMI in breast cancer patients. **METHODS:** This prospective study examined activity levels with the Godin questionnaire and anthropometric measurements at pre-surgery, as well as change in PA and weight at 6 and 12 months post-surgery. **RESULTS:** Pre-surgery measures of PA, BMI, and function were made on 303 overweight (BMI = 28.98) women (M age = 57.12 years) receiving treatment at a Comprehensive Cancer Center. Pre-surgery PA levels were below ACSM recommended levels for all intensities of aerobic activity. Using repeated measures ANOVA, mild PA decreased from baseline to 6 months post-surgery (-0.38 (SE=0.23); $p = 0.10$), and significantly decreased from baseline to 12 months (-0.66 (SE=0.20); $p = 0.001$). Moderate PA saw slight but insignificant increases from pre- to post-surgery. BMI was highly associated with moderate PA ($p = 0.024$), such that with every one unit increase in BMI, moderate PA dropped by .06 days/week. **CONCLUSIONS:** Overall, PA levels do not increase post-surgery, as the slight gains in moderate PA do not offset decreased mild PA. Physical activity intervention programs immediately post-surgery may prove most effective in promoting PA, weight control, and positive prognosis in breast cancer survivors.

THE EFFECT OF CYCLING EXERCISE INTENSITY ON COGNITIVE FUNCTION UTILIZING A MODIFIED STROOP TEST

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PURPOSE: The relationship between exercise intensity and cognitive function can be critical during both sport and occupational tasks. The effects of low, moderate and supramaximal intensity exercise were investigated to determine their effects on cognition. **METHODS:** 16 subjects (7 male, 9 female, age 23 ± 3 yrs) participated in this investigation. Prior to assessing the effect of exercise intensity on cognitive ability VO₂max was measured to establish maximum aerobic power (MAP). Subjects performed a Stroop test at rest and during three cycling intensities (60%, 95%, and 110% MAP) randomized over three separate days. Duration of cycling was determined by maintaining a constant energy expenditure between trials (60%-90 s, 95%-60 s, 110%-50 s). The Stroop test recorded color and word naming associations by showing response times and errors. **RESULTS:** Subjects recorded an average VO₂max of $34.8 + 7.6$ ml.kg⁻¹.min⁻¹. Average MAP was $150.3 + 50.1$ W. Repeated measures and Friedman's ANOVAs were used for analysis. Response times during exercise for word naming (60%, 95%, 110%) and color naming (95%, 110%) were significantly faster than at rest ($p < 0.05$). There were no significant differences between the three exercise intensities. Error rate did not vary between trials. **CONCLUSIONS:** Exercise enhanced cognitive function by improving Stroop response times, however, different intensities did not have differential effects.

Undergraduate Research

RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND BLOOD PRESSURE IN YOUNG ADULTS BORN WITH VERY LOW BIRTH WEIGHT

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Purpose: To examine the relationship between physical activity (PA) and ambulatory blood pressure (ABP) in a cohort of young adults born with VLBW. **Methods:** PA was measured by a GeneActiv monitor worn on the non-dominant wrist for 7 days from which average % of time the subject spent engaging in moderate PA was determined. Resting systolic (SBP) and diastolic (DBP) BP were measured in triplicate while seated and averaged. ABP was monitored for 24 hours from which mean 24-Hr, awake and asleep SBP and DBP were calculated. Nocturnal dipping was calculated as % change in SBP from awake to asleep. Spearman correlation coefficients were used to examine the associations between PA and BP. **Results:** 20 participants (6 M, 11 nonwhite) had both PA and ABP data. The average % of time per day spent in moderate PA was $10\% \pm 5\%$. The resting SBP and DBP were $108.9 + 9.3$ and $67.3 + 8.4$ respectively. Three participants were considered to be pre-hypertensive, and ten of twenty participants had SBP nocturnal dipping less than 10%. Moderate PA was significantly correlated with resting SBP ($r = .471$), 24-Hr SBP ($r = .455$), awake SBP ($r = .543$), and awake DBP ($r = .494$). **Conclusion:** The direct correlation between moderate PA and 24-Hr and awake SBP may reflect acute effects of PA on ABP during measurement. The lack of association between PA and asleep BP suggests that other factors may override the potential benefits of PA on BP.

Undergraduate Research

EMG ACTIVITY OF CLOSED KINETIC CHAIN AND OPEN KINETIC CHAIN EXERCISES

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Purpose: Closed (CK) and open (OK) kinetic chain exercises have been widely used in rehabilitation science, particularly for rehabilitation following knee injury. Many studies have reported neuromuscular activation specific to CK or OK only. The purpose of this study is to determine the load necessary for OK exercises to produce equivalent muscle activation as CK for the rectus femoris (RF), vastus lateralis (VL) and vastus medialis oblique (VMO). Methods: Eight untrained men (20.5±1 yr, 179.8±2cm, 85.5±9kg) were assessed for average neuromuscular activation (mV) of the RF, VL, and VMO using electromyography (EMG). Participants conducted three repetitions of single leg squats on their dominant leg. Participants then performed three repetitions of single leg extensions in 5% increments of body weight (BW) from 5% BW to maximal effort in randomized order. All lifts were performed at a cadence of 60 bpm with 90 secs recovery between lifts. EMG activity was recorded, transformed to root mean square (RMS) and analyzed for average activity per muscle. Results: CK EMG for the RF was similar to OK amplitude at 25% of body weight (RF: CK, 0.272±0.13 mV; OK at 25%BW, 0.272±0.10mV, p=0.99). CK EMG for the VL was similar to OK amplitude at 45% of body weight (VL: CK, 0.348±0.17 mV; OK at 45%BW, 0.350±0.09mV, p=0.98). CK EMG for the VM was similar to OK amplitude at 40% of body weight (VMO: CK, 0.386±0.15 mV; OK at 40%BW, 0.409±0.17mV, p=0.78). Conclusions: Rehabilitation often combines OK and CK exercises. Based on this data, interventions can utilize % body weight for determining the overload needed to match OK and KC exercises focusing on the quadriceps. Undergraduate Research

STRENGTH DIFFERENCES BETWEEN DOMINANT AND NON-DOMINANT LEGS AND THE EFFECTS ON BALANCE IN ATHLETES VS NON-ATHLETES

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PURPOSE: To determine the difference in leg strength between dominant and non-dominant legs and the effects of the strength differences on balance in track athletes and sedentary individuals. METHODS: Twelve collegiate track athletes and 12 sedentary individuals participated in the study. Leg strength was determined during 12 repetitions through the patient's full range of motion using the Biodex System 4 Dynamometer. Six repetitions were performed on each leg, three repetitions at 180 deg/sec and three repetitions at 300 deg/sec. Repetitions were performed in a concentric/concentric fashion; thus, strength measures for knee flexion and knee extension were obtained. Balance was measured during four repetitions of single leg stance on each leg using the Biodex Balance System. Two repetitions were performed on each leg, one repetition with the participant's eyes open and one repetition with participant's eyes closed. Forty-eight hours prior to testing participants performed a full practice trial to become familiarized with the protocols. RESULTS: Non-athletes displayed a greater trend towards strength differences between dominant and non-dominant legs (p=0.042 - 0.22) compared to athletes who showed greater symmetry between legs. Strong correlations were found between leg strength and balance score (r=0.5-0.73, p=0.002-0.11) in both dominant and non-dominant legs. However, there was no difference between athletes and non-athletes. CONCLUSIONS: These data suggest greater symmetry in isokinetic strength between dominant and non-dominant legs for athletes compared to non-athletes. Additionally, it appears greater leg strength is related greater balance.

Undergraduate Research

FOOD DESERTS: ENVIRONMENTAL ASSESSMENT OF FOOD RETAILERS IN ROCK HILL, SC

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Food retailers could be a contributing factor to obesity and chronic diseases. Location of these food retailers can dictate the neighborhoods' dietary behaviors. The purpose of this study was to perform an environmental assessment by comparing food items at mainstream and fringe food retailers according to the availability, price and quality using the Nutrition Environment Measures Survey in Stores (NEMS-S). Inter-rater reliability of >90% was used to ensure consistency of the results. Each food retailer was individually analyzed and mapped using GIS software to indicate food deserts. A total of 13 Mainstream, 14 Fringe, and 9 Fringe Food Desert retailers were assessed. The food desert map was designed to recognize the disadvantaged areas one mile or greater from a mainstream grocery store. Four graphs were formulated to show how the results in mainstream grocery stores, fringe retailers in food deserts and fringe retailers in non-food desert areas differed according to NEMS-S total points, availability of food items, price of food items and quality of food items. In result, access to mainstream grocery stores (36 total pts) ensured the best food options for Availability, Price, and Quality compared to food desert (9.6 total pts) and non food desert (10.3 total pts) fringe retailers, but the fringe retailers in the food desert areas had better quality produce compared to the fringe retailers in the non-food desert areas. Supported by the McNair Scholarship Program.

Undergraduate Research

IMPROVING HUMAN ANATOMY AND PHYSIOLOGY GRADES WITH ELECTRONIC LEARNING

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PURPOSE: To report the effectiveness of an e-learning system, Mastering A&P by Pearson Incorporated, using final course grade outcomes and student questionnaire perspectives. METHODS: Students in the Human Anatomy and Physiology I course participated in the Pearson Education Mastering A&P e-learning system. This electronically graded homework consisted of a mix of tutorials, videos, art-labeling, and end-of-chapters questions. The homework comprised 12.5% of the overall grade. Spring 2012 semester test scores (n=51) were compared with the spring 2011 semester that did not incorporate Mastering (n=56). The overall Mastering homework score and end of course test grade were compared. A mandatory end of course questionnaire was completed. RESULTS: A significant (P<0.001) increase was observed in mean test grades from spring 2011 (71.8±7.8) to spring 2012 (77.9±10.6). The average Mastering scores (82.0±14.3) were significantly (P≥0.01) and positively correlated (r=0.60) with the average test scores. There was a shift in the grade distribution, favoring those in the spring 2012 class, with the percentage of B's shifting from 11% to 20%, and A's from 0%-6%, respectively. End of course surveys and evaluative course interviews were in support of utilizing Mastering to improve course grades and material mastery. CONCLUSION: Mastering A&P was effective and positively received.

COMPARISON OF ARM ERGOMETRY MAXIMAL OXYGEN CONSUMPTION TO TREADMILL MAXIMAL OXYGEN CONSUMPTION IN FEMALES

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The objective of this study was to compare maximal oxygen consumption (VO₂max) obtained during arm ergometry testing to VO₂max obtained during treadmill testing in females. The literature states that VO₂ max obtained during arm ergometry testing is about 20-30% lower than VO₂ max obtained during treadmill testing in male subjects. Our hypothesis was that this 20-30% VO₂ max disparity would be more pronounced in females. Following consent, 38 female subjects, average age of 21.5 years, underwent two graded exercise tests to volitional exhaustion. Using protocols designed for young, healthy subjects, one test was performed using an arm ergometer and one test was on a treadmill. The tests were one week apart. Nineteen of the subjects had the arm ergometer test first and the other 19 underwent treadmill testing first. VO₂ max was calculated using the ACSM Guidelines formulas. Paired t-tests were used to determine probability levels. Statistical significance was established at the $p < 0.05$ level. The mean VO₂ max during arm ergometry testing (20.7 mL/kg/min) was 47% lower than the mean VO₂ max obtained during treadmill testing (39.1 mL/kg/min). This was significantly lower at the $p < 0.05$ level. This discrepancy was much greater than that reported in the literature on male subjects. The maximal heart rate was also lower during arm ergometry testing, but the mean maximal RPE was 16.8 (very hard on the standard Borg scale) for both arm ergometry and treadmill testing.

EFFECTS OF GENDER AND STRETCHING ON ISOKINETIC FORCE OUTPUT

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Mixed results exist regarding the effects of pre-activity stretching on a muscle's ability to generate peak force. PURPOSE: The purpose of this study was to examine the differences between gender and stretching on isokinetic force output. METHODS: Thirty healthy college-aged adults (17 F, 13 M), recruited from a convenience sample, participated in two days of knee flexion/extension isokinetic force output testing. On randomly selected testing days, each participant engaged in a non-stretch protocol or pre-stretch (dynamic [DYN] or proprioceptive neuromuscular facilitation [PNF]) protocol prior to the isokinetic testing. Using the Biodex isokinetic dynamometer each participant's knee flexion/extension isokinetic peak force was tested using five concentric contractions at 60°/s. RESULTS: Data were analyzed using a 2 x 2 (gender x group) ANOVA for both flexion and extension. Results indicated no interaction or stretching main effects for knee flexion, $p > .05$; however, there was a significant main effect for gender, $F(3, 56) = .106.65$, $p < .05$. Similarly, for knee extension there were no interaction or stretching main effects, $p > .05$; yet there was a significant main effect for gender, $F(3, 56) = 126.69$, $p < .05$. CONCLUSIONS: The results suggest there were no significant interaction effects; however, as we expected there was a significant main effect for gender on both flexion and extension. These results suggest that stretching does not significantly reduce an individual's force output production.

DIFFERENCES BETWEEN TWO TYPES OF STRETCHING PROTOCOLS ON ISOKINETIC FORCE OUTPUT

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Research suggests that dynamic (DYN) and proprioceptive neuromuscular facilitation (PNF) stretching can affect range of motion and power. PURPOSE: The purpose of this study was to examine whether two different types of stretching (DYN and PNF) influence peak force output of the knee flexors/extensors during maximal contraction. METHODS: Thirty college age students (17F, 13M) between the ages of 18-25 were recruited from a convenient sample. The participants randomly selected a stretching protocol of DYN or PNF, and then performed 5 minutes of stationary cycling at 50 rpm with 1kg of resistance for a warm-up. Afterwards, peak torque was measured using a Biodex isokinetic dynamometer for knee flexion and extension. Participants were tested at 60°/s, and served as their own controls. During testing, each participant performed five contractions at 75% of their maximal effort, followed by 5 seconds of rest. Immediately after the rest period, they performed 5 maximal contractions for both knee flexion and extension. Data were analyzed using a 2 x 2 (group x type of stretch) ANOVA for flexion and extension. RESULTS: There were no interaction effects for both flexion and extension ($p > .05$). There were also no significant main effects for group (stretch vs. non-stretch) or type of stretch (DYN vs. PNF), $p > .05$. CONCLUSION: The results from this study show that neither DYN nor PNF stretching will significantly decrease force output in college aged adults.

IN-SCHOOL PHYSICAL ACTIVITY AMONGST FOURTH-GRADE STUDENTS IN NORTH MISSISSIPPI

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PURPOSE: The purpose of this study were to determine the number of minutes of daily in-school moderate-to-vigorous physical activity (MVPA) achieved by fourth grade public school students in north Mississippi. METHODS: Seven fourth grade classes from seven public schools in north Mississippi participated in this study. Students wore Actigraph accelerometers on the right hip from the beginning to the end of the school day for five consecutive days. Accelerometer counts were converted to minutes of MVPA using cutpoints recommended by Evenson et al. (2008). Classroom teachers maintained a log book recording minutes spent by students in P.E, recess, or academically related physical activities. RESULTS: A total of 134 students (65 boys, 69 girls) participated in the study. The average number of minutes per day of MVPA was 20.5 ± 8.8 min. Boys engaged in significantly more minutes per day of MVPA (23.7 ± 10.0) than girls (17.6 ± 6.3) ($p < 0.01$). Only 13 boys (20%) and 2 girls (2.8%) achieved the recommended 30 min per day of in-school MVPA. Students were exposed to an average of 18 minutes of recess per day, 13 minutes of P.E. and < 2 minutes of academically related physical activities per day. CONCLUSIONS: Fourth-grade students in north Mississippi are not achieving the recommended amount of daily in-school MVPA.

THE ACUTE EFFECT OF A PERFORMANCE MOUTHPIECE ON MEASURES OF STRENGTH & POWER

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Early research on the ergogenic influence of performance mouthpieces are inconclusive and have focused mainly on physiologic measures. **PURPOSE:** The purpose of this study was to investigate the acute effect of a commercially available, performance mouthpiece on acute performance measures of power and strength. **METHODS:** 21 recreationally trained males (age 21.5 ± 1.3 yrs; height 177.5 ± 7.9 cm; mass 87.1 ± 10.8 kg) completed the study. The first of three lab visits included obtaining informed consent, familiarization with protocols, and providing the mouthpiece and fitting instructions. The remaining two visits were the experimental protocols, and were separated by exactly one week. The order of the two conditions, with mouthpiece (W) and without mouthpiece (WO), was randomized for all participants. Each condition involved a warm-up consisting of five minutes of cycling followed by specified, supervised calisthenics. The warm up was followed by maximum countermovement vertical jump (CMVJ) assessment using a standardized protocol with a Vertec device. 1RM (repetition maximum) standardized protocol for the bench press exercise was performed afterwards. Participants in this investigation were instructed to perform normally. All data were analyzed by paired-sample t-tests, comparing differences between the W and WO conditions for CMVJ and 1RM. **RESULTS:** For CMVJ, no significant ($p > 0.05$) differences were found between conditions for W (24.8 ± 2.9 in.) compared to WO (25.0 ± 3.1 in.). For 1RM bench press, no significant ($p > 0.05$) differences were found between conditions for W (255.0 ± 33.4 lbs.) compared to WO (253.8 ± 34.2 lbs.) **CONCLUSIONS:** These results indicate that wearing the mouthpiece has no effect on power and strength. Although no advantage was seen using the mouthpiece, there was also no disadvantage, indicating no decrement in performance. Further research is warranted on force and velocity characteristics related to the use of similar mouthpiece devices.

EFFECTS OF GENDER AND STRETCHING ON HAM/QUAD RATIOS IN COLLEGE-AGE ADULTS

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Research indicates that stretching prior to performance can decrease concentric and eccentric strength, yet few studies have compared hamstring to quadriceps (H/Q) isokinetic strength ratios after performing bouts of dynamic stretching (DS) or proprioceptive neuromuscular facilitation (PNF). **PURPOSE:** The researchers sought to compare gender differences in H/Q ratios and H/Q ratios after stretch and non-stretch conditions. **METHODS:** Thirty healthy college-aged adults (17F, 13M) were recruited from a convenience sample. Each participant randomly selected a stretching protocol of either DS or PNF. After a five minute warm-up (on a cycle ergometer), participants performed the stretch routine and then completed strength testing on an isokinetic dynamometer. Participants also completed a non-stretching trial on a separate day. Testing consisted of five concentric/concentric contractions (knee extension/ knee flexion) at $60^\circ/\text{s}$. Data were analyzed using a 2×2 (gender x stretch/non-stretch) ANOVA for both flexion and extension. **RESULTS:** The results indicated that there were no interaction effects, $F(3, 56) = .137$, $p = .71$, nor were there gender or stretching main effects, $p > .05$. **CONCLUSION:** The researchers concluded that there were no gender differences in H/Q strength ratios after performing stretching routines prior to isokinetic testing. Furthermore, the results showed that there were no gender differences in H/Q ratio when participants performed isokinetic testing without stretching. These findings suggest that neither stretching nor gender impact H/Q ratios.

EVALUATION OF POWER IN CROSSFIT VS. WEIGHT TRAINED INDIVIDUALS

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PURPOSE: The investigation evaluated performance indicators associated with power in healthy trained individuals participating in CrossFit (CF) or Traditional Weight Training (WT). Based on anecdotal evidence, many claims are made that CF training provides greater performance benefits related to power possibly due to the high intensity, constant variation of training and functional movements performed. **METHODS:** Male CF (N=5) and WT (N=6) individuals, age (CF: $27 + 9.4$ yrs, WT: $25.8 + 8.7$ yrs), Body Fat (CF: $11.7 + 8.8\%$, WT: $10.6 + 3.7$), were tested for upper and lower body power using the Medicine Ball Put, Vertical Jump, and Margaria-Kalamen assessments. All testing procedures were conducted according to NSCA guidelines (Miller, T., 2012). **RESULTS:** There were no significant differences in Medicine Ball Put (CF: $133.8 + 17.1$ in, WT: $141.8 + 18.5$ in); Vertical Jump (CF: $22.5 + 4.1$ in, WT: $24.9 + 4.7$ in); or Margaria-Kalamen (CF: $1425.3 + 222.5$ watts, WT: $1669 + 441$ watts) $P > 0.05$. **CONCLUSIONS:** According to the data, participating in CF does not offer a significant increase in performance associated with upper or lower body power, compared to participating in WT. Future investigations should continue to compare CrossFit training to other forms of high intensity training, especially training modalities used by military personnel and civil servants.

MUSCULAR ENDURANCE, AGILITY, AND FLEXIBILITY IN CROSSFIT VS. WEIGHT TRAINED INDIVIDUALS

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PURPOSE: The investigation assessed muscular endurance, agility, and flexibility in healthy trained individuals participating in CrossFit (CF) or Traditional Weight Training (WT). CF training may enhance muscular endurance, agility, and flexibility based on performing high intensity, constantly varying, functional movements. No empirical evidence is available to indicate that CF provides greater performance enhancements, compared to WT. **METHODS:** Male CF (N=5) and WT (N=6) individuals, age (CF: $27 + 9.4$ yrs, WT: $25.8 + 8.7$ yrs) and Body Fat (CF: $11.1 + 6.1\%$, WT: $10.6 + 3.7$), were tested using the push-up, pull-up, T-Test, and sit and reach assessments according to NSCA guidelines (Miller, T., 2012). **RESULTS:** There were no significant differences ($p > 0.05$) in push-up (CF: $37.6 + 9.6$ reps, WT: $38.8 + 11.8$ reps); pull-up (CF: $12.2 + 7.3$ reps, WT: $8.0 + 4.1$ reps); T-Test (CF: $10.7 + 1.4$ sec, WT: $10.2 + .84$ sec); or sit and reach (CF: $35.1 + 8.6$ in, WT: $29.9 + 8.9$ in). **CONCLUSIONS:** According to the data, CF did not provide a significant increase in muscular endurance, agility, or flexibility performance, compared to WT. Future investigations should continue to explore the safety and efficacy of CrossFit training compared to Traditional Weight Training as well as other modes of training.

ASSESSMENT OF 1RM STRENGTH BETWEEN CROSSFIT AND RESISTANCE TRAINED INDIVIDUALS

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P93 PURPOSE: CrossFit (CF) emphasizes constantly varied, high-intensity, functional movement while utilizing strength and conditioning, gymnastics movements, Olympic weightlifting, and sport/specialty movements. Contrarily, resistance training (RT) programs typically utilize the progressive overload principle to improve strength performance. To the authors' knowledge, no empirical research exists comparing CF and RT individuals on strength performance. METHODS: Male CF (N=5) and RT (N=6) participants (age: CF: 28.4 + 9.4 yrs, RT: 25.8 + 8.8 yrs; body fat: CF: 11.7 + 8.8 %, RT: 10.6 + 3.7%) were tested for upper and lower body strength using the bench press (BP) and back squat (BS). One Repetition Maximum (1RM) testing protocols were conducted using NSCA guidelines (Miller, T., 2012). RESULTS: Between groups, there was a statistically significant difference for 1RM SQUAT (CF: 271.0 + 36.5 lbs, RT: 392.0 + 106.6 lbs, $p = 0.04$); however, no difference existed for 1RM BP (CF: 216.0 + 32.3 lbs, RT: 265.8 + 78.4 lbs, $p > 0.05$). CONCLUSIONS: The authors hypothesized the RT group would perform better on 1RM BS and BP as these movements are commonly used in traditional RT. There was no statistically significant difference for 1RM BP but a difference was found between groups for 1RM BS. Interestingly, neither movement is routinely prescribed in CF. Further research is needed to clarify differences between these styles of training.

EFFECTIVENESS OF THE LIFE IMPROVING FUNCTIONAL EXERCISE (LIFE) PROGRAM ON PHYSIOLOGICAL AND PERFORMANCE VARIABLES IN ELDERLY ADULTS

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P94 PURPOSE: This investigation evaluated the effectiveness of the Life Improving Functional Exercise (LIFE) program on various descriptive and performance variables in a sample of elderly citizens (age: 74.4±8 yrs). The Barren River District Health Department (BRDHD) in Bowling Green, KY developed the LIFE program. This program was designed specifically to address low fitness levels in elderly individuals, and it was structured to ensure both improved fitness and retention in the program. METHODS: The program was administered at a local faith-based organization in their fitness facility. Staff members from BRDHD conducted pre-evaluations and screenings, and then led participants through the program two times per week for twelve weeks. At the end of twelve weeks, post-evaluations were conducted to assess improvements. RESULTS: Significant improvements were observed in participants' body weight ($p=0.04$), body mass index (BMI) ($p=0.04$), grip strength ($p=0.00$), flexibility ($p=0.02$), short physical performance battery (SPPB) ($p=0.01$), chair stand ($p=0.00$), and two-minute step assessment ($p=0.03$). CONCLUSIONS: The results of this study indicate that a program designed to encourage participation and retention by elderly individuals in a structured exercise program can be effective and improve significantly critical measures of fitness in this population.

COMPARISON OF AEROBIC AND ANAEROBIC POWER IN CROSSFIT AND RESISTANCE TRAINED INDIVIDUALS

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P95 PURPOSE: The purpose of this investigation was to evaluate aerobic (VO₂max) and anaerobic power in healthy trained individuals participating in CrossFit (CF) or traditional Resistance Training (RT). Although it has been claimed that CF training provides greater performance benefits than RT related to aerobic and anaerobic power due to the high intensity, constant variation of training, there is no empirical evidence supporting this assertion. METHODS: Male CF (N=5) and RT (N=6) individuals, age (CF: 27 + 9.4 yrs, RT: 25.8 + 8.7 yrs) and body fat (CF: 11.7 + 8.8 %, RT: 10.6 + 3.7), were tested for aerobic and anaerobic power utilizing the Bruce Treadmill Protocol and Wingate Anaerobic Test, respectively. RESULTS: There were no significant differences in VO₂max (CF: 57.9 + 12.9 mL/kg/min, RT: 53.6 + 4.03 mL/kg/ min); Wingate peak power (CF: 840.0 + 166.1 W, RT: 1050.8 + 354.7 W); mean power (CF: 630.1 + 95.7 W, RT: 658.8 + 176.2 W); or fatigue index (CF: 48.6 + 5.2 W, RT: 70.2 + 20.6 W) $P > 0.05$. CONCLUSIONS: It was hypothesized that the high intensity intervals of CF would elicit higher VO₂max as well as increased anaerobic power. However, participating in CF did not result in a significant increase in aerobic or anaerobic fitness. Future investigations should continue to explore the safety and efficacy of CF training, compared to traditional RT.

PULMONARY OXYGEN UPTAKE OFF-KINETICS AND FITNESS IN OBESE ADOLESCENTS

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P96 In adolescents, the pulmonary oxygen uptake (O₂) off-kinetic response during exercise recovery has received little attention in comparison to O₂ on-kinetics during exercise. Although studies have reported equivocal findings comparing on-kinetics between obese and lean adolescents, no relationship has been shown between peak oxygen consumption (VO₂peak) and moderate exercise on-kinetics. The evaluation of O₂ off-kinetics in adolescents has only occurred in lean subjects and training status did not impact O₂ during recovery. Therefore, the purpose of this study was to determine the relationship between VO₂peak and O₂ off-kinetics in obese adolescents. Twenty-five volunteers (13.81±1.65 yrs, 36.15±4.65 kg/m²) completed a graded exercise test to exhaustion on a treadmill. Averaged breath by breath data from the first 4-min of moderate exercise treadmill walking and during the immediate 4-min passive recovery was fit with a monoexponential equation to determine the O₂ on- and off-kinetic time constant (τ_{on} and τ_{off} , respectively). A significant inverse relationship ($r = -0.585$, $P = 0.002$) was found between τ_{off} (36.80±9.07s) and VO₂peak (45.72±5.4 mL O₂•leankg⁻¹•min⁻¹), whereas τ_{on} was not related to VO₂peak ($r = -0.294$, $P = .154$). These results suggest that the greater an obese adolescent's fitness levels the faster τ_{off} during exercise recovery. A longer τ_{off} displayed with reduced fitness may reflect the effects of elevated ventilation, body temperature, lactate clearance, and gluconeogenesis. Support: Virginia Premier Inc; NIH (K23-HD053742:EPW; UL1RR031990:VCU).

EFFECT OF A WEIGHTED VEST WARM-UP ON ATHLETIC PERFORMANCE IN COLLEGIATE ATHLETES

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Purpose: To examine the effects of college athletes wearing a weighted vest during a standardized warm-up on athletic performance. **Methods:** Nine collegiate athletes (5 men, 4 women; 20.8±1 yrs, 176.7±10 cm, 78.6±9 kg) participated in this study. Participants wore a fabric vest and executed a specific warm-up for the vertical jump test (in.) comprising of the following: 1) ten body squats, 2) three box jumps at the height of twelve inches and 3) three box jumps at the height of eighteen inches. Participants then recovered for two minutes, removed the vest, and performed two vertical jumps for maximal effort. Participants put the vest back on and were taken through a dynamic warm-up for the 40 yd dash and 4 cone drill (secs). This warm-up consisted of the following: backwards-reach run, lateral lunge, straight-leg march, heel-toe walk and two 40-yard dashes with progressing intensity. Following the warm-up, the subjects removed their vests and recovered for 2 mins. Then, the subjects performed two 40-yard dashes with 30 to 120 secs between each 40-yard sprint. Then, the participants performed two four-cone drills with 30 to 120 secs recovery. Each participant completed two trials identical in warm-up and testing procedures. In a counterbalance design, participants wore a weighted vest (2% of body weight, WV) or the vest only (V) with no additional weight during warm-up. The peak result of the two trials was analyzed. **Results:** There was no effect of a weight vest warm-up on vertical jump height (WV, 27.4±4 in.; V, 26.4±5in, $p=0.34$). Participants did not change performance for the 40 yd sprint (WV, 6.0±1 sec; V, 6.0±1 sec, $p=0.90$) or the 4 cone drill (WV, 5.0±1sec; V, 5.1±1sec, $p=0.80$). **Conclusions:** Providing an additional 2% of body weight resistance during warm-up does not improve athletic performance.

EFFECT OF AN ACUTE, DYNAMIC WARM-UP ON IMMEDIATE FLEXIBILITY AND THE ABILITY TO MAINTAIN FLEXIBILITY OVER TIME

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Purpose: To determine the effect of an acute, dynamic warm-up on immediate flexibility and the ability to maintain flexibility over a subsequent 30-minute period. **Methods:** Fifteen college-age females participated in the study (age=20.4±0.9yrs; body fat=21.4±5.6%; ht=161.8±13.1cm; wt=60.7±11.1kg). Flexibility was assessed using the Y-Balance Test (Star Excursion Balance Test) and a standard sit and reach test. On the day of the test, participants performed a pre-test on the Y-Balance Test and the sit and reach test. Following the pre-test, participants performed a dynamic warm-up consisting of a 5-minute jog and eight dynamic stretches (speed skips, heel kicks, toe hops, trunk twists, skipping toe touches, drop squats, sprints, high knees). Participants again performed the Y-Balance Test and the sit and reach test at 1, 10, 20, and 30 minutes following completion of the dynamic exercise. **Results:** A Repeated-Measures MANOVA revealed no significant difference between any of the time points for the sit and reach test ($p>0.05$). Additionally, scores for the Y-Balance Test were not significantly different across time for the right leg ($p>0.05$) or the left leg ($p>0.05$), respectively. While not a purpose of the study, the test-retest reliability of the Y-Balance test was significant for the right leg (Cronbach's alpha=0.978, $p<0.001$) and for the left leg (Cronbach's alpha=0.964, $p<0.001$). **Conclusions:** This study revealed that the dynamic warm-up was not sufficient to elicit changes in flexibility as measured by the Y-Balance Test and the sit and reach test. Thus, flexibility measures were unchanged from pre-test to immediate post-test and through the duration of the 30-minute passive rest period.

*denotes equal contribution.

EXERCISE INTENSITY IN COLLEGE STUDENTS PERFORMING WII JUST DANCE

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PURPOSE: Interactive video games, also called exergames, have been suggested as a possible alternative to traditional aerobic exercise. The purpose of this study was to determine the exercise intensities, via measurement of heart rate (HR), of college students while playing all three sweat levels of Just Dance 3 for Wii. **METHODS:** Thirteen females and two males, 19-24 years of age, completed the study. All participants completed three songs at each sweat level, during which HR was recorded. Additionally, subjects were asked to rank the enjoyment level for each song on a scale of 1-5. **RESULTS:** Average HR for sweat levels one, two, and three were 110 ± 5.1 , 123 ± 4.5 , and 126 ± 4.0 , respectively. Although the mean HR recorded during levels two and three were not different from each other, they were both significantly greater than that of level one ($p < 0.001$). Maximal HR for levels one, two, and three were 130 ± 8.3 , 137 ± 4.7 , and 143 ± 3.8 ($p = NS$). Enjoyment increased along with sweat level, with enjoyment rankings of 2.5 ± 0.3 , 3.2 ± 0.2 , and 4.7 ± 0.1 for levels one, two, and three, respectively. **CONCLUSIONS:** Since it is recommended that aerobic exercise be completed at a minimum intensity corresponding to 65% of maximal HR, the average HR data indicate that Just Dance 3 may not achieve the minimum intensity guidelines in this group of college students. However, the maximal HR data suggest that Just Dance 3 may provide a sufficient aerobic workout if the game is continued for a greater duration.

VALIDATION OF THE OMRON HJ-151 Pedometer DURING FREE-LIVING PHYSICAL ACTIVITY IN YOUTH

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PURPOSE: The purpose of this study was to document the accuracy of step counts measured by the Omron HJ-151 (OMR) pedometer during free-living step activity in children, whose PA is typically more intermittent than adults. **METHODS:** A total of 33 able-bodied boys and girls (8 to 12 years of age) wore the OMR on the right waistband and StepWatch Activity Monitor (SAM) above right lateral malleolus over a 24-hour period while engaging in normal, non-water activities. The SAM, which was the criterion step count device, was calibrated prior to monitoring while each participant walked on the treadmill at 2, 3, and 4 mph for a total of approximately two minutes. **RESULTS:** Daily step activity for the OMR and SAM were positively correlated ($r = 0.85$, $p < .001$). However, OMR step counts (6769 ± 3327 steps) were significantly lower ($p < .001$, Cohen's $d = 1.26$) compared to SAM step counts (10703 ± 5427 steps). **CONCLUSIONS:** Although a significant linear relationship exists between step counts obtained from the OMR and SAM activity monitors, OMR substantially undercounted free-living step activity when compared to the SAM, possibly due to the 4-second step filter of the OMR device. Supported by the MTSU Center for Physical Activity and Health in Youth.

THE EFFECT OF CHIROPRACTIC LUMBOSACRAL ADJUSTMENTS ON ISOKINETIC STRENGTH OF THE KNEE EXTENSORS AND FLEXORS

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PURPOSE: This study investigated the effect of Diversified chiropractic lumbosacral adjustments on isometric and isokinetic force production, measured during concentric contractions of the knee extensors and flexors. **METHODS:** A randomized, controlled, single-blind crossover design was utilized with 10 asymptomatic, college-aged subjects who had never received chiropractic treatment. During two separate sessions, subjects' peak torques were recorded while performing maximal voluntary contractions on the Biodex isokinetic dynamometer. Isometric knee extension and flexion were recorded at 60° of knee flexion, in addition to isokinetic measurements obtained at 60°/s and 180°/s. Baseline measurements were acquired before either treatment form of lumbosacral adjustment or sham, followed by identical peak torque measurements within five and twenty minutes post-treatment. **RESULTS:** Repeated measures ANOVA revealed no significant differences between the changes in peak torque measurements obtained at five and twenty minutes post-treatment between spinal adjustment and sham for any strength assessment. Following the treatments, the changes in means ranged from -7.1 to 12.9 Nm, however, a statistical significance did not occur between the sham and lumbosacral adjustments. **CONCLUSION:** The results of the current study suggest that Diversified lumbosacral adjustments had no significant strength modulating effect on knee extension or flexion.

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PHYSICAL ACTIVITY AND FITNESS LEVELS OF HIGH SCHOOL STUDENTS PARTICIPATING IN A NOVEL PHYSICAL EDUCATION CLASS

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Traditional physical education (PE) classes typically require all students to participate in the same activity regardless of interest or ability. A high school implemented a novel PE class that explored a variety of physical activities (weight training, aerobic activity, group exercise classes) at a local YMCA. Students were encouraged to pursue activities they enjoyed, and then they designed and implemented their own physical activity (PA) programs. **PURPOSE:** To assess the PA and health-related fitness of students participating in a novel PE class. **METHODS:** Participants were 30 high school students (16 boys, 14.6±0.6 y). PA during the PE class was assessed using both a waist-worn accelerometer (Actical) and direct observation (SOFIT). Health-related fitness (cardiorespiratory, body composition, muscular strength and endurance, and flexibility) was measured using the FITNESSGRAM test battery. Average time spent in moderate-to-vigorous PA (MVPA) was calculated and independent samples t-tests were used to determine differences between sexes for MVPA and fitness variables. **RESULTS:** Accelerometer data showed that students engaged in 20.0±7.0 min of MVPA during class; there was no difference between girls (19.9±8.0 min) and boys (20.1±5.2 min). SOFIT data revealed that 65% of the PE class was spent in MVPA. Boys and girls did not differ in any of the health-related fitness components with exception of flexibility; girls were more flexible than boys (15.2±2.3 vs. 11.2±5.0 in.; p=0.021). **CONCLUSION:** Boys and girls attained equal amounts of MVPA in the PE class. This is important given that adolescent girls tend to achieve significantly less overall MVPA than their male counterparts. SOFIT data suggests that students engage in MVPA for the majority of the class, which may be due in part to the design of the PE class.

THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND SHOOTING PERFORMANCE IN A TACTICAL PISTOL QUALIFIER

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PURPOSE: At rest and during a standardized competitive shooting match, autonomic response was examined in 28 healthy subjects for correlations to performance. **METHODS:** Heart rate variability (HRV), high frequency (HF), low frequency (LF), total power (TP), and inter-beat-interval (IBI) measured during shooting were subtracted from those measured during rest to produce Δ s. The shooting task involved several rapid tactical maneuvers. Time to completion and missed shots were recorded, and combined to form a score in which higher values indicated poor shooting performance. **RESULTS:** Shooting decreased IBI (i.e., increased HR) and LF. Match score was significantly correlated to Δ IBI ($r = -0.458$), Δ HF ($r = 0.467$), Δ LF ($r = 0.377$), Δ TP ($r = 0.392$). Inaccuracy was significantly correlated to Δ TP ($r = 0.416$) and Δ LF ($r = 0.376$). Time to completion was significantly correlated to Δ IBI ($r = -0.426$). A step-wise linear regression, found 39.4% of the variance in score was determined by the Δ IBI and Δ HF. **CONCLUSION:** Individuals with a greater decrease in IBI (greater increase in heart rate) performed better because they accomplished the match at a faster rate. Individuals with a lesser change in stress-related HRV measures (LF, HF, TP) performed better via improved accuracy. Δ LF, Δ HF, and Δ TP were independent of Δ IBI. HRV should be used to assess military and police performance under duress.

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AN EXAMINATION OF MAXIMAL AEROBIC CAPACITY ON A BIKE VERSUS A TREADMILL IN ACTIVE INDIVIDUALS

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Purpose: To investigate mode-specific differences (running vs. cycling) in maximal aerobic capacity (VO₂max) for individuals who trained in cycling, running, or general fitness practices. **Methods:** Cyclists (n = 12), runners (n = 16) and fitness enthusiasts (FE) (n = 12) were tested on separate days with treadmill and cycling ergometry protocols. The treadmill test consisted of a stage protocol with a constant speed being maintained and 2.5% grade added each 3 min. The cycling test was a ramp protocol beginning at 50 w for one minute followed by the addition of 2 w every 6 sec until 70 rpm could not be maintained. **Results:** For each group VO₂max was significantly higher when running vs. cycling protocols were administered. Cyclists achieved 51.9 +/- 5.5 and 49.8 +/- 5.9 respectively (p = 0.008), runners achieved 50.6 +/- 4.4 and 48.2 +/- 4.5 respectively (p = 0.007), and FE achieved 46.4 +/- 7.3 and 42.5 +/- 6.7 respectively (p < 0.001). **Conclusions:** Regardless of preferred training mode, a treadmill protocol for assessing VO₂max is better than a cycle ergometry protocol. FE would especially benefit from a treadmill protocol with the largest difference between the two modalities observed with this group. When possible, treadmill protocols should be used for VO₂max testing.

CLASSIFICATION ACCURACY OF THE WRIST-WORN GENE A ACCELEROMETER DURING STRUCTURED ACTIVITY BOUTS

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PURPOSE: To determine whether the left wrist cut-points of Esliger et al., for a triaxial GENE A accelerometer-based physical activity monitor, are accurate for predicting intensity categories during structured activity bouts. **METHODS:** A convenience sample of 130 adults (41.2 ± 10.9 y, 170.4 ± 9.0 cm, 74.9 ± 15.2 kg) wore a GENE A on their left wrist while performing 14 different lifestyle activities. During each activity O₂ uptake was continuously measured using the Oxycon mobile. Spearman's rank correlations were used to determine the relationship between measured and estimated intensity classifications. One-way Chi-square tests were used to determine whether the accuracy rate of each activity differed from 80%. **RESULTS:** For all activities the GENE A explained 41.1% of the variance in energy expenditure. The cut-points correctly classified 52.8% of observations when all activities were combined. Nine of the 14 activities (filing papers, moving a box, walking (self-paced, 4.8 km.hr-1, 6.4 km.hr-1, 6.4km.hr-1 at 5% grade), cycling (48W, 98W), and tennis) were significantly below the 80% accuracy mark and 1 activity (running at 9.6 km.hr-1) had an accuracy rate above 80% ($p < 0.05$). **CONCLUSION:** Researchers should be cautious when applying the Esliger et al. cut-points.

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RELIABILITY OF A SHORT, HIGH-INTENSITY EXERCISE TEST TO EXHAUSTION

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PURPOSE: To determine the reliability of a short, high-intensity exercise test to exhaustion (ETE). **METHODS:** Ten well trained, competitive cyclists performed an incremental exercise test to exhaustion on an electronically braked cycle ergometer (EBE) to determine power at VO₂ max (P_{MAX}). On three separate occasions, subjects performed an ETE on the EBE consisting of four, 1-min work periods at 100% P_{MAX} each followed by a 1 min recovery period at 25% P_{MAX}. Following the final 1 min recovery period, subjects completed a timed effort to exhaustion at 100% P_{MAX}. **RESULTS:** Mean times to exhaustion for the final effort were 134 ± 38 sec, 136 ± 42 sec, and 136 ± 43 sec for trials one, two, and three, respectively. These times revealed a maximum variation of 1.5% with a CV of 9.1%. No statistically significant differences between the trials were observed ($p = 0.91$). **CONCLUSIONS:** These results suggest that this test to exhaustion is a reliable measure of exercise performance and is suitable for use by investigators who are restricted to exercise tests to exhaustion.

ASSESSMENT OF PHYSICAL ACTIVITY LEVELS OF ELEMENTARY SCHOOL STUDENTS PARTICIPATING IN THE MORNINGS IN MOTION PROGRAM

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PURPOSE: To objectively assess the physical activity (PA) levels of students during a before-school time block on days when the Mornings in Motion (MIM) before-school activity program was offered, and on days when it was not. **METHODS:** Subjects were 69 elementary school children (8.5 ± 1.9 years) enrolled in the MIM program that was offered for 30 minutes every Monday, Wednesday, and Friday. When students arrived at school, they reported to the gym for MIM. Arrival times varied greatly among students. MIM focuses on health-related fitness through the use of aerobic activities, stretching to improve flexibility, and calisthenics to build muscular fitness. PA intensity and patterns were assessed over five days (Monday-Friday) using an accelerometer (Actigraph). Comparisons were made between days when the MIM program took place (Treatment) and days when it did not (Control) during the before-school time block. Pairwise t-tests were used to make comparisons between the before-school time blocks for the Treatment and Control days. **RESULTS:** Subjects achieved 5.4 more minutes per hour of moderate-to-vigorous PA (MVPA) during the before-school time block on Treatment compared to the Control days ($p < 0.05$). When adjusting for arrival time to the program, subjects spent 76.2% of time in activity (22.5% in MVPA and 53.7% in light activity) during MIM sessions. Children who attended MIM program for 15 minutes or more on Treatment days had an increase of 3.6 minutes in MVPA (total of 9 minutes per hour) when compared to those that attended the MIM program for less than 15 minutes. **CONCLUSION:** Participation in the MIM program resulted in greater MVPA compared to Control days. Creating opportunities for students to engage in a greater proportion of the program would increase its impact on PA levels.

EFFECTS OF A 12-WEEK JUST DANCE® TRAINING STUDY ON FITNESS AND HEALTH IN YOUNG ADULTS

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PURPOSE: To evaluate the fitness impact of a 12-week Wii dance intervention on college age students. **METHODS:** The participants, 17 sedentary and overweight/obese volunteers were measured for height, weight, resting heart rate, systolic (SBP) and diastolic blood pressure (DBP), skinfolds, and waist and hip circumferences before and after the intervention. YMCA sit and reach test was used to assess flexibility. Balance was assessed with the time the participants could stand on one leg with arms raised. Astrand-Rhyming cycle ergometer test was used to estimate aerobic fitness and push-ups were used to assess muscular fitness. The intervention consisted of three one-hour sessions a week and required the participants to exercise to a combination of eight songs. **RESULTS:** Participants were obese, as the females had a baseline BMI of 33.2 ± 6.0 kg/m² and males 31.4 ± 10.4 kg/m². Following the intervention, SBP, muscle fitness and right balance improved ($p < 0.05$). Pre-test correlations showed that only WHR and flexibility were related ($r = -.613$, $p < 0.05$). Post-test correlation showed relationships between Waist-to-Hip-ratio and flexibility ($r = -.623$, $p < 0.05$), and muscular fitness and percent body fat ($r = -.523$, $p < 0.05$). **CONCLUSION:** These data suggest that Wii video game training with multiple intensities can improve SBP, muscular fitness and right leg balance in college age students.

ELECTROMYORAPHIC COMPARISON OF THE PVC PUSHUP AND THE PERFECT PUSHUP

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P109 PURPOSE: The purpose of this study was to examine the electromyographic (EMG) response of the following prime movers during the pushup: pectoralis major (PM), anterior deltoid (AD), and triceps brachii (TB). This study specifically investigated the EMG response in these muscles during pushups using two different types of exercise equipment: PVC push-up and the Perfect Push-up device. METHODS: Twenty male subjects performed push-ups using the Perfect Push-up device and a U-shaped piece of PVC pipe of similar height, while EMG activity was monitored in the PM, AD, and TB. RESULTS: No statistically significant differences in the EMG response of the PM, AD, or TB were found between the PVC push-up and Perfect Push-up™. CONCLUSION: The results demonstrate that the Perfect Push-up device did not result in increased muscle activation in the prime movers involved in the push-up exercise; as such based on the results of this study, training with the Perfect Push-up device will not provide any additional advantage.

Undergraduate Research

ELECTROMYOGRAPHIC COMPARISON OF THE PUSH-UP AND THE RING PUSH-UP

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P110 PURPOSE: The purpose of the current study was to contrast the electromyographic (EMG) response of the pectoralis major (PM), anterior deltoid (AD), and triceps brachii (TB) during conventional push-ups and during ring push-ups. METHODS: Twenty male subjects performed push-ups using a pair of low suspended gymnastics rings and typical push-ups performed with the hands on the ground, while EMG activity in the PM, AD, and TB was monitored and recorded. RESULTS: Statistically significant differences between the two exercises ($p < 0.05$) were noted for the PM and the TB. There was no statistically significant difference in the EMG response for the AD. CONCLUSION: Based on the results, the ring push-up, an open kinetic chain exercise, requires a greater amount of muscular activity than does the conventional push-up, a closed kinetic chain exercise. The difference was most likely due to the increased need for muscle stabilization and control during the ring push-up compared to the conventional push-up.

Undergraduate Research

THE EFFECTS OF MINIMALISTIC FOOTWEAR ON SPEED AND AGILITY

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P111 PURPOSE: The purpose of this study was to examine the impact of minimalistic footwear on speed and agility. METHODS: Twenty college-age students who had been training using both minimalistic and traditional running footwear were recruited as subjects. The subjects were randomly assigned to begin testing using either minimalistic or traditional running footwear. The subjects were retested one-week later using the remaining footwear. After completing a standard warm-up, the subjects completed three trials, with a 2-minute rest between trials, of each of the following: agility T-test, 40-m dash, and 200-m dash. The best time of the three trials was recorded. RESULTS: There were no significant differences between any of the trials that were conducted for the agility T-test, 40-m dash, or the 200-m dash. CONCLUSION: Based on the results of this study, the wearing of minimalistic footwear had no advantage over the wearing of traditional running shoes when subjects participated in either agility or sprinting type activities.

Undergraduate Research

INFLUENCE OF FITNESS ON CHILDREN'S PHYSICAL ACTIVITY ACROSS THE SEGMENTED SCHOOL DAY

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P112 PURPOSE: To examine the effect of physical fitness and body mass index (BMI) on physical activity (PA) patterns in sixth-grade students across the segmented school day. A secondary purpose was to examine the effects of a physical education (PE) vs. a non-PE school day on PA. METHODS: 65 sixth-grade students ($n = 32$ boys, Mage = $11.4 + .52$ years) recorded pedometer step-counts (Yamax SW-200) for six consecutive school days, three of which included compulsory PE. Students logged step counts at marked time periods – at the start and end of school, before and after PE and lunchtime, and bedtime. Physical fitness data was collected via five subtests from the President's Challenge Youth Fitness test (mile run/walk, shuttle run, curl-ups, v-sit, and flexed arm hang). RESULTS: Physical fitness was found to be significantly associated with total steps/day after accounting for gender, $\Delta R^2 = .12$, $F(2,69) = 18.4$, $p < .001$. In particular, significant contributors to the association included the mile run/walk, curl-ups, and flexed arm hang. BMI was positively correlated with the mile run/walk and negatively correlated with flexed arm hang. Students were also found to take more steps on PE than non-PE days, largely attributable to steps taken in PE. CONCLUSIONS: Fitness and PE both contribute meaningfully to PA across the segmented school day. Supported by an undergraduate Aresty research grant from Rutgers University.

Undergraduate Research

ENERGY EXPENDITURE OF A HIGH INTENSITY CROSSFIT WORKOUT COMPARED TO A TRADITIONAL AEROBIC WORKOUT

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PURPOSE: The purpose of this study was to compare energy expenditure of a 30 minute jog (AER) to a 12 minute high intensity crossfit workout (HIT) with 18 minute cool down (HIT+CD). **METHODS:** This study consisted of 10 males and 9 females requiring three visits. On visit one, body fat was assessed via DXA analysis, anaerobic capacity was measured via Wingate test, and aerobic capacity measured via a VO2 max graded exercise test. The second and third visits were the subject's workout visits. Subjects performed both workouts, but the order in which they performed the workouts was randomly assigned. The workouts consisted of either a 30 minute run at 70% of the subject's VO2 max (AER) or a 12 minute crossfit (HIT) with an 18 minute cool down (HIT+CD). VO2 max and Wingate results classified our subjects as trained females (VO2= 46.2 ± 2.9 ml/kg/min, Mean Power = 432.9 ± 27.6 W, Peak Power= 746.5 ± 65.1W, Body Fat= 27.9 ± 2.9%) and trained males (VO2 = 57.3 ± 1.4 ml/kg/min, Mean Power = 586.4 ± 25.5 W, Peak Power = 1046.5 ± 60.6 W, Body Fat = 12.6 ± 0.9%). A one way ANOVA (AER v HIT v HIT+CD) was used, and a t-test (HIT vs AER for HR and RPE only) and significance was set at $p < 0.05$ a priori. **RESULTS:** Total energy expenditure was significantly higher overall in AER (354.7 ± 33.1 Kcals) compared to HIT (153.5 ± 16.1 Kcals) and HIT+CD (249.1 ± 27.1 Kcals). On a per minute basis, there was a significantly higher energy expenditure for a HIT (12.8 ± 1.3 Kcals) compared to AER (11.8 ± 1.1 Kcals) and HIT+CD (8.3 ± 0.9 Kcals). VO2, heart rate, and RPE were also significantly higher during HIT (HR=172.4 ± 2.5, RPE= 14.8 ± 0.3, VO2 39.1 ± 1.6 ml/kg/min) compared to AER (HR=161.6 ± 2.4, RPE= 12.4 ± 0.3, VO2 37.1 ± 1.2 ml/kg/min). **CONCLUSION:** Our findings conclude that an AER does expend more energy during a 30 minute time period; however, HIT expends more energy on a per minute basis. Finally, HIT also makes an individual work harder as evidenced by a higher heart rate, RPE and VO2.

Undergraduate Research

NO INFLUENCE OF BAREFOOT RUNNING ON RUNNING ECONOMY

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Barefoot running (BR) has been reported to change running gait and reduce the risk of injury, but few studies have been completed to examine these claims. Proponents of BR claim that running barefoot causes a shift from the heel to a forefoot strike—which improves running economy (RE). Most previous research on BR and RE has used high-level athletes. Therefore, the purpose of this study was to determine if RE differed in recreational runners when running barefoot (BR), running with shoes (SR), or weighted running (WR, foot weights added equal to shoe weight). The subjects were active male (n=9) and female (n=9) college-aged runners who were training to run in a local 10 km race. Height, weight, body composition (skinfold), and resting blood pressure were recorded and a medical history was completed before testing. Subjects performed three consecutive, seven-minute, randomly assigned, sub-maximal running trials either BR, SR, or WR. Oxygen consumption was measured using a Parvomedics TrueMax 2400 (Sandy, Utah). RPE (Borg 6-20 scale) and heart rate (Polar Heart Rate Monitor) were measured at 5.5 and 6.5 min of each segment. There were no significant differences ($p > 0.05$) in RE (ml/kg/min) among trials. Heart rate and RPE (BR, 12.6 +2.1; SR, 11.9 +2.9; WR, 13.4 +2.8) were not different among trials. Grouping subjects by sex also did not yield any significant differences. We conclude that RE, RPE, and heart rate were not significantly altered by BR in recreational runners who did not have a significant amount of previous experience with running barefoot.

Undergraduate Research

VARIABILITY IN RESISTANCE TRAINING REPETITIONS ACHIEVED AT SPECIFIC WORKLOADS BY GENDER

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Exercise loads in resistance training (RT) are typically based on a percent (%) of each subject's one repetition maximum (1RM) and include an expected number of repetitions (reps) performed at each given load. Published tables state a set number of reps can be achieved at specific loads on various pieces of cam mediated variable resistance exercise equipment (CMVREE), such as Nautilus. **METHODS:** Forty college subjects (19 male, 21 female) with a minimum of two months RT experience completed 1RM testing on eight pieces of CMVREE. Subjects subsequently completed a maximal number of reps at 60% and 80% of 1 RM with a minimum of 72 hours rest between protocols. Rest between exercises was standardized at two minutes. **RESULTS:** Reps achieved on eight pieces of CMVREE averaged 22 and 12 at 60% and 80% 1RM, respectively. The rep variability was high, ranging from a low of 11 on the shoulder press to a high of 41 on the leg press at 60% 1RM and a low of 7 on the shoulder press to 20 on the leg press at 80% 1 RM. Gender related differences in reps achieved at specified workloads were only found in the shoulder press (60%), leg extension (60%) and leg curl (60% and 80%). **CONCLUSION:** Exercise professionals should recognize that published repetition tables may not accurately predict the number of reps achieved on various pieces of RT equipment in male or female subjects.

Undergraduate Research

THE EFFECTS OF CROSSFIT ON FITNESS COMPARED TO TRADITIONAL SEPARATED CARDIORESPIRATORY AND RESISTANCE TRAINING

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PURPOSE: To examine the effects of CrossFit on muscular strength/endurance, cardiorespiratory endurance, and body composition compared to that of separate cardiorespiratory and resistance training. **METHODS:** Twelve males (19-22 yrs) participated in the study. Prior to training, all participants were assessed for muscular strength, muscular endurance, maximal aerobic capacity, body composition, resting heart rate (RHR), and blood pressure (BP). Participants were randomly assigned to a CrossFit (CF) training group or a separated resistance and cardiorespiratory (SRC) training group and underwent four weeks of training. The CF group performed two CrossFit training sessions each week, while the SRC group performed two resistance and two cardiorespiratory training sessions per week. After completing four weeks of training, all participants were reassessed for all measures. **RESULTS:** When comparing the changes from pre-test measures to the two-week values, there was no difference in body fat, systolic BP, diastolic BP, or resting HR between the two groups. Additionally, when combining groups there was no difference from pre-test to two weeks in body fat (14.5 ± 7.6% vs. 14.6 ± 7.5%, $p > 0.05$), systolic BP (130.4 ± 8.2 mmHg vs. 134.7 ± 9.7 mmHg, $p > 0.05$), diastolic BP (77.2 ± 9.4 mmHg vs. 78.4 ± 6.6 mmHg, $p > 0.05$), or resting heart rate (78.3 ± 13.3 bpm vs 80.4 ± 14.5 bpm, $p > 0.05$). Muscular strength/endurance and cardiorespiratory fitness will be assessed at the completion of the training program. **CONCLUSION:** Following two weeks of Cross-Fit Training with either combined (2d/wk) or separate workouts (4d/wk) no changes in body fat, BP or RHR were noted.

Undergraduate Research

THE ACUTE EFFECTS OF DEADLIFTING AND DEADLIFTING WITH RESISTANCE BANDS ON VERTICAL JUMP

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PURPOSE: The purpose of this study was to determine the impact of performing deadlifts and deadlifts with resistance bands on the vertical leap of NCAA D1 football players. **METHODS:** Twenty NCAA D1 football players were recruited as subjects. The subjects completed a warm-up and then an initial vertical jump test was performed by all subjects. The subjects were divided into two groups. Group A performed 3 sets of 2 reps at 125 kg on the deadlift and group B performed 3 set of 2 reps at 102 kg plus resistance bands with 23 kg of resistance at the top of the deadlift. Immediately after the third set members of both groups completed two vertical jumps and the average of the two jumps were calculated. After a 15 minute recovery time, each group completed the other deadlift protocol and repeated the vertical jump test. **RESULTS:** The results for vertical jump following both the deadlift (0.61 + 0.09m) and the deadlift with the bands (0.61 + 0.10m) were both significantly higher than the vertical jump (0.57 + 0.09m) performed without first deadlifting. There was no significant difference between the deadlift trial and the deadlift with resistance bands trial. **CONCLUSION:** This study has shown that preloading an athlete by having the athlete perform deadlifts immediately prior to attempting a vertical jump can result in improvements in performance.

THE EFFECTS OF STRETCHING ON VERTICAL JUMP

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PURPOSE: The purpose of this study was to determine the impact of stretching on ground contact time, power factor and average vertical jump height during the four-jump vertical leap test using a Jump Mat. **METHODS:** Twenty active, low-risk stratified, college-age students were recruited as subjects. The subjects were randomly assigned to begin testing in one of four protocols: A, no warm-up or stretching; B, warm-up only; C, warm-up and static stretching; and D, warm-up and dynamic stretching. After the prescribed warm-up and stretching procedures were completed, the subjects completed a Four-Jump Test on the Jump Mat system, during which time ground contact time, power factor and the average jump height were calculated. **RESULTS:** There were no significant differences between any of the trials for ground contact time or power factor. For average vertical jump height, there was a significant difference between the warm-up only trial (0.44 + 0.11m) and the warm-up plus dynamic stretching trial (0.46 + 0.11m). **CONCLUSION:** Based on the results of this study, warming up with or without stretching resulted in no additional benefit over performing the four-jump vertical leap test without warming up or stretching.

CORRELATES OF SCHOOL-DAY PHYSICAL ACTIVITY OF YOUNG CHILDREN

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PURPOSE: To determine the contribution of sex, age, body mass index, and motor competence to school-day physical activity participation in young children. **METHODS:** Thirty-two children from two childcare centers participated in this study. Sample 1 and 2 included 14 (M age = 3.5) and 18 children (M age = 4.9), respectively. Body Mass Index (BMI) values were calculated according to established guidelines. Children wore Omron HJ-720ITC pedometers for seven consecutive weekdays during the school-day and total step counts were converted to mean steps per minute for analyses. Children completed the Test of Gross Motor Development-2nd Ed. (TGMD) and the Movement Assessment Battery for Children-2nd Ed. (MABC). The TGMD includes two subscales: object control and locomotor skills. The MABC includes three subscales: manual dexterity, aiming and catching, and balance. Raw scores for subscales on each assessment were converted to standard scores according to manual guidelines. Spearman's correlations were calculated to determine the association between each variable and school-day physical activity. **RESULTS:** Correlations included: age (**-.64), BMI (-.16), object control (.44*), locomotor (.03), manual dexterity (-.09), aiming and catching (-.06), and balance (-.28). * and ** indicates significance at the .05 and .01 levels, respectively. **CONCLUSIONS:** Three-year olds were more active than four-year olds. Competence in object control skills was significantly associated with participation in physical activity. None of the subscales of the MABC-2 were associated with physical activity. The type of motor assessment administered may lead to different conclusions regarding the relationship between motor competence and physical activity.

NUTRITION AND PHYSICAL ACTIVITY PRACTICES AND POLICIES IN RURAL AREA CHILD CARE CENTERS

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PURPOSE: To determine if childcare centers in a rural area were meeting recommended practices for healthy eating and physical activity. **METHODS:** Thirty-three child care centers completed the Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) twice over a six month period. NAP SACC uses questions regarding nutrition (nine categories and 37 questions) and physical activity (PA) (five categories and 17 questions) to address environmental concerns. Childcare center directors responded to each question using a 4- point Likert scale (1=barely met, 2=met, 3=exceeded, and 4=far exceeded childcare standards). Interventions used action plans and were determined using pre-test results for each site. Prevalence estimates detected whether centers met recommendations (≥ 2) in each category. **RESULTS:** Pre-test assessments indicated three nutrition categories and one activity category fell below the 50th percentile while the post-test indicated only one category failed to improve (Foods Offered Outside of Regular Meals, pre=45.5%, post=60.6%; Supporting Healthy Eating, pre=33.3%, post=27.3%; Nutrition Education, pre=42.4%, post= 63.6%; PA Education, pre=48.5%, post=69.7%). Additionally, a Wilcoxon signed rank test ($p < 0.05$) indicated significant improvements in specific questions in the following categories: beverages, menus and variety, feeding practices, supporting healthy eating, nutrition and PA education, play environment, and supporting PA. **CONCLUSIONS:** Childcare centers in rural areas may focus on training and educational opportunities as well as modifying types of foods served and play environment to potentially impact childhood obesity.

THE EFFECT OF PHYTOECDYSTEROID TREATMENT ON NOTCH AND WNT SIGNALING IN AGED SKELETAL MUSCLE

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Dysfunctional Notch and Wnt signaling contributes to poor muscle regeneration and increased fibrosis in aged skeletal muscle. 20-hydroxyecdysone (20E), a phytoecdysteroid produced by the plant *Ajuga turkestanica*, increases muscle strength in young rats. The objective of this study was to determine if an extract from *A. turkestanica* (ATE), enriched in phytoecdysteroids, affects Notch and Wnt signaling in skeletal muscle of aged mice. Aged male C57BL/6 mice (20 mo) received ATE, 20E, or vehicle (CT) for 28 days. Immunohistochemistry on tricep brachii was performed using antibodies directed to Notch and Wnt signaling markers co-stained with a satellite cell marker, Pax 7. ATE-treated tricep muscle experience a ~2.2 fold increase in active Notch in Pax 7 +ve-cells relative to CT and 20-HE treated-muscle ($P < 0.01$). Preliminary findings report a possible decrease in active β -catenin (33%) in triceps of 20E-treated mice compared to ATE or CT. In conclusion, phytoecdysteroids, may rejuvenate Notch signaling in aged sedentary mouse skeletal muscle. Supported in part by a USDA Kannapolis Scholars Fellowship

EFFECT OF LOW VOLUME AEROBIC EXERCISE ON EXECUTIVE FUNCTION IN OLDER ADULTS

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P122 PURPOSE: To study the effect of a low volume of aerobic exercise on executive cognitive function in older adults. METHODS: Twenty seven adults (23 females, 4 males) ages 50-65 (M=58) volunteered to participate in an eight week low volume exercise (LVE) program consisting of preferred mode of aerobic exercise among treadmill, recumbent bicycle, or elliptical. Prior to exercise, participants were screened for cognitive impairment and high cardiovascular risk before completing the Trail Making Test as a measure of executive function. Exercise intensity was monitored using heart rate and BORG ratings of perceived exertion. Values of 85% maximum heart rate and 6 on the 10-point exertion scale were established as ceilings for moderate intensity. Participants exercised three times per week for 30 min at or below moderate intensity for a total of 90 min per week. The minimum volume of aerobic exercise recommended by the American College of Sports Medicine is 150 min per week at moderate intensity making the exercise intervention low in both volume and intensity. RESULTS: Trail Making A and B scores significantly improved following the LVE program ($p=0.03$, $p=0.01$). Mean times (sec) for Trail Making A (30.66 ± 11.21) and B (58.77 ± 17.28) decreased following eight weeks of LVE (26.38 ± 7.62 , 50.93 ± 16.17). CONCLUSIONS: These results suggest that even at low volume and intensity, aerobic exercise can improve executive function in older adults.

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DIFFERENTIAL EFFECTS OF CONTINUOUS VERSUS DISCONTINUOUS AEROBIC EXERCISE ON HEMODYNAMICS

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Introduction: Four weeks of exercise has been shown effective in decreasing blood pressure in older pre-to-stage-one hypertensives. However, there is a lack of evidence if the protocol (continuous vs. discontinuous) or individuals age (young vs. old) effects the decrease in blood pressure following the intervention. Therefore, the purpose of this study was to examine systolic and diastolic blood pressure changes in continuous versus discontinuous exercise in college-aged versus middle-aged subjects. Methods: Forty five male and female subjects (young = 21.62 ± 0.4 years; older 48.29 ± 0.8 years) were recruited for this study and each subject was randomly assigned a protocol prior to baseline testing for VO₂max and hemodynamic measurements. Participants were given a four week, wait-listed control before returning to repeat the testing and to begin one month of either continuous aerobic treadmill work (30 minutes at 70-75% HRmax) or three bouts of 10 minutes of exercise at 70-75% HRmax with two 10 minute break periods in between, totaling 30 minutes of aerobic work. Results: Both continuous and discontinuous groups demonstrated a significant improvement in VO₂max ($p < 0.001$), heart rate max ($p < 0.05$), and diastolic blood pressure ($p < 0.05$), with systolic blood pressure exhibiting a more pronounced decrease in the young continuous group and the older discontinuous group ($p = 0.012$). Conclusion: These data suggest that for young individuals, that continuous aerobic exercise is more effective at reducing SBP, whereas middle aged persons will gain more benefit from discontinuous training. Undergraduate Research

THE EFFECT OF MUSIC AS A MOTIVATIONAL TOOL ON ISOKINETIC CONCENTRIC PERFORMANCE IN ADULT MALES AND FEMALES

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Music has been identified as a motivational tool in physical activity and associated with improved performance in aerobic and anaerobic exercise. However, the effects of music on isokinetic strength testing have not been thoroughly examined. PURPOSE: The purpose of this study was to measure the difference in isokinetic force output in males and females when exposed to a motivational environment (arousing music) and non-motivational environment (silence). METHODS: Two 2 x 2 (gender x music/no music) ANOVAs for both flexion and extension were used with participants ($n = 19$; 12 male, 7 female) serving as their own control. Participants performed 5 isokinetic concentric repetitions of knee extension and knee flexion at a set velocity of 60°/sec in both a non-music trial and music trial. Testing order was randomized to control for learning effect. RESULTS: No significant interactions were found for both the flexion and extension conditions, and there was no significant main effect differences found between music and non-music conditions ($p > .05$). CONCLUSIONS: Music had no effect on isokinetic force output in either males or females. Music may not serve as an enhancer of maximal isokinetic performance, but it may increase enjoyment of otherwise monotonous activity in rehabilitation settings.

PSYCHOLOGICAL PREDICTORS OF COMPENSATORY RESPONSES TO A STRUCTURED EXERCISE PROGRAM

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PURPOSE: For many people, exercise interventions for weight management do not result in the expected degree of weight loss, and some participants may even gain weight. Behavior-related compensatory responses [i.e., decrease in leisure-time energy expenditure (EE) and/or increased energy intake (EI)] outside of the intervention are thought to underlie a large portion of the observed differences between measured and expected weight loss with exercise. This study aimed to identify possible psychological predictors of behavioral compensation to structured exercise (SE). **METHODS:** Young adults (20.6 + 1.5 years, n=20) participated in an 8-week exercise intervention, with an approximate dose of 120 minutes of moderate-to-vigorous SE per week, where diet and outside activity were measured at three time points (Baseline, Week 5, Week 8). At each time point, subjects wore ActiGraph accelerometers for 7 consecutive days and completed a 3-day food diary record using the National Cancer Institute's ASA24 recall program. **RESULTS:** There were no significant mean differences between EI and EE at baseline and Week 8; however, substantial inter-individual variability was observed in changes in both EI and EE. Among the psychological constructs measured at baseline, self-motivation was significantly correlated with change in EI ($r = -.61, p < 0.05$) and positive urgency, a construct related to trait impulsivity, was significantly correlated with EE change ($r = -.70, p < 0.05$). **CONCLUSION:** Selected personality traits are associated with compensatory changes in EI and EE in response to SE.

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THE EFFECT OF EXERCISE ON MECHANICAL PRESSURE PAIN THRESHOLD IN THE PRESENCE AND ABSENCE OF DELAYED-ONSET MUSCLE SORENESS

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Fatiguing isometric exercise has been shown increase pressure-pain threshold (PPT), termed hypoalgesia, in both the ipsilateral (contracting) and contralateral muscle. However, exercise has been shown to increase pain sensitivity in clinical pain populations. **PURPOSE:** Delayed-onset muscle soreness (DOMS) approximates clinical pain; thus the purpose of this study was to examine the effects of fatiguing isometric exercise on PPT in the presence and absence of DOMS. **METHODS:** Data were collected on 23 males (age: 19-29yrs). Following familiarization, baseline testing (no DOMS) was performed. Eccentric exercise was then performed to induce DOMS, and all tests were repeated 48-hours later when DOMS was present. Participants held 25% of maximum voluntary contraction (MVC) until fatigue, defined as force declining >10% below the target force. PPT was assessed in the left and right rectus femoris at the mid-point between the patella and ASIS prior to, every 30 seconds during, and 2 and 15-minutes post exercise. **RESULTS:** No condition x time interactions were found for either the ipsilateral ($p=0.81$) or contralateral ($p=0.61$) thigh nor was a main effect for condition found ($p=0.65$). A main effect for time was found with PPT being elevated during ($p \leq 0.001$) and after exercise in the ipsilateral thigh ($p \leq 0.039$), but only during exercise in the contralateral thigh ($p \leq 0.002$). **CONCLUSIONS:** Unlike clinical pain, DOMS had no effect on the PPT response exercise in either the ipsilateral or contralateral thigh. Increases in PPT during exercise in both thighs suggests a centralized alteration in pain sensitivity. The restriction of post-exercise effects to the contracting thigh suggests a localized mechanism due to contraction may be at play.

ATTITUDES TOWARD OBESITY AMONG UNDERGRADUATE EXERCISE SCIENCE MAJORS AND NON-MAJORS

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PURPOSE: To further examine attitudes towards obesity among 82 sport science and fitness management students and 38 non-majors at an Historically Black College/University (HBCU). **METHODS:** The Exercise Professionals Perceptions Regarding Obesity questionnaires, Parts A (OBA) and B (OBB) were completed. The questionnaire items were created to evaluate fitness professionals' attitudes toward obesity and were answered on a Likert scale. **RESULTS:** Both groups recognized excessive calorie consumption and poor eating habits as major contributors to obesity. In addition, both majors and non-majors believed that exercise is an important way to combat obesity. Groups differed in several ways, however. First, non-majors demonstrated a tendency to recognize a wider group of causes of obesity than did majors. Also, non-majors more strongly believed that with guidance, obese persons are able to lose weight. Finally, exercise science majors more strongly believed that an obese person's ability to succeed at weight loss should determine whether the person should be part of an obesity treatment program. **CONCLUSIONS:** The results of the present study indicate that exercise science majors may have less empathy and lower expectations for success for those who are obese.

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EXAMINING QUALITY OF LIFE AND HEALTH SATISFACTION FACTORS OF A MID-SOUTH UNIVERSITY POPULATION

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PURPOSE: This investigation examined quality of life (QL) and health satisfaction (HS) factors in faculty, staff, and students at a medium-sized (approximately 21,000 students) university campus in the mid-south region of the United States. Research has indicated that QL and HS are related to one's productivity and success, which in turn may influence university administration in their student affairs policies and campus recreation programming. **METHODS:** The brief version of the World Health Organization (WHO) quality of life survey (WHOQOL-BREF) was utilized for this study. The survey was administered for three weeks both online and in paper format, yielding a total sample size of 1073 respondents. The WHOQOL-BREF contains questions in four domains: physical (PHY), psychological (PSY), social relationships (SR), and environmental (ENV). **RESULTS:** Pearson correlations revealed moderate correlations for each domain on QL and HS. The weakest relationships were SR:QL (.37) and SR:HS (.33), while the strongest relationships were PSY:QL (.54) and PSY:HS (.55). Correlations for the remaining two domains were PHY:QL (.49), PHY:HS (.49), ENV:QL (.53), and ENV:HS (.41). **CONCLUSIONS:** These data demonstrate that in this population, QL and HS are moderately affected across each of the four domains, though SR may affect QL and HS less than the other three.

CHILDREN'S ENJOYMENT OF PHYSICAL ACTIVITY AND PREFERENCE FOR THREE DIFFERENT SOCIAL CONDITIONS

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PURPOSE: To assess children's enjoyment (i.e., liking) of physical activity and preference for a physical activity session when playing alone (AL), with a single friend (SF) and with a group of four friends (GF). **METHODS:** Children (n= 12 boys, n= 12 girls) between the ages of 6-10 years participated in 30-minute free-play physical activity, in a 4,300 square foot gymnasium, in three separate social conditions (AL, SF, GF) on different days. Children could participate in a variety of age-appropriate physical and/or sedentary activities in any pattern or amount they wished. Upon completion of each condition, children indicated their liking of their physical activity for that session by making a mark on a 10-cm visual analog scale that was anchored by "do not like it at all" and "like it very much". After completing the three social conditions children indicated which of the three they preferred. **RESULTS:** A mixed-effects regression model revealed that children significantly ($p < 0.001$) liked the SF (9.5 ± 0.1 cm) and GF (9.4 ± 0.2 cm) conditions more than the AL (7.2 ± 0.5 cm) condition. There was no significant difference ($p = 0.806$) in liking between the social conditions (SF, GF). Chi-square analysis revealed a significantly greater ($p = 0.004$) number of children indicated they preferred the GF (N = 19) social condition versus the AL (N = 0) and SF (N = 5) social conditions. **CONCLUSIONS:** The presence of a single or group of friends has a powerful positive effect on children's perception of a physical activity environment.

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FITNESS, FATNESS, AND DEPRESSION

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PURPOSE: To examine the longitudinal relationship between cardiorespiratory fitness (CRF), fatness and depressive symptoms in the Aerobics Center Longitudinal Study (ACLS). **METHODS:** Adults in the ACLS (n=12,599, 18% women) completed the 10-item Center for Epidemiologic Studies Depression Scale (CES-D). Measures of fatness were BMI, waist circumference and percent body fat. Maximal exercise treadmill testing determined CRF. Separate logistic regressions tested the associations between each fatness measure and the onset of depressive symptoms. Models were repeated using CRF as the predictor variable. Additional analyses determined the joint effect of CRF and fatness on depressive symptom onset. **RESULTS:** High CRF was associated with lower odds of developing depressive symptoms in both men and women (p values $< .0001$). When controlling for CRF, fatness did not predict depressive symptom onset (p values $> .2468$). Unfit-fat men and women had higher odds of developing depressive symptoms compared to fit-unfat men and women. Additionally, unfit men with a waist circumference > 102 cm had 63% higher odds of developing depressive symptoms than fit men with the same waist circumference (OR=1.634; CI=1.240-2.155). Similarly, unfit women with a BMI ≥ 25 had 94% higher odds of depressive symptom onset than fit women with the same BMI (OR=1.942; CI= 1.266-1.878). **CONCLUSIONS:** CRF is a stronger predictor of depressive symptom onset than fatness. Fit-fat individuals may be at lower risk of developing depression than unfit-fat individuals.

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FITNESS AND HR REACTIVITY TO MENTAL STRESS: IMPACT OF OBESITY

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P130

Although the physiological impact of physical fitness (PF) on CVD is studied intensively, less attention is given to any cross-stressor adaptation of PF on psychological stress, an independent risk factor to CVD. The impact of PF on heart rate (HR) reactivity to acute mental stress is unclear and may be confounded by the effects of adiposity. Therefore, the purpose of this study was to determine the relationship between PF on HR reactivity during a mental challenge task in non-obese and obese males. Non-obese (N=10, 21.2 \pm 2.6 yrs, 21.8 \pm 1.7 kg/m², 16.7 \pm 4.1 %FAT) and obese (N=10, 21.4 \pm 2.5 yrs, 37.2 \pm 4.5 kg/m², 40.0 \pm 3.5 %FAT) males completed a graded exercise test to exhaustion on a treadmill. Averaged breath by breath data was collected to determine the highest reported oxygen consumption (VO₂peak). Participants also completed a 20 minute acute mental challenge (Stroop Color-Word Task and Mental Arithmetic Task). HR reactivity was defined as the heart rate difference between resting and peak values taken during the mental challenge. In the non-obese group, a significant relationship ($r = .656$, $P = .40$) was found between the mental challenge HR reactivity (24.2 \pm 6.0) and VO₂peak (52.34 \pm 6.4 mL·O₂·kg⁻¹·min⁻¹). There was no significant relationship observed in the obese group between the mental challenge HR reactivity (23.9 \pm 10.0) and VO₂peak (36.24 \pm 3.5 mL·O₂·kg⁻¹·min⁻¹). These results suggest that the impact of PF on HR reactivity to an acute mental stress is blunted in obese individuals, which may be due to the chronic adaptation of increased adiposity levels. Supported by VCU Presidential Research Incentive Program

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THE EFFECT OF SUBMAXIMAL ISOMETRIC EXERCISE TO FATIGUE ON MECHANICAL PRESSURE PAIN THRESHOLD IN THE FINGER

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Exercise reduces pressure pain thresholds (PPT) muscles, especially those activated during the exercise bout. The effects in non-contracting tissue are less well characterized and limited due to methodological considerations. **PURPOSE:** The purpose of this study was to examine the effects of isometric exercise to fatigue with the knee extensors on PPT in the finger. **METHODS:** Data were collected on 25 males (age: 19-29 yrs). Testing consisted of participants holding 25% of maximal voluntary contraction (MVC) with the knee extensor muscles until fatigue. Fatigue was defined as a force declining $> 10\%$ below the target force. PPT was assessed before, 2-minutes and 15-minutes following exercise in the middle finger on the right hand using a pressure algometer. Applied force was progressively increased until participants indicated the stimulus moved from being "uncomfortable" to "faintly painful." **RESULTS:** Prior to exercise PPT was 5.5 \pm 2.6 kg/cm². Following exercise, PPT showed a trend toward an increase ($p=0.087$) with values increasing to 6.2 \pm 2.4 and 5.8 \pm 2.5 kg/cm² at 2-minutes 15-minutes post-exercise, respectively. **CONCLUSIONS:** The results of the present study indicated fatiguing isometric exercise with the knee extensors did not alter pressure pain threshold in the finger 2 minutes and 15 minutes post-exercise. Indicating exercise restricted to a single muscle group may not significantly alter central pain processing to affect pain sensitivity in a distant tissue.

EXERCISE AND DIET INTERVENTION MAY IMPROVE STRESS CONTROL OVER EXERCISE OR DIET ALONE IN POSTMENOPAUSAL WOMEN

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PURPOSE: The impact of an exercise, diet, or combination intervention on stress control (SC) was investigated in postmenopausal (PM) women. **METHODS:** 35 PM women (57.9 ± 4.7 yrs.) were randomly assigned to either a diet-induced weight loss (DWL) ($n=16$) or circuit-training (CT) ($n=19$) 9-week intervention. DWL participants attended weekly sessions, while CT participants attended 3x/week resistance and aerobic circuits and remained weight stable. After a 1-month washout, 9 (3 DWL, 6 CT) participants completed the combination protocol, which combined DWL and CT (DWLCT). At 0 (PRE) and 10 (POST) weeks, participants were evaluated for BMI, body composition (via DXA), physical fitness (PF) (VO_{2max} , sit-and-reach, push-ups, curl-ups, 5RM chest press and leg press), self-report physical activity (IPAQ), and completed the USDHHS Health Behavior Survey, which included SC. Mixed-design ANOVA identified variables that changed over time within groups; post hoc analyses followed. **RESULTS:** There was a time x group interaction ($p=.028$) for SC. No group changed across time, but DWLCT trended towards improvement ($p=.106$). At PRE, groups reported similar SC; at POST, DWLCT had significantly better SC than DWL ($p=.007$). **CONCLUSIONS:** These data indicate that a combination intervention may improve SC better than diet or exercise alone. However, all participants in the DWLCT group were enrolled for a total of 18 weeks; therefore, these data may indicate that longer interventions are needed to achieve SC benefits.

ETHNIC DIFFERENCES IN THE CONSISTENCY OF ACCURACY OF PERCEIVED EXERTION

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Previous findings suggest overweight women who over-perceived their exertion during a submaximal task gained more weight during the following year, reported lower vitality, poorer mental health, and poorer dietary control when compared to those who under-perceived exertion. We investigated the effect of diet-induced weight loss on accuracy of perceived exertion (APE), and examined whether any changes persist one year following a weight loss intervention in premenopausal, previously overweight, African American (AA) and European American (EA) women. Formerly overweight women ($n=102$, age 20-44 yrs) completed a weight loss program to achieve a normal body weight ($BMI < 25$). Measures of physiological and perceived exertion (Borg's 6-20 RPE Scale) were recorded prior to, immediately following, and approximately one year after weight loss during a submaximal aerobic exercise task. APEz was significantly greater than zero at baseline and at 1-year follow-up for EA women (0.347 ± 0.88 $p < 0.05$ and 0.525 ± 0.92 , $p < 0.01$ respectively) and was significantly less than zero at 1-year follow-up for AA (-0.366 ± 1.1 , $p < 0.010$). EA women had lower physiological effort at baseline and 1-year follow-up states (-0.238 ± 0.66 $p < 0.05$; and, -0.266 ± 0.84 $p < 0.05$ respectively). AA women had higher physiological effort, at 1-year follow-up state (0.207 ± 0.61 , $p < 0.010$). EA women tended to overperceive despite lower physiological effort compared to AA women. AA women tended to underperceive, despite having higher physiological effort than EA women. Physiologic effort and perceived exertion contributed independently to the racial differences, and APE may be a trait evaluation before planning an exercise intervention.

DOSE RESPONSE OF CLASSROOM EXERCISE BREAKS AND EDUCATIONAL OUTCOMES

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PURPOSE: To determine whether various durations of classroom exercise breaks have acute effects on cognitive functions including executive functions, attention and academic performance. **METHODS:** Using a within-subjects crossover design, 96 students in 4th and 5th grades participated in 5, 10, and 20 minutes of classroom exercise breaks or 10 minutes of a sedentary activity. Students completed the Trail Making Test, a working memory test, a timed math test, and were observed for time-on-task behavior before and after each condition. Post-test scores were compared using repeated measures ANCOVA adjusted for classroom, gender and with pretest scores included as a time-varying covariate. **RESULTS:** Baseline fitness, but not BMI, was positively associated with math test and Trail Making Test scores when adjusted for age, sex, race, parent education, and parent income. Math scores were slightly but significantly higher after 10 ($p=.01$) and 20 ($p=.03$) minutes of exercise and working memory was higher after 20 ($p=.01$) minutes compared to after the sedentary condition. Off-task behavior was lower after 10 ($p < .01$) and 20 ($p=.06$) minutes of exercise (12.4% and 16.1% respectively vs 23.2%). There were no improvements after 5 minutes of exercise. **CONCLUSION:** To receive the full benefits of acute classroom exercise, students need to participate in 10 or 20 minutes of physical activity.

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RELATIONSHIP BETWEEN TEAM EFFICACY AND TEAM PERFORMANCE IN HIGH SCHOOL VOLLEYBALL PLAYERS

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Psychological factors affecting individual and team performance are less studied compared to physical performance skills, although the literature supports the role that efficacy beliefs can play in performance. The purpose of this study was to evaluate team-efficacy in female high school volleyball players compared to team performance (win percentage). Players ($N=37$) recruited from three schools provided parent consent and youth assent. They completed the Team Confidence (team-efficacy) Likert scale at preseason, midseason, and postseason. Repeated measures ANOVA showed no changes in team efficacy at preseason and postseason, but one school had a large increase at mid-season ($F(2,4)= 10.37$, $p=.000$). Pearson correlation was performed to measure team-efficacy and team performance at each time point. There was no correlation between team-efficacy and team performance at the preseason ($r = -.247$, $p = .141$) but there was at midseason ($r = -.369$, $p=.025$) and postseason ($r = -.343$, $p=.037$) indicating that high team-efficacy did not positively correlate to performance as expected. Regression analyses showed at preseason there was no prediction of team performance based on team-efficacy ($R\text{-square}=.061$, $p=.141$) but there were small predictors at midseason ($R\text{-square}=.136$, $p=.025$) and postseason ($R\text{-square}=.118$, $p=.037$). In summary, team-efficacy was a small predictor of team performance at midseason and postseason, although repeated testing effects may explain these predictions. Researchers and coaches may wish to explore other predicting factors with larger sample sizes.

DIETARY INTAKE, BODY COMPOSITION AND FITNESS AMONG COLLEGE FEMALE ATHLETES DURING IN- AND OFF-SEASON

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NUTRIENT INTAKE OF FEMALE COLLEGIATE TRACK AND FIELD ATHLETES

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P137 The purpose of the present study was to examine dietary intake of essential macro- and micro-nutrients, the use of dietary supplements, body composition and physical fitness in NCAA Division I female athletes during in- and off-season training. Twenty seven female athletes from basketball, tennis, softball and soccer teams completed 3-day food records, dietary supplements survey, body composition assessment using Dual-energy X-ray absorptiometry (DXA) and modified Bruce treadmill test to determine VO₂peak. Mean age was 20 ± 1, body mass 72 ± 16 kg, height 172 ± 10 cm, body fat 29 ± 6% and VO₂peak 41 ± 6 ml/kg/min. Mean energy intake was 2137 ± 1015 kcal/day. The energy obtained from carbohydrate (CHO), protein (PRO), total fat and saturated fat based on total calories from fat were 48 ± 11%, 17 ± 6%, 37 ± 13% and 30 ± 9 %, respectively. Mean CHO intake was 3.7 ± 1.4 g/kg and PRO intake 1.3 ± 0.5 g/kg was at the lower end of recommendations for athletes. Mean cholesterol intake was 362 ± 336 mg well above the recommended by American Heart Association (AHA) and fiber intake 18 ± 11 g was well below recommended. Based on dietary intake Recommended Dietary Allowances (RDA) were not met for Vitamin A, Vitamin E, Calcium, Magnesium, Iron, and Potassium by 16%, 72%, 25%, 30%, 17% and 52%, respectively. Mean sodium intake exceeded the RDA by 236%. In addition, 81% of athletes reported taking dietary supplements in the past 30 days. In conclusion, dietary recalls indicated inadequate intake of many crucial macro- and micro-nutrients through diet which are critical for energy metabolism, glycogen replenishment, neutralization of free radicals and bone health in young female athletes. The lack of these nutrients could potentially be affecting athletic performance and overall health; therefore, nutritional counseling specific to these micronutrients for female athletes is warranted.

P139 To obtain optimal performance and recovery it's important for an athlete to meet their recommended nutritional intake. **PURPOSE:** To determine if female athletes meet nutritional recommendations for their age, sex, and activity level. **METHODS:** Females from a NCAA Division III collegiate track and field team (N=26) were asked to record all of their foods and beverages for a 24 hour period using an Eating Behavior Journal immediately following a hard practice day during their competitive season. The journal entries were used to determine macro- and micronutrients as well as their rating of the quality of their diet. Information was then entered into food processor software with activity level set as "high." Height and weight were also recorded to determine relative nutritional recommendations. An ANOVA was used to compare jumpers, sprinters, and long distance runners and frequencies were used to determine if athletes were over, under, or met nutrient recommendations. **RESULTS:** No significant differences were detected between events for total calories, however only 19% met relative amounts (e.g., kcal/kg). Macronutrient intakes showed 27% met carbohydrate, 35% met fat, while most (96%) met protein recommendations. Even though caloric intake was below recommended amounts, participants perceived their diet as healthy (e.g., 3.7 on a 5 point scale). **CONCLUSIONS:** Female athletes competing in high intensity activities often view their diet as healthy despite not meeting recommendations. Therefore, providing education about caloric intake and key macronutrients, important for performance and recovery, may be warranted.

PHYSICAL ACTIVITY AND HEALTHY EATING ENVIRONMENTAL AUDIT TOOLS IN CHILD AND YOUTH CARE SETTINGS: A SYSTEMATIC REVIEW

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PURPOSE: To review and evaluate the measurement properties of audit tools assessing physical activity (PA) and healthy eating environments in settings that care for youth 3-18 years old. **METHODS:** Audit tools were identified by searching English language databases, national education department and national health organizations web pages. Two reviewers independently classified audit tools as meeting the following inclusion criteria: tools assessing PA and / or healthy eating environment at one setting caring for youth 3-18 years old. **RESULTS:** Thirty five environmental audit tools were identified of which 32 tools met the inclusion criteria. Twenty five tools assessed both PA and healthy eating environment compared to 5 tools assessing PA environment and 2 tools assessing healthy eating environment alone. The majority of the tools used self-report methods (n=23), and were developed to assess the PA and healthy eating environments at school settings (n=25) compared to preschool (n=7) and afterschool settings (n=3). Most of the tools lacked validity and/or reliability data (n=22). Inter-rater reliability and construct validity were the most frequently reported reliability (n= 6) and validity types (n=4). **CONCLUSIONS:** Current audit tools used to assess PA and healthy eating environment in various settings caring for children and youth lack both reliability and validity evidence. Future effort should be directed to establishing a strong measurement foundation of such environmental audit tools.

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P140 The position statements of both Academy of Nutrition and Dietetics and American College of Sports Medicine indicate that athletic performance and recovery is enhanced by optimal nutrition. In order to develop effective nutritional interventions, dietitians must first recognize the misconceptions of the current student-athletes. **PURPOSE:** The purpose of this study was to identify common nutritional misconceptions amongst student-athletes. **METHODS:** A questionnaire was developed, based on previous studies, that was privately completed by 321 respondents (age: 18.3±0.8 years old, 80.2% freshman) during incoming preparticipation physical examinations between 2010 – 2012. **RESULTS:** The overwhelming majority of respondents (91%) had received formal academic nutritional education in high school or college. The respondent's most common sources of nutritional information was the "Team Coach" (59.4%) followed by their Athletic Trainer (56.8%) and the "Internet" (55.6%). Many food items were mischaracterized by respondents such as baked beans as high in fat (53.5%), cheese is low in protein (52.8%), and that eggs are high in fiber (38.9%). Further, large numbers of respondents did not know what the recommended total daily caloric intake for fat (41.7%), protein (30.3%), or fiber (34.1%) should be. Additional misconceptions included the belief that vitamins and minerals increase energy level (70.8%), protein is the primary source of energy for the muscles (73.4%), and that sweets should not be eaten before an athletic event (68.0%). **CONCLUSION:** The results of this study suggest substantial nutrition misconceptions persist despite the almost all respondents having received formal nutrition education. Sports medicine clinicians who provide nutrition related information should consider beginning with basic nutrition recommendations and addressing these common misconceptions.

COMMON NUTRITION MISCONCEPTIONS AMONGST NCAA STUDENT-ATHLETES

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EFFECTS OF 75 VERSUS 150% FLUID REPLACEMENT ON SUBSEQUENT MORNINIG HYDRATION STATUS AND 10-KM RUNNING PERFORMANCE

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This study examined the effects of fluid replacement volume between running bouts. Following a moderate intensity 75 min evening run (WBGT = ~27 °C), runners (n = 13; age = 37 ± 12 y; VO2max = 63.3 ± 4.5 ml/kg/min) replaced 75% (1637 ± 372 mL) or 150% (3099 ± 850 mL) of sweat losses with a combination of water, sport beverage, and orange juice and consumed a standardized dinner and breakfast. The following morning, runners completed a 10-km time trial (WBGT = ~23 °C) on a rigorous outdoor course. Urine voids were collected between runs and urine specific gravity (USG) was assessed pre-run. High and low fluid replacement volumes resulted in a significant difference (P = 0.02) in pre-run body mass (75% = 69.6 ± 9.2; 150% = 70.1 ± 9.3 kg) and USG (75% = 1.026 ± 0.005; 150% = 1.014 ± 0.007; P < 0.001). Average heart rate (168 ± 14 vs. 168 ± 12 bpm) and intestinal temperature were not significantly different (P > 0.05) between treatments (pre-run = 37.10 ± 0.43 vs. 37.08 ± 0.25 °C; post-run = 39.08 ± 0.52 vs. 39.00 ± 0.70 °C) for 75% and 150% respectively. Despite finishing 2.9 ± 2.5% faster (75% = 47.28 ± 6.64; 150% = 45.93 ± 6.04 min; P = 0.001), session RPE was lower (P = 0.02) for 150% (7.5 ± 1.3) versus 75% (8.4 ± 0.9) trials. Fluid replacement equaling 75% of sweat loss is inadequate to maintain optimal running performance between an evening and morning run in the heat. However, copious urine production and reported difficulties in consuming 150% of sweat losses suggests an alternate fluid intake prescription below 150% may be ideal.

THE EFFECT OF ACUTE BEETROOT JUICE SUPPLEMENTATION ON MUSCLE FATIGUE IN KNEE EXTENSOR EXERCISE

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PURPOSE: The effect of acute beetroot juice supplementation (providing 8.0mMol/day of inorganic nitrate) on the rate of resistance exercise fatigue as measured by changes in peak torque, was investigated. **METHODS:** In a placebo-controlled, double-blind, cross-over study, 35 recreationally active subjects consumed beetroot (BR) juice or placebo (PL: isocaloric/isonitrogenous black currant beverage) 12 and 2.5 hours before the fatiguing exercise procedure. Peak torque was measured on the BIODEX dynamometer by performing 50, maximal effort, concentric (CON) knee extensions at 90°/s. The change in peak torque over time was used as a fatigue index. Peak torque was averaged over 5 consecutive contractions and then expressed as a percentage. Blood pressure (BP) was recorded before and after exercise. **RESULTS:** There was no significant difference between BR and PL in the rate of fatigue over 50 contractions. By stage 3 (11th-15th reps) subjects retained 87.6±6.9% of their strength with BR and 86.7±6.3% with PL. Results for stages 6 (26th-30th) and 10 (46th-50th) were as follows: BR 64.1±11.4 vs. PL 63.2±11.7 %, BR 47.9±12.6 vs. PL 46.9±12.9%, respectively. No significant differences between BR and PL in resting BP (systolic or diastolic) were observed before fatiguing exercise. After fatiguing exercise, diastolic BP (BR 67.2±9.8 vs. PL 64.5±7.9mmHg, p < 0.05) and MAP (BR 91.6±9.3 vs. PL 88.8±8.2mmHg, p < 0.05) were both increased with BR supplementation differing from PL group. **CONCLUSION:** The outcome of the present study suggested that acute bouts of beetroot juice supplementation had no significant effect on knee extensor muscle fatigue measured during isokinetic contractions.

EXOGENOUS SUPPLEMENTATION OF MELATONIN DOES NOT AFFECT 20 MILE CYCLING TIME TRIAL PERFORMANCE

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PURPOSE: While some studies suggest that melatonin may improve athletic performance in hot humid environments due to its precooling effect, melatonin is consumed as a sleep aid due to its depressive effects on the central nervous system leading to the question of whether melatonin is a viable aid to performance. This study was conducted to determine whether taking a 5 mg supplement of melatonin affected performance of a laboratory simulated 20 mile cycling time trial. **METHODS:** Subjects (n = 7; VO2 max = 62.5 ± 5.2 ml/kg/min), performed three 20 mile time trials separated by a minimum of 7 days each on an electronically braked cycle ergometer. During the final two trials subjects received either a placebo or a 5 mg melatonin supplement 15 min prior to exercise in a double blind crossover design. Variables were measured at five mile intervals. **RESULTS:** Mean 20 mile time trial completion times for the melatonin (62.54 ± 4.99 min) and placebo (62.53 ± 5.73 min) trials were not different (P = 0.991). Mean time trial power output for the melatonin (205.6 ± 37.5 watts) and placebo (207.0 ± 42.8 watts) trials were not different (P = 0.820). Rectal temperature was not significantly affected compared with placebo (P = 0.505). **CONCLUSIONS:** These results suggest that a 5 mg melatonin supplement administered 15 min prior to exercise does not measurably impact performance of a 20 mile time trial. Any impact of melatonin on cycling performance may occur at a larger dose or at a different consumption time relative to the onset of exercise.

24-H FLUID BALANCE FOLLOWING A 1 H RUN IN COLLEGE AGE RUNNERS

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Empirical evidence documenting between exercise bout fluid kinetics for runners in their natural environments is sparse. The purpose of this study was to describe fluid consumption, beverage choice, and retention of fluids ingested over a 24-h period post-run. Seven women and 12 men who were members of either a collegiate cross country team or a college running club ran laps for 1 h during the late afternoon on a challenging outdoor road course at a self-selected pace (5.3 ± 0.9 min/km; dry = 23.8 ± 3.9 °C; relative humidity = 55 ± 13%). Water (W) was provided during the run. W and a variety of chilled sodas (S), diet sodas (DS), fruit juices (FJ), caloric (CSB) and non-caloric sport beverages (NSB) were provided to runners in plastic bottles immediately post-run and again the following morning. Fluid intake was assessed by measuring change in bottle mass for hours 0-1, 1-12, and 12-24 post-run. Urine volume was assessed from post-run to 12 h and 12-24 h. Sweat losses equaled 1374 ± 422 mL (2.0 ± 0.5% of body mass). Runners consumed 228 ± 178 mL of W during their run and an additional 1025 ± 250 mL within 1 h post-run. Cumulative fluid consumption equaled 3876 ± 1133 mL with 37% of fluid ingested lost through urine voids (1450 ± 678 mL). W and CSB equaled 34 ± 26% and 34 ± 19% of post-run fluid intake respectively followed by FJ (13 ± 17%), S (12 ± 16%), NSB (7 ± 16%) and DS (1 ± 3%). Fluid balance based on intake and urine production equaled -1147 ± 485 mL post-run, 554 ± 669 mL at 12 h, and 1186 ± 735 mL at 24 h. Urine specific gravity remained unchanged (p = 0.33) from pre-run (1.018 ± 0.008) to hour 12 (1.021 ± 0.009) and hour 24 (1.017 ± 0.010). Only 3 runners had a negative fluid balance (< 350 mL) at 12 h and 1 runner (< 250 mL) at 24 h. These results suggest college age runners will rehydrate adequately ad libitum by 12 h under conditions similar to this study when a variety of beverages are readily available.

VARIAIBILITY OF GLUTATHIONE IN WHOLE BLOOD FROM DAY TO DAY

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Glutathione is a key regulatory molecule for controlling oxidative stress and inflammation. The reduced form of glutathione (GSH) helps regulate redox compounds and influences cellular metabolism/cell survival. The oxidized form (GSSG) is used to indicate oxidative stress. Whole blood glutathione is often determined without knowing the variability of this measure from day to day. It is not currently known if time of day would influence the amount or form of glutathione within RBC. **PURPOSE:** This study determined if time of day influenced resting glutathione concentration, its form and ratio to ascertain if values are stable within individuals. **METHODS:** Twelve apparently healthy resistance trained males (24.6 ± 3.0 yrs) reported to the laboratory in a post absorptive state at various times of the day (7 times) within 4 weeks at least 72 hrs between conditions without having strenuously exercised for at least 24hrs before each visit. Subjects were instructed to reproduce their diets from the first visit. Subjects rested at least 30 minutes after arriving in the laboratory. Blood samples were obtained by vacutainer and immediately processed to stabilize the whole blood glutathione. Extracts were centrifuged, filtered and then determined by HPLC and compared to standards. All samples were determined at least in duplicate. Data was analyzed by SPSS v 19. **RESULTS:** GSH varied across individuals over time ranging from .51-2.11 mM. Values varied within individuals (28-48%). GSSG also varied over time at rest within an individual. Since the amount of GSSG was a very small fraction (generally < 5%) this resulted in as much as a 5 fold difference between visits. In contrast the ratio of GSSG/TGSH was more stable over time across visits within (1-2%) and between (2-4%) subjects at rest. **CONCLUSIONS:** These results indicate that GSH and GSSG concentration can differ based on time of day and across different visits. These results suggest that GSSG/ TGSH was more stable than the concentrations of GSH and GSSG.

P145**THE RELATIONSHIP BETWEEN CHILDREN'S ENVIRONMENTAL ACCESS TO PHYSICAL ACTIVITY OPPORTUNITIES AND PHYSICAL ACTIVITY LEVELS TO WEIGHT STATUS**

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According to the CDC (2012) more than one third of children (2 to 19 years) in the US are overweight or obese. Previous research shows that youth physical activity (PA) levels and children's environments in terms of access to PA opportunities affect a child's weight status. The purpose of this study was to examine the relationship of home and recreational PA opportunities and participation in daily PA to a child's current weight status. 157 3rd-6th (age 10.3 yrs ± 1.3) graders enrolled in a rural elementary school served as the target population for this study. Height and weight were measured and participant's BMI percentiles were classified according to the CDC age- and sex-specific BMI cutoff points. Objective measures of PA behavior were obtained using Actical Accelerometers. Participants completed a series of single items designed to measure social and physical environmental determinants of PA behavior (access to sporting and/or fitness equipment at home, access to play areas, safety, and involvement in community PA organizations). Results showed that participants average BMI was in normal range, 21.8 ± 6.6 and a mean BMI percentile of normal weight status 71.9th percentile. Children averaged 71.12 ± 38.99 minutes of moderate, 18.65 ± 23.69 minutes of vigorous, 267.11 ± 119.80 minutes of light activity and 1045.80 ± 167.29 minutes of sedentary activity per day. The step-wise linear regression determined that MVPA ($p=.016$), and sedentary activity ($p=.016$) were significantly related to weight status. This study indicated that the physical inactivity, as well as, the amount of MVPA significantly related to the children's weight status. Interventions should target reducing sedentary behavior as well as promoting MVPA for this population.

P146**CONDUIT ARTERY ADAPTATIONS TO TRAINING IN NOVICE MARATHON RUNNERS**

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The effects of 15 weeks of run training on brachial and popliteal (local) as well as carotid (systemic) conduit artery remodeling were investigated in first time marathon runners. Intima-media thickness (IMT), arterial wall thickness, lumen diameter, and total arterial diameter were assessed in college-aged males and females, before and after marathon training (M; n = 14) and compared to untrained, age-matched controls (C; n = 12). Arterial dimensions were measured with ultrasonography. Pre and post-training, VO₂max and running speed at 3.5mmol lactate were measured in the M group. VO₂max was unaltered, but running speed increased from 7.8 ± 0.7 mph to 8.2 ± 0.9 mph ($p < 0.01$). A group x time interaction was observed for the brachial and popliteal measures ($p < 0.05$), but not in the carotid. No pre-post differences were observed in group C. In group M, training reduced wall thickness in the brachial (pre = $0.99 \pm .16$ mm; post = 0.84 ± 0.10 mm; $p < 0.01$) and popliteal (pre = 0.96 ± 0.09 mm; post = 0.86 ± 0.11 mm; $p < 0.01$) arteries, characterized, in part, by a 0.07mm decrease in brachial IMT ($p < 0.05$) and no change in popliteal IMT. Lumen diameter increased in the brachial (pre = 3.38 ± 0.35 mm; post = 3.57 ± 0.41 mm; $p < 0.05$) and popliteal (pre = 4.73 ± 0.48 mm; post = 5.11 ± 0.72 mm; $p < 0.01$) arteries. Increased lumen diameters and reduced wall thicknesses translated to no change in total vessel diameters. These data suggest that arterial remodeling in response to first-time marathon training favors increased local blood flow and perfusion in the active muscles.

P147**ASSOCIATION BETWEEN SERUM - SALIVARY CORTISOL RESPONSES TO VARYING INTENSITIES OF EXERCISE IN ENDURANCE-TRAINED MALES**

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PURPOSE: The association between serum and salivary cortisol (C) responses to varying exercise intensities was examined in endurance-trained males. **METHODS:** Subjects (n = 19, maximal oxygen uptake [VO₂max] = $4.24 + 0.83$ L/min, completed four trials all on separate days; rest for 30 min (control), cycle exercise for 30 min at low (40%, VO₂max), moderate (60%, VO₂max), and high (80%, VO₂max) intensities. For the analysis of C, serum and saliva samples were collected pre-trial, immediately post-trial, and 30 minutes into the recovery from each trial. The order of experimental trials was counter-balanced. Data were analyzed using Pearson correlation and repeated measures ANOVA. **RESULTS:** Immediately after moderate and high intensity exercise, C responses increased significantly ($p < 0.05$) for both serum and saliva. Peak serum C levels, occurred immediately post-exercise, while peak salivary C occurred 30 minutes into recovery. The association between serum and salivary C across all trials yielded a significant relationship ($r = 0.72$; $p < 0.001$). A scatterplot displayed that changes in the matched pairs of salivary and serum C measures were similar in magnitude at low and moderate concentrations, but at higher concentrations the relationship was weakened and more variable. **CONCLUSION:** A significant association exists between salivary and serum C concentrations. However, at high concentrations in the physiological range, as induced by intense exercise, there is a large degree of variance between serum and salivary C responses. Also, peak salivary C responses to exercise occur later than those in serum, which may relate to a prolonged diffusion time of C from the blood into saliva.

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CASE REPORT: MITOCHONDRIAL RESPONSES AFTER ENDURANCE ELECTRICAL STIMULATION TRAINING IN PERSONS WITH SPINAL CORD INJURY

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D1

INTRODUCTION: Spinal cord injury (SCI) results in many changes to skeletal muscle, including a reduction in mitochondrial capacity. Current therapies for persons with SCI involve electrical stimulation (ES) of paralyzed muscle. Mitochondrial responses to a twitch ES endurance training protocol have not been tested previously. **METHODS:** One male participant with SCI (C5-C6, AIS A) completed 12 weeks of ES on the quadriceps muscles. Frequency of ES, duration of training sessions, a number of training sessions per week, progressively increased based on visual observation of muscle fatigue. The initial training session was at 2 Hz for 10 minutes and increased to 7 Hz for 75 minutes after 12 weeks. Near-infrared spectroscopy (NIRS) was used to measure muscle oxygenation recovery kinetics (mVO₂max) as an assessment of mitochondrial capacity pre and post training. **RESULTS:** Pre NIRS measured mVO₂max was 0.52 min⁻¹. Post measurements of mVO₂max were performed three times and were 1.43, 1.46, and 1.40 min⁻¹. **DISCUSSION:** After 12 weeks of electrical stimulation training, mitochondrial capacity increased 3-fold. There was qualitative evidence of fatigue resistance and faster wound healing rates during ES training. Future research using bigger sample sizes will be needed to determine the effects of endurance training on mitochondrial capacity and leg health in the SCI population.

OBJECTIVELY MEASURED TOTAL ACCELEROMETER COUNTS AND MVPA: RELATIONSHIP WITH BIOMARKERS USING 2003 – 2006 NHANES

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D2

PURPOSE: To compare the associations of objectively measured moderate-to-vigorous physical activity (MVPA) and total accelerometer counts with biomarkers in a representative sample of U.S. adults. **METHODS:** Data from the 2003 – 2006 NHANES were used for this analysis. The sample included adults ≥ 20 y, not pregnant or lactating, who had self-reported PA and ≥ 4 d of accelerometer data with ≥ 10 h wear time (N = 5668). MVPA was defined as the mean minutes with counts ≥ 2020 using a 10-min bout criterion on valid days. Total accelerometer counts represented the mean counts acquired on valid days. Biomarkers included: blood pressure, body mass index (BMI), waist circumference, triceps and subscapular skinfolds, total cholesterol, triglyceride, glycohemoglobin, plasma glucose, C-peptide, insulin, C-reactive protein, and homocysteine. Age-adjusted linear regressions were conducted in which each biomarker was regressed on MVPA and total accelerometer counts per day independently. **RESULTS:** Of the 16 biomarkers, 12 were significantly associated with MVPA and 13 with total accelerometer counts per day. When compared to MVPA, total accelerometer counts per day displayed stronger associations with the following biomarkers: BMI, triceps skinfolds, triglycerides, C-peptide, insulin, C-reactive protein, and homocysteine (adj. Wald F = 1.9 – 171.89, P < 0.05 – 0.0001). **CONCLUSIONS:** Total accelerometer counts per day were more robustly associated with various biomarkers than MVPA. Thus, using total accelerometer counts per day may provide a better estimate of the strength of the relationship between PA and some biomarkers.

ELEVATED NADPH OXIDASE ACTIVITY LINKS ENDOTHELIAL DYSFUNCTION TO ROS IN OBESE HUMAN SKELETAL MUSCLE

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D3

Purpose: Excessive production of reactive oxygen species (ROS) contributes to the development of endothelial dysfunction, which is observed in several obesity associated diseases. The contribution of NADPH oxidase to skeletal muscle extracellular ROS and microvascular endothelial function was assessed. **Methods:** Three microdialysis probes were inserted into the vastus lateralis of young, sedentary lean (n=7) and obese (n=6) individuals, allowing for sampling of extracellular fluid. To measure ROS, probes were perfused with saline containing 5 mM ethanol, 100 μ M Amplex Ultrared, 1 U/ml horseradish peroxidase, and 10 U/ml superoxide dismutase in the presence and absence of 300 μ M apocynin (Apo), an NADPH oxidase inhibitor. Dialysate fluorescence was measured at the outlet. Endothelial function was assessed with addition of acetylcholine (ACh) to the perfusate and analysis of the ethanol outflow:inflow ratio, which was converted to blood flow units. **Results:** Extracellular ROS was 6-fold higher in obese compared to lean (4.91 ± 1.78 vs. 0.79 ± 0.21 nM, p < 0.01). Apo blocked 93% (obese) and 71% (lean) of ROS measured. ACh-stimulated blood flow was lower in the obese than lean group (16.5 ± 3.7 vs. 44.6 ± 4.5 ml/(100g*min), p < 0.001), while Apo augmented ACh-stimulated flow only in the obese group (O: 30.2 ± 10.4 vs. L: 30.9 ± 8.2 ml/(100g*min), p = 0.07). **Conclusions:** The substantial elevation in ROS in obesity was predominantly driven by NADPH oxidase. Microvascular endothelial dysfunction was evident in obesity, which was partially restored by NADPH oxidase inhibition. Supported by a doctoral student grant from the American College of Sports Medicine.

CACHECTIC SKELETAL MUSCLE RESPONSE TO A NOVEL BOUT OF LOW FREQUENCY STIMULATION

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D4

Cachexia is a condition of skeletal muscle wasting associated with an underlying disease. It is commonly associated with a loss in muscle function. While we have demonstrated exercise training benefits related to cachexia-induced muscle and body weight loss, the cachectic muscle's response to an acute bout of exercise is unknown. **PURPOSE:** The purpose of this study was to determine if cachectic mice are able to respond to an acute bout of low frequency muscle stimulation (LoFS). **METHODS:** Cachectic ApcMin/+ (Min) and wild type (WT) mice had the left leg undergo a simulated endurance exercise bout, while the right leg served as the intra-animal control. The sciatic nerve was stimulated for one second at 10Hz every other second for thirty minutes. Mice were sacrificed 3h after completion of the protocol. **RESULTS:** Min mice exhibited a $13.8 \pm 2.9\%$ decrease in body weight from peak weight and gastrocnemius muscle mass was significantly reduced compared to WT mice (p < 0.001). Volitional strength was decreased in Min mice 73% compared to WT mice. At baseline muscle Glut4 mRNA was decreased 1.6 fold in Min mice. LoFS increased muscle Glut4 mRNA 3h post exercise in both WT mice and Min mice. Stimulation increased muscle p-AMPK in both the WT and the Min mice (p < 0.01); however the Min mice had higher p-AMPK prior to exercise (p < 0.001). Muscle cytochrome c protein was increased 1.5 fold after stimulation in WT mice, but this effect was not present in Min mice. **CONCLUSION:** Cachectic mice respond to an acute exercise stimulus at the transcriptional and metabolic signaling levels; however, cachexia may alter the acute exercise response at the level of protein translation.

THE REPRODUCIBILITY OF 31P MRS AND NIRS METHODS TO EVALUATE SKELETAL MUSCLE MITOCHONDRIAL FUNCTION

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D5

Muscle mitochondrial function has been measured using both 31P magnet resonance spectroscopy (31P MRS) and near infrared spectroscopy (NIRS). The aim of our research was to compare the absolute values and reproducibility of these two methods in healthy adults. Five subjects (age = 22.9 ± 1.4 years) were tested on two separate days, two sessions per day 90 minutes apart, and twice in each session. Twitch ES (4 Hz) of the medial gastrocnemius/soleus muscles was used to increase muscle oxygen consumption ($m\dot{V}O_2$). 31P MRS used a 3T multinuclear magnet to measure the rate of phosphocreatine resynthesis after muscle activation. NIRS used short duration transient arterial occlusions after muscle activation to measure the rate of recovery muscle oxygen consumption ($m\dot{V}O_{2max}$). The PCr rate constant had a coefficient of variation (CV) of 7.6% for each test and 2.6% for between days. The NIRS rate constant had a CV of 8% for each test and 7.1% between days. There were no significant differences between PCr ($1.73 \pm 0.37 \text{ min}^{-1}$) and NIRS rate constants ($2.24 \pm 0.42 \text{ min}^{-1}$) ($p = 0.09$). These results suggest that both methods could be used in research or clinical trials designed to monitor skeletal muscle mitochondrial function. Supported in part by NIH R01 HD039676 and Biogen IDE.

EFFECT OF AN ACUTE BOUT OF MODERATE-INTENSITY AEROBIC EXERCISE ON NATURAL KILLER CELL COUNTS IN BREAST CANCER SURVIVORS

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D6

PURPOSE: To examine the effect of a bout of moderate-intensity aerobic exercise on natural killer (NK) cell counts in 9 women who were 3-6 months post-treatment for breast cancer (breast cancer survivor) and 9 women without a history of cancer diagnosis or treatment (control). METHODS: Subjects completed 30 minutes of aerobic exercise on a cycle ergometer at a workload corresponding to 60% of $\dot{V}O_{2peak}$. Blood samples were obtained pre-exercise, immediately post-exercise, 2 hours post-exercise, and 24 hours post-exercise. Complete blood counts were obtained at each time point to assess total lymphocyte counts. Proportions of lymphocytes that carry the NK cell phenotype were obtained via flow cytometric analysis. Absolute NK cell counts (total lymphocyte counts multiplied by NK cell proportions) were compared between study groups and across time using ANOVAs. RESULTS: Pre-exercise NK cell counts were somewhat higher in the control group ($p=0.089$). Immediately post-exercise, NK cell counts were significantly elevated in both groups ($p<0.02$) and were significantly higher in the control group when compared to the breast cancer survivor group ($p=0.041$). At 2 hours and 24 hours post-exercise, NK cell counts were not significantly different from pre-exercise levels in either group ($p>0.05$). Additionally, NK cell counts were not significantly different between groups at 2 hours and 24 hours post-exercise ($p>0.05$). CONCLUSIONS: The results suggest that recent breast cancer survivors and control women may have a similar immune response to and recovery from acute moderate-intensity aerobic exercise. Supported by UNC Lineberger Comprehensive Cancer Center and the Petro Kulynych Foundation.

TREADMILL RUNNING INFLUENCES POLYP BURDEN AND IMMUNE REGULATION IN THE ApcMin/+ MOUSE MODEL OF INTESTINAL TUMORIGENESIS

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D7

BACKGROUND: Many observational epidemiologic studies suggest an association between exercise and colon cancer risk. However, there is a lack of controlled experimental studies that examine this relationship and the mechanisms involved. We examined the effects of exercise on tumorigenesis and immune regulation in the ApcMin/+ mouse model of colon cancer. METHODS: Male ApcMin/+ mice were randomly assigned to either sedentary (Sed) or exercise (Ex) treatment ($n=6-8/\text{group}$). The exercise treatment consisted of daily treadmill running for 1hr/day at 18m/min from 4wks of age until 18 wks of age. Intestinal polyps were counted and categorized by size. Mucosal tissue was analyzed for mRNA expression of overall macrophages as well as M2 (pro-tumor) macrophages. Mesenteric lymph nodes (MLN) and spleen were analyzed for helper T cells (Th), cytotoxic T cells (Tc) and regulatory T cells (Tregs), as well as macrophages using FACS. RESULTS: While there was no significant difference in overall polyp number between the groups (Sed: 23.3 ± 4.3 and Ex: 16.5 ± 4.3), Ex did have a reduction in the number of large polyps (Sed: 6.1 ± 1.1 and Ex: 3.0 ± 0.6) ($P<0.05$). This was consistent with a decrease in spleen weight ($P<0.05$). Similarly, Ex reduced mRNA expression of macrophages and in particular M2 (pro-tumor) macrophages in the mucosal tissue ($P<0.05$). Tregs and macrophages were reduced with Ex in both the spleen and MLN. In contrast Th and Tc were increased in the spleen but not the MLN. CONCLUSION: These data provide strong support for a beneficial effect of regular exercise training on colon cancer progression. These benefits of exercise are likely mediated, at least in part, through regulation of immune cell populations that are known to influence cancer progression. This work was supported by a grant from the American Institute of Cancer Research to E.A.M.

RAPAMYCIN EXACERBATES STRENGTH DEFICITS AFTER ECCENTRIC CONTRACTION-INDUCED SKELETAL MUSCLE INJURY

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D8

PURPOSE: FKBP12 binds to the sarcoplasmic reticulum (SR) Ca^{2+} release channel [ryanodine receptor (RyR1)], and may affect SR Ca^{2+} release and strength deficits related to exercise-induced muscle injury. The purpose of this study was to determine if strength deficits following a bout of eccentric contractions in mice are altered by drugs (synthetic ligand of FKBP [SLF] and rapamycin [RAP]) known to interfere with FKBP12-RyR1 binding. METHODS: Anterior crural muscle isometric torque (20-300 Hz) was assessed before, immediately after, 3, 7, and 14-d following a single bout of 150 eccentric contractions. Mice received daily injections of 1.0 $\mu\text{g}/\text{kg}$ BW SLF, 1.5 mg/kg BW RAP or saline (0.9%) for duration of the study. RESULTS: Torque detriments across the eccentric contractions were greater in RAP ($60.1 \pm 2.0\%$) compared to SLF ($51.6 \pm 0.8\%$) and saline ($51.6 \pm 1.5\%$). Reductions in isometric torque (20-300 Hz) immediately post and 3-d after injury were not significantly different among the groups. At both low and high stimulation frequencies (e.g., 20 and 200 Hz), RAP exacerbated torque deficits compared to saline at 7- (20 Hz: 60.2 ± 6.5 vs. $24.2 \pm 12.0\%$; 200 Hz: 40.3 ± 4.6 vs. $22.3 \pm 2.4\%$) and 14-d (20 Hz: 35.8 ± 3.1 vs. $+9.6 \pm 13.8\%$; 200 Hz: 28.8 ± 2.6 vs. $11.8 \pm 4.5\%$). Torque deficits were not different between SLF and saline. CONCLUSION: RAP increases strength deficits transiently during a bout of eccentric contractions and slows recovery of isometric strength. Supported by NIH grant R01 AR041802.

LEFT VENTRICULAR HYPERTROPHY ACROSS THE LIFESPAN IN PHYSICALLY ACTIVE AND SEDENTARY MICE

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M1

Intro: Left ventricular (LV) structure is known to change in response to aging. Additionally, physical activity is known to attenuate these age-associated cardiac changes. **Purpose:** The purpose of this study was to determine the differing age periods for alterations in LV structure with running and sedentary C57B1/6J mice. **Methods:** Thirty C57B1/6J mice, fifteen male and fifteen female, were placed in individual cages at eight weeks of age and monitored up to 24 mo of age (~ 90% of lifespan). Fifteen mice (eight males and seven females) were housed in cages that included running wheels, magnetic sensors and a digital odometer (RUN). Activity was recorded (running distance, duration and speed) each day. The remaining fifteen mice were housed in cages without a wheel (SED). Every four weeks left ventricular structure was imaged using 2D M-mode echocardiography and Doppler ultrasound with a SONOS 5500 ultrasound and 15-6L ultrasound probe. **Results:** LV end-diastolic dimension, posterior wall thickness and thickness-to-radius ratio was different between the RUN and SED mice throughout the first half of the lifespan ($p=0.020$, $p<0.0001$, and $p<0.0001$; respectively). Differences in LV characteristics were observed at 6 mo of age. All LV characteristics significantly increase throughout the first half of the lifespan. Throughout the second half of the lifespan, LV posterior wall thickness, thickness-to-radius ratio, and LV mass are significantly greater in the SED mice ($p<0.0001$, $p<0.0001$, $p=0.017$), with the LV thickness-to-radius ratios becoming similar between the groups at 20 mo of age. **Conclusion:** By 6 mo of age there is a difference in the LV characteristics suggesting the development of left ventricular hypertrophy (LVH) by the first quarter of the lifespan in C57B1/6J mice. Also, near the end of the lifespan the LVH characteristics become similar in the two groups, most likely due to the low activity levels of the RUN mice.

Funded by the University of North Carolina Faculty Research Grant Program

EXOGENOUS SUPPLEMENTATION OF MELATONIN DOES NOT AFFECT 20 MILE CYCLING TIME TRIAL PERFORMANCE

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M2

PURPOSE: While some studies suggest that melatonin may improve athletic performance in hot humid environments due to its precooling effect, melatonin is consumed as a sleep aid due to its depressive effects on the central nervous system leading to the question of whether melatonin is a viable aid to performance. This study was conducted to determine whether taking a 5 mg supplement of melatonin affected performance of a laboratory simulated 20 mile cycling time trial. **METHODS:** Subjects ($n = 7$; $VO_2 \text{ max} = 62.5 \pm 5.2 \text{ ml/kg/min}$), performed three 20 mile time trials separated by a minimum of 7 days each on an electronically braked cycle ergometer. During the final two trials subjects received either a placebo or a 5 mg melatonin supplement 15 min prior to exercise in a double blind crossover design. Variables were measured at five mile intervals. **RESULTS:** Mean 20 mile time trial completion times for the melatonin ($62.54 \pm 4.99 \text{ min}$) and placebo ($62.53 \pm 5.73 \text{ min}$) trials were not different ($P = 0.991$). Mean time trial power output for the melatonin ($205.6 \pm 37.5 \text{ watts}$) and placebo ($207.0 \pm 42.8 \text{ watts}$) trials were not different ($P = 0.820$). Rectal temperature was not significantly affected compared with placebo ($P = 0.505$). **CONCLUSIONS:** These results suggest that a 5 mg melatonin supplement administered 15 min prior to exercise does not measurably impact performance of a 20 mile time trial. Any impact of melatonin on cycling performance may occur at a larger dose or at a different consumption time relative to the onset of exercise.

GENDER DIFFERENCES IN HIGH SENSITIVITY C-REACTIVE PROTEIN AND SELF-REPORTED MUSCLE STRENGTHENING ACTIVITY AMONG U.S. ADULTS

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M3

PURPOSE: To examine the gender differences between high sensitivity C-reactive protein (CRP) and muscle strengthening activity (MSA) in a nationally representative sample of U.S. adults. **METHODS:** Sample ($n=4,998$) included adults (>20 years of age) that participated in the 1999-2004 National Health and Nutrition Examination Survey. Three categories of MSA participation were created: no MSA (referent group), some MSA (>1 to <2 days/week), and meeting the 2008 Department of Health and Human Services (DHHS) recommendation (>2 days/week). The dependent variable was elevated CRP ($3 < \text{CRP} < 10 \text{ mg/L}$). Logistic regression models were adjusted for age, race, smoking status, low-density lipoprotein cholesterol, diabetes, and waist circumference (WC). **RESULTS:** Gender stratified analysis revealed significantly lower odds of having elevated CRP for women reporting some MSA (OR 0.62; 95% CI 0.41-0.93, $p=0.0210$), or volumes of MSA meeting the recommendation (OR 0.67; 95% CI 0.53-0.86, $p=0.0019$). Significantly lower odds of men having elevated CRP was observed in those reporting MSA volumes meeting the recommendation (OR 0.76; 95% CI 0.58-1.00, $p=0.0478$). Following adjustment for WC these associations were no longer significant. **CONCLUSIONS:** Women reporting any MSA were found to have significantly lower odds of having elevated CRP when compared to those reporting no MSA. However, significantly lower odds in men were only observed in those meeting the DHHS recommendation. These results suggest that WC may mediate the associations between MSA and CRP. Future studies should examine the associations among MSA, CRP, and other markers of metabolic health.

REPRODUCIBILITY OF SKELETAL MUSCLE OXIDATIVE FUNCTION USING NEAR-INFRARED SPECTROSCOPY

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M4

Near-infrared spectroscopy (NIRS) is a non-invasive method of measuring muscle oxygenation and hemodynamics in skeletal muscle. **PURPOSE:** To assess the reproducibility of measuring resting blood flow, resting oxygen consumption, mitochondrial capacity, and reactive hyperemia rate in skeletal muscle using NIRS. **METHODS:** Four healthy participants (2 male, 2 female) were tested on two occasions within a 3-day period. The NIRS device was placed on the medial gastrocnemius and venous and arterial occlusions were performed in order to obtain the resting blood flow and oxygen consumption. A series of repeated arterial occlusions was used to measure the recovery kinetics of muscle oxygen consumption after 7 seconds of voluntary plantar flexion exercise. **RESULTS:** Resting blood flow and oxygen consumption had a mean coefficient of variation (CV) of 30.2% (mean ICC = 0.66) and 10.5% (mean ICC = 0.83) respectively. The recovery time constant of oxygen consumption had a mean CV of 10.7% (mean ICC = 0.98). **CONCLUSIONS:** These results suggest that measurements of resting blood flow and oxygen consumption using NIRS can be obtained with good reproducibility and reliability.

MINIMAL DETECTABLE CHANGE SCORES IN SCAPULA UPWARD ROTATION

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M5

Recently the importance of scapular upward rotation in relation to chronic shoulder pathology has been highlighted. However, the minimal detectable change (MDC) of scapular upward rotation has not been established, limiting the interpretability of the change scores of measurements. PURPOSE: Therefore, the purpose of this study was to calculate the MDC of scapular upward rotation at 4 angles. METHODS: Seventeen male subjects (Age: 22.4±2.9 years old; Height: 176.5±7.2 cm; Weight: 75.6±10.8 kg), without a history of shoulder pathologies, participated in the study. Static scapular upward rotation was measured three times per day for three days on the dominant arm with a digital protractor while subjects were at rest (0°) and at 60°, 90° and 120° of humeral elevation in the scapular plane. The daily mean at each angle was used to calculate the MDC, as described by Stratford ($MDC_{95} = SEM \times 2 \times 1.96$). RESULTS: The intraclass correlation coefficients were excellent as all exceed 0.95. The mean scapular upward rotation was -0.39° at rest, 7.9° at 60°, 18.6° at 90°, and 31.6° at 120°. The MDC values were 1.04° at rest, 1.71° at 60°, 0.86° at 90°, and 1.82° at 120°. CONCLUSIONS: The measurement of scapular upward rotation has been suggested to be a critical component in the assessment of chronic shoulder pathologies such as impingement syndrome. The results of this study provide clinicians with baseline values for both normal scapular upward rotation positions as well as the MDC value for longitudinal tracking. Therefore, clinicians and researchers can investigate the changes in scapular upward rotation following either acute or chronic exercise or pathology and confidently identify the difference between normal daily variation and actual differences.

THE EFFECT OF AD LIBITUM HYDRATION ON COGNITIVE FUNCTION FOLLOWING EXERCISE IN THE HEAT

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M6

PURPOSE: To quantify the effect of three different hydration strategies on physiological responses and post-exercise cognitive function following exercise in the heat. METHODS: Twelve unacclimatized and recreationally active males (22.2 ± 2.4 yr) completed three 50 min cycling tests (60% VO_{2peak}) in the heat (32 C; 65% RH) with three hydration strategies: no fluid (NF), ad libitum (AL), and full fluid replacement to match sweat loss during NF (FR). Physiological responses were examined every 5 min. A cognitive battery assessing working memory, pattern recognition, perceptual speed, sustained attention, visual search and scanning speed, and executive function was administered pre- and post-exercise. RESULTS: Fluid loss during NF was greater than AL and FR (NF: 1.5 ± 0.6; AL: 0.3 ± 0.8; FR: 0.1 ± 0.3 % Body Mass; $p < 0.001$). Greater increases in core temperature, mean skin temperature, heart rate, rating of perceived exertion, and thermal sensation were observed after 35-50min with NF compared to AL and FR ($p < 0.05$). No differences in cognitive measures were observed between hydration strategies but overall mean response time decreased ($p < 0.05$) in post- vs. pre-exercise measures for perceptual speed, working memory, and pattern recognition. CONCLUSIONS: AL and FR were similar and more effective in mitigating thermoregulatory strain than NF. Moderate intensity exercise in the heat (with or without mild dehydration of < 1.5% body mass loss) enhances perceptual speed, pattern recognition, and working memory. Supported by a WMU Graduate Student Research Grant.

THE RELATIONSHIP BETWEEN HEART RATE VARIABILITY AND SHOOTING PERFORMANCE IN A TACTICAL PISTOL QUALIFIER.

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M7

PURPOSE: At rest and during a standardized competitive shooting match, autonomic response was examined in 28 healthy subjects for correlations to performance. METHODS: Heart rate variability (HRV), high frequency (HF), low frequency (LF), total power (TP), and inter-beat-interval (IBI) measured during shooting were subtracted from those measured during rest to produce Δ s. The shooting task involved several rapid tactical maneuvers. Time to completion and missed shots were recorded, and combined to form a score in which higher values indicated poor shooting performance. RESULTS: Shooting decreased IBI (i.e., increased HR) and LF. Match score was significantly correlated to Δ IBI ($r = -0.458$), Δ HF ($r = 0.467$), Δ LF ($r = 0.377$), Δ TP ($r = 0.392$). Inaccuracy was significantly correlated to Δ TP ($r = 0.416$) and Δ LF ($r = 0.376$). Time to completion was significantly correlated to Δ IBI ($r = -0.426$). A step-wise linear regression, found 39.4% of the variance in score was determined by the Δ IBI and Δ HF. CONCLUSION: Individuals with a greater decrease in IBI (greater increase in heart rate) performed better because they accomplished the match at a faster rate. Individuals with a lesser change in stress-related HRV measures (LF, HF, TP) performed better via improved accuracy. Δ LF, Δ HF, and Δ TP were independent of Δ IBI. HRV should be used to assess military and police performance under duress.

A COMPREHENSIVE AND COORDINATED APPROACH TO INCREASING CHILDREN'S PHYSICAL ACTIVITY IN AFTERSCHOOL PROGRAMS: A PILOT STUDY

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M8

PURPOSE: The purpose of this study was to evaluate the impact of strategies developed via a community-based participatory collaborative to achieve moderate-to-vigorous physical activity (MVPA) goals for elementary aged children in afterschool programs (ASPs). METHODS: Four large-scale YMCA ASPs serving ~500 children adopted MVPA goals in the Fall of 2011 that specified each child accumulate at least 30 minutes of MVPA/day during the ASP. The strategies consisted of detailing staff roles/responsibilities for promoting MVPA during scheduled activity time, professional development training, creating activity plans based on current games/activities offered, and ongoing technical assistance. Using a pre/post-assessment no control group design, implemented strategies were evaluated by measuring child MVPA via ActiGraph accelerometers. RESULTS: At baseline 13.9% of girls and 28.2% of boys met the MVPA goal, representing 17.7 and 22.9 minutes of MVPA/day, respectively. By post-assessment, 23.1% and 44.2% of girls and boys met the MVPA goal, representing 21.7 and 28.3 minutes of MVPA/day, respectively. This represented a 1.99 (95CI 1.13 to 3.39) and 2.12 (95CI 1.46 to 3.08) increase in the odds of meeting the standard for any day a girl and boy, respectively, attended the ASPs by post assessment. CONCLUSIONS: The strategies developed can lead to a sizeable increase in the proportion of children meeting MVPA standards in ASPs. Support by Grant #1R21HL106020.

PHYSICAL ACTIVITY, EXECUTIVE FUNCTION, AND SCHOOL READINESS IN YOUNG CHILDREN

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U1

Moderate-to-vigorous physical activity (MVPA) and executive function (EF), the ability to organize thoughts and make decisions, have been identified as contributors to cognitive ability and academic success in school-aged children. These associations have not been established in young children. **PURPOSE** To determine the influence of MVPA and EF on school readiness in young children. **METHODS** Participants were 30 preschool and kindergarten children (5.2±1.3 y). School readiness was evaluated using verbal (Bracken Basic Concept Scale Receptive; BBCS-R) and physical (Bracken Basic Concept Scale Expressive; BBCS-E) identification of concepts. EF was measured using the Head-Toes-Knees-Shoulders (HTKS) task, which requires children to remember rules and respond to commands. MVPA was assessed using a waist-mounted accelerometer (ActiGraph GT3X) and cut points determined by Pate et al. (2006). Correlations were calculated to identify associations between MVPA, HTKS, BBCS-R, and BBCS-E. Stepwise linear regression was used to examine the contribution of MVPA and HTKS to school readiness (BBCS-R and BBCS-E). **RESULTS** There was a significant, positive correlation between HTKS and BBCS-E ($r=0.40$, $p<0.05$). MVPA was significantly related to both BBCS-R ($r=0.422$, $p<0.05$) and BBCS-E ($r=0.429$, $p<0.05$). Regression analysis showed that MVPA accounted for approximately 18% of the variance in school readiness (BBCS-R $r^2=0.178$; $p<0.05$ and BBCS-E $r^2=0.184$; $p<0.05$). HTKS did not improve the regression model. **CONCLUSIONS** Results revealed that both MVPA and HTKS were significantly associated with school readiness. The MVPA and academic success have been documented in older children and appears to also be associated with greater school readiness in younger children. Funding provided by the UT KLAS Center Pilot and Feasibility Grant.

THE RELATIONSHIP BETWEEN PERCEIVED FITNESS STATUS AND PHYSICAL ACTIVITY LEVEL

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U2

Despite compelling evidence to the contrary, most American adults believe they are healthy. According to the Transtheoretical Model of Behavioral Change (TMBC), this mismatch between perception and reality of one's health may have significant repercussions. Specifically, the TMBC offers that the first step in changing one's behavior is to perceive that a problem exists. **PURPOSE:** The aim of this study was to evaluate the relationship between physical activity level and perceived fitness status in adults. **METHODS:** Forty-one adults (32 females; average age = 50.4 ± 7.22 years) completed a 7-day assessment of their daily physical activity using a validated pedometer. In addition, they were asked to rank their fitness level on a 10-point Likert Scale [1=not at all physically fit; 5=somewhat physically fit; 10=extremely physically fit]. Following accepted guidelines participants were stratified according to daily step count as sedentary (SED; < 5,000 steps), low active (LA; 5,000-7,499 steps), somewhat active (SA; 7,500-9,999 steps), or active (ACT; 10,000-12,499 steps). Two one-way ANOVA's were used to assess between-group differences in physical activity level and perceived fitness (PF) status. **RESULTS:** Significant differences in physical activity were noted between groups ($p < .01$). In addition, a significant difference in PF was evidenced between the SED (PF = 4.9) and SA individuals (PF = 7.1; $p = .03$), but no differences were observed between SED (PF = 4.9), LA (PF = 5.7) and ACT (PF = 7.0) individuals ($p's > .05$). **CONCLUSIONS:** Our results indicate that a discrepancy is present between PF status and physical activity level. It is unclear whether sedentary individuals are perceiving themselves as being more physically fit than they should be or, rather, if active individuals are perceiving themselves to be less fit. Based on the TMBC, a mismatch between perceived and actual fitness status may impede individuals from becoming more physically active.

RUNNERS UNDERESTIMATE SWEAT LOSSES IN TEMPERATE ENVIRONMENT RUN

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U3

Previous research from our laboratory has shown that runners underestimate their sweat losses by ~50% in hot and humid environments. The purpose of this study was to examine if these underestimations in sweat losses would be exhibited similarly in an environment more conducive to mitigating heat storage. Ten former or current collegiate cross-country runners (CC) and 10 runners from a recreational collegiate running club (RC) (men = 12, women = 8) ran at a self-selected pace for ~ 1 h on an outdoor road course during a spring afternoon (WBGT = 19.9 ± 3.0 °C). Following exercise, runners were asked to fill 8 oz race station paper water cups with an amount of water they felt represented their sweat losses. The cups were placed on a digital scale viewable to the participants. Runners were allowed to change their estimations after seeing the weight if desired. Running attire and a towel used to wipe sweat from the body were also measured to assess the volume of sweat retained in clothing and on the skin following the run. CC ran further and faster ($P < 0.001$; 12.7 ± 1.8 km; 4.65 ± 0.63 min per km) than the RC members (10.6 ± 1.0 km, 5.86 min per km), but there were no differences ($P = 0.64$) in total sweat losses between the groups. Sweat losses (1353 ± 422 mL) as assessed by change in body mass were equal to 1.94 ± 0.51% of body weight and were significantly greater ($P < .001$) than estimated losses (686 ± 586 mL). Average sweat loss estimations equaled 50.2 ± 38.1% (95% CI = 32.3–68.0%) of actual sweat losses with no differences between CC and RC. Sweat retained in clothing or on the skin was 11 ± 6% of total sweat losses equaling less than half the percentage found in our previous study conducted in the heat. Underestimations were nearly identical to our previous findings in hot conditions, supporting the position that runners underestimate losses in temperate conditions even when sweat is less visibly evident.

THE EFFECTS OF CHOCOLATE SOYMILK ON RECOVERY IN RECREATIONALLY ACTIVE WOMEN

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U4

Recently it has been suggested that consuming chocolate milk (CHOC) post-exercise may improve glycogen replenishment and protein re-synthesis thus aiding recovery. CHOC has been suggested to be an appropriate recovery beverage due to its combination of carbohydrates and protein (Karp et al., 2006). While this is a benefit to some exercisers, vegan and lactose intolerant exercisers will not consume CHOC. Therefore, chocolate soymilk (SOY) which contains similar content of protein and carbohydrate to CHOC and is lactose-free, could serve as a vegan alternative. **PURPOSE:** To examine the effects of SOY on recovery in recreationally active women. **METHODS:** A double-blind, repeated measures design was used in this study. Participants ($n = 17$) completed one familiarization session and two exercise sessions separated by one week. Sessions 2 & 3 consisted of a 20-km time trial (TT), followed by the ingestion of a recovery drink, a two hour recovery period, and then a second 20-km TT. TT performance was measured and recorded. Sessions 2 & 3 were identical with an exception of the consumption of CHOC or SOY as a recovery treatment in randomized and counterbalanced order. The content of protein and carbohydrate were similar for both recovery treatments. **RESULTS:** A repeated measures GLM revealed no statistical differences ($p = 0.20$) in TT performance between CHOC (T1: 43.2 ± 1.2 m; T2: 43.5 ± 1.3 m) and SOY (T1: 42.7 ± 1.3 m; T2: 43.2 ± 1.2 m). **CONCLUSION:** These data indicate that drinking SOY following exercise may be as effective for recovery as CHOC. This may prove to be beneficial for exercisers with dietary concerns or restrictions..

COMPARISON OF HIP WORN AND WRIST WORN ACTIVITY MONITORS

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Accelerometers worn at the hip are used to assess physical activity, but lack of compliance with the measurement protocol can limit such studies. **PURPOSE:** The purpose of this study was to examine the agreement between wrist worn and hip worn accelerometers on various physical activity outcome variables. **METHODS:** Sixty-four participants (mean age 21.3 ± 2.4 yrs; mean BMI 24.7 ± 4.6 kg/m²) wore two ActiGraph GT3X+ accelerometers (on hip and wrist) for two consecutive days. Participants exercised on a treadmill at two speeds to allow comparison of accelerometer output during walking and running. Participants also reported their preferences regarding hip and wrist worn activity monitors. **RESULTS:** Activity counts for axis 1 and the vector magnitude were significantly higher for wrist worn than for hip worn monitors ($p < .05$), although monitor output was significantly correlated between the wrist and hip ($r = .74$) during both treadmill and free living physical activity. Regression analysis to develop a cut-off score for wrist worn monitors comparable to established cut-off scores for hip worn monitors resulted in large errors. More participants felt the wrist worn monitor compared to the hip worn monitor was comfortable to wear when sleeping (65% vs. 52%) and easy to wear while exercising (94% vs. 67%). **CONCLUSIONS:** Activity counts from wrist worn monitors are moderately correlated to counts from hip worn monitors, but large standard deviations during both treadmill exercise and free living physical activity make it difficult to equate output from the two sites. Compliance may be improved with wrist worn monitors because participants report greater comfort and ease of wear than for hip worn monitors.

U5

THE EFFECT OF SHOD VERSUS BAREFOOT RUNNING ON LOWER LIMB MUSCLE ACTIVATION

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Purpose: Little research has focused on the effect of footwear on lower limb muscle activation. While increased muscle activation may result in increased speed, higher levels of muscle activation during distance walking and running may result in greater muscle fatigue and injury. The purpose of this study is to determine the effects of being shod or barefoot on lower limb muscle activation when walking and running. **Methods:** Six college-aged men ($n=2$) and women ($n=4$) participated in the protocol (21.4 ± 1 yrs, 178.3 ± 8 cm, 83.8 ± 26 kg). Average electromyography (EMG) amplitude (mV) over a 15 second measurement period was recorded for the tibialis anterior (TA), peroneus brevis (PB), medial gastrocnemius (MG), lateral gastrocnemius (LG), soleus (SO) and peroneus longus (PL). All EMG activity was recorded, transformed, and reported as root mean square (RMS) activity. Recordings were taken during the last 15 seconds of a single bout of 3 minutes of walking (0.55 m/s) or running (3.6 m/s). Separate trials of barefoot or shod were completed for each speed; all trials were completed on the same day and counterbalanced with 2 minutes recovery between trials. **Results:** As expected, running increased muscle activation for all lower limb muscles from walking to running, regardless of being barefoot or shod ($p < 0.05$). When comparing barefoot to shod during walking, there was no significant difference in EMG activity of any muscle ($p = 0.16 - 0.87$). However, EMG activity during barefoot running was reduced in the PL (11%, $p = 0.04$) and tended to be lower in the soleus (23%, $p = 0.07$) when compared to shod running. **Conclusions:** Some lower limb muscles show reduced neural activation when running barefoot.

U6

SEX DIFFERENCES FOLLOWING FOUR WEEKS OF DISCONTINUOUS VERSUS CONTINUOUS EXERCISE IN CENTRAL PULSE WAVE VELOCITY

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Introduction: Cardiovascular disease is the primary cause of mortality in both men and women, yet recent data suggests inherent differences in the response to exercise training on arterial distensibility when comparing men and women. Currently, the prescription of 30 minutes may show differences when compared to discontinuous exercise, therefore, the purpose of this study was to examine the oxygen uptake and pulse wave velocity differences in continuous (CON) versus discontinuous (DCT) exercise in men and women. **Methods:** Forty-five subjects were randomly assigned to a CON or DCT group and all subjects were evaluated at baseline for heart rate maximum (HRmax), VO₂max and central pulse wave velocity (cPWV). Subjects were then brought back to the lab after a four week control period and re-evaluated before beginning one month of either CON (30 minutes at 70-75% HRmax) or DCT (3 bouts of 10 minutes of exercise at 70-75% HRmax) aerobic exercise. **Results:** Both continuous and discontinuous groups demonstrated a significant improvement in VO₂max ($p < 0.001$) and HRmax ($p < 0.05$) regardless of sex. However, females displayed a significant sex effect on cPWV ($p = 0.022$). **Conclusion:** These data suggest that either continuous or discontinuous aerobic training is effective in improving measures of fitness and vascular health, yet females may receive greater decreases in arterial distensibility (decrease in cPWV) when compared to their male counterparts.

U7

THE EFFECTS OF EXERCISE AND DIETARY SUPPLEMENTATION ON AVASCULAR NECROSIS; A CASE STUDY

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Introduction: Avascular necrosis (AN) is the death of bone tissue due to lack of blood flow to the bone. The most common locations for the disease are within the hip and shoulder. The bone's inability to receive blood causes tissue necrosis resulting in the non-nutrient supplied bone to lose strength which may result in collapse. Without treatment the disease progresses into very severe arthritis. The purpose of this study was to document if a proprietary exercise and supplement (Glucosamine-Chondroitin and Fish Oil) regimen would augment the post-surgery development of bone remodeling on the effected and contralateral joint. **Methods:** Between July 2011 and March 2012, a patient 20 years of age with a semi-dislocation causing avascular necrosis was evaluated post-surgery. Each month the patient had a Bone Density (DEXA) measurement on both hips (bone mineral content, and bone mineral density) in order to quantify a change in outcome from the previously recorded data. At the onset of the study the patient's standards (sex, ethnicity, height, weight, and age) were entered as continuous variables. The change in measurement from each month was used to quantify improvements in bone growth following the rehabilitation and supplementation techniques. Exercise rehabilitation included physical therapy as soon as the surgery was completed, two months of crutches, and progressive running with weight training. **Results:** Bone Density in the left surgery-inflicted hip realized a total increase of 8.6%, however the right healthy hip showed a 3.1% decrease. **Conclusion:** Although an increase in BMD was realized in the afflicted hip, a deleterious decrease in BMD was shown in the left hip. While exercise and supplementation increased BMD in the hip of interest, these data suggest special care to be taken to mitigate the loss of BMD on the contralateral joint.

U8

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Fidia Pharma

www.fidiapharma.us

ParvoMedics

www.parvo.com/

Proaxis Therapy

www.proaxistherapy.com

VacuMed

<http://www.vacumed.com/>



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