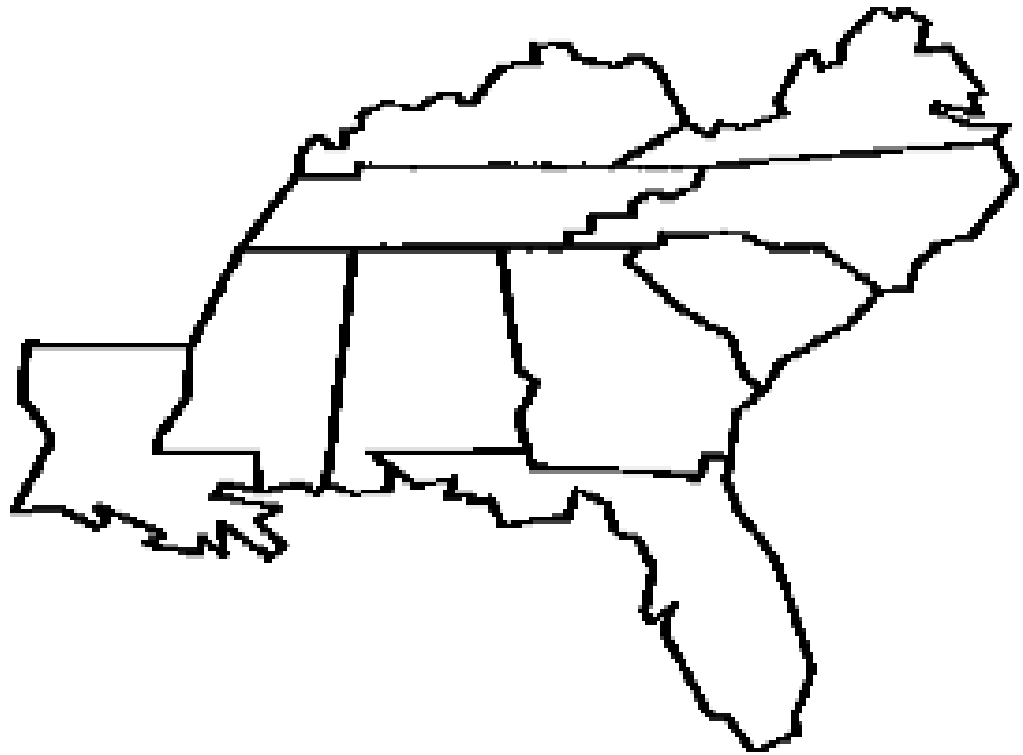


**AMERICAN COLLEGE
of SPORTS MEDICINE**
SOUTHEAST REGIONAL CHAPTER

**February 9-11, 2012
40th Annual Meeting
Jacksonville Hyatt Regency Riverfront Hotel
Jacksonville, Florida**

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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)

Day/Time	Conference Center A	City Terrace					Grand 1,2,3
		4	7	9	10	11	

2/9/2011 POSTERS

4:00 PM	Student Awards D1-D8, M1-M8, U1-U8 (4:00-6:00)
5:00 PM	
6:00 PM	
7:00 PM	
8:00 PM	
9:00 PM	

T1 (4:00-5:00)	T2 (4:00-5:00)	T3 (4:00-5:00)	T4 (4:00-5:00)
T5 (5:15-6:15)	T6 (5:15-6:15)	T7 (5:15-6:15)	T8 (5:15-6:15)

KEYNOTE
Dr. Pate
(7:30-9:00)

Preconvene
SOCIAL
(9:00-10:00)

AM 2/10/2011

6:00 AM								
7:00 AM								
8:00 AM	P1-P29 (8:00-9:30)	O5-O8 (8:00-9:30)	O1-O4 (8:00-9:30)	T9 (8:00-9:00)	S1 (8:00-9:30)	S2 (8:00-9:30)	S3 (8:00-9:30)	
9:00 AM								
10:00 AM								BASIC SCI. Dr. Trappe (9:45-10:45)
11:00 AM	P30-P55 (11:00-12:30)		O9-O12 (11:00-12:30)	T10 (11:00-12:00)	S4 (11:00-12:30)	T11 (11:00-12:00)	S5 (11:00-12:30)	
12:00 PM								

River Terrace 1
WOMEN'S
BREAKFAST
(6:45-7:45)

Day/Time	Conference Center A	City Terrace						Grand 1,2,3	Suite 4104	
		4	7	9	10	11	12			
PM 2/10/2011										
1:00 PM		Clinical Track Sessions (12:30-6:15)							MONTOYE Dr. Warren (2:00-3:00)	PAST-PRESIDENT'S LUNCH (12:30-2:00)
2:00 PM										
3:00 PM	P56-P82 Undergrad Posters (3:15-4:45)		O13-O16 (3:15-4:45)	S6 (3:15-4:45)	T12 (3:15-4:15)	T13 (3:15-4:15)	O17-O20 (3:15-4:45)			
4:00 PM										
5:00 PM								STUDENT BOWL (4:50-5:50)	Grand 4 GRAD STUDENT FAIR (5:50-7:00)	
6:00 PM										
7:00 PM									River Terrace 2 CLINICAL, PAST-PRES RECEPTION (6:30-8:00)	
8:00 PM										

2/11/2011

7:00 AM		Clinical Track Sessions (7:30-12:00)							
8:00 AM	P83-P108 (8:00-9:10)		T14 (8:00-9:00)	T15 (8:00-9:00)	T16 (8:00-9:00)	T17 (8:00-9:00)	T18 (8:00-9:00)		
9:00 AM								KOZAR Dr. Ainsworth (9:15-10:15)	
10:00 AM			O21-O24 (10:30-12:00)	T19 (10:30-11:30)	T20 (10:30-11:30)	S7 (10:30-12:00)	O25-O28 (10:30-12:00)		
11:00 AM	P109-P136 (10:30-12:00)								
12:00 PM								LUNCHEON Dr. Guskievicz (12:00-2:00)	
1:00 PM									

Fortieth Annual Meeting

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

**Jacksonville Hyatt Regency Riverfront Hotel
Jacksonville, Florida
February 9-11, 2012**

Officers

President: David Pascoe, Auburn University

Past President: Peter Grandjean, Baylor University

President-Elect: Paul Davis, University of North Carolina-Greensboro

Executive Board:

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

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

Cherilyn Hultquist, At-large Member, Kennesaw State University

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

Lindsey Miller, Student Representative, Auburn University

John Quindry, At-Large Member, Auburn University

Beverly Warren, Representative to ACSM, Virginia Commonwealth 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

Clinical Track Meeting Objectives

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

- Recognize metabolic bone states effecting sports and exercise.
- AS it relates to ADHD, obesity and overuse, recognize at risk children to promote safe participation in sports.
- Educate and manage the aging athlete as it relates to their medical conditions and co-morbidities.

Clinical Track CME Accreditation

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

AMA/PRA

The Hawkins Foundation designates this educational activity for a maximum of 9.0 AMA PRA Category I Credit(s)TM. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Continuing Education Credits

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

Faculty Disclosure

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

Disclosure of Unlabeled/Unapproved Uses of Drugs or Devices

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

Acknowledgement of Commercial Support

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges the program support from: Steadman Hawkins Clinic of the Carolinas, Council for Undergraduate Research, Gatorade Sports Science Institute, Actigraph and DonJoy.



STEADMAN HAWKINS
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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

Paul Davis, David Pascoe, Michael Berry, Kyle Cassas, Peter Grandjean, Cheryl Hultquist,
Matt Green, Michael McKenzie, John Quindry, Carolyn Berry, Don Torok, Beverly Warren

SEACSM List of Reviewers

Edward Acevedo, Virginia Commonwealth University; Rebecca Battista, Amy Knab, Lanay Mudd, Andrew Shanelly, Kevin Zwetsloot, Appalachian State University; Andrew Bosak, Georgia Southwestern University; Dawn Coe, University of Tennessee; Katrina DuBose, East Carolina University; John Garner, University of Mississippi; Allan Goldfarb, University of North Carolina at Greensboro; Benjamin Gordon, University of South Carolina at Columbia; Susan Graves, Florida Atlantic University; Elizabeth Holbrook, Roanoke College; Will Lyerly, Coastal Carolina University; Bonita Marks, University of North Carolina at Chapel Hill; Kevin McCully, University of Georgia; Paul Miller, Elon University; Lynn Panton, Florida State University; Brian Parr, University of South Carolina at Aiken; Mark Schafer, Western Kentucky University; Timothy Scheet, College of Charleston; Ray Thompson, University of South Carolina at Columbia; Michael Turner, University of North Carolina at Charlotte; Wendi Weimar, Auburn University; Art Weltman, University of Virginia.

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

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Mike Stone Executive Board</u>
13th	Jan. 31-Feb. 2, 1985 Boone, NC	Chris Zauner Kirk Cureton Robert McMurray	Ron Bos (ES) John Billings Harry DuVal Diane Spitler J. W. Yates
14th	Jan. 23-25, 1986 Athens, GA	Robert McMurray Chris Zauner Scott Powers	Ron Bos (ES) Terry Bazarre John Billings J. Larry Durstine Russ Pate (N) Diane Spitler
15th	Jan. 29-31, 1987 Charleston, SC	Scott Powers Robert McMurray Diane Spitler	Ron Bos (ES) Terry Bazarre J. Larry Durstine Steve Messier Allen Moore (S) Russ Pate (N) Janet Walberg
16th	Jan. 28-30, 1988 Winston-Salem, NC	Diane Spitler Scott Powers Phil Sparling	Ron Bos (ES) Dalynn Badenhop Gay Israel Steve Messier Russ Pate (N) Janet Walberg Rankin Mark Senn (S)
17th	Jan. 19-20, 1989 Atlanta, GA	Phil Sparling Diane Spitler Emily Haymes	Ron Bos (ES) Dalynn Badenhop Kirk Cureton (N) Mark Davis Gay Israel Ben Kibler (MD) David Peltzer (S) Art Weltman
18th	Feb. 1-3, 1990 Columbia, SC	Emily Haymes Phil Sparling Harry DuVal	Ron Bos (ES) Jerry Brandon Maria Burgess (S) Kirk Cureton (N) Mark Davis Ben Kibler (MD) Dianne Ward Art Weltman
19th	Jan. 31-Feb. 2, 1991 Louisville, KY	Harry DuVal Emily Haymes Steve Messier	Ron Bos (ES) Jerry Brandon Maria Burgess (S) Kirk Cureton (N) Kevin Davy (S) Alan Rogol (MD) Jeff Rupp Amanda Timberlake Dianne Ward

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
20th	Jan. 30-Feb. 1, 1992 Auburn, AL	Steve Messier Harry DuVal Gay Israel	Ron Bos (ES) Kevin Davy (S) Bill Duey (S) Ben Kibler (MD) Mindy Millard-Stafford Bob Moffatt Alan Rogol (MD) Jeff Rupp Phil Sparling (N) Amanda Timberlake
21st	Jan. 28-30, 1993 Norfolk, VA	Gay Israel Steve Messier J. Mark Davis	Vaughn Christian (ES) Barbara Ainsworth Michael Berry Jeff Chandler (CC) Shala Davis (S) Mindy Millard-Stafford Bob Moffatt Alan Rogol (MD) Phil Sparling (N) Kevin Tipton (S)
22nd	Jan. 20-22, 1994 Greensboro, NC	J. Mark Davis Gay Israel Janet Walberg Rankin	Vaughn Christian (ES) Barbara Ainsworth Michael Berry Jeff Chandler (CC) Shala Davis (S) Allan Goldfarb Victoria Schnyder (S) Phil Sparling (N) Beverly Warren
23rd	Feb. 2-4, 1995 Lexington, KY	Janet Walberg Rankin J. Mark Davis J. Larry Durstine	Vaughn Christian (ES) Carolyn Berry Jeff Chandler (CC) Allan Goldfarb Ed Howley (N) David Nieman Victoria Schnyder (S) Beverly Warren
24th	Feb. 1-3, 1996 Chattanooga, TN	J. Larry Durstine Janet Walberg Rankin Bruce Gladden	Vaughn Christian (ES) Carolyn Berry Ed Howley (N) Tim Lightfoot Patricia Mosher David Nieman Stewart Trost (S) George Wortley (MD)
25th	Jan. 23-25, 1997 Atlanta, GA	Bruce Gladden J. Larry Durstine Bob Moffatt	Vaughn Christian (ES) Dave Bassett Ed Howley (N) Tim Lightfoot Patricia Mosher Ann Swank Stewart Trost (S) George Wortley (MD) Don Torok

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
26th	Jan. 29-31, 1998 Destin, FL	Bob Moffatt Bruce Gladden Dianne Ward	Vaughn Christian (ES) Dave Bassett Mark Davis (N) Bonita Marks Mike Overton Ann Swank Melicia Whitt (S) George Wortley (MD) Don Torok
27th	Feb. 4-6, 1999 Norfolk, VA	Dianne Ward Bob Moffatt Jeff Rupp	Vaughn Christian (ES) Mark Davis (N) Steve Dodd Bonita Marks Mike Overton Dixie Thompson Melicia Whitt (S) George Wortley (MD) Don Torok
28th	Jan. 27-29, 2000 Charlotte, NC	Jeff Rupp Dianne Ward Mindy Millard-Stafford	Vaughn Christian (ES) Ted Angelopoulos Linda Chitwood Mark Davis (N) Keith DeRuisseau (S) Steve Dodd Dixie Thompson George Wortley (MD) Don Torok
29th	Jan. 25-27, 2001 Charlotte, NC	Mindy Millard-Stafford Jeff Rupp David Nieman	Vaughn Christian (ES) Ted Angelopoulos Linda Chitwood Bruce Gladden (N) Keith DeRuisseau (S) Craig Broeder Liz Dowling George Wortley (MD) Don Torok
30 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 Kyle Cassas (MD) Matt Green Cherilyn Hultquist Michael McKenzie Lindsey Miller (S) John Quindry Beverly Warren (N) Don Torok

ES = Executive Secretary
N = National Representative

S = Student Representative
MD = Physician Representative

CC = Clinical Consultant
ED = Executive Director

SEACSM Award Winners

	<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

SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE 2012 ANNUAL MEETING SCHEDULE (OUTLINE)

THURSDAY, February 9, 2012

12:00-2:00 SEACSM EXECUTIVE BOARD MEETING (City Terrace 12)

1:00-6:00 REGISTRATION (3rd Floor Skybridge)
Purchase tickets for special meals at the registration desk:
Women's Breakfast by 6:00 PM Thursday
Saturday luncheon by 5:00 PM Friday

4:00-6:30 EXHIBITS (3rd Floor Skybridge)

4:00-5:00 Tutorials T1-T4

T1 HOW TO USE YOUR EXERCISE SCIENCE DEGREE TO ENHANCE YOUR FUTURE PROFESSIONAL SCHOOL EXPERIENCE **(City Terrace 7)**

T2 PROVE IT – TRANSLATE IT – SUSTAIN IT! **(City Terrace 9)**

T3 SHEDDING LIGHT - A PRACTICAL GUIDE TO USING NEAR INFRARED SPECTROSCOPY TO STUDY SKELETAL MUSCLE **(City Terrace 10)**

T4 USING INTERACTIVE VIDEO GAMES: WHAT DOES THE EVIDENCE TELL US? **(City Terrace 11)**

4:00-6:00 STUDENT AWARD POSTER FREE COMMUNICATIONS I: D1-D8, M1-M8, U1-U8 (Conference Center A)

5:15-6:15 Tutorials T5-T8

T5 CLUSTERING PATTERN OF METABOLIC SYNDROME CONDITIONS IN MULTICULTURAL POPULATIONS **(City Terrace 7)**

T6 EVIDENCE-BASED MEDICINE IN PHYSICAL REHABILITATION: THE FUNCTIONAL AND MOLECULAR EFFECTS OF THERAPEUTIC ULTRASOUND TO TREAT MUSCLE INJURY **(City Terrace 9)**

T7 INCREASING RESEARCH LITERACY IN THE UNDERGRADUATE CLASSROOM **(City Terrace 10)**

T8 APPLICATION OF TELEHEALTH, TELEREHABILITATION, AND EXERCISE TO RURALLY LOCATED CLINICAL POPULATIONS **(City Terrace 11)**

7:30-9:00 OPENING REMARKS AND KEYNOTE ADDRESS (Grand Ballroom 1,2,3)
"The Evolution of Physical Activity as a Public Health Priority"

Russell R. Pate, Ph.D., FACSM

Professor, Department of Exercise Science

Director, Children's Physical Activity Research Group, Arnold School of Public Health
University of South Carolina

ACSM Past-President

Presiding: David D. Pascoe, Auburn University, SEACSM President

Speaker Introduction: Paul G. Davis, University of North Carolina at Greensboro

9:00-10:00 SEACSM SOCIAL (2nd Floor Preconvene Area)

FRIDAY, February 10, 2012

- 6:45-7:45 WOMEN'S BREAKFAST (River Terrace 1)**
(Registration Required)
"Women in Leadership: Honoring Past Presidents of the SEACSM"
Moderator: Tiffany A. Esmat, Ph.D, Kennesaw State University
- 8:00-5:00 REGISTRATION (3rd Floor Skybridge)**
Purchase tickets for special meals at the registration desk:
Saturday luncheon by 5:00 PM Friday
- 8:00-6:00 EXHIBITS (3rd Floor Skybridge)**
- 8:00-9:30 SYMPOSIA S1-S3**
- S1 PHYSIOLOGICAL PROFILES OF LAW ENFORCEMENT OFFICERS AND THEIR ABILITY TO MEET REQUIRED OCCUPATIONAL DEMANDS **(City Terrace 10)**
- S2 EXERCISE SCIENCE EDUCATION: PROMOTING STUDENT ENGAGEMENT **(City Terrace 11)**
- S3 ANDROGENS, ESTROGENS, IGF-1 AND EXERCISE AN INTEGRATIVE APPROACH **(City Terrace 12)**
- 8:00-9:00 Tutorial T9**
- T9 IMMUNE NUTRITION SUPPORT FOR ATHLETES: BENEFIT OR HAZARD? **(City Terrace 9)**
- 8:00-9:30 ORAL FREE COMMUNICATIONS I & II**
- O1-O4 VASCULAR PHYSIOLOGY **(City Terrace 7)**
- O5-O8 SPORTS MEDICINE **(City Terrace 4)**
- 8:00-9:30 POSTER FREE COMMUNICATIONS II: P1-P29 (Conference Center A)**
CLINICAL EXERCISE EVALUATION; CHRONIC DISEASE & DISABILITY; EXERCISE BEHAVIOR/PSYCHOLOGY; CARDIORESPIRATORY PHYSIOLOGY
- 9:30-9:45 BREAK**
- 9:45-10:45 BASIC SCIENCE LECTURE (Grand Ballroom 1,2,3)**
"Skeletal Muscle Health with Space Flight and Aging"
Scott W. Trappe, PhD, FACSM
John and Janice Fisher Professor of Exercise Science
Director, Human Performance Laboratory
Director, Human Bioenergetics Program
Department of Physical Education, Sport, and Exercise Science
Ball State University
Chair: Laurie Wideman Gold, University of North Carolina at Greensboro
- 10:45-11:00 BREAK**
- 11:00-12:30 SYMPOSIA S4-S5**
- S4 DISORDERED BODY COMPOSITION, MUSCLE QUALITY AND PHYSICAL FUNCTION IN OLDER ADULTS: DEFINING, MEASURING AND IMPROVING **(City Terrace 10)**
- S5 DOXORUBICIN AND ENDURANCE EXERCISE TRAINING: EFFECTS ON CARDIAC AND SKELETAL MUSCLES **(City Terrace 12)**

11:00-12:00 Tutorials T10-T11

T10 AMERICAN COLLEGE OF SPORTS MEDICINE LEADERSHIP & DIVERSITY TRAINING PROGRAM (**City Terrace 9**)

T11 SECONDARY DATA ANALYSIS – THE CROSS-SECTIONAL STUDY (**City Terrace 11**)

11:00-12:30 ORAL FREE COMMUNICATIONS III

09-012 PHYSICAL FITNESS/EXERCISE TESTING (**City Terrace 7**)

11:00-12:30 POSTER FREE COMMUNICATIONS III: P30-P55 (Conference Center A)
SPORTS MEDICINE; BIOMECHANICS/MOTOR CONTROL; COMPETITIVE ATHLETES

12:30-1:45 PAST PRESIDENT’S LUNCH (Suite 4104)

SEACSM CLINICAL TRACK (City Terrace 4)

“Cradle to the Grave” - Current Issues in the Pediatric and Aging Athlete

12:30 Welcome and Announcements: Kyle J. Cassas, MD, FACSM

12:45 Metabolic Bone Disease in the Pediatric Patient: Bryce Nelson, MD, PhD

1:15 Pediatric Fractures: Alex B. Diamond, DO, MPH

1:45 Osteoporosis and Exercise: Heather Fullerton, MD

2:15 Break

2:40 Fellow Case 1 – Hip injury (Dr. Connor, Vanderbilt)

2:55 Fellow Case 2 – Foot pain (Dr. Huntress, Steadman Hawkins)

3:10 Fellow Case 3 – Great toe pain (Dr. McCullough, ASMI)

3:30 Concussion in the ADHD Athlete: Dave Blake, MD

4:00 Pediatric Obesity: Kerry Sease, MD, MPH

4:30 Break

4:40 Injuries in the Young Thrower: Mike Kissenberth, MD

5:10 “Injury Prevention in Youth Sports: What Works, What Doesn’t and What’s Next”:
Alex B. Diamond, DO, MPH

5:40 Discussion

6:30-8:00 Clinical Track Reception (River Terrace 2) - Sponsored by Steadman Hawkins Clinic of the Carolinas

2:00-3:00 HENRY MONTOYE SCHOLAR LECTURE (Grand Ballroom 1,2,3)

“Impairments of Skeletal Muscle Function: Some Causes, Some Differences, and Few Treatments”

Gordon L. Warren, PhD, FACSM

Professor

Division of Physical Therapy

Byrdine F. Lewis School of Nursing & Health Professions

Georgia State University

Chair: Kirk J. Cureton, University of Georgia

3:00-3:15 BREAK

3:15-4:45 SYMPOSIUM S6

S6 THE EXPERIMENTAL CONTINUUM: ANSWERING COMPLEX PHYSIOLOGICAL QUESTIONS (**City Terrace 9**)

3:15-4:15 TUTORIALS T12-T13

T12 SIGNIFICANCE OF NON-ST-SEGMENT DATA COLLECTED DURING A GXT (**City Terrace 10**)

T13 CARBOHYDRATE INTAKE DURING ENDURANCE EXERCISE: HIGHLIGHTING 30 YEARS OF SCIENCE TO OPTIMIZE PERFORMANCE (**City Terrace 11**)

3:15-4:45 ORAL FREE COMMUNICATIONS IV & V

O13-O16 OBESITY/WEIGHT LOSS (**City Terrace 7**)

O17-O20 YOUTH (**City Terrace 12**)

3:15-4:45 POSTER FREE COMMUNICATIONS IV: P56-P81 (Conference Center A)
UNDERGRADUATE RESEARCH POSTERS; sponsored by the Council on Undergraduate Research

4:50-5:50 STUDENT BOWL (Grand Ballroom 1,2,3)

5:55-7:00 SEACSM GRADUATE STUDENT FAIR (Grand Ballroom 4)

**6:30-8:00 CLINICAL TRACK RECEPTION
(River Terrace 2)**

SATURDAY February 11, 2012

SEACSM CLINICAL TRACK (City Terrace 4)

"Cradle to the Grave" - Current Issues in the Pediatric and Aging Athlete

7:30 Welcome and Announcements: Kyle J. Cassas, MD, FACSM
7:45 Back Pain in the Young Athlete: John Batson, MD, FACSM
8:15 FAI and Sports Hip: Jason Folk, MD
8:45 Sports and the Total Joint Patient: Brandon Broome, MD
9:15 **Break**
9:30 Fellow Case 4 – Shoulder pain (Dr. Liddle, Vanderbilt)
9:45 Fellow Case 5 – Shoulder pain (Dr. Robinson, ASMI)
10:00 Fellow Case 6 – Thigh injury (Dr. Horak, ASMI)
10:15 Pediatric ACL: Jason Folk, MD-Supported by DonJoy
10:45 Medical Considerations in the Aging Athlete: Delmas Bolin, MD, PhD, FACSM
11:15 **Break**
11:25 Fellow Case 7 – Bilateral LE pain (Dr. DeMatas, Mayo Clinic, Jacksonville)
11:40 Fellow Case 8 – Knee pain (Dr. Sabo, USF)
11:55 Fellow Case 9 – Syncope (Dr. Riederer, Vanderbilt)
12:10 Voting for Best Case Presentation and Closing Remarks

8:00-12:00 EXHIBITS (3rd Floor Skywalk)

8:00-9:00 TUTORIALS T14-T18

T14 MEASURING OXYGEN UPTAKE: THEN AND NOW (**City Terrace 7**)

T15 ACSM GUIDANCE FOR PRESCRIBING EXERCISE: CLARITY OR CONFUSION (**City Terrace 9**)

T16 QUERCETIN AND ENDURANCE EXERCISE CAPACITY: WHAT IS THE EVIDENCE? (**City Terrace 10**)

T17 PHYSIOLOGICAL FOUNDATIONS OF TAI CHI HEALTH BENEFITS (**City Terrace 11**)

T18 TO INFINITY AND BEYOND: THE "BUZZ" ON SUCCESS FOR CAREERS IN EXERCISE SCIENCE (**City Terrace 12**)

8:00-9:10 POSTER FREE COMMUNICATIONS V: P83-P108 (Conference Center A)
ENDOCRINOLOGY/IMMUNOLOGY; EPIDEMIOLOGY & PREVENTIVE MEDICINE;
SKELETAL MUSCLE; BODY COMPOSITION/ENERGY BALANCE/WEIGHT CONTROL

9:15-10:15 ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS (Grand Ballroom 1,2,3)
"Physical Activity, Fitness, and Health"
Barbara E. Ainsworth, PhD, MPH, FACSM, FNAK
Professor, Exercise and Wellness Program
School of Nutrition and Health Promotion
Arizona State University
President, American College of Sports Medicine
Chair: Katrina D. DuBose, East Carolina University

10:15-10:30 BREAK

10:30-12:00 SYMPOSIUM S7

S7 A GUT WRENCHING TALE (**City Terrace 11**)

10:30-11:30 TUTORIALS T19-T20

T19 SPORT AND COMMUNITY DEVELOPMENT: SERVICE-LEARNING IN A KINESIOLOGY CONTEXT (**City Terrace 9**)

T20 THE IMPLICATIONS OF TAKING ANTIOXIDANTS IF ONE EXERCISES (**City Terrace 10**)

10:30-12:00 ORAL FREE COMMUNICATIONS VI & VII

O21-O24 CHRONIC DISEASE (**City Terrace 7**)

O25-O28 MUSCLE MASS/BONE MASS (**City Terrace 12**)

10:30-12:00 POSTER FREE COMMUNICATIONS VI: P109-P136 (Teal)
METABOLISM; NUTRITION; ENVIRONMENTAL PHYSIOLOGY;
FITNESS/TESTING/ASSESSMENT

12:00-2:00 SEACSM LUNCHEON AND LECTURE (Grand Ballroom 1,2,3)*
"Preventing Concussion in Sport: From the Lab to the Law"

Kevin M. Guskiewicz, PhD, ATC, FACSM

Kenan Distinguished Professor

Chair, Department of Exercise and Sport Science

University of North Carolina at Chapel Hill

Presiding: David D. Pascoe, Auburn University, SEACSM President; Peter W.

Grandjean, Baylor University, SEACSM Past-President

Speaker Introduction: Kyle J. Cassas, MD, FACSM, Steadman Hawkins Clinic of the Carolinas

****Tickets need to be purchased by 5:00 PM on Friday.***

2:00-3:00 SEACSM EXECUTIVE BOARD MEETING (City Terrace 12)

HAVE A SAFE TRIP HOME; SEE YOU NEXT YEAR AT SEACSM IN GREENVILLE, SC

SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE 2012 ANNUAL MEETING SCHEDULE (COMPLETE)

On Friday and Saturday, to celebrate **40 years of SEACSM**, several people who have contributed significantly to the history of the Chapter are either presenting **40th Meeting Highlighted Sessions** or are serving as **VIP Chairs** of the oral free communications sessions in which they will give a historical perspective of their topic during the last 30 minutes of the session.

All *SEACSM Presidents* are **boldfaced**.

THURSDAY, February 9, 2012

12:00-2:00 SEACSM EXECUTIVE BOARD MEETING (City Terrace 12)

1:00-6:00 REGISTRATION (3rd Floor Skybridge)

**Purchase tickets for special meals at the registration desk:
Women's Breakfast by 6:00 PM Thursday
Saturday luncheon by 5:00 PM Friday**

4:00-6:30 EXHIBITS (3rd Floor Skybridge)

4:00-5:00 Tutorials T1-T4

- T1 HOW TO USE YOUR EXERCISE SCIENCE DEGREE TO ENHANCE YOUR FUTURE PROFESSIONAL SCHOOL EXPERIENCE
A. Bosak¹ and M. Ellis². ¹*Georgia Southwestern State University, Americus, GA* and ²*Advanced Medical, Daytona, FL (City Terrace 7)*
Chair: Lindsey S. Miller, Auburn University
- T2 PROVE IT – TRANSLATE IT – SUSTAIN IT!
Bhibha M. Das, PhD, MPH and Ellen E. Evans, PhD. *University of Georgia, Athens, GA (City Terrace 9)*
Chair: Michael J. Turner, University of North Carolina at Charlotte
- T3 SHEDDING LIGHT - A PRACTICAL GUIDE TO USING NEAR INFRARED SPECTROSCOPY TO STUDY SKELETAL MUSCLE
J.T. Brizendine & K.K. McCully, FACSM. *University of Georgia, Athens, GA 30602 (City Terrace 10)*
Chair: James C. Churilla, University of North Florida
- T4 USING INTERACTIVE VIDEO GAMES: WHAT DOES THE EVIDENCE TELL US?
E.A. Wikstrom. *Dept. of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC (City Terrace 11)*
Chair: Dena P. Garner, The Citadel

4:00-6:00 STUDENT AWARD POSTER FREE COMMUNICATIONS I: D1-D8, M1-M8, U1-U8 (Conference Center A)

1st authors present 4:30-6:00

Chair: **Peter W. Grandjean**, Baylor University

- D1 RESVERATROL IMPROVES MUSCLE FUNCTION, INCREASES UTROPHIN EXPRESSION, AND DECREASES INFLAMMATION IN THE MDX MOUSE
Bradley S. Gordon, Diana C. Delgado-Diaz and Matthew C. Kostek. *University of South Carolina, Columbia, SC*
- D2 ESTRADIOL AND REGIONAL LIPOLYSIS IN PREMENOPAUSAL WOMEN
KM Gavin, DK Raymer, M Scamp and RC Hickner, FACSM. *Dept of Kinesiology, Human Performance Lab, East Carolina University, Greenville, NC*

- D3 BENEFITS OF VOLUNTARY EXERCISE ON BREAST CANCER PROGRESSION IN C3(1)SV40TAG MICE.
J Steiner¹, **JM Davis**¹, JM McClellan¹, and EA Murphy². ¹*Dept. of Exercise Science and* ²*Dept. of Pathology, Microbiology & Immunology, University of South Carolina, Columbia, SC*
- D4 THE EFFECTS OF SUPRAPHYSIOLOGIC TESTOSTERONE ADMINISTRATION ON SERUM ADIPONECTIN
L.A. Beggs, J.F. Yarrow, S.C. McCoy, C.F. Conover, S.E. Borst. *VA Medical Center, University of Florida, Gainesville, FL*
- D5 HAT AND HDAC EXPRESSION DURING MUSCLE ATROPHY
Adam Beharry, Sarah Senf, Brandon Roberts, Andrew Judge. *Departments of PT and APK, University of Florida Gainesville, FL*
- D6 THE EFFECT OF EXERCISE TRAINING ON MUSCLE ENERGY STATUS IN IL-6 INDUCED CACHEXIA
M.J. Puppa, A.A. Narsale, K.T Velazquez, S. Sato, J.P White, J.A Carson, FACSM. *Dept. of Exercise Science, U. of South Carolina, Columbia, SC*
- D7 EFFECTS OF ACUTE MODERATE- AND HIGH-INTENSITY EXERCISE ON GLUCOSE DISPOSAL AND BETA-CELL FUNCTION.
CA Rynders, JY Weltman, A Chan, EJ Barrett, and A Weltman (FACSM). *Exercise Physiology Laboratory, University of Virginia, Charlottesville, VA*
- D8 THERAPEUTIC ULTRASOUND AFFECTS MUSCLE CELL PROLIFERATION: IMPLICATIONS FOR MUSCLE REHABILITATION
Diana C. Delgado-Díaz^{1,2}, Matthew C. Kostek¹. ¹*University of South Carolina, Columbia, SC,* ²*Universidad Industrial de Santander, Bucaramanga, Santander, Colombia*
- M1 MALE RUNNERS DEMONSTRATE POOR SWEAT LOSS ESTIMATION ACCURACY
B.A. Davis, A.D. Horton, J.H. Hornsby, J.M. Green and E.K. O'Neal. *Dept. Health, Physical Education and Recreation, University of North Alabama, Florence, AL*
- M2 ABILITY OF THE PACER TO ELICIT PEAK EXERCISE RESPONSES IN YOUTH
S.N. Scott, D.R. Bassett Jr., FACSM, **D.L. Thompson**, FACSM, and D.P. Coe. *Dept. of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville, TN*
- M3 PHYSICAL ACTIVITY AND MOTOR SKILL DEVELOPMENT IN YOUNG CHILDREN
J.I. Flynn, D.P. Coe, J.T. Fairbrother, S. Durham. *University of Tennessee, Knoxville, TN*
- M4 FAST-TO-SLOW: MUSCLE FIBER TYPE TRANSFORMATION IN RESPONSE TO ALTERED SIX1 GENE EXPRESSION.
Collins, B. C., B. S. Gordon, and M. C. Kostek. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC*
- M5 The Energy Expenditure of Drumming: A Rhythmic Alternative
M.R. Hooper, C. Hultquist, and J. McLester. *Department of Health, Physical Education, and Sport Science. Kennesaw State University, Kennesaw, GA*
- M6 THE EFFECTS OF WEIGHT LOSS ON RELATIVE BONE MINERAL DENSITY IN PREMENOPAUSAL WOMEN
K.C. Hamilton, G. Fisher, J. Roy, B.A. Gower, and G.R. Hunter. *Dept. of Human Studies, The University of Alabama- Birmingham, Birmingham, AL*

- M7 CONCUSSION DOES NOT IMPAIR GAIT STEPPING CHARACTERISTICS
T.G. Tapia-Lovler, B.A. Munkasy, T.A. Buckley. *Department of Health and Kinesiology, Georgia Southern University, Statesboro, GA*
- M8 EFFECTS OF SIMPLE AND COMPLEX MOVEMENTS ON COGNITIVE FUNCTION
N.A. Boerio, T.F. Mahar, C.R. Diaz, C.D. Kemble, K. Kim, and M.T. Mahar. *East Carolina University, Greenville, NC*
- U1 CALORIC RESTRICTION CAUSES DIFFERENTIAL BRAIN GENE EXPRESSION IN WHEEL RUNNING AND SEDENTARY MICE
L. Grant Canipe, Lana Ray, Meghan E. Kusper, R. Andrew Shanely, Amy M. Knab. *Appalachian State University, College of Health Sciences, Boone, NC*
- U2 DISTINCTIONS IN PHYSICAL ACTIVITY HABITS AMONGST ACADEMIC MAJOR AND YEAR IN UNDERGRADUATE STUDENTS
Jennifer A. Tacke, Jennifer A. Bunn. *Campbell University, Buies Creek, NC*
- U3 EXAMINATION OF THE IMPACT OF AN ACTIVE VIDEO GAME ON ACADEMIC TESTING
Caroline A. York, W.R. Bixby (FACSM), P.C. Miller, E.E. Hall (FACSM). *Elon University, Elon, NC*
- U4 THE EFFECT OF BREATHING FREQUENCY ON BARORECEPTOR SENSITIVITY
Timothy Brady, Paul Mazanka, Patricia Nixon. *Wake Forest University, Winston-Salem, NC*
- U5 HSP70 IS NECESSARY FOR NORMAL SKELETAL MUSCLE GROWTH
T.M. Howard, S.M. Senf, A.R. Judge, Dept. of PT, *The University of Florida, Gainesville, FL*
- U6 CATECHOL-O-METHYLTRANSFERASE GENOTYPE INFLUENCES COGNITIVE PERFORMANCE AND CONCUSSION HISTORY IN COLLEGE FOOTBALL PLAYERS
M.H. Sundman, E.E. Hall, R.A. Gardner, W.R. Bixby, P.C. Miller, S.E. Folger, M.C. Kostek, B.S. Gordon & K.P. Barnes. *Department of Exercise Science, Elon University, Elon, NC and Department of Exercise Science, The University of South Carolina, Columbia, SC*
- U7 EFFECTS OF BODY-IMAGE AND SELF-ESTEEM ON PHYSICAL ACTIVITY LEVELS IN ADOLESCENTS
Ashley Cancer, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL*
- U8 DIFFERENCES IN EMG ACTIVITY OF FIVE LOWER LIMB MUSCLES DURING ONE-LEGGED AND TWO-LEGGED SQUATS
Jeremy Towns, Thomas Broussard, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL*

5:15-6:15 Tutorials T5-T8

- T5 CLUSTERING PATTERN OF METABOLIC SYNDROME CONDITIONS IN MULTICULTURAL POPULATIONS
L. Proctor and **L.J. Brandon**, FACSM. *B.E.A.M. LLC, Ruston, LA and Dept. of Kinesiology & Health, Georgia State University, Atlanta, GA (City Terrace 7)*
Chair: J. Mark Loftin, University of Mississippi
- T6 EVIDENCE-BASED MEDICINE IN PHYSICAL REHABILITATION: THE FUNCTIONAL AND MOLECULAR EFFECTS OF THERAPEUTIC ULTRASOUND TO TREAT MUSCLE INJURY
M.C. Kostek and D.C. Delgado. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC (City Terrace 9)*
Chair: Peter M. Magyari, University of North Florida

T7 INCREASING RESEARCH LITERACY IN THE UNDERGRADUATE CLASSROOM
E.K. O'Neal[†], R.C. Pritchett[‡], and K.L. Pritchett[‡]. [†]*University of North Alabama, Florence, AL*, [‡]*Central Washington University, Ellensburg, WA* **(City Terrace 10)**
Chair: Brian B. Parr, University of South Carolina at Aiken

T8 APPLICATION OF TELEHEALTH, TELEREHABILITATION, AND EXERCISE TO RURALLY LOCATED CLINICAL POPULATIONS
Sean C. McCoy, Toni Chiara. *NFSG Malcolm Randall VAMC, Gainesville, FL*
(City Terrace 11)
Chair: Ellen M. Evans, University of Georgia

7:30-9:00 OPENING REMARKS AND KEYNOTE ADDRESS (Grand Ballroom 1,2,3)
"The Evolution of Physical Activity as a Public Health Priority"
Russell R. Pate, Ph.D., FACSM
Professor, Department of Exercise Science
Director, Children's Physical Activity Research Group, Arnold School of Public Health
University of South Carolina
ACSM Past-President
Presiding: **David D. Pascoe**, Auburn University, SEACSM President
Speaker Introduction: Paul G. Davis, University of North Carolina at Greensboro

9:00-10:00 SEACSM SOCIAL (2nd Floor Preconvene Area)

FRIDAY, February 10, 2012

6:45-7:45 WOMEN'S BREAKFAST (River Terrace 1)
(Registration Required)
"Women in Leadership: Honoring Past Presidents of the SEACSM"
Moderator: Tiffany A. Esmat, Ph.D, Kennesaw State University

8:00-5:00 REGISTRATION (3rd Floor Skybridge)

Purchase tickets for special meals at the registration desk:
Saturday luncheon by 5:00 PM Friday

8:00-6:00 EXHIBITS (3rd Floor Skybridge)

8:00-9:30 SYMPOSIA S1-S3

S1 PHYSIOLOGICAL PROFILES OF LAW ENFORCEMENT OFFICERS AND THEIR ABILITY TO MEET REQUIRED OCCUPATIONAL DEMANDS
K. J. Kelleran¹, A. Bosak², and G.A. Ryan³. ¹*Old Dominion University*, ²*Georgia Southwestern State University*, and ³*University of Alabama* **(City Terrace 10)**
Chair: G. William Lyerly, Coastal Carolina University

S2 EXERCISE SCIENCE EDUCATION: PROMOTING STUDENT ENGAGEMENT
Brian B. Parr, John C. Quindry, Peter M. Magyari, Timothy P. Scheett, Yuri Feito.
University of South Carolina Aiken (Parr), Auburn University (Quindry), University of North Florida (Magyari), College of Charleston (Scheett), Barry University (Feito)
(City Terrace 11)
Chair: Rebecca A. Battista, Appalachian State University

S3 ANDROGENS, ESTROGENS, IGF-1 AND EXERCISE AN INTEGRATIVE APPROACH
Stephen E Borst, Fan Ye, Sean C McCoy, Joshua F Yarrow. *VA Medical Center, Gainesville Geriatric Research, Education and Clinical Center and University of Florida Departments of Applied Physiology & Kinesiology and Physical Therapy, Gainesville, FL*
(City Terrace 12)
Chair: **Allan H. Goldfarb**, University of North Carolina at Greensboro

8:00-9:00 Tutorial T9

T9 40th SEACSM HIGHLIGHTED SESSION

IMMUNE NUTRITION SUPPORT FOR ATHLETES: BENEFIT OR HAZARD?

David C. Nieman, FACSM. *Appalachian State University and North Carolina Research Campus (City Terrace 9)*

Chair: **Alan Utter**, Appalachian State University

8:00-9:30 ORAL FREE COMMUNICATIONS I: 01-04

Vascular Physiology (**City Terrace 7**)

VIP Chairs:

Kevin K. McCully, PhD, FACSM, University of Georgia

Michael A. Welsch, PhD, FACSM, Louisiana State University

- O1 8:00 REPRODUCIBILITY OF ERYTHROCYTE-ENDOTHELIAL GAP IN HUMAN CHEEK CAPILLARIES
Kate Austin, Daniel Credeur, Michael Welsch. *Louisiana State University, Baton Rouge, LA*
- O2 8:15 BRACHIAL ARTERY VASCULAR OPERATING RANGE IN HEALTH AND DISEASE
Alan Sticker, D. Credeur, M.A. Welsch. *Louisiana State University, Baton Rouge, LA*
- O3 8:30 RESISTANCE AND ENDURANCE TRAINING IMPROVE ENDOTHELIAL FUNCTION AND VASOACTIVE BALANCE IN YOUNG PREHYPERTENSIVES
Darren T. Beck, Ph.D., J.S. Martin⁽¹⁾, D.P. Casey⁽²⁾, R.W. Braith⁽¹⁾ FACSM. ⁽¹⁾*Center for Exercise Science, Department of Applied Physiology and Kinesiology, College of Health and Human Performance, University of Florida, Gainesville, FL, and the* ⁽²⁾*Department of Anesthesiology, Mayo Clinic, Rochester, MN*
- O4 8:45 ASSOCIATIONS BETWEEN ARTERIAL STIFFNESS AND MARKERS OF INFLAMMATION IN OLDER WOMEN
G. Fisher¹, G.R. Hunter², Stephen Glasser³. ¹*Dept of Nutrition Sciences,* ²*Dept of Human Studies, and* ³*Dept of Medicine, University of Alabama at Birmingham, Birmingham, AL*
- 8:00-9:30 ORAL FREE COMMUNICATIONS II: 05-08**
Sports Medicine (**City Terrace 4**)
VIP Chairs:
Joanne "Anne" B. Allen MD, FACSM
George C. Wortley, MD, FACSM
- O5 8:00 AN INTERDISCIPLINARY APPROACH TO INJURY PREVENTION AND PERFORMANCE ENHANCEMENT IN NCAA DIVISION I BASEBALL
Jeremy Gentles, B.D. Johnston, W.G. Hornsby, C.J. MacDonald, and M.H. Stone. *East Tennessee State University, Johnson City, TN*
- O6 8:15 PLANTAR MASSAGE IMPROVES POSTURAL CONTROL IN THOSE WITH CHRONIC ANKLE INSTABILITY
E.A. Wikstrom & J.E. LeClaire. *Department of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC*
- O7 8:30 RELATIONSHIP BETWEEN ACUTE CONCUSSION SYMPTOMS AND DURATION OF RECOVERY IN COLLEGE ATHLETES
Terrell, T. R. MD, MPhil, Cantu, R. MD, Nobles, T.J., Heidel, R.E. MS, Rader, B., Yeager, J.M., McKeag, D. MD, Bielak, K. MD. *Dept. of Family Medicine, University of Tennessee Graduate School of Medicine, Knoxville, TN*

O8 8:45 ALTERED GAIT TERMINATION STRATEGIES FOLLOWING CONCUSSION
T.A. Buckley¹, E.A. Wikstrom², T.G. Tapia-Lovler¹, B.A. Munkasy¹. ¹*Department of Health & Kinesiology, Georgia Southern University, Statesboro, GA*, ²*Department of Kinesiology, University of North Carolina at Charlotte, Charlotte, NC*

8:00-9:30 POSTER FREE COMMUNICATIONS II: P1-P29 (Conference Center A)

1st authors present 8:00-9:30

Clinical Exercise Evaluation; Chronic Disease & Disability; Exercise Behavior/Psychology; Cardiorespiratory Physiology

Chair: Dawn P. Coe, University of Tennessee

- P1 EFFECTS OF EXERGAMING COMPARED TO TRADITIONAL PHYSICAL ACTIVITY ON CARDIOVASCULAR RESPONSES
Stacey L. Beam, G. William Lyerly, Brooke C. Towner, Timothy J. Meyler. *Coastal Carolina University, Conway, SC*
- P2 THE RELATIONSHIP BETWEEN BMI, SCREEN TIME, AND PHYSICAL FUNCTION IN A PEDIATRIC POPULATION
R. Privette, G.D. Miller, S. Frino, J. Skelton *Departments of Health and Exercise Science and Pediatrics, Wake Forest University, Winston-Salem, NC*
- P3 CROSS-VALIDATION OF A RECENTLY PUBLISHED EQUATION PREDICTING ENERGY EXPENDITURE TO RUN OR WALK A MILE IN NORMAL WEIGHT AND OVERWEIGHT ADULTS.
C. Morris, M. Loftin, S. Owens, D. Waddell, M. Bass, and J. Bentley. *Dept. of Health, Exercise Science, and Recreation Management, The University of Mississippi, University, MS*
- P4 THE EFFECTS OF MUSIC TEMPO ON PHYSIOLOGICAL RESPONSES TO SUBMAXIMAL EXERCISE
R. Baker, J. Hawe, B. Tobin and K. Manning. *Department of Kinesiology, Georgia College & State University, Milledgeville, GA*
- P5 IMPROVEMENTS IN FITNESS ATTRIBUTES ACCOMPANYING CIRCUIT RESISTANCE TRAINING IN PERSONS WITH TETRAPLEGIA ARE PARTIALLY DEPENDENT ON TIMELY PROTEIN SUPPLEMENTATION.
Jochen Kressler, Mendez, Armando, Ph.D.; Burns, Patricia, M.S.; Betancourt, Luisa, M.D.; Nash, Mark, Ph.D. *University of Miami, Miller School of Medicine, Miami Project to Cure Paralysis, and the Diabetes Research Institute, Miami, FL*
- P6 RELIABILITY OF A SURVEY TO ASSESS THE ATTITUDES AND BELIEFS OF ADULTS WITH SPINAL CORD INJURIES (SCI) ABOUT EXERCISE
BA Rohaly, JR Wojcik and WM Scelza. *Winthrop University, Rock Hill, SC; Carolinas Rehabilitation, Charlotte, NC*
- P7 SKELETAL MUSCLE METABOLISM AND GLUCOSE TOLERANCE AFTER SPINAL CORD INJURY: INFLUENCE OF INTRAMUSCULAR FAT AND INJURY DURATION
T.E. Ryan, J.T. Brizendine, M.L. Erickson, H.J. Young, K.K. McCully FACSM. *Department of Kinesiology. University of Georgia, Athens, GA*
- P8 SKELETAL MUSCLE INSULIN SENSITIVITY AND DURATION OF TYPE 2 DIABETES MELLITUS
Jacob Ernst, SE Kehe, AH Clark, RD McKernie, HB Kwak, MA Reed, M Dar, WE Pofahl, GL Dohm, and TP Gavin, FACSM. *East Carolina University, Greenville, NC*

- P9 EFFECTS OF RESISTANCE EXERCISE AND DRIED PLUM CONSUMPTION ON BODY COMPOSITION, MUSCULAR STRENGTH AND PHYSICAL FUNCTION IN BREAST CANCER SURVIVORS
E. Simonavice, P-Y. Liu, J.Z. Ilich, J-S. Kim., B. Arjmandi, L.B. Panton, *Dept. of Nutrition, Food & Exercise Sciences, Florida State University, Tallahassee, FL*
- P10 CHANGES IN PHYSICAL FITNESS WITH KRANKCYCLE TRAINING IN PERSONS WITH OBESITY
Joel D. Brasher, J. P. Barfield², Ildiko Nyikos, Carol Kutik, & Laurie A. Malone. *Lakeshore Foundation, Birmingham, Alabama; ²Tennessee Tech University, Cookeville, Tennessee*
- P11 PHYSICAL FUNCTION AND FALLS IN OLDER CANCER SURVIVORS
Courtney Whicker, Shannon L Mihalko, and Heidi D Klepin. *Health and Exercise Science and Oncology, Wake Forest University, Winston Salem, NC*
- P12 MACROPHAGE DEPLETION IN MDX MICE DECREASES MUSCLE REMODELING BUT HAS NO EFFECT ON MUSCLE FUNCTION
J. Kindred, B.S. Gordon, D.C. Delgado, M.C. Kostek. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC*
- P13 TAILORED TEXT MESSAGING: HELPING WOMEN STEP IT UP IN THE WORKPLACE
Nancy M. Gell, Danielle D. Wadsworth. *Department of Kinesiology, Auburn University, Auburn, AL*
- P14 THE EFFECTS OF EXERGAMING ON PERCEIVED HEALTH, REPORTED PHYSICAL ACTIVITY AND FITNESS
Timothy J. Meyler, Lisa A. Barella, Sarah K. Banks, Sandy L. Wilson, Stacey L. Beam. *Coastal Carolina University, Conway, SC*
- P15 ARE YOU READY YET? PSYCHOLOGICAL RETURN TO PLAY AFTER INJURY
VA Garner, DB Hollander, TR Parish, C Merck. *Southeastern Louisiana University, Hammond, LA*
- P16 EFFECT OF MAXIMAL EXERTION ON SELECTIVE ATTENTION AND PROCESSING SPEED IN COLLEGE AGE MALES
Kumar Tammareddi MD, Ali Boolani PhD. *Meharry Medical College, Murfreesboro, TN*
- P17 THE INFLUENCE OF PERCEIVED PHYSICAL ACTIVITY STATUS ON SELF-REPORTED PHYSICAL ACTIVITY RECALL ACCURACY
Katrina D. DuBose, Brooke Graves, Thomas D. Raedeke, Lucas Carr, Lesley Lutes. *Department of Kinesiology, East Carolina University, Greenville, NC*
- P18 ALLOSTATIC LOAD AND TRAINING ADAPTATION: THE IMPACT OF LIFE STRESS ON BODY COMPOSITION AND STRENGTH GAINS OVER A 16-WEEK RESISTANCE EXERCISE PROGRAM
Bovorn Sirikul, Daniel Hollander, Melina Todesco, Alyssa Hargett, Alan Luwe, Dustin Smith, Ashlee Fritscher, Shannon Martin, and Elizabeth Turner. *Southeastern Louisiana Univeristy, Hammond, LA*
- P19 EFFECT OF INTERMITTENT ACTIVITY DURING CARDIOTHORACIC SURGERY ON HUMAN DIAPHRAGM MITOCHONDRIAL RESPIRATION
D Martin, HV Deoghare, BK Smith, A Joseph, T Beaver, T Martin, C Leeuwenburgh; *Depts of Physical Therapy, Aging and Surgery, University of Florida, Gainesville, FL*
- P20 THE EFFECT OF PERIPHERAL ARTERIAL DISEASE ON VARIABILITY OF VELOCITY AND TIME COURSE OF REACTIVE HYPEREMIA
H.J. Young¹, J.T. Brizendine¹, M.L. Erickson¹, T.E. Ryan¹, X. Li², J.R. Murrow², K.K. McCully¹, *¹Department of Kinesiology, The University of Georgia, ²UGA-MCG Medical Partnership, GA*

- P21 SKIN TEMPERATURE RESPONSE TO WHOLE BODY VIBRATION
C. Yarar, J.M. Sefton, and **D. Pascoe**. *Dept. of Kinesiology, Auburn University, AL*
- P22 GENDER DIFFERENCE IN THE ACUTE INFLUENCE OF A 2-HOUR RUN ON ARTERIAL STIFFNESS IN TRAINED RUNNERS
Dustin A. Dew, Pamela G. Krasen, **David C. Nieman**. *Appalachian State University, Boone NC*
- P23 POST-EXERCISE HYPOTENSION IN BRIEF EXERCISE
Jay Bush, M. Schafer, S. Arnett, J. Navalta, S. Lyons, S. Sobrero. *Western Kentucky University, Bowling Green, KY*
- P24 CARDIOVASCULAR AND METABOLIC RESPONSES TO KETTLEBELL EXERCISE
Christy L Hutchison, Brandon F. Grubbs, Allen Jeter, Marcus Lawrence, Robert R. Kraemer. *Department of Kinesiology and Health Studies, Southeastern Louisiana University, Hammond, LA*
- P25 COMPARISON OF CAROTID, BRACHIAL, AND POPLITEAL INTIMA-MEDIA THICKNESS IN SEDENTARY AND ACTIVE MEN 40 TO 60 YEARS OLD
N. Hafner, A. Robinson, E. Albert, C. Womack, D. Wenos, N. Luden & M. Todd. *Department of Kinesiology, James Madison University, Harrisonburg, VA*
- P26 EFFECT OF DIFFERENT EXERCISE TEST PROTOCOLS ON POST-EXERCISE HYPOTENSION
Demetrice Kirkwood, Shannon Sims, Laura Igaune, James W. Navalta, T. Scott Lyons, and Mark A. Schafer. *Dept. of Kinesiology, Recreation, and Sport, Western Kentucky University, Bowling Green, KY*
- P27 VASOREACTIVITY AND ARTERIAL FLOW PATTERNS IN HEART FAILURE
A. Scruggs, D. Credeur, and M. Welsch. *Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA*
- P28 BACKGROUND STRESS AND BLOOD FLOW RESPONSE TO MENTAL STRESS: IS THERE AN ASSOCIATION?
M.L. Erickson¹, E. Hansen², K.K. McCully¹ FACSM, J.R. Murrow². *Department of Kinesiology¹ and Georgia Health Sciences University², University of Georgia, Athens, GA*
- P29 RELATIONSHIPS AMONG VASCULAR FUNCTION MEASURES AT REST AND AFTER SUBMAXIMAL EXERCISE
L.P. Salom, J.A. Arrowood, R.L. Franco, R.K. Evans. *Virginia Commonwealth University, Richmond, VA*

9:30-9:45 BREAK

**9:45-10:45 BASIC SCIENCE LECTURE (Grand Ballroom 1,2,3)
"Skeletal Muscle Health with Space Flight and Aging"**

Scott W. Trappe, PhD, FACSM

John and Janice Fisher Professor of Exercise Science

Director, Human Performance Laboratory

Director, Human Bioenergetics Program

Department of Physical Education, Sport, and Exercise Science

Ball State University

Chair: Laurie Wideman Gold, University of North Carolina at Greensboro

10:45-11:00 BREAK

11:00-12:30 SYMPOSIA S4-S5

- S4 DISORDERED BODY COMPOSITION, MUSCLE QUALITY AND PHYSICAL FUNCTION IN OLDER ADULTS: DEFINING, MEASURING AND IMPROVING
Anne E. O'Brien, MS, Ellen M. Evans, PhD. *Department of Kinesiology, University of Georgia, Athens (City Terrace 10)*
Chair: Timothy P. Gavin, East Carolina University
- S5 DOXORUBICIN AND ENDURANCE EXERCISE TRAINING: EFFECTS ON CARDIAC AND SKELETAL MUSCLES
Ashley J. Smuder¹, Kisuk Min¹, and Andreas N. Kavazis². ¹*Department of Applied Physiology and Kinesiology, University of Florida, Gainesville, FL* and ²*Department of Kinesiology, Mississippi State University, Mississippi State, MS*
(City Terrace 12)
Chair: Stephen J. Rossi, Georgia Southern University

11:00-12:00 Tutorials T10-T11

- T10 AMERICAN COLLEGE OF SPORTS MEDICINE LEADERSHIP & DIVERSITY TRAINING PROGRAM
L. Jerome Brandon, FACSM and NiCole R. Keith, FACSM, *Department of Kinesiology & Health, Georgia State University, Atlanta, GA and University of Indiana-Purdue University, Indianapolis, IN (City Terrace 9)*
Chair: B. Sue Graves, Florida Atlantic University
- T11 SECONDARY DATA ANALYSIS – THE CROSS-SECTIONAL STUDY
J.R. Churilla. *Department of Clinical and Applied Movement Sciences, The University of North Florida, Jacksonville, FL (City Terrace 11)*
Chair: Andy Bosak, Georgia Southwestern State University

11:00-12:30 ORAL FREE COMMUNICATIONS III: O9-O12

Physical Fitness/Exercise Testing **(City Terrace 7)**

VIP Chairs:

Edward T. Howley, PhD, FACSM, University of Tennessee (emeritus)

Dixie L. Thompson, PhD, FACSM, University of Tennessee

- O9 11:00 THE RELATIONSHIP BETWEEN SELF-REPORTED HEALTH HISTORY, PHYSICAL LIMITATIONS, AND PHYSICAL PERFORMANCE IN OLDER ADULTS
Alicia Tatum, J. M. Green³, S. Black², and P. A. Bishop². *Columbus State University, Columbus, GA, The University of Alabama, Tuscaloosa, AL, The University of North Alabama, Jacksonville, AL*
- O10 11:15 ADIPOSITY IMPACTS PHYSICAL FUNCTION MORE THAN LEG LEAN MASS IN COMMUNITY-DWELLING OLDER MEN AND WOMEN
C.R. Straight, C.L. Ward, B.M. Das, R.J. Valentine, J. Georgiadis, E.M. Evans, FACSM. *Department of Kinesiology, University of Georgia*
- O11 11:30 COMPARISON OF MAXIMAL HEART RATE PREDICTION EQUATIONS IN ESTIMATING VO₂MAX FROM THE YMCA SUBMAXIMAL CYCLE ERGOMETER PROTOCOL
Patrick O. Gélinas and Danielle L. Cranston, *Department of Exercise and Sports Science, University of South Carolina Aiken, Aiken, SC*
- O12 11:45 WHY IS THERE CONFUSION ABOUT VO₂ PLATEAU? A RE-EXAMINATION OF THE WORK OF A.V. HILL
Richie V. Castle, David Bassett FACSM, **Dixie Thompson** FACSM, Dawn Coe, Scott Conger. *University of Tennessee, Knoxville*

11:00-12:30 POSTER FREE COMMUNICATIONS III: P30-P55 (Conference Center A)

1st authors present 11:00-12:30

Sports Medicine; Biomechanics/Motor Control; Competitive Athletes

Chair: Benjamin T. Gordon, University of South Carolina at Columbia

- P30 EFFECTS OF A LOWER BACK WRAP WITH FAR INFRARED TECHNOLOGY ON CHANGES IN SKIN TEMPERATURE
H.L. Kaylor, C.A. Rynders, S. Saliba, J. Hertel FACSM, A. Weltman FACSM *Exercise Physiology Laboratory and Sports Injury Laboratory, University of Virginia, Charlottesville, Virginia*
- P31 INFLUENCE OF ATHLETIC WRAPS TREATED WITH NEGATIVE IONS AND FAR INFRARED ON SKIN TEMPERATURE.
Richard H. Laird, Khalil A. Lee, **David D. Pascoe** FASCM, *Auburn University, Auburn AL*
- P32 THERAPEUTIC ULTRASOUND DECREASES PAIN PERCEPTION AND INCREASES PAIN TOLERANCE AFTER MUSCLE DAMAGE
S.E. Aaron, D.C. Delgado, M.C. Kostek. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC*
- P33 THE INFLUENCE OF LEG DOMINANCE, VISION AND SURFACE TYPE ON BALANCE USING A SINGLE LEG STANCE IN ACTIVE YOUTHS
Katelyn Graben, Andrea Harrison, Bethany Washington, Rebecca Bernheim, Adam Knight, and Brendon Hale. *Department of Kinesiology, Mississippi State University, Mississippi State, MS*
- P34 THE EFFECTS OF LOW VERSUS HIGH CONTEXTUAL INTERFERENCE ON THE ACQUISITION OF STRENGTH AND SKILL OF THE BENCH PRESS
M. Naimo, D.W. Eccles, J.M. Wilson, M.C. Zourdos, J-S. Kim, and L.B. Panton, *Depts. of Nutrition, Food & Exercise Sciences, and Educational Psychology and Learning Systems, The Florida State University, Tallahassee, FL, and Department of Health Sciences and Human Performance, The University of Tampa, Tampa, FL*
- P35 VERTEBRAL COMPRESSION WITH A PULL UP
J. H. Patel and W. H. Weimar. *Dept. of Kinesiology, Auburn University, Auburn, AL*
- P36 INFLUENCE OF A MARCHING SNARE DRUM SYSTEM ON CONTACT PRESSURE
Andrea M. Sumner, W.H. Weimar, J.H. Patel, B.H. Romer, J.W. Fox, and J.M. Rehm. *Dept. of Kinesiology, Auburn University, Auburn, AL*
- P37 EVALUATION OF XENITH X1 AWARE-FLOW SHOCK ABSORBER CLAIMS
Janisse AP, Lippa NM, Goetz JT, Krzeminski DE, Gould TE, Piland SG, Rawlins JW. *School of Human Performance and Recreation, School of Polymers and High Performance Materials. University of Southern Mississippi, Hattiesburg, MS*
- P38 LINEAR IMPACT ENERGY ATTENUATION OF THE XENITH X1 AWARE-FLOW SHOCK ABSORBER
Krzeminski DE, Goetz JT, Lippa NM, Janisse AP, Piland SG, Gould TE, Rawlins JW. *School of Human Performance and Recreation, School of Polymers and High Performance Materials. University of Southern Mississippi, Hattiesburg, MS*
- P39 TRANSITIONING TO A MINIMALIST SHOE: A PILOT STUDY
Jennifer Bunn, L. Chris Eschbach.. *Campbell University and NC Wesleyan University*
- P40 DIFFERENCE IN LANDING KINETICS DURING VERTICAL DROP DOWN MOVEMENT ACROSS DIFFERENT FOOTBALL POSITIONS
Sara McGinley¹, Kathryn Hosene², Daniel Carruth¹, Brendon Hale², and Adam Knight².
¹*Center for Advanced Vehicular Systems;* ²*Department of Kinesiology. Mississippi State University, Mississippi State, MS*

- P41 DIFFERENCE IN LANDING KINETICS DURING SIMULATED ANKLE SPRAIN MOTION BETWEEN CHRONIC ANKLE INSTABILITY AND HEALTHY PARTICIPANTS
Kathryn Hosene¹, Sara McGinley², Brendon Hale¹, and Adam Knight¹. ¹*Department of Kinesiology*; ²*Center for Advanced Vehicular Systems. Mississippi State University, Mississippi State, MS*
- P42 IDENTIFYING LOWER EXTREMITY KINEMATIC AND KINETIC DIFFERENCES AMONG FOOTWEAR CONDITIONS DURING A WALKING TASK:A DESCRIPTIVE STUDY
Kristin Keene, Anh-Dung Nguyen, Ph.D., Shannon Hardester, Ashley Conrad, Marc DiFronzo, William R. Barfield, Ph.D., FACSM, *Department of Health and Human Performance, College of Charleston, 66 George Street, Charleston, SC*
- P43 RELATIONSHIPS BETWEEN ANTHROPOMETRIC AND PERFORMANCE MEASURES TO VELOCITIES IN COLLEGIATE BASEBALL HITTERS
David J. Szymanski, Brent E. Porche, and Kelly A. Brooks. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P44 THE THROWING SHOULDER'S RESISTANCE ZONE IS GREATER FOR EXTERNAL ROTATION THAN INTERNAL ROTATION
Jeff T. Wight¹, Guy B. Grover², Kelly Larkin², Beven P. Livingston¹, and Mark D. Tillman². ¹*University of North Florida, Jacksonville, FL*, ²*University of Florida, Gainesville, FL*
- P45 CHANGES IN MEASURES OF POWER IN NCAA DIVISION I FEMALE SOCCER ATHLETES THROUGH COMPETITIVE SEASONS
Christopher J. MacDonald, Ryan P. Alexander, Adam L. Sayers, Howard S. Gray, Michael A. Israetel, Christian R. Carter, Jeremy A. Gentles, Aaron Casey, Matt L. Sams, Hugh S. Lamont, Michael W. Ramsey, Michael H. Stone. *East Tennessee State University, Johnson City, TN*
- P46 A COMPARISON BETWEEN THE POLAR TEAM2 TRAINING LOAD AND SESSION RPE TRIMP AS METHODS OF MONITORING TRAINING IN NCAA DIVISION 1 MALE SOCCER PLAYERS
Howard S. Gray, Satoshi Mizuguchi, L. Scott Calabrese, Scott I. Dishner, Justin D. Meredith, Christopher J. MacDonald, Marco Cardinale, G. Gregory Haff, Michael W. Ramsey, Adam L. Sayers, Michael H. Stone. *Center of Excellence for Sport Science and Coach Education, East Tennessee State University, Johnson City, TN*
- P47 FUTURE PHYSICAL LIMITATIONS AND COLLEGIATE ATHLETIC PARTICIPATION
K.A. Brooks. *Department of Kinesiology, Louisiana Tech University, Ruston, LA*
- P48 EFFECT OF PICKLE AND PICKLE JUICE CONSUMPTION ON ENDURANCE EXERCISE IN THE HEAT
D.J. Elmer, M.D. Barberio, K.A. Lee, and **D.D. Pascoe**. *Department of Kinesiology, Auburn University, Auburn, AL*
- P49 EXAMINATION OF OVERSPEED TRAINING ON POWER, SPEED AND AGILITY
A.E. Salek, W.R. Bixby (FACSM), J.T. Lee. *Elon University, Elon, NC*
- P50 MOUTHPIECE USE DECREASES LACTATE DURING HIGH-INTENSITY RESISTANCE EXERCISE
Wesley D. Dudgeon¹, Timothy P. Scheett², Erica J. McDivitt¹, Dena P. Garner¹. ¹*Department of Health, Exercise & Sport Science, The Citadel* and ²*Dept. of Health and Human Performance, College of Charleston*

- P51 TESTOSTERONE CORTISOL RATIO IMPROVES IN COLLEGIATE FOOTBALL PLAYERS WITH USE OF PERFORMANCE MOUTHPIECE
Dena P. Garner¹, Timothy P. Scheett², Erica J. McDivitt¹, Wesley D. Dudgeon¹. ¹*Dept. of Health, Exercise & Sports Science, The Citadel* and ²*Dept. of Health & Human Performance, College of Charleston*
- P52 EXAMINATION OF THE IMPACT OF A COOLING PRODUCT ON CYCLING PERFORMANCE IN THE HEAT
Amanda B. Mischo, W.R. Bixby (FACSM), P.C. Miller, S.B. Bailey, E.E. Hall (FACSM).
Elon University, Elon, NC.
- P53 FORCE PRODUCTION OF THREE DIFFERENT FLIP-TURN STYLES WHILE RIDING A DRY LAND CART
J.M. Rehm, J.H. Patel, B.H. Romer, J.W. Fox, A.M. Sumner and W.H. Weimar. *Dept. of Kinesiology, Auburn University, Auburn, AL*
- P54 TURN TIME FOR FOUR DIFFERENT FLIP-TURN STYLES
B.H. Romer, J.H. Patel, J.W. Fox, J.M. Rehm, A.M. Sumner, and W.H. Weimar. *Dept. of Kinesiology, Auburn University, Auburn, AL*
- P55 UNDERSTANDING THE EFFECTIVENESS OF TWO TRAINING METHODS TO IMPROVE JUMP PERFORMANCE
Tim McInnis, Kimi Sato; Adam Colorito; Geoffrey Fryer. *East Tennessee State University, Johnson City, TN*

12:30-1:45 PAST PRESIDENT'S LUNCH (Suite 4104)

- 2:00-3:00 HENRY MONTOYE SCHOLAR LECTURE (Grand Ballroom 1,2,3)**
"Impairments of Skeletal Muscle Function: Some Causes, Some Differences, and Few Treatments"
Gordon L. Warren, PhD, FACSM
Professor, Division of Physical Therapy
Byrdine F. Lewis School of Nursing & Health Professions
Georgia State University
Chair: **Kirk J. Cureton**, University of Georgia

3:00-3:15 BREAK

3:15-4:45 SYMPOSIUM S6

- S6** ***40th SEACSM HIGHLIGHTED SESSION***
THE EXPERIMENTAL CONTINUUM: ANSWERING COMPLEX PHYSIOLOGICAL QUESTIONS
Scott K. Powers, FACSM, Oh-Sung Kwon, W. Bradley Nelson, Kurt J. Sollanek.
University of Florida, Gainesville, FL (City Terrace 9)
Chair: **J. Larry Durstine**, University of South Carolina

3:15-4:15 TUTORIALS T12-T13

- T12 SIGNIFICANCE OF NON-ST-SEGMENT DATA COLLECTED DURING A GXT
Mohammad Irfan, M.D., J. Mahurin, W. Jones, B. Meredith, and Z. Zhou.
Montgomery Family Medicine Residency Program, Montgomery, AL
(City Terrace 10)
Chair: **Peter W. Grandjean**, Baylor University
- T13 CARBOHYDRATE INTAKE DURING ENDURANCE EXERCISE: HIGHLIGHTING 30 YEARS OF SCIENCE TO OPTIMIZE PERFORMANCE
Michael J. Saunders. *James Madison University, Harrisonburg, VA (City Terrace 11)*
Chair: Edmund O. Acevedo, Virginia Commonwealth University

3:15-4:45 ORAL FREE COMMUNICATIONS IV: O13-O16

Obesity/Weight Loss (**City Terrace 7**)

VIP Chairs:

Janet W. Rankin, PhD, FACSM, Virginia Polytechnic and State University

Arthur L. Weltman, PhD, FACSM, University of Virginia

- O13 3:15 THE IMPACT OF A LIFESTYLE WEIGHT LOSS INTERVENTION ON HEALTH-RELATED QUALITY OF LIFE IN THE HEALTHY LIVING PARTNERSHIPS TO PREVENT DIABETES (HELP PD): A RANDOMIZED CONTROL TRIAL
L. Squires, A. Greulich, S. Isom, M. Vitolins, D. Goff, C. Blackwell, E. Rosenberger, T. Morgan, J. Katula. *Dept. of Health and Exercise Science, Wake Forest University, Winston-Salem, NC*
- O14 3:30 ADIPOSITY AND FATIGUE IN POSTMENOPAUSALWOMEN
C.L. Ward¹, B.M. Das¹, D.D. Guest², J. Georgiadis², E.M. Evans¹, FACSM . *Department of Kinesiology, ¹University of Georgia, ²University of Illinois*
- O15 3:45 EFFECTS OF EXERCISE TRAINING ON FAT OXIDATION IN UNTRAINED OVERWEIGHT AND OBESE FEMALES
K.P. Manning, J.C. Rupp, D. Benardot, **L.J. Brandon**, and J.A. Doyle. *Dept. of Kinesiology and Health, Georgia State University, Atlanta, GA*
- O16 4:00 LIPOLYTIC AND GLUCOREGULATORY RESPONSES TO FEEDING AND EXERCISE IN OBESE AND LEAN CHILDREN
J.R. Pierce, G.H. Geyer, R.C. Squibb, R.C. Hickner, FACSM. *Human Performance Lab, Kinesiology, Physiology, and Center for Health Disparities Research, East Carolina University, Greenville, NC*

3:15-4:45 ORAL FREE COMMUNICATIONS V: O17-O20

Youth (**City Terrace 12**)

VIP Chairs:

Patricia A. Nixon, PhD, FACSM, Wake Forest University

Dianne S. Ward, EdD, FACSM, University of North Carolina

- O17 3:15 SPORTS GAME PLAY IN MIDDLE SCHOOL PHYSICAL EDUCATION: A COMPARISON OF MODERATE TO VIGOROUS PHYSICAL ACTIVITIES
Patience, M.A., Kilpatrick, M.W, Sun, H. Flory, S.B., Watterson, T.A. *Dept. of Physical Education, University of South Florida, Tampa, FL*
- O18 3:30 SEASONAL CHANGES IN PHYSICAL ACTIVITY OUTSIDE OF SCHOOL IN YOUTH
B.D. Wiseman, J.M. Pivarnik, D.P. Coe. *Department of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville, TN. Department of Kinesiology, Michigan State University, East Lansing, MI*
- O19 3:45 PHYSICAL ACTIVITY COMPENSATION IN ELEMENTARY SCHOOL STUDENTS DURING AN AFTER-SCHOOL EXERCISE PROGRAM
Amanda D. Gipson¹, Michael D. Schmidt¹, Catherine L. Davis² (1) *Dept. of Kinesiology, The University of Georgia, Athens, GA;* (2) *Georgia Prevention Institute, Georgia Health Sciences University, Augusta, GA*
- O20 4:00 MODELING RELATIONSHIPS BETWEEN PHYSICAL ACTIVITY, DIET, FITNESS, FATNESS AND ACADEMIC RELEVANT OUTCOMES IN OVERWEIGHT CHILDREN
Erin Kaye Howie¹, Catherine L. Davis², ¹*University of South Carolina, Columbia, SC,* ²*Georgia Health Sciences University, Augusta, GA*

3:15-4:45 POSTER FREE COMMUNICATIONS IV: P56-P81 (Conference Center A)

1st authors present 3:15-4:45

Undergraduate Research Posters; *sponsored by the Council on Undergraduate Research*

Chair: Paul C. Miller, Elon University

- P56 EFFECT OF MUSCULAR STRENGTH ON MUSCULAR FATIGUE AND RUNNING ECONOMY IN COLLEGE AGED WOMEN
Olivia Bosshardt, Martha Claire Huff, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL*
- P57 LOWER LIMB ASYMMETRY IN BALANCE, FLEXIBILITY, AND STRENGTH IN ACTIVE AND INACTIVE COLLEGE WOMEN
Jennifer Rice, Aaren Fisher, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL*
- P58 EFFECTS OF RESISTIVE TRAINING ON STRENGTH, BALANCE, QUALITY OF LIFE, SELF-EFFICACY, AND PHYSICAL ACTIVITY IN THE ELDERLY
E.E. Cooper and E.K. Bailey, *Health and Human Performance, Elon University; Kinesiology, East Carolina University, Greenville, NC*
- P59 EFFECTS OF KNEE ALIGNMENT ON GAIT KINEMATICS IN KNEE OSTEOARTHRITIS
R.A. Lanzer, **S. Messier**, J. Smith. *Department of Health and Exercise Science, Wake Forest University, Winston-Salem NC*
- P60 THE EFFECTS OF POWER BALANCE BRACELETS ON STATIC BALANCE
Nicole Picha, Seth Lancaster, JK Petrella, RW Hensarling. *Samford University, Birmingham, AL*
- P61 EFFECT OF SKECHER SHAPE UP SHOES ON DYNAMIC BALANCE
M. Langford and J. Davis. *Department of Exercise Science, Elon University, Elon, NC*
- P62 THE INFLUENCE OF VISION AND SURFACE TYPE ON BALANCE USING A DOUBLE LEG STANCE IN ACTIVE YOUTHS
Rebecca Bernheim, Bethany Washington, Andrea Harrison, Katelyn Graben, Adam Knight, and Brendon Hale. *Department of Kinesiology, Mississippi State University, Mississippi State, MS*
- P63 THE CORRELATION BETWEEN A 1RM BENCH PRESS AND THE ACCURACY AND VELOCITY OF A LACROSSE SHOT IN FEMALE COLLEGE CLUB LACROSSE ATHLETES
Jordan Moore, Courtney George, JK Petrella, RW Hensarling. *Samford University, Birmingham, AL*
- P64 THE EFFECT OF COMPETITION ON FREE-THROW SHOOTING PERCENTAGE
Preston Smith, Ruth Ketcham, JK Petrella. *Samford University, Birmingham, AL*
- P65 FATIGUE IN WALKING VERSUS RIDING A CART IN AN 18-HOLE ROUND OF GOLF
Daniel Price, Trevor McHardy, JK Petrella, RW Hensarling. *Samford University, Birmingham, AL*
- P66 A COMPARISON OF CALORIC EXPENDITURE AND RATING OF PERCEIVED EXERTION BETWEEN THE SHAKE WEIGHT® AND A REGULAR DUMBBELL
Elizabeth Schuppert, Lindy Steele, JK Petrella, RW Hensarling. *Samford University, Birmingham, AL*
- P67 INTRA-RATER AND INTER-RATER RELIABILITY OF A HAND HELD DYNAMOMETER
Zachary Rogers, **Michael J. Berry**, Ashlee H. Case. *Wake Forest University, Winston-Salem, NC*
- P68 VARIABILITY IN RESISTANCE TRAINING REPETITIONS ACHIEVED AT SPECIFIC WORKLOADS
Caleb Williams and Peter Magyari, *Department of Exercise Science at the University of North Florida*

- P69 VALIDATION OF EXERCISE WORKLOADS ON TWO LEG ERGOMETERS
A. Silverman, J. Ross, D. Clevenger. *Dept. of Health & Exercise Science, Wake Forest University, Winston-Salem, NC*
- P70 HIGH INTENSITY TRAINING EFFECTS ON MAXIMAL POWER AND VO2 MAX
A.D. Dixon, J.L. Long, M.J. McKenzie. *Exercise Science Program, Department of Human Performance and Sport Sciences, Winston Salem State University, Winston-Salem NC*
- P71 COMPARING PHYSICAL ACTIVITY MONITORING DEVICES
Caitlin Davis, Peter Brubaker. *Health and Exercise Science, Wake Forest University, Winston-Salem, NC*
- P72 MEASURING ACTIVITY PATTERNS IN VENICE STUDY (MAPS)
Robert Musci, Peter Brubaker, PhD. *Wake Forest University, Winston-Salem, NC*
- P73 THE RELATIONSHIP OF SELF-REPORTED EXERCISE HABITS AND ORAL HYGIENE
Taneshia McGhee, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL*
- P74 THE EFFECTS OF LOCATION OF FOOD RETAILERS AND ROLE OF FOOD DESERTS IN ROCK HILL, SC
S.I. Igozee and J.R. Wojcik, *Dept. of Exercise Science, Winthrop University, Rock Hill, SC*
- P75 PHYSICAL ACTIVITY AND FOOD CONSUMPTION: IS THERE A RELATIONSHIP?
Sophie Guderian, Dr. Mike Turner, Dr. Tricia Hubbard-Turner. *UNC Charlotte, Charlotte, NC*
- P76 CHARLESTON PHYSICALLY ACTIVE RESIDENTIAL COMMUNITIES AND SCHOOLS (C-PARCS): A PRELIMINARY EVALUATION OF A COMMUNITY-BASED WELLNESS PARTNERSHIP
K. Bowling, S. Kubinski, B. Williams, L. Taylor, L. Lane, P. Angelakis, E. Cooper, J. Fojo, M. Hassig, C. Campbell, S. Flynn and T. Scheett. *College of Charleston, Charleston, SC*
- P77 RISK FOR METABOLIC SYNDROME FOLLOWING DIET-INDUCED WEIGHT LOSS OR EXERCISE IN POST MENOPAUSAL WOMEN
Layne Eidemiller, Elizabeth S. Edwards, Christopher J. Womack, FACSM and Judith A. Flohr. *James Madison University and Morrison Bruce Center, Harrisonburg, VA*
- P78 DIFFERENCES IN RISK OF DISORDERED EATING AMONG DIVISION I FEMALE COLLEGE ATHLETES
Alexandra Chin, Robin Leathers, L. Chris Eschbach, Jennifer Bunn. *Campbell University and NC Wesleyan University*
- P79 THE EFFECTS OF GLYCINE PROPIONYL-L-CARNITINE ON ANAEROBIC POWER PRODUCTION IN RECREATIONALLY-ACTIVE WOMEN
M.C. Chun, P.C. Miller, and P.L. Jacobs. *Dept. of Exercise Science, Elon University, Elon, NC*
- P80 THE EFFECT OF GATORADE PRIME ON FATIGUE IN HIGH ANAEROBIC INTERMITTENT SPRINT RUNNING IN FEMALES
Trent Burgess, Courtney Naylor, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL*
- P81 DOSE RESPONSE ASSESSMENT OF SUSPENSION TRAINING WORKOUTS IN COLLEGE-AGED WOMEN
A.Fortune, H. Lund, B. Wright, H. Sayer, J. Holler, B. Monk, M. Roberts, M. Grieff, W.D. Dudgeon and T.P. Scheett. *College of Charleston and The Citadel, Charleston, SC*

- 4:50-5:50 STUDENT BOWL (Grand Ballroom 1,2,3)**
Chair: **Judith A. Flohr**, James Madison University
- 5:55-7:00 SEACSM GRADUATE STUDENT FAIR (Grand Ballroom 4)**
- 6:30-8:00 CLINICAL TRACK RECEPTION –Sponsored by Steadman Hawkins Clinic of the Carolinas (River Terrace 2)**

SATURDAY February 11, 2012

8:00-12:00 EXHIBITS (3rd Floor Skywalk)

8:00-9:00 TUTORIALS T14-T18

T14 40th SEACSM HIGHLIGHTED SESSION

MEASURING OXYGEN UPTAKE: THEN AND NOW

L. Bruce Gladden. *Department of Kinesiology; Auburn University, Auburn, AL (City Terrace 7)*

Chair: **David D. Pascoe**, Auburn University

T15 ACSM GUIDANCE FOR PRESCRIBING EXERCISE: CLARITY OR CONFUSION
Michael A. Welsch. *Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA, 70803 (City Terrace 9)*
Chair: Sean C. McCoy, North Florida/South Veterans Health System

T16 QUERCETIN AND ENDURANCE EXERCISE CAPACITY: WHAT IS THE EVIDENCE?
Jochen Kressler. *University of Miami, Miller School of Medicine, Miami Project to Cure Paralysis and Georgia Institute of Technology, School of Applied Physiology, Miami, FL (City Terrace 10)*
Chair: Kimberly Reich, High Point University

T17 PHYSIOLOGICAL FOUNDATIONS OF TAI CHI HEALTH BENEFITS
P.A. Gryffin, *Department of Health Education and Behavior, University of Florida, Gainesville, FL (City Terrace 11)*
Chair: Wally R. Bixby, Elon University

T18 TO INFINITY AND BEYOND: THE "BUZZ" ON SUCCESS FOR CAREERS IN EXERCISE SCIENCE
Lanay M. Mudd¹, Rebecca A. Battista¹, Dawn P. Coe², ¹*Appalachian State University, Boone, NC;* ²*University of Tennessee, Knoxville, TN (City Terrace 12)*
Chair: Wesley D. Dudgeon, The Citadel

8:00-9:10 POSTER FREE COMMUNICATIONS V: P83-P108 (Conference Center A)

Authors present 8:00-9:10

Endocrinology/Immunology; Epidemiology & Preventive Medicine; Skeletal Muscle; Body Composition/Energy Balance/Weight Control

Chair: T. Scott Lyons, Western Kentucky University

P83 MCP-1 -/- MICE SHOW BLUNTED EXPRESSION OF INFLAMMATORY CYTOKINES IN BRAIN AND MUSCLE FOLLOWING EXERCISE-INDUCED MUSCLE DAMAGE
BT Gordon, EA Murphy, JL McClellan, MD Carmichael, **JM Davis**, *Dept. of Exercise Science, University of South Carolina, Columbia, SC*

P84 THE EFFECTS OF RED WINE AND ETHANOL ON GLUCOSE, INSULIN, AND C-PEPTIDE RESPONSES DURING AN ORAL GLUCOSE TOLERANCE TEST IN MEN.
B.M. Harris and K.A. Abraham. *Exercise Science Program, Transylvania University, Lexington, KY*

- P85 THE DISEASE ANALOG MODEL AND LEPTIN MAY IDENTIFY SUSCEPTIBLE PRE-OBESE AFRICAN-AMERICAN WOMEN
James Navalta, T. Scott Lyons, Sharon E. Whitlock, Demetrice D. Kirkwood, Scott W. Arnett, Mark A. Schafer, and Gina Sobrero. *Exercise Physiology Laboratory, Department of Kinesiology, Recreation, and Sport, Western Kentucky University, Bowling Green, KY*
- P86 PHYSICAL ACTIVITY LEVELS, INJURIES, AND PRODUCTIVITY IN LOUISIANA LABORERS
K.T. Craven, and K.A. Brooks. *Louisiana Tech University, Ruston, LA*
- P87 EFFECT OF CLASSROOM-BASED PHYSICAL ACTIVITY BREAKS ON PHYSICAL ACTIVITY AND ON-TASK BEHAVIOR IN PRESCHOOL CHILDREN
Elizabeth K. Webster, Samuel W. Logan, Danielle D. Wadsworth, Leah E. Robinson, Laura T. Barber. *Auburn University, Auburn, AL*
- P88 EXAMINING LINKS BETWEEN DAILY PHYSICAL EDUCATION ON COGNITION AND FITNESS AMONG AFRICAN AMERICAN YOUTH
S. Howell, JA. Reed. *Department of Health Sciences, Furman University, Greenville, SC*
- P89 DOSE-RESPONSE RELATIONS BETWEEN CHANGE IN SEDENTARY TIME AND CHANGE IN CARDIOMETABOLIC RISK FACTORS
Kayla Cangelosi and Lucas J. Carr. *Department of Kinesiology, East Carolina University, Greenville, NC*
- P90 FIBER TYPE CONVERSION IN VIVO: THE EFFECTS OF SIX1 GENE EXPRESSION IN MURINE SKELETAL MUSCLE
K. L. Hetzler, M. C. Kostek. *University of South Carolina, Columbia, SC*
- P91 THE EFFECT OF TUMOR BURDON ON SKELETAL MUSCLE IN CACHEXIA.
Roberts B, Senf S, Beharry A, Judge A. *Department of Physical Therapy, and University of Florida Gainesville, FL*
- P92 EFFECT OF SLOW VELOCITIES OF MOVEMENT ON FORCE AND EMG ACTIVITY
Will Hayes, Jerome Sauret, **Allan H. Goldfarb**. *University of North Carolina Greensboro, Greensboro, NC*
- P93 RELATIONSHIP BETWEEN BODY COMPOSITION AND STRENGTH MEASUREMENTS IN BREAST CANCER SURVIVORS
T.A. Madzima, E. Simonavice, P.Y. Liu, J.Z. Ilich, J-S. Kim., L.B. Panton, *Dept. of Nutrition, Food & Exercise Sciences, Florida State University, Tallahassee, FL*
- P94 EMG AND ANAEROBIC POWER RESPONSES TO ACUTE WHOLE BODY VIBRATION
G. Wentz, A. Gross, K. Brand, P. Riuli, C.J. Ketcham and P.C. Miller
Department of Exercise Science, Elon University, Elon, NC
- P95 THE INFLUENCE OF STIMULATION CURRENT ON NIRS MEASURED METABOLIC RATE
Hillary Liken, Jared T. Brizendine, Kevin K. McCully, FACSM. *Biology and Kinesiology Depts, University of Georgia, Athens, GA*
- P96 DOES A SECONDARY LOSS OF STRENGTH OCCUR FOLLOWING INDUCTION OF MUSCLE INJURY?
A. Farthing, S. Coley, B. Piaro, C. Satterfield, C. Vlahos, J. Lewis, and G. Warren.
Division of Physical Therapy, Georgia State University, Atlanta, GA

- P97 THE IMPACT OF A 6-WEEK RESISTANCE TRAINING PROGRAM WITH PRE- AND POST-EXERCISE PERFORMANCE SUPPLEMENTATION ON CARDIOVASCULAR RISK IN RESISTANCE-TRAINED MEN
D. David Thomas, Jeong-Su Kim, W. Kyle Mandler, Amber W. Kinsey, Colin J. Riley, Lynn B. Panton, Timothy P. Scheett, Michael J. Ormsbee. *The Florida State University, Tallahassee, FL* ²*Dept. of Health and Human Performance, College of Charleston, Charleston, SC*
- P98 NUTRITION AND PHYSICAL ACTIVITY ENVIRONMENTS IN RURAL AREA CHILD CARE CENTERS.
H. Fleig, R.A. Battista, and L.M. Mudd. *Department of Health, Leisure and Exercise Science, Appalachian State University*
- P99 CARDIOMETABOLIC RISK FACTORS AND FITNESS IN RURAL, LOW SOCIO-ECONOMIC CHILDREN: A DESCRIPTIVE STUDY
Colleen M. Daly, Leah E. Robinson, Danielle D. Wadsworth, Brenda Lindah. *Auburn University, Auburn, AL*
- P100 BREAKFAST IS RELATED TO A HIGHER TOTAL DAILY CALORIE INTAKE AND LOWER BMI IN NORMAL WEIGHT ADOLESCENTS. IT IS NOT KNOWN WHETHER THIS ASSOCIATION HOLDS TRUE FOR LATINO POPULATIONS OF NON MEXICAN DESCENT.
Lorena Martin, Arlette C. Perry, Ph.D. *University of Miami, Miami, FL*
- P101 EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION I: BODY COMPOSITION AND HEMODYNAMIC CHANGES (PRELIMINARY DATA)
GM Hudson, LA Knecht, CJ Tullos, ER Buras, BL Boleware, JT Goetz, DE Krzeminski, AD Sample, and MJ Webster, FACSM. *School of Human Performance and Recreation, The University of Southern Mississippi, Hattiesburg, MS*
- P102 EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION II: METABOLISM (PRELIMINARY DATA)
BL Boleware, LA Knecht, GM Hudson, CJ Tullos, ER Buras, DE Krzeminski, JT Goetz, AD Sample, and MJ Webster, FACSM. *School of Human Performance and Recreation, The University of Southern Mississippi, Hattiesburg, MS*
- P103 EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION III: SERUM LIPIDS CHANGES (PRELIMINARY DATA)
CJ Tullos, LA Knecht, GM Hudson, BL Boleware, ER Buras, AD Sample, and MJ Webster, FACSM. *School of Human Performance and Recreation, The University of Southern Mississippi, Hattiesburg, MS*
- P104 EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION IV: SERUM MARKERS OF LIVER AND KIDNEY FUNCTION (PRELIMINARY DATA)
ER Buras, GM Hudson, LA Knecht, BL Boleware, CJ Tullos, AD Sample, and MJ Webster, FACSM. *School of Human Performance and Recreation, The University of Southern Mississippi, Hattiesburg, MS*
- P105 DEHYDRATION AND ACUTE WEIGHT GAIN IN MIXED MARTIAL ARTS FIGHTERS PRIOR COMPETITION
Adam Jetton, **Alan C. Utter** (FACSM), Marcus M. Lawrence, Tracie L. Haines and Marco Meucci. *Appalachian State University, Department of Health, Leisure, and Exercise Science, Boone, NC*
- P106 COMPARING THE ENERGY COST OF TWO BODY SHAPER UNDERGARMENTS DURING WALKING
C. Brady, C.A. Rynders, F.I. Katch FACSM, and A. Weltman FACSM
Exercise Physiology Laboratory, University of Virginia, Charlottesville, Virginia

P107 EFFECTS OF THE WALKING WORKSTATION ON WORK PRODUCTIVITY AND SELECTED PHYSIOLOGICAL VARIABLES
D.L. Wenos, T.L. Lytle, H.N. Hamdan, and M.K.Todd. *James Madison University, Harrisonburg, VA*

P108 DIFFERENCES IN ENERGY EXPENDITURE BETWEEN RESISTANCE SHOES AND RUNNING SHOES
Rebecca Werner ⁽¹⁾, L.C.Eschbach ⁽²⁾, Kourtney Barnes ⁽¹⁾, Cassondra Bolick ⁽¹⁾, Stephanie Wilson Stephanie ⁽¹⁾. ⁽¹⁾ *Meredith College*, ⁽²⁾ *North Carolina Wesleyan College*

**9:15-10:15 ANDREW KOZAR ACSM PRESIDENTIAL ADDRESS (Grand Ballroom 1,2,3)
"Physical Activity, Fitness, and Health"**

Barbara E. Ainsworth, PhD, MPH, FACSM, FNAK
Professor, Exercise and Wellness Program
School of Nutrition and Health Promotion
Arizona State University
President, American College of Sports Medicine
Chair: Katrina D. DuBose, East Carolina University

10:15-10:30 BREAK

10:30-12:00 SYMPOSIUM S7

S7 A GUT WRENCHING TALE
David D. Pascoe¹, Matt Barberio¹, Vitaly Vodyanoy¹, Tim More¹, James Carson², Iryna Sorokulova¹. *(1) Department of Kinesiology/ Department of Anatomy, Physiology, and pharmacology/Gastrointestinal Research Center, Auburn University; (2) Department of Exercise Science, University of South Carolina (City Terrace 11)*
Chair: Lanay M. Mudd, Appalachian State University

10:30-11:30 TUTORIALS T19-T20

T19 SPORT AND COMMUNITY DEVELOPMENT: SERVICE-LEARNING IN A KINESIOLOGY CONTEXT
Dixie L. Thompson, Ph.D. and Ashleigh Huffman, Ph.D. *Dept. of Kinesiology, Recreation, and Sport Studies, University of Tennessee, Knoxville, TN (City Terrace 9)*
Chair: Mark A. Schafer, Western Kentucky University

T20 THE IMPLICATIONS OF TAKING ANTIOXIDANTS IF ONE EXERCISES
Allan Goldfarb. *University of North Carolina at Greensboro, Greensboro, NC (City Terrace 10)*
Chair: Erik A. Wikstrom, University of North Carolina at Charlotte

10:30-12:00 ORAL FREE COMMUNICATIONS VI: O21-O24

Chronic Disease **(City Terrace 7)**

VIP Chairs:

Michael J. Berry, Wake Forest University
J. Larry Durstine, University of South Carolina

O21 10:30 EXERCISE REDUCES AUTOIMMUNE CELL INFILTRATION AND PRESERVES MOTOR NEURONS AND AXONS IN AN ANIMAL MODEL OF MULTIPLE SCLEROSIS
W.M. Pryor, L.J. White. *Dept. of Kinesiology, The University of Georgia, Athens, GA*

O22 10:45 FUNCTIONAL AEROBIC IMPAIRMENT IN A SAMPLE OF HIV-INFECTED ADULTS
Jason R. Jagers, Vivek Prasad, Wesley D. Dudgeon, Stephanie Burgess, Steven N. Blair, and Gregory A. Hand. *Arnold School of Public Health and 2College of Nursing, University of South Carolina, Columbia SC, The Citadel, Charleston, SC*

- O23 11:00 EFFECT OF MASTECTOMY SITE ON ARM STRENGTH, LEAN MASS, AND QUALITY OF LIFE IN BREAST CANCER SURVIVORS
Melissa J. Benton, PhD, RN, FACSM, Maura C. Schlairet, EdD, RN, David R. Gibson, PhD. *Valdosta State University, Valdosta, GA*
- O24 11:15 BREAST CANCER REHABILITATION: IS IT FEASIBLE?
Leah Gardner, S. Mihalko, P. Brubaker, N. Kassebaum, and M. Vitolins. *Departments of Health and Exercise Science and Epidemiology, Wake Forest University, Winston-Salem, NC*
- 10:30-12:00 ORAL FREE COMMUNICATIONS VII: O25-O28**
Muscle Mass/Bone Mass (**City Terrace 12**)
VIP Chairs:
Kirk J. Cureton, University of Georgia
Emily M. Haymes, Florida State University
- O25 10:30 A MITOCHONDRIA-TARGETED ANTIOXIDANT PROTECTS AGAINST CASTING-INDUCED SOLEUS ATROPHY IN THE RAT
Erin E. Talbert¹, Ashley J. Smuder¹, Kisuk Min¹, Oh-Sung Kwon¹, Hazel H. Szeto², and **Scott K. Powers**, FACSM¹. ¹*University of Florida, Gainesville, FL.* ²*Weill Cornell Medical College, New York, NY*
- O26 10:45 WEIGHT LOSS AND EXERCISE EFFECTS ON MUSCLE QUALITY AND PHYSICAL FUNCTION IN OLDER WOMEN
R.L. Larson¹, D.D. Guest², B.M. Das¹, C.L. Ward¹, J. Georgiadis², E.M. Evans¹, FACSM. ¹*Dept. of Kinesiology, The University of Georgia,* ²*The University of Illinois*
- O27 11:00 COMPARISON OF IMMATURE PORCINE AND HUMAN BONE MINERAL DENSITY: IMMATURE PORCINE KNEES ARE INAPPROPRIATE SPECIMENS FOR GRAFT PULL-OUT TESTING
Margaret Hayes, William R. Barfield, Ph.D., FACSM, Philip R. Coker, M.D., Kristin R. Calandra, Kathy D. Johnson, Joseph J. Calandra, M.D. *Department of Health and Human Performance College of Charleston and Department of Orthopaedic Surgery Medical University of South Carolina, Charleston, SC*
- O28 11:15 BONE MINERAL DENSITY AND FACTORS RELATED TO THE FEMALE ATHLETE TRIAD IN COLLEGIATE FEMALE ATHLETES
D. Knorr and R.A. Battista. *Department of HLES, Appalachian State University*
- 10:30-12:00 POSTER FREE COMMUNICATIONS VI: P109-P136 (Conference Center A)**
1st authors present 10:30-12:00
Metabolism; Nutrition; Environmental Physiology; Fitness/Testing/Assessment
Chair: Gordon Fisher, University of Alabama at Birmingham
- P109 DETERMINING THE CALORIC EXPENDITURE OF FEMALE COLLEGIATE VOLLEYBALL PLAYERS
L.B. Mize. *Dept. of Health and Human Performance, Austin Peay State University, Clarksville, TN*
- P110 REGULATION OF LIPOLYSIS BY BETA-ADRENERGIC ACTIVATION AND EXERCISE IN OBESE AFRICAN-AMERICAN AND CAUCASIAN WOMEN
Dustin K. Raymer, Kathleen M. Gavin, Charles Tanner Myung Dong Choi, and Robert C. Hickner, FACSM. *Departments of Kinesiology, and Physiology. Human Performance Lab, Diabetes and Obesity Institute, Center for Health Disparities Research, East Carolina University, Greenville, NC*
- P111 SKELETAL MUSCLE MITOCHONDRIAL RESPIRATION AND TYPE 2 DIABETES DURATION
TP Gavin, FACSM, JM Ernst, SE Kehe, MA Reed, AH Clark, RD McKernie, M Dar, WE Pofahl, GL Dohm, and H-B Kwak. *East Carolina University, Greenville, NC*

- P112 EFFECTS OF MULTIPLE DAILY BOUTS OF MODERATE AEROBIC EXERCISE ON GLUCOSE TOLERANCE AND INSULIN RESISTANCE IN PERSONS WITH TYPE 2 DIABETES MELLITUS
Robert Buresh, PhD, Robert Jacobs, Mallorie Kenny. *Kennesaw State University, Kennesaw, GA*
- P113 FATTY ACID OXIDATION IS DEPRESSED FOLLOWING CHRONIC HYPERINSULINEMIA AND HYPERLIPIDEMIA IN HUMAN MYOTUBES FROM SEVERELY OBESE INDIVIDUALS
J.M. Maples, T. M. Weber, M.A. Reed, T.P. Gavin, W.J. Pories, G.L. Dohm, and J.A. Houmard. *East Carolina University, Greenville, NC*
- P114 THE EFFECT OF QUERCETIN SUPPLEMENTATION ON VOLITIONAL FATIGUE AND SKELETAL MUSCLE MASS RETENTION DURING CANCER CACHEXIA
Justin Perry Hardee, K.T. Velázquez, M.J. Puppa, J.D. Aartun, A.A. Narsale, S. Sato, **J.M. Davis**, FACSM, J.A Carson, FACSM. *University of South Carolina, Columbia, SC*
- P115 RELIABILITY AND VALIDITY OF TWO DIGITAL REFRACTOMETERS TO A CLINICAL REFRACTOMETER
Minton DM,¹ Torres-McGehee TM,¹ Goins JM². ¹*University of South Carolina, Columbia SC*, ²*The University of Alabama, Tuscaloosa, AL*
- P116 The Effects of Surge Workout Fuel on Anaerobic Sprint Performance
Carter, J.G., Brooks, K.A., *Louisiana Tech University, Ruston, La*
- P117 FEMALE RUNNERS UNDERESTIMATE SWEAT LOSSES DURING 1 H OUTDOOR RUN
L.K. Thigpen, C.R. Caufield, J.R. McIntosh, R.L. Keating and E.K. O'Neal. *Dept. Health, Physical Education and Recreation, University of North Alabama, Florence, AL*
- P118 Influence of Acute RPE on Session RPE
JH Hornsby, JM Green, EK O'Neal, LL Gover, J McIntosh, TE Coates. *Dept. of Health, Physical Education and Recreation, University of North Alabama and the University of Alabama Tuscaloosa*
- P119 THE EFFECTS OF PRE-EXERCISE CARBOHYDRATE SUPPLEMENTATION ON ACUTE RESISTANCE TRAINING PERFORMANCE IN RESISTANCE-TRAINED FEMALES
Kelly Raposo, B.I. Campbell, A. Bullion, A. Petchonka, N. Pannoni, B. Cloer, S. Deignan, and T. Vyas. *University of South Florida, Tampa, FL*
- P120 EFFECTS OF PRE- AND POST-EXERCISE INTAKE OF PERFORMANCE SUPPLEMENTS ON BODY COMPOSITION, CIRCUMFERENCES, AND MUSCLE STRENGTH IN TRAINED MEN DURING 6 WEEKS OF RESISTANCE TRAINING
W. Kyle Mandler, Jeong-Su Kim, D. David Thomas, Amber W. Kinsey, Colin J. Riley, Lynn B. Panton, Michael J. Ormsbee. *Department of Nutrition, Food, and Exercise Sciences, The Florida State University, Tallahassee, FL*
- P121 Effects of Sodium Bicarbonate Supplementation with Acute Caffeine Ingestion on Ventilatory Compensation and Exercise Efficiency
Brian S. Ferguson,¹ Felicia A. Greer,² Jacobo O. Morales², Tim R. Anderson† ¹*Auburn University, Auburn, AL*, ²*California State University Fresno, Fresno, CA*
- P122 EFFECTS OF ACUTE HYPOXIA ON EXERCISE-INDUCED BLOOD OXIDATIVE STRESS.
McGinnis, G., Kliszczewicz, B., Barberio, M., Peters, B., Ballmann, C., Ruby, B., Dumke, C., Cuddy, J., Slivka, D., Quindry, J.C. *Auburn University, Auburn, AL*
- P123 THERMOREGULATORY ADAPTATIONS FOLLOWING SPRINT INTERVAL TRAINING
CP Katica, AT Del Pozzi, E Williams, S Nepocatych, GA Ryan, and JE Wingo. *Department of Kinesiology, University of Alabama, Tuscaloosa, AL*

- P124 CHanneled FABRIC CLOTHING EFFECTS ON THERMOREGULATION, HEART RATE, AND THERMAL COMFORT
S. Nepocaty¹, G. Balilionis¹, E.K. O'Neal², J. E. Wingo³, G.J. Hodges³, M. T. Richardson³, P. A. Bishop³. ¹*Department of Exercise Science, Elon University, Elon, NC*; ²*Department of Health, Physical Education and Recreation, University of North Alabama, Florence, AL*; ³*Department of Kinesiology, University of Alabama, Tuscaloosa, AL*
- P125 EFFECT OF A CHanneled FABRIC GARMENT UNDER A BALLISTIC VEST ON PHYSIOLOGICAL AND COMFORT RESPONSES DURING EXERCISE
G. Balilionis¹, S. Nepocaty¹, E.K. O'Neal², A.T. Del Pozzi³, J. E. Wingo³, G.J. Hodges³, M. T. Richardson³, P. A. Bishop³. ¹*Department of Exercise Science, Elon University, Elon, NC*; ²*Department of Health, Physical Education and Recreation, University of North Alabama, Florence, AL*; ³*Department of Kinesiology, University of Alabama, Tuscaloosa, AL*
- P126 IMPACT OF VARYING LEVELS OF SIMULATED ALTITUDE ON REACTION TIME
James Schoffstall, Melissa Gogain, Taylor Clay. *Liberty University, Lynchburg, VA*
- P127 PASSIVE COOLING EFFECTS ON MICROENVIRONMENTAL AND THERMOREGULATORY RESPONSES IN SOFT BODY ARMOR IN HOT ENVIRONMENTS
G.A. Ryan, C.P. Katica, S.H. Bishop, R.L. Herron, and P. Bishop. *Dept. of Kinesiology, The University of Alabama, Tuscaloosa, AL*
- P128 DOES PHYSICAL ACTIVITY EXPLAIN RACIAL/ETHNIC DIFFERENCES IN CARDIORESPIRATORY FITNESS IN 18-49 YEAR OLDS?
T.G. Ceaser, E.C. Fitzhugh, & **D.L. Thompson**, FACSM. *Department of Kinesiology, Recreation, and Sport Studies, The University of Tennessee, Knoxville, TN*
- P129 VALIDITY AND RELIABILITY OF A MODIFIED UPPER-BODY MUSCULAR ENDURANCE TEST
SH Bishop, GA Ryan, RL Herron, CP Katica, and JE Wingo, *Dept. of Kinesiology, University of Alabama, Tuscaloosa, AL*
- P130 ASSESSMENT OF CAROTID VERSUS RADIAL HEART RATE PALPATION ACCURACY FOLLOWING A SUBMAXIMAL THREE MINUTE STEP TEST
N. Winn, A. Bosak, T. Andre, F. Glover, and D. Porley, *Dept. of Health and Human Performance, Georgia Southwestern State University, Americus, GA*
- P131 ACTIVE VS. PASSIVE RECOVERY FOLLOWING AN AEROBIC EXERCISE BOUT: A PILOT STUDY
Sparks, J.R., Brooks, K.A. *Louisiana Tech University, Ruston, LA*
- P132 VALIDATION OF THE ZEPHYR BIOHARNESSE USING THE COSMED CPET METABOLIC CART
Franklin, E.L., Brooks, K.A. *Louisiana Tech University, Ruston, LA*
- P133 THE EFFECT OF STRETCHING ON SQUAT VELOCITY OF NCAA D1 VOLLEYBALL PLAYERS
Z. Lutz, K. Haseman, K. Baggaly, B. Smith, J. Haegerich, J. Schoffstall. *Liberty University, Lynchburg, VA*
- P134 BODY COMPOSITION HAS A NEGATIVE EFFECT ON AEROBIC AND ANAEROBIC POWER TESTS IN MIDDLE SCHOOL STUDENTS
Pamela G. Krasen, Dustin A. Dew, **David C. Nieman**. *Appalachian State University, Boone, NC*

- P135 ACTIVE GAMING COMPARISONS WITH TRADITIONAL EXERCISE IN HIGH AND LOW INTENSITY EXERCISERS
Naugle KE, Naugle KM, Wikstrom EA. *Department of Applied Physiology and Kinesiology, University of Florida, Gainesville, FL 32611, University of North Carolina-Charlotte, Charlotte NC*
- P136 VALIDITY OF HEART RATE MEASUREMENT USING AN EARBUD SENSOR: A PILOT STUDY
L.C. Eschbach (1), J.A. Bunn(2), M. Magal(1), R. Voge(3) and R. Yow(3). 1) *Math and Sciences Division, North Carolina Wesleyan College, Rocky Mount, NC*, 2) *Campbell University Buies Creek, NC* 3) *Meredith College, Raleigh, NC*
- P137 INFLUENCE OF SELF-EFFICACY MANIPULATION ON ANAEROBIC PERFORMANCE DURING A 30-SECOND WINGATE BIKE TEST
Todd Sherman, D.A., Jasmin Hutchinson, PhD, *University of Tennessee @ Martin and Springfield College, Martin, TN and Springfield, MA*

12:00-2:00 SEACSM LUNCHEON AND LECTURE (Grand Ballroom 1,2,3)*

“Preventing Concussion in Sport: From the Lab to the Law”

Kevin M. Guskiewicz, PhD, ATC, FACSM

Kenan Distinguished Professor

Chair, Department of Exercise and Sport Science

University of North Carolina at Chapel Hill

Presiding: **David D. Pascoe**, Auburn University, SEACSM President; **Peter W.**

Grandjean, Baylor University, SEACSM Past-President

Speaker Introduction: Kyle J. Cassas, MD, FACSM, Steadman Hawkins Clinic of the Carolinas

**Tickets need to be purchased by 5:00 PM on Friday.*

2:00-3:00 SEACSM EXECUTIVE BOARD MEETING (City Terrace 12)

HOW TO USE YOUR EXERCISE SCIENCE DEGREE TO ENHANCE YOUR FUTURE PROFESSIONAL SCHOOL EXPERIENCE

A. Bosak¹ and M. Ellis². ¹*Georgia Southwestern State University, Americus, GA* and ²*Advanced Medical, Daytona, FL.*

With the requirement of obtaining the DPT degree for new physical therapists to practice their trade and the increase of various “Professional School” degree options (ie. Occupational Therapy, Physician Assistant, and Chiropractic, etc.), there has been a rise in students who enter exercise science degree programs in order to pursue further professional school training. The need to advise these specific students on how to utilize their exercise science degree to improve their chances of being admitted to professional school has become very important. Ironically, there is a strong relationship between the content covered in an exercise science degree and the related material that students encounter at the professional school level. Hence, this tutorial’s purpose will be to suggest how students can maximize all aspects of their exercise science degree in order to enhance their future overall professional school experience. Similarities between classes at the professional school and undergraduate level, plus the completion of all relevant tasks, required to pursue professional school degrees, will be discussed. An additional feature of this tutorial is that both an exercise science assistant professor and a practicing Doctor of Physical Therapy will give their perspectives on how to prepare students for professional school degrees. This presentation is intended for students seeking future professional school degree options and advisors or new professors who assist students in preparing for their professional school future.

T1

PROVE IT – TRANSLATE IT – SUSTAIN IT!

Bhibha M. Das, PhD, MPH and Ellen E. Evans, PhD, *University of Georgia, Athens, GA.*

Despite the evidence linking physical activity (PA) to improved mental and physical health and millions of dollars of grant funding dedicated to PA research, only ~30% of Americans report habitual leisure time PA with even less reporting habitual exercise. As health care costs continue to rise, it is imperative to bridge the gap between research and practice by creating and evaluating sustainable PA interventions. While recent literature and federal funding agencies have touted the importance of translatable research, the importance of “why” and “how” to conduct translational research remains a mystery to most in the field of Kinesiology. Specifically, competing interests between the internal and external validity of research designs have hampered efforts to transform effective clinical interventions into efficacious translatable sustainable programs in our communities. Typically clinical scientists utilize randomized models for the internal validity while social scientists promote quasi-experimental designs for its external validity and translatability. The purposes of this symposium are to: a) briefly review the relative strengths and weaknesses of research designs focused on internal versus external validity; b) discuss the public health impact (i.e. external validity) of PA interventions using the RE-AIM framework (Reach, Efficacy/Effectiveness, Adoption, Implementation, Maintenance); c) provide examples of tools for used with translation research (e.g. LOGIC models). The target audience for this symposium includes students, scientists, and practitioners with an interest in translatable and sustainable PA research.

T2

SHEDDING LIGHT - A PRACTICAL GUIDE TO USING NEAR INFRARED SPECTROSCOPY TO STUDY SKELETAL MUSCLE

J.T. Brizendine & K.K. McCully, FACSM. *University of Georgia, Athens, GA.*

The purpose of this tutorial is to provide an all-you-need-to-know guide on how to use near-infrared spectroscopy (NIRS) to measure oxygen delivery and mitochondrial capacity in skeletal muscle. There will be a short introduction to NIRS technology including the capabilities of different devices. Addressed in the introduction will be the need for regional imaging, multiple pathlengths to correct for subcutaneous adipose tissue, calibration methods, and device portability. The next section will detail methods for measuring the balance between oxygen delivery and demand, as onset and offset kinetics to measure blood flow. The final section will detail methods of measuring mitochondrial function. Approaches for handling subcutaneous fat, skin color, postural changes, and exercise ability of participants will be addressed. Detailed protocols, representative examples, and results will be presented. Attendees of this tutorial will leave with an understanding of how to employ our practical suggestions in designing their own studies and interpreting experiments using various modern infrared devices

T3

USING INTERACTIVE VIDEO GAMES: WHAT DOES THE EVIDENCE TELL US?

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

A variety of allied health care professions have begun to use interactive gaming systems and technology to help: 1) promote physical activity and 2) rehabilitate musculoskeletal and neurological pathologies. The growing popularity of interactive gaming is due, in part, to the belief that playing interactive video games during physical activity and/or rehabilitation can redirect a patient’s focus away from the repetitive nature of aerobic exercise and rehabilitation exercises and towards the competitive aspects of video games. Unfortunately, the available evidence for using interactive video games is scattered throughout the existing literature and not readily available to most clinicians. Therefore, this tutorial session will provide examples of gaming systems that are currently being used and present the existing evidence in three main areas: 1) energy expenditure, 2) enjoyment, and 3) rehabilitation effectiveness. This session is designed to assist the audience in determining the suitability of multiple interactive video game systems as clinical rehabilitation tools and enhancing clinical decision making based on the cumulative findings.

T4

CLUSTERING PATTERN OF METABOLIC SYNDROME CONDITIONS IN MULTICULTURAL POPULATIONS

L. Proctor and L.J. Brandon, FACSM. *B.E.A.M. LLC, Ruston, LA and Dept. of Kinesiology & Health, Georgia State University, Atlanta, GA.*

T5 The metabolic syndrome (MetS) is reported to be based on the clustering of pre-disease conditions that will progress and contribute to the development of cardiovascular disease (CVD) if not treated via medical intervention. The MetS is used to predict the likelihood of one developing CVD. The consistency and utility of the MetS in predicting CVD in different populations is questionable. For example, African Americans (AA) have a higher prevalence of CVD morbidity and mortality than European (EA) and Hispanic Americans (HA). Paradoxically, AA males have a lower prevalence of the MetS than EA and HA, and AA females have a lower prevalence than HA females. Reason for this paradox are not clear, but may be partially related to the relationship among and clustering pattern of MetS conditions in the different populations and the fact that MetS conditions and norms were apparently developed from EA data and are more appropriate for that population. The focus of this tutorial is to discuss the relative influence each MetS condition has on CVD morbidity and mortality, the relationship the different conditions have with each other and the consistency of the influence across racial/ethnic populations. Literature summaries relative to the clustering pattern and influence of the MetS conditions (elevated glucose and blood pressure, high levels of triglyceride, obesity and low levels of high density cholesterol) on CVD will be discussed. Also data from our labs relative to the relationship of MetS conditions with each other and their influence on CVD in AA will be discussed.

EVIDENCE-BASED MEDICINE IN PHYSICAL REHABILITATION: THE FUNCTIONAL AND MOLECULAR EFFECTS OF THERAPEUTIC ULTRASOUND TO TREAT MUSCLE INJURY

M.C. Kostek and D.C. Delgado. *Dept. of Exercise Science, The University of South Carolina, Columbia, SC.*

T6 Muscle strains account for up to 30% of the patients typically seen in a Sports Medicine practice. Additionally, muscle contusions, tears, and lacerations are common and nearly all muscle injuries are treated conservatively. Thus non-surgical therapeutic modalities and interventions that can improve or enhance the healing process are considered ideal to treat muscle injuries. Indeed, one such modality, therapeutic ultrasound (TUS), is one of the most common modalities used in the treatment of soft tissue injuries, like skeletal muscle. Yet, there is very little evidence to support its use to improve healing of muscle tissue. Additionally, it is a contentious modality as just as many therapists or trainers use it as those who do not due to lack of evidence. New hypotheses have emerged regarding the effectiveness and mechanism by which TUS works in muscle injuries. The purpose of this tutorial is to examine the evidence from the molecular, animal, and human literature that reports on the use of TUS in the treatment of skeletal muscle injury. Additionally, recent data from our laboratory examines human genome expression profiles of muscle biopsies that have been treated with TUS, an updated cell culture system to examine TUS, and a clinical trial that is examining muscle function and pain in humans after muscle damage and TUS treatment. This tutorial is designed to thoroughly examine the existing literature, compare to recent findings from our laboratory, and make evidence-based conclusions regarding the use of this modality.

INCREASING RESEARCH LITERACY IN THE UNDERGRADUATE CLASSROOM

E.K. O'Neal¹, R.C. Pritchett², and K.L. Pritchett². ¹*University of North Alabama, Florence, AL,* ²*Central Washington University, Ellensburg, WA.*

T7 Teaching students to access and interpret peer-reviewed research should be a central tenant in undergraduate exercise science related programs. However, such practice is often neglected due to demands to cover course material and concern that students may not possess the capacity to comprehend content and statistical terminology without extensive aid from the instructor. Failing to expose undergraduates to reading research likely means students who do not pursue post-baccalaureate degrees will fail to become practitioners who are consumers of research or worse, result in misinterpretation of read literature. Conversely, the positive outcomes of introducing research into the curriculum include producing students who are more prepared for graduate work, peaking interest of undergraduates to become involved with research, and potential for a greater impact of research by increasing the population of adept professional journal readers. The intention of this tutorial is to disseminate practical techniques to increase exposure to reading original research in the undergraduate curriculum. Tips to aid in the design of student-friendly assignments that teach undergraduates how to effectively interpret journal articles and that can be evaluated by the instructor in a time efficient manner will be emphasized. The intended target audience will be faculty members at small to mid-size universities, particularly those without doctoral programs that rely heavily on help from undergraduate students to conduct research.

APPLICATION OF TELEHEALTH, TELEREHABILITATION, AND EXERCISE TO RURALLY LOCATED CLINICAL POPULATIONS

Sean C. McCoy and Toni Chiara. *NFSG Malcolm Randall VAMC, Gainesville, FL.*

T8 The importance of different exercise and rehabilitative strategies to serve underserved clinical populations. This tutorial will focus on application of current technologies to serve rurally located clinical populations within the healthcare setting. The presenters will describe current research examining the measurement of clinical outcomes, related to the effects of exercise interventions and rehabilitation on physical function, and participant safety. The relevance of telehealth will be discussed as it relates to maintaining physical functioning and quality of life in persons geographically limited to the continuum of care.

40th SEACSM HIGHLIGHTED SESSION

IMMUNE NUTRITION SUPPORT FOR ATHLETES: BENEFIT OR HAZARD?

David C. Nieman, DrPH, FACSM, Professor, *Appalachian State University*, and *Director of the Human Performance Laboratory, North Carolina Research Campus*

T9

Prolonged and intensive exercise has transient but significant, wide ranging effects on the immune system. The exercise-induced immune perturbations and associated physiologic stress are associated with an elevated risk of upper respiratory tract infections (URTI), especially during the 1-2 week period following competitive endurance races. Immunonutrition support for athletes is an active area of research endeavor, and this lecture will summarize the efficacy of various nutritional products in countering exercise-induced immune dysfunction, oxidative stress, and inflammation. The value of using immunonutrition support for athletes has been questioned because blocking the transient oxidative stress, inflammation, and elevations in stress hormones following heavy exertion potentially interferes with important signaling mechanisms for training adaptations. Another viewpoint is that even the most effective immunonutrition support only partially blocks exercise-induced physiologic stress indicators, analogous to the beneficial use of ice packs to reduce swelling following mild injuries. In the end, the value of immunonutrition support for athletes during periods of heavy exertion and competitive races will be evaluated by whether or not the athlete has improved recovery, lowered URTI, reduced muscle damage and soreness, and enhanced overall athletic performance.

AMERICAN COLLEGE OF SPORTS MEDICINE LEADERSHIP & DIVERSITY TRAINING PROGRAM

L. Jerome Brandon, FACSM and NiCole R. Keith, FACSM, *Department of Kinesiology & Health, Georgia State University, Atlanta, GA and University of Indiana-Purdue University, Indianapolis, IN.*

T10

The American College of Sports Medicine (ACSM) has initiated a program to increase racial/ethnic minority leadership presence in the college. This is being done through the ACSM Leadership and Diversity Training Program. Since over 55% of African Americans and 35% of Hispanic/Latino Americans live in the south and many Historical Black Colleges and Universities are in the south, an excellent opportunity exists to increase the diversity leadership in ACSM with members from the Southeast chapter. The purpose of the ACSM Leadership & Diversity Training Program is to encourage racially/ethnically diverse students and professionals to become members and later fellows of ACSM. There are three levels of the program. Level 1 is to promote the establishment of ACSM membership and involvement for undergraduate students of racially/ethnically diverse backgrounds. Level 2 is to encourage Master level, Ph.D., and M.D./D.O. candidates who are also ACSM student members of racially/ethnically diverse backgrounds to participate in activities that will lead to increased ACSM service, enhanced pathways to degree completion, and successful post-terminal degree experiences. Level 3 is to train ACSM racially/ethnically diverse professional members who hold a terminal degree to become ACSM leaders and Fellows. The application process, mentoring opportunities, and benefits to participants and mentors will be explained during the tutorial.

SECONDARY DATA ANALYSIS – THE CROSS-SECTIONAL STUDY

J.R. Churilla. *Department of Clinical and Applied Movement Sciences, The University of North Florida, Jacksonville, FL.*

T11

Secondary data analysis is a type of research that allows investigators to look broadly at research interests using existing data. Typically, large nationally representative survey data is used in what are most commonly cross-sectional study designs. Cross-sectional study designs are well represented in the exercise science and chronic disease literature, with much of this research published in high-impact publications. This tutorial will examine how secondary data analysis can be used in conducting research in the area of physical activity epidemiology. Both strengths (e.g., large samples) and limitations (e.g., inferred causality is limited) of using this approach to conduct research will be covered. Many of the publicly available data sets will be discussed (e.g., NHANES, BRFSS). Participants will be shown where to find the various surveys and be provided will rudimentary information on getting started with this type of research. Basic statistical nomenclature will be reviewed and statistical issues with utilizing a secondary data analysis approach to research will be covered. Following this tutorial, the attendees will know where to locate publicly available data sets, understand how to manage this type of data and have some basic direction in conducting a cross-sectional study.

SIGNIFICANCE OF NON-ST-SEGMENT DATA COLLECTED DURING A GXT

Mohammad Irfan, M.D., J. Mahurin, W. Jones, B. Meredith, and Z. Zhou. *Montgomery Family Medicine Residency Program, Montgomery, AL.*

T12

Coronary artery disease is the leading cause of death within developed countries. Hence, many physicians perform graded exercise testing (GXT) on selected patients to evaluate the possibility of existing cardiac disease. However, the potential of the GXT is compromised if the diagnosis and prognosis of significant cardiac disease is limited to the evaluation of ST-segment alterations. Focusing on this one parameter may result in false positive and false negative results, lead to needless and expensive supplemental testing, and cause under or over treatment of patients. This tutorial will explore the significance of non-ST-segment data obtained during a GXT to better predict cardiac events and the risks of premature mortality and morbidity. Topics to be discussed include, but are not limited to: 1) variability of heart rates and blood pressures obtained during and following exercise, 2) impaired chronotropic response to exercise, 3) ventricular ectopy during exercise and recovery, 4) functional capacity and 5) constitutional signs and symptoms during the evaluation. Additionally, an argument will be presented to support direct clinician observation during the GXT to better gather and evaluate ST and non-ST-segment data.

CARBOHYDRATE INTAKE DURING ENDURANCE EXERCISE: HIGHLIGHTING 30 YEARS OF SCIENCE TO OPTIMIZE PERFORMANCE

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

T13

Prior to the early 1980's it was believed that there were limited benefits associated with carbohydrate intake during endurance exercise. Over the past 30 years, the effects of consuming carbohydrate during exercise have been studied extensively, and our understanding of carbohydrate's impact on athletic performance has grown considerably. It is now known that carbohydrate consumption can enhance performance in prolonged endurance events. There is also evidence that carbohydrate intake may augment performance in shorter, more intense endurance events of ~1hr duration, as well as endurance-based sports such as tennis, soccer and basketball. Contemporary studies have investigated the underlying mechanisms by which carbohydrate influences performance under differing exercise conditions. For example, carbohydrate from exogenous sources can be oxidized at relatively high rates during exercise. This may spare the limited endogenous reserves of liver (and possibly muscle) glycogen; providing greater carbohydrate availability for the late-stages of prolonged exercise. In addition, carbohydrate may influence central fatigue during shorter events, where endogenous carbohydrate availability is not limiting to performance. Recent studies have been conducted to determine optimal rates of carbohydrate intake during exercise, and the impact of consuming multiple carbohydrate sources. This tutorial will: a) provide a brief historical account of the study of carbohydrate ingestion by endurance athletes, b) investigate current perspectives regarding the influences of carbohydrate on endurance performance, and c) discuss practical considerations and questions to consider for future research. The tutorial is targeted to students, professionals and practitioners who have an interest in the metabolic and performance effects of carbohydrate for endurance athletes.

40th SEACSM HIGHLIGHTED SESSION

MEASURING OXYGEN UPTAKE: THEN AND NOW

L. Bruce Gladden. *Department of Kinesiology; Auburn University, Auburn, AL.*

T14

The basic techniques for modern gas exchange measurements date at least to the late eighteenth century. In 1911, Douglas described his "bag" technique. While the first principles of measurement of oxygen uptake and carbon dioxide output are clear, accurate execution of the techniques requires careful attention to calibration and detail. Thirty-one years ago I gave a tutorial on "Preparing for Gas Exchange Measurements" at the annual meeting of the Southeast Chapter of the American College of Sports Medicine (SEACSM) in Charleston, SC. That presentation dealt with the basic aspects of calibration and validation of oxygen uptake and carbon dioxide measurements. These concerns remain vitally important and timely as evidenced by a Commentary by Gladden, Howley and Yates scheduled for publication in *Medicine and Science in Sports and Exercise* in 2012. As SEACSM celebrates its Fortieth Anniversary, it is the goal of the present tutorial to re-visit these important concepts with some attention to how things "used to be done" versus "how they are done now." An important conclusion is that the Douglas bag technique remains state-of-the-art for measurement of small changes in metabolic rate in the steady state.

ACSM GUIDANCE FOR PRESCRIBING EXERCISE: CLARITY OR CONFUSION

Michael A. Welsch. *Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA.*

T15

The pronouncement on the guidance of exercise, released in July 2011, replaces the 1998 ACSM Position Stand. The guidelines are aimed to provide scientific evidence-based recommendations to health and fitness professionals in the development of individualized exercise prescriptions for apparently healthy adults of all ages. Moreover, given the number of available exercise recommendations there appears to be significant confusion among professionals and the public how to commence and progress through exercise training programs. The objective of this tutorial is to discuss whether the 2011 guidelines provide greater clarity or further confusion to the prescription of exercise. Three specific areas will be considered: (1) Are the guidelines realistic for the target population, (2) Is it possible to implement the components of exercise training per exercise session, and (3) Are the strategies to progress /advance training clearly presented. The information presented aims to provide clinicians with practical information about exercise programming for apparently healthy individuals and basic scientists with a call for greater emphasis on the biological mechanistic evidence to strengthen the exercise prescription.

QUERCETIN AND ENDURANCE EXERCISE CAPACITY: WHAT IS THE EVIDENCE?

Jochen Kressler. *University of Miami, Miller School of Medicine, Miami Project to Cure Paralysis and Georgia Institute of Technology, School of Applied Physiology, Miami, FL.*

T16

Quercetin is a polyphenolic flavonoid, a natural component in several plant foods (e.g., skin of grapes, onions, apples). It is generally recognized as safe by the FDA and there are several purported health and physiological benefits of quercetin administration including cardioprotective, anticarcinogenic, antioxidant, antiapoptotic, and ergogenic properties. Quercetin has been theorized to exert its ergogenic properties through one of two mechanisms: 1) activation of key signaling intermediates mitochondrial biogenesis; 2) antagonism of adenosine receptors. The former has been demonstrated in animal models with chronic ingestion but limited evidence to date exists in humans. Whether the acute ingestion of quercetin acts via adenosine receptor antagonism is also not well established. Several studies have investigated ergogenic benefits of chronic (days or weeks) quercetin supplementation but results have been equivocal. This tutorial will review key conclusions drawn from our meta-analysis (Quercetin and Endurance Exercise Capacity: A Systematic Review and Meta-Analysis, *Med Sci Sports Exerc*, in press) on endurance exercise capacity as defined as the composite score reflecting both changes in maximal oxygen uptake and endurance exercise performance. Differences in experimental designs, absorption kinetics and subject populations have been proposed as reasons for divergent findings and these factors are assessed quantitatively. This tutorial will conclude by identifying gaps in our knowledge following the review of the evidence and where further investigation is needed.

PHYSIOLOGICAL FOUNDATIONS OF TAI CHI HEALTH BENEFITS

P.A. Gryffin, *Department of Health Education and Behavior, University of Florida, Gainesville, FL.*

T17

Current research into various physiological mechanisms explaining many of the benefits of Tai Chi practice. Most Tai Chi research investigates cause and effect, with little in the way of the mechanisms behind benefits, beyond vague abstractions. This tutorial will present underlying physiological mechanisms of how Tai Chi can benefit sports performance, cancer, balance and fall prevention, heart disease, and chronic conditions, as well as methods for researching and teaching TC utilizing large groups with minimal instruction. Interested participants will have the opportunity to experience the Group Tai Chi Form, which permits immediate practice of Tai Chi with a minimal learning curve. Resources for Tai Chi research are also presented.

TO INFINITY AND BEYOND: THE “BUZZ” ON SUCCESS FOR CAREERS IN EXERCISE SCIENCE

Lanay M. Mudd¹, Rebecca A. Battista¹, Dawn P. Coe², ¹*Appalachian State University, Boone, NC;* ²*University of Tennessee, Knoxville, TN.*

T18

Students seeking to further their education are often bewildered about how to search for programs, choose mentors, and write a successful application. Furthermore, they often do not know what to expect or what will be expected of them as masters or doctoral students, postdocs or junior faculty members. This student-focused tutorial will discuss strategies for gaining entry and being successful in masters and doctoral programs, as well as postdocs and academic positions. Speakers will offer advice on the application process at each level, including what they look for in applicants. In addition, speakers will discuss strategies for identifying the best fit as a student to further their professional goals. Transitions from undergrad to master's student, master's to doctoral student, and doctoral student to academician will be addressed. This will be followed by an interactive discussion with audience members addressing specific questions. The objectives of this session include: 1) equipping students with skills to search for the program, mentor, and career that best fits their needs, 2) supplying insider information on the application review process, and 3) providing tips on what to expect and how to succeed at various levels of their academic career.

SPORT AND COMMUNITY DEVELOPMENT: SERVICE-LEARNING IN A KINESIOLOGY CONTEXT

Dixie L. Thompson, Ph.D. and Ashleigh Huffman, Ph.D. *Dept. of Kinesiology, Recreation, and Sport Studies, University of Tennessee, Knoxville, TN.*

T19

Service-Learning is an approach to teaching that brings students into direct contact with individuals in need. This approach has 3 key components: (1) application of discipline-specific knowledge; (2) reflection as a tool to inform learning; and (3) interaction with the community in ways that leads to mutual benefits. This approach has gained popularity in the past decade, but its application in kinesiology programs, particularly at research-intensive institutions, is limited. At the University of Tennessee, a course was designed to allow undergraduate kinesiology majors and recreation and sport management majors to interact with Iraqi refugee families living in Knoxville. Around 150 Iraqi families have immigrated to the Knoxville area in recent years. A number of factors, including language and culture, have led to this community being isolated from the wider community and limited their access to recreation, exercise, and sport activities. Faculty and students met with members of the Iraqi community and designed a series of recreational and exercise activities. For example: Women from the Iraqi culture are prohibited from engaging in exercise in the presence of men, and many of the women have small children, so childcare is needed in order to exercise. The solution: A private exercise space was secured in a building near the community where many of the families lived. The female students designed the exercise class along with the Iraqi women, and members of the class provided childcare during which time active play was encouraged. Thus, both children and their mothers were provided access to health-enhancing physical activity in ways that were culturally appropriate. This tutorial will describe how service-learning is being used at the University of Tennessee and will provide a model that could be applied in other settings.

THE IMPLICATIONS OF TAKING ANTIOXIDANTS IF ONE EXERCISES.

Allan Goldfarb. *UNCG, Greensboro, NC.*

T20

Exercise of sufficient intensity and duration can demonstrate oxidative stress. This is a situation where the pro-oxidants have transiently overcome the antioxidant defense system. This typically is determined by measuring a number of cellular markers which have been shown to increase transiently in response to the exercise. Numerous studies have shown that taking antioxidants prior to the exercise can result in a slight reduction in the elevation in these markers of oxidative stress. However, several of the studies have actually noted an exacerbated oxidative stress response when taking antioxidants during the activity. Recent evidence has come to light to suggest that taking antioxidants may alter the exercise-induced training adaptations. The results from these studies suggest that several important training adaptations such as glucose transport, insulin signaling, and mitochondrial biogenesis can be impaired by taking antioxidants. This also indicates that these adaptations are, in part, induced by changes in redox signaling pathways in response to exercise. This tutorial will discuss the implications of taking these antioxidants (timing, type and dose) if one exercises.

PHYSIOLOGICAL PROFILES OF LAW ENFORCEMENT OFFICERS AND THEIR ABILITY TO MEET REQUIRED OCCUPATIONAL DEMANDS

K. J. Kelleran¹, A. Bosak², and G.A. Ryan³. ¹*Old Dominion University*, ²*Georgia Southwestern State University*, and ³*University of Alabama*.

S1

The relationship between fitness and Law Enforcement Officers (LEO) has been assessed in prior research studies. Many of these studies evaluated the association between fitness, stress, cardiovascular disease risks, and/or job absenteeism. Yet, few studies have assessed the unique “on the job” workload requirements and the corresponding fitness parameters needed to meet these specific demands. LEO are faced with exceptional physiological challenges during the course of duty where they may sit for long periods of time while patrolling, but when called upon “to serve and protect”, instantly must respond at or near maximal physical capacity. This stressful reaction takes the body through a dramatic “fight or flight” response. Hence, the purpose of this presentation, with an intended target audience of those interested in sports, occupational, and environmental physiology, will be to assess the particular physiological demands of several LEO positions (ie. Patrol, SWAT, etc.) and suggest ways to develop appropriate training programs. Also, an outline of the physiological limitations associated with wearing soft body armor and their connection to fitness status, which could contribute to improving safety, comfort, and performance, will be provided. Finally, physiological issues associated with shooting a weapon in the line of duty will be reviewed and methods, from a fitness perspective, to increase the shooting accuracy of LEO, will be discussed.

EXERCISE SCIENCE EDUCATION: PROMOTING STUDENT ENGAGEMENT

Brian B. Parr, John C. Quindry, Peter M. Magyari, Timothy P. Scheett, Yuri Feito. *University of South Carolina Aiken (Parr)*, *Auburn University (Quindry)*, *University of North Florida (Magyari)*, *College of Charleston (Scheett)*, *Barry University (Feito)*.

S2

Engaging students as active learners is both a challenging and worthwhile goal of academic programs in exercise science. The purpose of this symposium is to share innovative methods for enhancing student engagement through classroom teaching and practical experience. In addition to the role in academic and professional performance, student engagement is increasingly included in institutional and program objectives and assessment. John Quindry will share his original teaching strategies in exercise physiology. Peter Magyari will discuss interactive directed learning, emphasizing active student involvement in the learning process. Tim Scheett will share his experiences with involving undergraduate students in research. Yuri Feito will describe methods for enhancing student skills and knowledge through service learning. Brian Parr will discuss goals and recommendations for student internships in exercise science.

ANDROGENS, ESTROGENS, IGF-1 AND EXERCISE AN INTEGRATIVE APPROACH

Stephen E Borst, Fan Ye, Sean C McCoy, Joshua F Yarrow. *VA Medical Center, Gainesville Geriatric Research, Education and Clinical Center and University of Florida Departments of Applied Physiology & Kinesiology and Physical Therapy, Gainesville, FL*.

S3

Mechanical loading of the musculoskeletal system provides regulation of skeletal muscle mass and bone mineral density in cooperation with the concomitant influences of androgens, estrogens, and IGF-1. The presenters will describe current research surrounding the role of testosterone, estradiol, and IGF-1 in regulating musculoskeletal tissue. They will also describe how these hormones influence the ability of mechanical loading to augment muscle and bone. Additionally, they will provide an overview of various pharmacological agents, which have the ability to enhance musculoskeletal tissue.

DISORDERED BODY COMPOSITION, MUSCLE QUALITY AND PHYSICAL FUNCTION IN OLDER ADULTS: DEFINING, MEASURING AND IMPROVING

Anne E. O'Brien, MS, Ellen M. Evans, PhD. *Department of Kinesiology, University of Georgia, Athens, GA*.

S4

Increases in adiposity and loss of muscle mass (i.e. disordered body composition) contribute to declines in physical function subsequently leading to loss of independence with advancing age. Moreover, older adults have not escaped the obesity epidemic, it being a primary factor in nursing home admissions. Risk for physical disability is greatest in older adults who have increased adiposity and reduced skeletal muscle, a condition termed “sarcopenic obesity”. Aging, with concurrent increases in fat mass and reductions in physical activity, is also associated with increased adipose tissue infiltration in skeletal muscle, causing a reduction in muscle quality and physical function in older adults. Despite being an active area of research interest, it remains unclear which of the aforementioned components of body composition are the strongest contributors to physical function in older adults. Although habitual physical activity and adequate nutrition are appreciated for the preservation of optimal body composition by both physicians and practitioners alike, management of obesity in older adults is challenging. The purposes of this symposium targeting the older adult population are to highlight the contemporary literature regarding: a) interactions between body composition (fat and skeletal muscle mass) and physical function; b) various definitions and measures of “muscle quality” and how they relate to physical function; and c) the role that exercise can play with regard to muscle quality. This topic will be of interest to students, scholars and practitioners with an interest in older adults and strategies to keep this growing sector of the population living independently.

DOXORUBICIN AND ENDURANCE EXERCISE TRAINING: EFFECTS ON CARDIAC AND SKELETAL MUSCLES

Ashley J. Smuder¹, Kisuk Min¹, and Andreas N. Kavazis². ¹*Department of Applied Physiology and Kinesiology, University of Florida, Gainesville, FL* and ²*Department of Kinesiology, Mississippi State University, Mississippi State, MS.*

S5

Doxorubicin is an effective antitumor agent used in cancer treatment. Unfortunately, doxorubicin is also toxic to both cardiac and skeletal muscles and can result in significant muscle impairment. Currently the means by which doxorubicin induces toxicity in muscle remains unclear, but it is established that doxorubicin-induced toxicity is associated with increased generation of reactive oxygen species and oxidative damage within muscle fibers. In addition, the calpain, caspase-3 and autophagic/lysosomal system also appear to play a major role in doxorubicin-induced myotoxicity. Therefore, developing methods to combat doxorubicin-induced muscle toxicity is important. In this regard, exercise training has been shown to be protective during a variety of conditions. Specifically, exercise can promote the expression of numerous cytoprotective proteins including many antioxidant enzymes and heat shock protein 72. Therefore, the focus of this symposium will be to describe the deleterious effects of doxorubicin on both cardiac and skeletal muscle, as well as to describe the mechanisms by which exercise training can protect these muscles from the side-effects of doxorubicin. We will present data indicating that endurance exercise training is sufficient to reduce the doxorubicin-induced damage caused to both cardiac and skeletal muscle.

40th SEACSM HIGHLIGHTED SESSION

THE EXPERIMENTAL CONTINUUM: ANSWERING COMPLEX PHYSIOLOGICAL QUESTIONS

Scott K. Powers, FACSM, Oh-Sung Kwon, W. Bradley Nelson, Kurt J. Sollanek. *University of Florida, Gainesville, FL.*

S6

Exercise physiologists are keenly interested in investigating the mechanisms responsible for the adaptations that occur in both cardiac and skeletal muscle due to increased physical activity and prolonged inactivity. However, to answer many of the complex physiological questions in this area, a continuum of experimental models (i.e. cell culture, animal and human based) may be required. This symposium will discuss the advantages and disadvantages of using three separate experimental approaches to study both exercise and inactivity-induced adaptations in muscle. Scott Powers will provide an introduction to the topic and will address the concept of the "Experimental Continuum." Oh-Sung Kwon will then discuss how cell culture models can be used to examine questions regarding the impact of both activity and inactivity on muscle fibers. Brad Nelson will then discuss the application of animal models to study the effects of physical activity and inactivity on skeletal muscle. Kurt Sollanek will examine how human models are used in a similar context. All three presenters will discuss the advantages and limitations of using each model. Lastly, Scott Powers will conclude the symposium, by discussing the concept that the combined use of in vitro, in situ, and in vivo experimental models (i.e., Experimental Continuum) can effectively provide answers to complex physiological questions.

A GUT WRENCHING TALE

David D. Pascoe¹, Matt Barberio¹, Vitaly Vodyanoy¹, Tim More¹, James Carson², Iryna Sorokulova¹. ⁽¹⁾ *Department of Kinesiology/ Department of Anatomy, Physiology, and pharmacology/Gastrointestinal Research Center, Auburn University;* ⁽²⁾ *Department of Exercise Science, University of South Carolina.*

S7

The gastrointestinal tract is responsible for maintaining hydration, absorption of nutrients (growth, development), immune functions, and absorption of oral medications. The epithelial cells and gut flora constitute the gut lining that regulates fluid and material transport into the blood stream. The GI tract can be adversely affected by climatic or exertional heat stress, prolonged and/or strenuous exercise, psychological stress, disordered sleep, some medications (e.g. aspirin, antibiotics), medical emergencies (hemorrhagic shock, burn injury, traumatic brain injury or stroke, chronic heart failure, and pancreatitis). Gut barrier dysfunction is characterized by the breakdown and leakage of this cell lining which initiates pathways of oxidative stress, pro and anti-inflammatory responses, immune responses, and gut leakage (endotoxemia). This symposium will discuss: 1) Historical overview of gut science and stress influence on GI function on health and performance; 2) Gut structures/pathways/signaling in response to excessive stress that alter normal barrier functions; 3) Advanced microscopy and imaging of the gut using high resolution light microscopy and histology to evaluating gut barrier structures; 4) Role of Gut barrier dysfunction and endotoxemia in the progression of cancer cachexia. Implications of nutritional and exercise interventions in gut maintenance will be explored; 5) The Role, strategies, and challenges for the use of probiotics bacteria in the stabilization of the gut barrier function.



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REPRODUCIBILITY OF ERYTHROCYTE-ENDOTHELIAL GAP IN HUMAN CHEEK CAPILLARIES

Kate Austin, Daniel Credeur, Michael Welsch. *Louisiana State University, Baton Rouge, LA.*

01

Measurement of the Erythrocyte-Endothelial (EE) gap is considered a potential tool to monitor microvascular vulnerability. New methods of capillaroscopy have been developed to allow for quantification of the EE gap. PURPOSE: (1) To estimate red blood cell velocity (RBCV) and EE-gap in cheek capillaries; (2) To assess the reproducibility of the microvessel diameter, RBCV and EE-gap. METHODS: Six subjects (male=1, female= 6, age = 22.5±1.13 years) participated in this study. Subjects rested for 10 minutes in the supine position prior to determining arterial stiffness and microvascular structure on two separate occasions. RBCV and EE-Gap were examined in capillaries of the cheek using OPS-imaging (Capiscope, KK technology, Exeter, UK). Arterial stiffness was defined as carotid-to-radial pulse wave velocity (PWV). In addition, fitness was measured using a 12-minute run and a handgrip strength test. RESULTS: PWV was 6.7±0.43cm/s. Average microvessel diameter was 4.1±0.73µm, RBCV and EE-Gap were 118.15±32.65µm/s and 1.74±0.41µm, respectively. The mean 12-min run distance was 2384.13±390.74m (Estimated VO₂peak = 41.9±8.79mL/kg/min), and the right handgrip strength was 35.8±10.6kg. No significant differences were found within and between days for RBCV (129.92±49.78µm/s, r=0.530) and EE-gap (1.80±0.39µm, r=0.795). CONCLUSION: These data suggest measurements of microcirculatory diameter and velocity are reproducible using OPS imaging. Ongoing studies are examining associations of the microvascular measures to larger vessels and physical fitness.

BRACHIAL ARTERY VASCULAR OPERATING RANGE IN HEALTH AND DISEASE

Alan Sticker, D. Credeur, M.A. Welsch. *Louisiana State University, Baton Rouge, LA.*

02

Previous work has suggested the measurement of a vasoactive range may provide additional information about systemic vascular health. PURPOSE: To examine the influence of age, fitness, and health status on the brachial artery vascular operating range. METHODS: Subjects were young (ATH; n=12; Age:22±2.03yrs and YA; n=12; Age:23±2.00yrs), middle-age (MA; n=12; Age:55±5.70yrs), patients with heart failure (CHF; n=12; Age:68±11.86yrs) and old-age (OLD; n=12; Age:75±4.69yrs). Ultrasonography was used to assess brachial diameters at rest, in response to flow mediated dilation (FMD) and a cold pressor test (CPT). The maximum (following FMD) and minimum (following CPT) diameter responses were combined to establish a vascular physiological operating range (VOR). The equation: $[1 - (\text{FMD absolute}/\text{VOR mm}) * 100]$ was used to calculate the base diameter as a percentage of the VOR. Cardio-respiratory fitness was estimated from a 6 minute walk, or step test. RESULTS: Young subjects had the highest estimated VO₂peak (ATH: 43.34 ±3.96 and YA: 42.12±4.09mL/kg/min). ATH had the largest base diameter (5.39±1.51mm, p<0.05) yet greatest FMD (0.45±0.16mm, p<0.05), CPT (0.16±0.05mm, p<0.05) and VOR (0.55±0.15mm, p<0.05). OLD had the smallest VOR (0.23±0.12mm, p<0.05). CHF had the lowest FMD (0.11±0.06mm, p<0.05), but highest VORbase% (51±12.55%, p<0.05). VOR was related to FMD (r=0.93) and CPT (r=0.57). In addition, significant associations between VORbase% and FMD (r=0.42), CPT (r=0.48), and estVO₂peak (r=-0.44), and CPT were noted. CONCLUSION: Younger age, higher fitness, and health are associated with a greater VOR, and lower base diameter in the VOR. Understanding factors that contribute to the VORbase% may be critical in understanding both vasodilatory and constrictor responses.

RESISTANCE AND ENDURANCE TRAINING IMPROVE ENDOTHELIAL FUNCTION AND VASOACTIVE BALANCE IN YOUNG PREHYPERTENSIVES

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03

The separate effect of resistance and endurance exercise training on arterial function was investigated in 43 young prehypertensives and 15 normotensive controls. Training groups completed an 8 week exercise training regimen. Brachial artery flow mediated dilation (bFMD), plasma nitric oxide (NOx), and endothelin (ET-1) were measured before and after exercise training and time matched control. Resistance and endurance training improved bFMD absolute dilation, percentage change in dilation, and FMD normalized to shear rate (0.26±0.03 to 0.34±0.04 vs. 0.22±0.03 to 0.34±0.03 mm, p<0.05; 6.17± 0.89 to 8.30±1.15 vs. 5.92±0.97 to 9.64±1.25 Δ%, p<0.05; 0.21±0.03 to 0.25±0.03 vs. 0.16±0.02 to 0.28±0.03 Normalized s-1, p<0.05; respectively). Exercise training increased NOx (18.86±3.48 to 22.439±1.61 and 18.84±3.34 to 24.57±2.08 µmol/L, p<0.05) and decreased ET-1 (12.17±2.33 to 10.23±2.05 and 12.44±2.72 to 9.40±1.59 pg/ml, p<0.05) in the resistance and endurance training groups, respectively. Consequently, exercise training improved the NOx:ET-1 ratio (1.63±0.61 to 2.29±1.00 and 1.58±0.59 to 2.74±1.04, p<0.05) in the resistance and endurance training groups, respectively. No changes in bFMD absolute dilation, percentage change in dilation, FMD normalized to shear rate (0.24±0.03 to 0.18±0.03 mm; 6.20±0.83 to 5.85±1.07 Δ%; 0.19±0.04 to 0.19±0.03 Normalized s-1, p>0.05; respectively), NOx, ET-1, or NOx:ET-1 ratio occurred in the control group. Both resistance and endurance exercise training improved bFMD, increased plasma levels of NOx, reduced plasma levels of ET-1, and improved the NOx:ET-1 ratio.

ASSOCIATIONS BETWEEN ARTERIAL STIFFNESS AND MARKERS OF INFLAMMATION IN OLDER WOMEN

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04

Chronic inflammation plays an important role in hypertension and atherosclerosis. An increase in systemic inflammation is considered to be one of the primary initiators of endothelial dysfunction and arterial stiffness. Therefore, the purpose of this investigation was to examine the associations between circulating markers of inflammation (MOI) and indices of arterial stiffness in normotensive healthy older women. Subjects were 50 postmenopausal women over 60 yrs of age, mean BMI 27 ± 4, and physically untrained. Large artery elasticity (LAE), small artery elasticity (SAE), systemic vascular resistance (SVR), total vascular impedance (TVI), and estimated cardiac output (ECO) were determined using pulse contour analysis (PCA), which records and analyzes the blood pressure waveform data from the Arterial Pulse Wave Sensors. Serum concentrations of tumor necrosis factor (TNF-α), C-reactive protein (CRP), and interleukin 6 (IL-6) were assessed. Results from Pearson's correlation analysis revealed that TNF-α was inversely associated with LAE (-0.426, P < 0.01), and ECO (-0.324, P < 0.05); and positively associated with SVR (0.386, P < 0.01) and TVI (0.416, P < 0.01). Additionally, CRP was inversely associated with LAE (0.308, P < 0.01). No significant correlations were found for IL-6. In conclusion, these results showed that an elevation in MOI is associated with a decreased arterial elasticity and cardiac output, and an increased vascular resistance among healthy older women. Further, it suggests that TNF-α may be a pivotal cytokine in the inflammatory cascade that mediates arterial compliance.

AN INTERDISCIPLINARY APPROACH TO INJURY PREVENTION AND PERFORMANCE ENHANCEMENT IN NCAA DIVISION I BASEBALL

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05

Much of the current literature related to injuries in sport has addressed the influence of a particular exercise intervention on a specific type of injury without considering changes in sport performance. The purpose of this research was to investigate an interdisciplinary approach to athlete development and its initial effects on injury rates and measures of performance in collegiate baseball. In October 2008, an NCAA Division I baseball team began working with a sport performance enhancement group (SPEG) which consists of a collaborative effort between sport coaches, sport medicine and sport science departments. Injury rates were calculated for each academic year from 2006/2007 through 2010/2011. As part of the athlete monitoring program provided through SPEG, peak force was measured using an isometric mid-thigh pull from 2008/2009 through 2010/2011. Team win percentage and home runs were also reported from 2003/2004 through 2010/2011. Compared to 2006/2007 and 2007/2008, injury rates during 2008/2009 decreased 40% and 16%, 2009/2010 decreased 64% and 48%, while 2010/2011 decreased 33% and 6%. Team mean allometrically scaled isometric peak force (IPFa) increased each year from 2008/2009 through 2010/2011 (200.6 N, 229.6 N, 244.2 N). IPFa during 2009/2010 and 2010/2011 were significantly greater than 2008/2009 ($p = .001$ and $.002$). Win percentage increased from 2008/2009 through 2010/2011 (47%, 53%, 63%) and the 2010/2011 win percentage was higher than any other year since 2003/2004. Total team home runs during 2009/2010 and 2010/2011 were higher than any other season since 2003/2004. These results seem to indicate that the collaborative efforts of SPEG were able to substantially reduce injury rates while increasing lab based and on-field performance.

PLANTAR MASSAGE IMPROVES POSTURAL CONTROL IN THOSE WITH CHRONIC ANKLE INSTABILITY

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06

Lateral ankle sprains are an extremely common musculoskeletal injury and up to 75% of those who sprain their ankle develop chronic ankle instability (CAI). Traditional rehabilitation strategies for CAI focus on motor pathway impairments (e.g. strength, coordination) with very little emphasis on the potential to intervene through sensory pathways. Therefore, the purpose of this investigation was to determine if a sensory plantar massage can improve postural control in those with CAI. A total of 18 individuals with CAI (age: 23.9 ± 5.6) volunteered to participate. CAI was defined as experiencing multiple sprains (5.1 ± 3.0) and episodes of giving way (3.9 ± 4.7), as well as have increased self-assessed disability via the Foot and Ankle Ability Measure-Sport ($80.1 \pm 13.6\%$). All subjects completed a series of 3 balance assessments (baseline, post-first treatment, post-second treatment). Each assessment consisted of 3, 20-second trials of single leg stance with the eyes open. A crossover design was used so that the order of massage and control treatments was applied in a counterbalance fashion. The plantar massage treatment consisted of 5-minutes of light petrissage and effleurage while the control treatment consisted of 5-minutes of quiet sitting. Repeated measures ANOVAs revealed Time main effects for the anteroposterior ($p=0.019$), mediolateral ($p=0.005$), and resultant ($p=0.004$) center of pressure (COP) excursions. Post-hoc testing revealed that the post-second treatment COP excursions (anteroposterior: 53.4 ± 8.1 mm, mediolateral: 49.6 ± 7.5 mm, resultant: 80.0 ± 10.8 mm) were significantly lower ($p < 0.05$) than baseline excursions (anteroposterior: 58.9 ± 11.8 , mediolateral: 57.2 ± 15.6 , resultant: 92.7 ± 23.8). No Time \times Treatment order interactions were observed ($p > 0.05$). The results provide preliminary evidence in support of the immediate effectiveness of plantar massage at improving postural control in those with CAI.

RELATIONSHIP BETWEEN ACUTE CONCUSSION SYMPTOMS AND DURATION OF RECOVERY IN COLLEGE ATHLETES

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07

A multicenter prospective cohort study of 2584 high school and college athletes is being conducted. We report cross sectional results about the most common risk factors and characteristics of concussion (conc). Subjects completed a baseline conc/medical history questionnaire. The population predominantly included college football (70%) and men's/women's soccer players (28.4%). 719 subjects had a self-reported history of at least 1 prior conc. 155 experienced multiple concs. Common conc symptoms included headache (77.8%), dizziness (62.4%) and "fogginess" (41.6%). Subjects with a prior conc played their sport significantly longer ($M=9.69$) than those without a conc ($M=8.7$), p -value < 0.001 . Athletes that lost consciousness (LOC) during their first conc were significantly more likely to sustain a second [OR=3.11; 1.84-5.25] and third conc [OR=3.3; 1.18-9.24] compared to those without LOC. Post conc symptoms such as "fogginess" [OR=2.38; 1.44-3.92], nausea [OR=1.8; 1.09-2.98], and fatigue [OR=2.31; 1.34-3.97] were associated with prolonged restriction from athletics. As reflected in previous studies, "fogginess" was associated with restriction in athletic participation greater than one game/practice [OR=2.27; 1.34-3.88]. These results suggest that certain symptoms of conc are associated with future concs and restriction from athletics. Future plans include the association between genetic polymorphisms and conc severity/recovery. Supported by a grant from NOCSAE.

ALTERED GAIT TERMINATION STRATEGIES FOLLOWING CONCUSSION

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08

Impaired postural control is a cardinal symptom of concussion and the assessment is a recommended component in identifying concussion recovery. Unfortunately, many assessment techniques return to baseline values within 3 – 5 days despite the continued presence of concussion symptoms. Therefore, the purpose of this investigation was to determine if gait termination, a novel and dynamic postural control assessment technique, can identify postural control impairments in individuals following a concussion. Participants included 20 uninjured controls (age: 19.0 ± 1.6 years, height: 152.4 ± 8.0 cm, weight: 50.0 ± 10.6 kg), and 15 concussed individuals (age: 19.1 ± 1.0 years, height: 173.3 ± 13.9 cm, weight: 75.9 ± 18.1 kg; 13.3% LOC). All subjects completed 2 standard gait and 5 planned gait termination trials per test session. Controls were tested once, while concussed individuals were tested daily from the day after their concussion until the day they returned to full unrestricted activity (mean: 13 days). Main outcome measures included: gait velocity, propulsive, braking, and ratio force alterations. The results indicate that gait velocity (Control: 1.3 ± 0.1 m/s, Day 1: 1.1 ± 0.2 m/s, Day 10: 1.4 ± 0.2 m/s), braking force increase (Control: $47.2 \pm 23.6\%$, Day 1: $-14.6 \pm 19.0\%$, Day 10: $13.4 \pm 17.6\%$, and force ratio (Control: $51.4 \pm 8.7\%$, Day 1: 60.3 ± 12.2 , Day 10: 48.1 ± 14.9) were significantly different. More specifically, the results indicate that immediately following a concussion, individuals walk slower, decrease their braking forces, and have an altered force ratio while terminating gait. However, by day 10 post concussion, gait velocity and force ratio had returned to "normal" values. These results indicate that gait termination outcomes can detect postural control impairments following concussion.

THE RELATIONSHIP BETWEEN SELF-REPORTED HEALTH HISTORY, PHYSICAL LIMITATIONS, AND PHYSICAL PERFORMANCE IN OLDER ADULTS

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09

Many older adults report certain medical conditions as reasons for not participating in physical activity. This study explored the extent an older adult's perceptions of physical limitations affected physical performance. Fifty older adults (65-91 years, 88% female, 44% African-American) who lived independently were interviewed at senior nutrition and activity sites or at their homes. The participant's perception of physical independence was measured by a lifestyle information form (LIF) and compared with a physical performance measure, the timed up-and-go (TUG). A health history questionnaire (HHQ) was used to determine if the number and/or types of medical conditions between individuals who were moderately dependent (MDEP) and performed within normal or above average limits on the TUG were any different from participants who were also MDEP, but performed below average or who were at risk for loss of functional mobility on the TUG. An inverse linear relationship existed between the older adult's level of independence and their health history ($r = -.46, p < .01$) and their physical performance ($r = .31, p < .05$). A one-way ANOVA found significantly faster ($p < .05$) TUG completion times for the IND group (8.30 ± 1.93 sec.) compared to the moderately dependent (MDEP) group (12.58 ± 9.27 sec.). Out of those older adults who reported physical limitations ($n=30$) only four (13%) performed at or above average on the TUG. We concluded that generally, those older adults who report physical limitations are actually physically limited.

ADIPOSIY IMPACTS PHYSICAL FUNCTION MORE THAN LEG LEAN MASS IN COMMUNITY-DWELLING OLDER MEN AND WOMEN

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O10

The interaction of body composition measures, strength and physical activity and the most salient outcome for lower-extremity physical function (LEPF) in older adults is an active area of research due to the implications for physical disability. Therefore, to elucidate the relative importance of adiposity (%Fat), leg lean mass, muscle strength, muscle quality (MQ), and physical activity (PA) on LEPF, we assessed community-dwelling adults ($n=231$, 96 male; 68.5 ± 6.7 y) for body composition via dual energy X-ray absorptiometry, upper leg strength via isokinetic dynamometer (MVC), PA via pedometer, and LEPF via the timed up-and-go test (UPGO), 30-second chair stand test (CHR), and fast 7-m walk (WLK). MQ was calculated as MVC normalized for upper leg mineral-free lean mass (MFLM). No significant differences were observed between men and women in PA, MQ, or MFLM. As expected, men were 35% stronger than women ($p < .01$) while women had greater %Fat ($38.8 \pm 6.5\%$ vs. $26.1 \pm 5.5\%$, $p < .01$). Due to gender differences in MVC and %Fat, analyses were adjusted for sex. MQ and MFLM were not associated with any measures of physical function ($p > .05$). Greater %Fat was associated with reduced LEPF [UPGO ($r=0.23$), CHR ($r=-0.30$), and WLK ($r=0.26$) (all $p < .01$)]. Increased PA was also associated with better LEPF ($r=0.31-0.34$, all $p < .01$). %Fat and PA demonstrate a stronger relationship with LEPF than MQ or MFLM in community-dwelling older adults. Supported by NIH-HL090455

COMPARISON OF MAXIMAL HEART RATE PREDICTION EQUATIONS IN ESTIMATING VO2MAX FROM THE YMCA SUBMAXIMAL CYCLE ERGOMETER PROTOCOL

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O11

The purpose of this study was to determine whether a difference exists between the predictive abilities of two equations for maximal heart rate (traditional vs. Gellish et al., Med Sci Sports Exerc, May, 2007) in estimating individuals' maximal oxygen consumption (VO2max) when performing the YMCA submaximal cycle ergometer protocol. It was hypothesized that subjects' predicted VO2max values would be more strongly correlated with their measured VO2max values when employing the Gellish et al. equation ($206.9 - (0.67 \times \text{age})$) versus the traditional prediction equation ($220 - \text{age}$). Seventeen younger, apparently healthy subjects performed two cycle ergometer exercise tests separated by a period of one week. The first test was a treadmill VO2max test and the second test was a YMCA submaximal cycle ergometer test. Each subject's submaximal test data was then plotted twice on a graph to determine predicted VO2max, once representing each of the prediction equations. A t-statistic was used to compare the correlation coefficients between each of the two prediction equations with each subject's measured VO2max. Data analysis demonstrated that the correlation between the VO2max derived from the Gellish et al. formula and measured VO2max was significantly higher $r = 0.36$, than the correlation between the VO2max derived from the traditional formula and measured VO2max, $r = 0.32, t = 3.23 (p < 0.01)$. This finding suggests that the widely-used YMCA submaximal cycle ergometer protocol should be revised to employ the Gellish et al. formula, given its superior predictive ability in estimating individuals' true VO2max values.

WHY IS THERE CONFUSION ABOUT VO2 PLATEAU? A RE-EXAMINATION OF THE WORK OF A.V. HILL

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O12

Maximal oxygen uptake (VO2max) is regarded as the gold standard for assessing aerobic fitness. In 1923, A.V. Hill et al. proposed that VO2max represents the maximal ability of the body to take in and consume O2 during strenuous exercise. Recently, however, controversy has arisen whether VO2max is a valid physiological phenomenon due to low prevalence of attainment of a leveling off, or "plateau" in VO2. The purpose of this study was to compare two different VO2max protocols and determine if both protocols show direct evidence of an upper limit on O2 uptake. Nine runners (18-35 years old) completed a continuous graded exercise test (CGXT), followed by a discontinuous graded exercise test (DGXT). The CGXT consisted of gradually increasing treadmill running velocity to the point of volitional exhaustion; the highest velocity attained was labeled the peak treadmill velocity (PTV). The DGXT was conducted over the next several days and consisted of participants running at 80%, 90%, 100%, 105%, and 110% of PTV for 10 minutes each, or until volitional exhaustion was reached. Oxygen uptake measurements were measured with an Oxycon Mobile breath-by-breath measuring device. All participants ($n=9$) achieved a "VO2 ceiling" (or upper limit) during the DGXT, while only 44% ($n=4$) achieved a "VO2 plateau" on the CGXT. There was no significant difference between the highest VO2 values obtained from a CGXT ($57.4 \pm 2.6 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) and DGXT ($60.0 \pm 3.1 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$). There were no significant differences between highest oxygen uptake measured at 90%, 100%, 105%, and 110% of PTV. However, the highest VO2 recorded at 80% PTV was significantly lower than that recorded at all other velocities ($p < .05$). In this study, a ceiling was always seen on the DGXT, but a plateau was not always seen on the CGXT. DGXT and CGXT yield similar VO2max values, illustrating that a CGXT can be used to assess VO2max even without the appearance of a plateau during the test.

THE IMPACT OF A LIFESTYLE WEIGHT LOSS INTERVENTION ON HEALTH-RELATED QUALITY OF LIFE IN THE HEALTHY LIVING PARTNERSHIPS TO PREVENT DIABETES (HELP PD): A RANDOMIZED CONTROL TRIAL

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013

The purpose of this study was to examine the impact of a community based translation of the Diabetes Prevention Program lifestyle weight loss intervention (LWL) on health-related quality of life (HRQL) compared to an enhanced usual care condition (UCC) in adults with prediabetes. Three hundred and one volunteers (Mean (SD) age = 58 (9.5) years; BMI=32.7(4.0) m/kg²; fasting blood glucose = 105.5 (11.3) mg/dL) were randomly assigned to either the LWL or UCC. The goal of the LWL was $\geq 7\%$ weight loss achieved through physical activity and caloric intake goals. The LWL consisted of weekly group meetings for 6 months and monthly meetings for the next 18 months led by Community Health Workers (CHWs). The UCC comprised of two individual meetings with a RD and a monthly newsletter. HRQL was assessed using the physical component scale (PCS) and the mental component scale (MCS) of the SF-36 at baseline and 12 months. Interestingly, change in PCS was significantly different between groups ($p=0.004$), but change in MCS was not significantly different between groups ($p=0.1075$). The results of this study demonstrate that a community-based LWL program led by CHWs positively influences the physical component of HRQL compared to UCC in pre-diabetics adults.

ADIPOSIITY AND FATIGUE IN POSTMENOPAUSALWOMEN

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014

Fatigue is a common clinical complaint among older women. We aimed to evaluate relationships among adiposity, physical activity (PA) and dimensions of fatigue in this cohort. Women (age=66.0 \pm 5.9 y) were stratified into a normal weight ($n=22$, BMI=23.6 \pm 1.7 kg/m², 44 \pm 3.5%Fat; NW) or obese group ($n=31$, BMI=33.1 \pm 4.0 kg/m², 34.9 \pm 5.2%Fat; OB) and were assessed for adiposity (%Fat) using DXA; PA using pedometer step count; and self-reported fatigue dimensions using the Multidimensional Fatigue Inventory [general (GEN), physical (PHY), mental (MEN), reduced activity (RACT), reduced motivation (RMOT)]. NW accumulated more steps per day (7,478 \pm 3,358 vs. 4,330 \pm 2,506; $p=0.001$) than OB. Higher PA was related to lower %Fat ($r=0.62$, $p<0.001$). OB reported greater fatigue than NW in GEN, PHY and RACT (all $p<0.001$) but no differences in MEN or RMOT ($p>0.05$). Likewise, greater %Fat was associated with more fatigue (GEN, PHY, RACT; $r=0.47$ to 0.59 , all $p<0.01$). Greater PA was only associated with less RACT ($r=0.31$, $p<0.05$). When controlling for PA, the strength of association with RACT was reduced slightly ($r=0.26$, $p=0.08$). Controlling for %Fat, the relationship between PA and GEN emerged ($r=0.30$, $p=0.046$). It appears that %Fat impacts fatigue more than PA; however, the relative and independent effects of PA and %Fat on fatigue dimensions in older women needs further study.

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EFFECTS OF EXERCISE TRAINING ON FAT OXIDATION IN UNTRAINED OVERWEIGHT AND OBESE FEMALES

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015

This study examined whether a high-intensity interval (IT) or a continuous steady-state (CT) exercise training program had the greatest effect on fat oxidation rates and fat mass loss in a population of untrained overweight and obese females. Thirteen female subjects (VO_{2peak} 30.6 \pm 1.29 ml.kg.min⁻¹, BMI 29 \pm 0.79, fat mass [FM] 33.3 \pm 2.09 kg) were randomly assigned to either a CT (exercise at the relative intensity that elicits the maximal fat oxidation rate [FATmax]) or an IT (intervals alternating 5 minutes at 40% and 85% VO_{2peak}) training group that exercised approximately 1 hour, 3 days.week⁻¹ for 10 weeks. Body composition assessments, peak oxygen uptake (VO_{2peak}), FATmax and plasma free fatty acid (FFA) concentrations were examined pre- and post-training using dual-energy X-ray absorptiometry (DEXA), ParvoMedics gas analysis system and FFA half micro tests (Roche Diagnostics). No significant differences were found post-training in body weight (kg), body fat (%), fat-free mass, or fat mass ($P>0.05$). The relative exercise intensity that elicited FATmax was significantly increased from 35.3 \pm 2.55% to 44.7 \pm 3.56% in the IT group post-training ($P<0.05$). The maximal fat oxidation rate was determined at a higher relative exercise intensity after 10 weeks of a IT program compared with a CT program, which resulted in longer durations of fat oxidation during submaximal exercise bouts. These data suggest that an IT program induces a greater increase in the relative exercise intensity that elicits maximal fat oxidation after 10 weeks of training compared to a CT program in this population. Although body composition and FATmax were not altered, it is possible that through training induced metabolic adaptations from the IT program, intramuscular triacylglyceride (IMTG) contributions to fat oxidation at a given steady-state work rate could be increased post-training.

LIPOLYTIC AND GLUCOREGULATORY RESPONSES TO FEEDING AND EXERCISE IN OBESE AND LEAN CHILDREN

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016

The effect of exercise on subsequent metabolic responses to eating has not been determined in lean or obese youth, despite the demonstrated positive effects of prior exercise on meal responses in adults. Therefore, we sought to determine whether or not an exercise bout can improve subsequent meal metabolic responses (lipolytic and glucoregulatory) in prepubescent children. Overnight fasted obese ($n=56$) and lean ($n=34$) children (>95th and <85th percentile of age-adjusted BMI, respectively) had microdialysis (MD) catheters placed in subcutaneous abdominal adipose tissue (SCAT). Interstitial metabolites (glycerol and glucose) were collected in the MD dialysate prior to, and following, breakfast, exercise, or lunch. Dialysate comparisons were made between subjects categorized by BMI or exercise/control groups with repeated measures ANOVA. As expected, obese children had poor lipolytic suppression following a meal vs. lean counterparts (delta MD glycerol: -12.3 \pm 18.3 vs. -35.1 \pm 32.3 uM, respectively; $p<0.01$). The lipolytic response in obese children to a second identical meal was no longer different from lean children (delta MD glycerol: -4.4 \pm 19.2 vs. -8.1 \pm 17.2 uM, obese vs. lean, respectively; $p=0.36$). MD glucose was increased following both meals ($p<0.01$) prior to and following exercise, and this response was higher in lean children in both cases ($p<0.01$). However, these responses were not dependent on exercise between the two meals ($p=0.37$). These results suggest that poor suppression of lipolysis following feeding in obese children can be improved by implementation of a pre-meal exercise bout; however, glucose responses to a subsequent meal do not seem to be sensitive an exercise bout

SPORTS GAME PLAY IN MIDDLE SCHOOL PHYSICAL EDUCATION: A COMPARISON OF MODERATE TO VIGOROUS PHYSICAL ACTIVITIES

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O17 Physical activity (PA) in physical education (PE) middle school students has been declining. Recent suggestions for improving curricula should include PA that promotes fitness by maintaining moderate to vigorous physical activity (MVPA). Flag rugby has been suggested as an alternative to traditional team sports. **PURPOSE:** To compare the estimated intensity and duration of flag football (FF), basketball (BB) and flag rugby (FR) in middle school students. **METHODS:** 101 (55 M; 46 F, age 11-14) students were selected to participate in three week sport units of FF, BB and FR. Activity counts and duration were collected using the Stayhealthy RT3™ accelerometer on the last Friday of each unit. Average kcal per activity was converted into adolescent MET values. Duration of activity was measured by the average completion of each sport. The research design used an RMANOVA. **RESULTS:** Mean MET values were: FF 4.93 + 1.35(SD), BB 5.51 + 2.02, and FR 6.02 + 1.52. Average durations were: FF 39.26 + 4.78 min, BB 40.55 + 5.92 and FR 41.76 + 4.84 min. The significant difference in duration was between FR and FF ($p = 0.001$) The MET results were significant between FF and BB ($p = 0.023$) and FR and FF ($p < 0.000$), but not between BB and FR ($p = 0.109$). **DISCUSSION:** FR produced greater intensity and duration than FF or BB ($p < 0.001$). Results of this study suggest FR participants are most active for longer durations. Inclusion of sports such as FF, BB and FR in PE may be beneficial for health by producing MVPA.

SEASONAL CHANGES IN PHYSICAL ACTIVITY OUTSIDE OF SCHOOL IN YOUTH

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O18 Several factors are known to be related to physical activity (PA) levels in youth; two of the most common are sex and season. Boys tend to more active than girls and youth tend to be more active in mild weather. The purpose of this study was to determine seasonal changes in PA outside of school in middle school boys and girls. Participants were 411 students (grades 6 – 8; 197 boys, 214 girls; 12.2±0.9 y) enrolled in a single middle school in Western Michigan. PA outside of school was assessed in thirty minute blocks using the three-day physical activity recall (3DPAR). Students completed the 3DPAR in the fall, winter, and spring. The average number of thirty-minute time blocks of daily moderate-to-vigorous PA (MVPA) was calculated for PA outside of school. A repeated measures ANOVA was used to determine differences in blocks of daily MVPA by sex and season, as well as an interaction between the two. There was a significant effect of season, but not sex. There was also a significant interaction between sex and season; boys had a greater decrease in blocks of daily MVPA from fall to winter as well as a greater increase in blocks of daily MVPA from winter to spring compared to girls [fall 4.2±2.9, winter 2.6±2.7, spring 4.5±3.1 blocks (boys) vs. fall 3.5±2.9, winter 3.0±2.7, spring 4.0±3.1 blocks (girls); $P=0.001$]. These data suggest that due to the significant decrease in blocks of daily MVPA during winter, it may be necessary to provide additional opportunities for increased PA during the winter to attenuate the seasonal effect. These opportunities may be especially beneficial for boys. Funding was provided by the Blue Cross Blue Shield Foundation of MI, the North American Society for Pediatric Exercise Medicine, and Michigan State University College of Education and Graduate School.

PHYSICAL ACTIVITY COMPENSATION IN ELEMENTARY SCHOOL STUDENTS DURING AN AFTER-SCHOOL EXERCISE PROGRAM

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O19 Among adults, adding a structured exercise program may not result in expected increases in total energy expenditure due to a compensatory decrease in non-exercise activity. Preliminary data from a randomized trial of two types of after-school programs (ASP) among students aged 8-11 were used to investigate the extent to which physical activity compensation occurs in children. The 9 month long ASP consisted of 30 minutes of homework followed by either 40 minutes of vigorous intensity physical activity (exercise group) or 40 minutes of a cognitively engaging sedentary activity (attention control group). Students were instructed to wear Actigraph GT1M accelerometers during waking hours for 7-days prior to the intervention and during the last week of the intervention. Duration of moderate and vigorous physical activity (MVPA) was estimated separately for ASP and non-ASP time periods. Among the 68 subjects with valid Actigraph data at both time points there was a statistically significant ($p < 0.01$) increase in MVPA during the post-intervention period in both the exercise (5.5 min/d) and control groups (5.7 min/d). Participation in MVPA outside of the ASP was relatively unchanged among both groups (-0.3 min/day and -0.4 min/d for the exercise and control groups, respectively) suggesting no significant compensatory response. Exploring further, individual changes in MVPA during and outside of the ASP were found to be weakly correlated (spearman $r = -0.08$ among all subjects). In summary, participation in an active ASP did not result in a compensatory decrease in physical activity outside of the ASP.

MODELING RELATIONSHIPS BETWEEN PHYSICAL ACTIVITY, DIET, FITNESS, FATNESS AND ACADEMIC RELEVANT OUTCOMES IN OVERWEIGHT CHILDREN

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O20 The purpose is to test a model of the effects of physical activity, nutrition, fatness, and fitness on cognition, behavior, and academic achievement in children. Few analyses have examined these interrelated health behaviors simultaneously. Participants were 141 overweight children. Structural equation modeling was conducted with LISREL 8.8 using robust maximum likelihood estimation. A Multiple Indicator, Multiple Cause (MIMIC) model was estimated to account for heterogeneity among groups by race, sex, age, and parent education. The MIMIC model had good overall fit with multiple fit indices including Satorra-Bentler chi-square (Chi-square=252.07, $df=215$, $p=0.042$), CFI (0.98) and RMSEA (0.037). In the MIMIC model, improved fitness was associated with improved cognitive performance and decreased behavior problems (standardized $\beta = .29$ and $-.24$). Increased fatness predicted increased behavior problems ($\beta = .10$). Effects of diet on fitness and fatness as well as fatness on cognitive performance and academics in the unadjusted model were attenuated when covariates were included in the MIMIC model. Improved fitness is associated with multiple positive school-relevant outcomes in overweight children. Adjustment for covariates altered this relationship, indicating that these variables may be confounding the relationships between health behaviors, health and cognitive and academic outcomes. Supported by grants NIH DK60692, DK70922

EXERCISE REDUCES AUTOIMMUNE CELL INFILTRATION AND PRESERVES MOTOR NEURONS AND AXONS IN AN ANIMAL MODEL OF MULTIPLE SCLEROSIS

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021

Multiple Sclerosis (MS) is an autoimmune disease of the central nervous system resulting in accumulated loss of motor function. We evaluated the clinical and neuropathological effects of voluntary wheel running in C57BL/6J mice with myelin oligodendrocyte glycoprotein (MOG)-induced experimental autoimmune encephalomyelitis (EAE), an animal model of MS. Exercising EAE mice exhibited less severe neurological disease score (0.88 ± 1.17 exercise, 1.88 ± 1.67 sedentary), and later onset of disease when compared to sedentary EAE animals (14.3 ± 0.58 days, exercise, 11.67 ± 0.58 days, sedentary). Nissl staining revealed a greatly attenuated loss of lumbar ventral horn motor neuron cell bodies in the EAE exercise group (31.9 ± 15.05 cells) when compared to the EAE sedentary group (14.0 ± 5.14 cells). Immune cell infiltration in the ventral tracts of the lumbar spinal cord was reduced in the EAE exercise group by 67.5% when compared to sedentary EAE animals. Neurofilament heavy-chain immunolabeling in the anterior corticospinal tract displayed a 46% greater loss of axons in the sedentary EAE animals. Voluntary exercise results in reduced and attenuated disability, reductions in autoimmune cell infiltration, and preservation of motor neurons and axons within the lumbar spinal cord of mice with EAE.

FUNCTIONAL AEROBIC IMPAIRMENT IN A SAMPLE OF HIV-INFECTED ADULTS

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022

Published results from our lab have shown males living with HIV exhibit functional aerobic impairment (FAI) as indicated by a 25% decrease in their age predicted VO₂ max. Currently no investigation has assessed aerobic capacity in a sample of HIV+ females. Therefore the purpose of the investigation was to evaluate aerobic capacity of males and females living with HIV. Methods: Preliminary data was used from an ongoing exercise intervention, which included a total of 8 males and 15 females. All participants underwent a maximal exercise test at baseline prior to randomization in which VO₂, heart rate, and blood pressure were assessed. FAI was determined if the participant exhibited a peak VO₂ \leq 25% of their age-predicted VO₂. Results: Both males and females exhibited FAI (males: FAI = 36%; females: FAI = 47%). When separated by gender males had a peak VO₂ of 24.82 ± 2.77 , whereas females had a significantly less peak VO₂ of 15.37 ± 0.97 ($p = 0.001$). Both genders had a peak heart rate significantly less than their age predicted max (males: 138 ± 8 bpm; females: 136 ± 5 bpm). Conclusion: These data agree with previously published data that show males living with HIV often present functional aerobic impairment, possibly due to a sedentary lifestyle and/or disease related fatigue. These results indicate that females living with HIV have higher FAI compared to males. Caution should be taken when prescribing aerobic exercise with this population and should be initiated at a light intensity less than the current recommendations for the general population. Supported by a grant from the NIH/NINR: 1R21NRO11281

EFFECT OF MASTECTOMY SITE ON ARM STRENGTH, LEAN MASS, AND QUALITY OF LIFE IN BREAST CANCER SURVIVORS

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023

Surgical mastectomy for treatment of breast cancer can result in muscular atrophy with loss of upper body strength and function. Tasks that involve lifting and carrying, including hand and arm flexion activities, are the most difficult for women after mastectomy. Mastectomy site (dominant or non-dominant arm) may moderate post-surgical outcomes. To evaluate the effect of arm dominance and mastectomy site, 16 right-arm dominant women (age = 58.3 ± 2.9 years) completed the 30-second arm curl test using both dominant and non-dominant arms before and after an 8-week resistance training program. All were diagnosed with breast cancer and status post unilateral mastectomy. Nine had right-sided mastectomy (RSM) and seven had left-sided mastectomy (LSM). At baseline, the LSM group was observed to have equal strength bilaterally with no significant difference in arm curl repetitions achieved in 30 seconds between the dominant right and non-dominant left sides (16.4 ± 1.3 repetitions and 16.1 ± 1.6 repetitions, respectively). By comparison, the RSM group (dominant side mastectomy) had significantly greater weakness on the dominant right side than on the non-dominant left side (16.7 ± 1.2 repetitions versus 18.6 ± 1.1 repetitions, $p < 0.01$). After participation in 8 weeks of resistance training twice a week, both groups were significantly stronger ($p < 0.001$) and the RSM group no longer demonstrated right-sided weakness. Specifically, the RSM group increased arm curl repetitions by 34% on the dominant (initially weaker) side and 23% on the non-dominant (initially stronger) side; while the LSM group increased 24% on the dominant and 25% on the non-dominant sides that were initially equal in strength. Women who experience mastectomy on their dominant side are at risk for significant imbalances in arm strength that may impair their quality of life. These results support the efficacy of a relatively short-term resistance training program for resolving these imbalances. Further research in this area is needed.

BREAST CANCER REHABILITATION: IS IT FEASIBLE?

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024

Breast cancer is the most common form of cancer in women resulting in 207,090 new cases of invasive breast cancer in 2010. Breast cancer treatment is linked to many side effects and research has shown that physical activity can positively impact these effects. In spite of physical activity's beneficial impact, women decrease their physical activity during treatment and for months after treatment. The purpose of this pilot study was to test the feasibility of conducting a six month comprehensive rehabilitation program in women following the completion of breast cancer treatment. The program consisted of three weekly 1-hour exercise sessions that included aerobic, resistance and flexibility training. At baseline, 3, and 6 months participant fitness, flexibility, strength, diet, and social support were assessed. Feasibility was determined by recruitment rate, exercise session attendance, retention to the program, adverse events, and enjoyment. Seventeen participants with stage I to IV breast cancer consented, with 65% of those recruited agreeing to participate. The session attendance rate was 75% with vacation the most commonly reported reason for absence (35%). Eighty-two percent of the participants remained in the program and only one adverse event was reported. Overall enjoyment of the program was rated a 3.8 (mean score on likert scale, 4 being "liked the program very much"). This study provides preliminary support for the feasibility of breast cancer rehabilitation and future efforts to implement a multi-component program on a larger scale are warranted.

A MITOCHONDRIA-TARGETED ANTIOXIDANT PROTECTS AGAINST CASTING-INDUCED SOLEUS ATROPHY IN THE RAT

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025 Prolonged skeletal muscle disuse leads to muscle atrophy, and reactive oxygen species (ROS) are known to be an important cause of this atrophy. Currently, the primary source of this ROS remains unknown, although mitochondria are suspected. We tested the hypothesis that daily administration of a mitochondria-targeted antioxidant (SS-31) could protect against inactivity-induced 1) increases in mitochondrial ROS emission; 2) mitochondrial dysfunction; and 3) atrophy in the rat soleus muscle following 7 days of hindlimb casting. Seven days of casting increased ROS emission from permeabilized soleus fibers by 43%, and this increase was attenuated by SS-31. Casting decreased mitochondrial coupling as measured by the respiratory control ratio (RCR) by 52%, and SS-31 completely prevented this decrease. Seven days of casting resulted in a significant 13% decrease in the cross-sectional area (CSA) of soleus type 1 fibers, and treatment with SS-31 attenuated this atrophy. Importantly, treatment of control animals with SS-31 did not alter soleus CSA. In conclusion, these results indicate that mitochondria are an important source of inactivity-induced ROS production in skeletal muscle, and that mitochondrial ROS production plays a critical role in disuse muscle atrophy.

WEIGHT LOSS AND EXERCISE EFFECTS ON MUSCLE QUALITY AND PHYSICAL FUNCTION IN OLDER WOMEN

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026 Leg muscle quality (MQ), defined as strength normalized to mineral free lean mass, is a key factor in lower extremity physical function (LEPF) in older obese women; however, the relative effects of a weight loss diet (WL-D) or exercise (EX) on MQ and LEPF is incompletely characterized. The aim of this study was to assess the impact of WL-D or EX on MQ and the subsequent impact on LEPF. Sedentary obese (BMI \geq 30-35 kg/m²) women (N = 30) were randomized to a WL-D or EX intervention for 16 weeks. Upper leg mineral free lean mass (kg) was determined by DXA and strength was assessed via maximal isometric (IM) and isokinetic (at 60 deg/sec, IK60) contractions using an isokinetic dynamometer. MQ-IM and MQ-IK60 were as calculated Nm/kg. LEPF was determined by a 30 s chair stand (CS) and 8-meter up and go (UPGO) challenge. WL-D (n=8, 65.4 \pm 8.0 y) lost 2.4 \pm 3.9 kg of body weight (p=0.12) and EX (n=12 63.8 \pm 4.3 y) lost 0.04 \pm 1.7 kg (p=0.93). Changes in upper leg lean mass did not differ between groups. EX improved strength when compared to WL-D with IM and IK60 improving 19% and 20%, respectively (p<0.05). Compared to WL-D, EX improved MQ-IM 17% (Cohen's d=1.0, p=0.10) and MQ-IK60 16% (Cohen's d=1.5 p=0.12). Changes in MQ-IM and MQ-IK60 were associated with improvements in CS (r=0.62, and 0.69, p=0.04 and 0.02, respectively) but not with UPGO (r=-0.12, and -0.18 p=0.61 and 0.50, respectively). EX enhanced MQ with subsequent improvements in LEPF. Minimal change in weight does not appear to impact MQ or LEPF. Supported by NIH-HI.090455

COMPARISON OF IMMATURE PORCINE AND HUMAN BONE MINERAL DENSITY: IMMATURE PORCINE KNEES ARE INAPPROPRIATE SPECIMENS FOR GRAFT PULL-OUT TESTING

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027 Bone mineral density (BMD) and bone mineral content (BMC) are two methods commonly utilized when assessing bone quality, however the results of these methods are typically not reported in graft and orthopaedic hardware pull-out studies featuring non-human specimens. This study sought to determine whether immature porcine knees would be a realistic representation of human knees for human graft and hardware pull-out studies. This study tested and compared BMD and BMC of two human knee groups and immature cadaveric porcine knees (ICPK). One human group consisted of collegiate athletes (HG1) and the other consisted of 10 people between the ages of 24-55 (HG2). BMD and BMC measurements were obtained using Lunar 10655/Prodigy DEXA Scanner and software. ANOVA was used to assess among group differences. Post hoc testing was used to determine differences between the three groups. BMD in both human groups was statistically higher (p<0.037) when compared with immature porcine specimen at the distal femur BMD and proximal tibia (p=0.001). BMC in both human groups at the distal femur (p=0.001) and proximal tibia (p=0.001) was statistically higher than in the porcine group. These results demonstrate that BMD and BMC in the distal femur and proximal tibia of an ICPK is significantly less than that of an adult human and suggests that graft and hardware pull-out studies with non-human knees may not be appropriate for humans. Future work with graft and hardware pull-out studies should assess the quality of bone with BMD and BMC and should also document these assessments.

BONE MINERAL DENSITY AND FACTORS RELATED TO THE FEMALE ATHLETE TRIAD IN COLLEGIATE FEMALE ATHLETES

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028 While participation in sport has a positive influence on bone, other factors such as type of training, diet, and menstrual cycle may also influence bone mineral density. PURPOSE: The purpose of this study was to compare body composition, bone mineral density, caloric intake, and menstrual cycle status in collegiate female athletes in high and low loading sports. METHODS: Thirty-seven female collegiate athletes (aged 20.7 \pm 0.8 years) from high loading (gymnastics and basketball) and low loading (swimming) sports were measured during the pre-season. Dual energy X-ray absorptiometry (DEXA) was used to estimate bone mineral density (BMD) and body composition. BMD was reported as Z scores matched for sex and age. Age, height (cm), weight (kg), and menstrual cycle status were also measured and recorded. Lastly, athletes completed a 24 hour dietary recall with prompt questions and food models to estimate total calories and calcium intake. RESULTS: Differences were only detected in Z scores for total (2.11 \pm 0.72 vs. 0.50 \pm 0.64), femoral (2.29 \pm 0.91 vs. 0.64 \pm 0.73), and vertebral (1.95 \pm 1.20 vs. 0.16 \pm 1.10) BMD with high loading being significantly higher compared to low loading athletes. Prevalence estimates of components related to the Female Athlete Triad revealed 3 athletes (14.3%) from the high loading group and 1 athlete (6.3%) from low loading group having the combination of an irregular menstrual cycle, < 30 kcal/kg lean body mass, and BMD Z score < 0. CONCLUSIONS: Overall, female athletes participating in high loading sports have increased BMD. However, despite the potential positive influence of training on bone, our results indicate some female athletes in higher loading sports may still be at risk for the Female Athlete Triad.

EFFECTS OF EXERGAMING COMPARED TO TRADITIONAL PHYSICAL ACTIVITY ON CARDIOVASCULAR RESPONSES

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P1

Participation in traditional physical activity (TPA) is an established method for improving markers of health and fitness. Currently exergaming (EG) is being introduced as an alternative activity that is shown to elicit acute physiological responses similar to TPA. However, few studies have directly compared the training effects of EG and TPA. **PURPOSE:** To compare training adaptations in resting blood pressure, resting heart rate and cardiorespiratory fitness in college-age adults following 7 weeks of participating in EG and TPA. **METHODS:** Resting systolic blood pressure (SBP), diastolic blood pressure (DBP), and heart rate (RHR) were measured on students enrolled in EG (n=25; age=21.2±5.2) and TPA (Jogging: n=15; age=20.6±1.1) classes. Each participant then completed a YMCA submaximal exercise test to predict maximal oxygen consumption (VO₂). Following 7 weeks of monitored activity (150 min/week), each measurement was repeated and groups were compared using repeated measures ANOVA. **RESULTS:** There were no group differences for baseline measurements. Following training, a combined group decrease in SBP was observed (pre=123.7±11.0, post=119.4±10.6, p<0.05); however, within group differences in SBP were only seen in EG (pre=123.3±11.3, post=119.2±11.4, p<0.05). No other differences were observed either within or between groups. **CONCLUSION:** The data indicate that college students participating in physical activity classes can significantly reduce SBP and that EG may result in greater reduction in SBP than TPA.

THE RELATIONSHIP BETWEEN BMI, SCREEN TIME, AND PHYSICAL FUNCTION IN A PEDIATRIC POPULATION

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P2

Recent data show that 16.9% of U.S. children and adolescents are obese and 32% are either overweight or obese. Implications of obesity on measures of fitness and function have not been well described. This study examined correlates of physical function in overweight and obese children attending a pediatric obesity clinic (Brenner FIT (Families in Training)). BMI z-score was calculated; measures of physical function included the 6-minute walk distance (6MWD), sit-up and pushup tests, hamstring flexibility and a balance test. As BMI z-score increased, physical function significantly decreased across all measured variables. Also, participation in organized sports was related to improved 6MWD. Males had worse flexibility and older children had poorer balance and flexibility. Using linear regression, BMI z-score had the strongest association with 6MWD (R² change of 0.30). From logistic regression, BMI z-score was significantly associated with balance with an odds ratio of 4.86, such that for each unit increase in z-score there is nearly a 5 fold increase in risk for an abnormal balance assessment. These data show a negative impact on function in children in a pediatric obesity clinic. These findings target factors pediatric weight management interventions should address to maximize patient success.

CROSS-VALIDATION OF A RECENTLY PUBLISHED EQUATION PREDICTING ENERGY EXPENDITURE TO RUN OR WALK A MILE IN NORMAL WEIGHT AND OVERWEIGHT ADULTS.

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P3

An equation recently published by Loftin, et al. (2010) was cross-validated using 30 subjects consisting of 10 normal weight walkers, 10 overweight walkers, and 10 distance runners. Gender was balanced across sub-groups. Participants walked or ran for 5 minutes at their preferred pace. Preferred walking pace was determined by six timed 50-ft trials and preferred running pace was determined by the runner's preferred training pace. Energy expenditure (EE) was determined via indirect calorimetry and reported in absolute units (kcal), and corrected to a mile distance. Body composition was assessed via DXA. EE per mile was predicted using the Loftin, et al. (2010) equation. Absolute EE per mile for the cross-validation (CV) group was similar across sub-groups with the overall mean 107.8 + 15.5 kcal/mile, which was within the standard error of the estimate (SEE) of the original equation. The Loftin, et al. equation [Kcal = mass (kg) x 0.789 – gender (men=1, women=2) x 7.634 + 51.109, R² = 0.632, SEE = 10.9 kcal/mile] yielded a mean of 99.7 + 10.9 kcal/mile. A regression equation for the CV group produced an R² of 0.605 and the SEE (9.8 kcal/mile) was similar to the original equation. Further, a Chow test found no significant differences between regression coefficients of the original equation and the CV group equation. We suggest the Loftin, et al. regression equation is useful for exercise prescription in that it allows for the prediction of EE for either walking or running a mile in normal weight and overweight adults.

THE EFFECTS OF MUSIC TEMPO ON PHYSIOLOGICAL RESPONSES TO SUBMAXIMAL EXERCISE

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P4

Music is used as a form of ergogenic aid to assist individuals through personal cardiorespiratory and resistance training exercise programs. The purpose of this study was to determine physiological responses during submaximal exercise with varying classical music tempos. We looked at the responses of 13 college-aged females (age = 21.5 ± 0.22 yr) during submaximal cycle ergometry. Subjects were asked to participate in an initial assessment consisting of basic anthropometric measurements (height= 66.1 ± 0.76 in, weight = 139.7 ± 5.3 lbs, body fat = 21.6% ± 1.1%) and a 15-minute cycle familiarization trial, as well as two (2) 30-minute exercise bouts. Two 30-minute instrumental music recordings were created consisting of three (3) minute segments ranging from silence to 54 – 170 beats per minute (bpm). The recordings were randomly assigned to each exercise bout and the music was administered through personal earphones. The Monark cycle resistance was set at 1.5 kilopond (kp) and revolutions per minute (rpms), heart rate (HR) and rating of perceived exertion (RPE) were recorded each minute while blood pressure was recorded every two (2) minutes of each exercise bout. The bouts were separated by at least 48 hours and occurred at the same scheduled time each testing day. No significant differences were seen between the two recordings in rpms, HR, RPE or BP (P > 0.05). These results suggest that for music to influence physiological responses during submaximal exercise in this population, music genre and individual interest may be more important than music tempo alone.

IMPROVEMENTS IN FITNESS ATTRIBUTES ACCOMPANYING CIRCUIT RESISTANCE TRAINING IN PERSONS WITH TETRAPLEGIA ARE PARTIALLY DEPENDENT ON TIMELY PROTEIN SUPPLEMENTATION.

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Circuit resistance training (CRT) increases muscular strength and cardiorespiratory (CR) fitness in untrained individuals with chronic paraplegia. Whether CRT is also effective for conditioning persons with tetraplegia is unknown. In addition, protein supplementation (PS) prior to, and immediately post-exercise has been shown to optimize exercise adaptations. **PURPOSE:** To investigate whether a modified CRT program will improve fitness attributes in individuals with tetraplegia, and whether these changes are enhanced by PS. **METHODS:** 10 individuals with chronic tetraplegia underwent 6 months of CRT 3x/wk. Five randomly assigned participants received PS (Whey protein: 48 grams) in split doses immediately prior to and after exercise. Others consumed a matched dose 24 hours post-exercise. Measurements of one-repetition maximal (1-RM) strength for six different exercises, peak oxygen consumption (VO₂peak) and anaerobic power (Wingate) were obtained 3 months before (-3mo), at the beginning (0mo), three months into (3mo) and 6 months after (6mo) the beginning of CRT. **RESULTS:** Overall, 1-RM increased significantly by 10±8, 11±8 and 12±12% for each successive three month period independent of PS group. VO₂peak increased significantly from 0mo to 6mo with immediate PS (12.0±8.0 to 14.9±6.9ml.kg-1min-1, p=.008) but not with delayed PS (7.5±2.6 to 8.1±2.9ml.kg-1min-1, p=.701). Wingate results indicated significant decrease in power drop (116±68 to 67±67, p=.018) from 0mo to 6mo independent of PS group. **CONCLUSION:** CRT effectively increased muscular strength and CR fitness in persons with chronic tetraplegia, and at least tended to improve attributes of anaerobic power. Early analysis suggests a potential role for PS in this population.

P5

RELIABILITY OF A SURVEY TO ASSESS THE ATTITUDES AND BELIEFS OF ADULTS WITH SPINAL CORD INJURIES (SCI) ABOUT EXERCISE

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This study sought to determine the need for and possible impact of exercise on the physical health, mobility and quality of life in individuals with SCI. It was necessary to discover its future use as a measurement tool for doctors, therapists and fitness professionals. Literature makes it clear that persons with SCI need to become active. Subjects with SCI (N=32) were recruited from the Spinal Cord Injury Program and provided consent. Length of time since injury ranged from 6 months to 36 years (M=10.319). Reliability estimates were made on all 33 questions using Cronbach's alpha (alpha = .857). Descriptive and frequency tests were run to analyze categorical data by percentages to determine a representative sample. Chi Square was used to compare paraplegic vs. tetraplegic answers. Age was defined by category: 18-29, 30-49, and 50+. A Kruskal Wallis Nonparametric Chi square test compared answers by age category. Significance was found in questions 3, 4, 5, 9 and 27. A Mann-Whitney U test examined breakdowns as a post-hoc analysis on the five questions. Results revealed a very good level of reliability (alpha = .857) in the survey. It is usable with both paraplegic and tetraplegic individuals based on the insignificant difference in their p values in Chi Square test on their responses to all questions. As a preliminary tool, it shows that the younger age group enjoys exercise more and the older age group feels that exercise impacts personal care mobility and need for aides.

P6

SKELETAL MUSCLE METABOLISM AND GLUCOSE TOLERANCE AFTER SPINAL CORD INJURY: INFLUENCE OF INTRAMUSCULAR FAT AND INJURY DURATION

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Spinal cord injury (SCI) represents one of the most extreme health conditions resulting in physical inactivity, especially in the paralyzed musculature. This lack of physical activity results in muscle atrophy, increases in intramuscular fat, and reduced mitochondrial function. The purpose of this study was to examine the relationships between injury duration and intramuscular fat (IMF), mitochondrial function, and glucose tolerance. Eleven individuals (2 female) with chronic (1.7-22.1 years post-injury) SCI gave informed consent prior to testing. All subjects completed a standard oral glucose tolerance test at the Shepherd Hospital (Atlanta, GA). Blood samples were analyzed for glucose and insulin. Magnetic resonance testing was performed in a 3 Tesla magnet. Axial T1-weighted magnetic resonance images of the thighs were collected to assess IMF. Muscle metabolism of the vastus lateralis was measured as the rate of phosphocreatine recovery after electrical stimulation using 31P MRS. The results showed relationships between the duration of injury and mitochondrial impairment (r = 0.58), IMF and mitochondrial impairment (r = 0.58), and IMF and glucose tolerance (r = 0.59). In this study we found no relationship between mitochondrial function and glucose tolerance. In conclusion, the duration of spinal cord injury appears to be related to the degree of mitochondrial dysfunction and level of intramuscular fat. Intramuscular fat may be a predictor of glucose tolerance; while the role of mitochondrial function in glucose tolerance is still being investigated.

P7

SKELETAL MUSCLE INSULIN SENSITIVITY AND DURATION OF TYPE 2 DIABETES MELLITUS

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We have recently observed that Type 2 Diabetes Mellitus (T2DM) resolution following Roux-en Y gastric bypass (RYGB) surgery is reduced in patients with longer duration of T2DM and lower pre-RYGB insulin sensitivity. Insulin sensitivity is reduced in T2DM. Skeletal muscle accounts for 80-90% of insulin mediated glucose disposal. **PURPOSE:** It was hypothesized that insulin sensitivity would be lowest in T2DM patients with long-duration (LD; ≥ 8 y) compared to medium-duration (MD; 4-7) and short-duration (SD; ≤ 3 y). **METHODS:** Insulin sensitivity (Si) and the acute response to glucose (AIRg) were measured following an insulin modified intravenous glucose tolerance test (IVGTT) using Minimal Model analysis in T2DM patients (N = 11). **RESULTS:** There was a non-significant (p = 0.08) trend of lower Si with longer T2DM duration (LD: 0.7 +/- 0.5; MD: 1.8 +/- 0.4; SD: 2.3 +/- 0.7 min/mU/ml) and a significant correlation between Si and duration of T2DM (r = -0.70; p = 0.02). There was no difference in AIRg between groups. There was a significant correlation between HbA1c (an index of glycemic control) and Si (r = -0.70; p = 0.02), but not AIRg (r = -0.293; p = 0.382). **CONCLUSIONS:** Insulin sensitivity is lower in T2DM patients with longer duration of T2DM. Clinically, lower insulin sensitivity, but not lower insulin secretion is linked to poor glycemic control.

P8

EFFECTS OF RESISTANCE EXERCISE AND DRIED PLUM CONSUMPTION ON BODY COMPOSITION, MUSCULAR STRENGTH AND PHYSICAL FUNCTION IN BREAST CANCER SURVIVORS

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Breast cancer survivors (BCS) encounter side effects from cancer treatments that negatively affect body composition. Studies have shown that resistance training (RT) and dried plum (DP) consumption may elicit positive body composition changes. The purpose was to assess 27 BCS, (RT, n=14; RT+DP, n=13) pre-and post-intervention (6 mo) on the following variables: total body and regional sites (lumbar spine, femur, and forearm) of bone mineral density (BMD) and body composition (by dual energy X-ray absorptiometry), muscular strength (chest press and leg extension 1RM) and physical function (Continuous Scale Physical Functional Performance test). RT consisted of two days/wk of ten exercises including two sets of 8-12 repetitions at ~60-80% of 1RM. RT+DP also consumed 90g of DP daily. Two-way group x time ANOVA revealed no interaction for any variables, therefore the data from RT and RT+DP were combined. No changes occurred for any BMD or body composition variables; total body BMD (1.146±0.133 to 1.143±0.133g/cm²), lean mass (39.9±6.3 to 40.3±6.3kg), fat mass (30.7±9.2 to 30.9±9.3kg). BCS significantly (p<0.05) increased upper (70±22 to 88±22kg) and lower (71±23 to 89±30kg) body strength and total physical function (66±12 to 74±12 units). Results showed DP did not provide additional benefits to RT for the variables assessed and RT could be an effective means to improve muscular strength and physical function in BCS. A longer intervention may be needed to elicit positive changes in body composition and BMD.

P9

CHANGES IN PHYSICAL FITNESS WITH KRANKCYCLE TRAINING IN PERSONS WITH OBESITY

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Krankcycle training is a new exercise modality that is now being used as an alternative to 'spin' classes for adults with disabilities and chronic health conditions such as obesity. The purpose of this preliminary study was to determine if a 12-week Krankcycle training program improved health-related physical fitness among adults with a BMI > 25. Seven adults (4 males, 3 females; mean age = 52.1 ± 12.0 yrs; mean BMI = 37.7 ± 11.1) completed 12 weeks of Krankcycle training 3 times per week for 30 minutes per session. A total of 34 Krankcycle classes were conducted; all participants attended at least 80% of the classes. Pre and post fitness measures included VO₂ at 80% predicted HR max, hand-grip strength (kg), arm curls (30 sec), 1-RM triceps press down, 1-RM chest press, back scratch and BMI. Participants wore a heart rate monitor during each class, with heart rates displayed on the wall (anonymously using numbers), so that target heart rates and appropriate exercise intensities could be maintained. Classes were designed to progressively increase in intensity over the 12 weeks. Paired t-tests were computed using SPSS 17.0 to determine if significant changes (p < 0.05) occurred in the fitness measures. Significant improvements in aerobic capacity, power output, muscular strength and muscular endurance were observed. Findings from the current study indicate that overweight and obese adults can improve certain components of health-related physical fitness after 12-weeks of Krankcycle training. A longer training program is the next step to determine if additional fitness gains could be achieved with Krankcycle training.

P10

PHYSICAL FUNCTION AND FALLS IN OLDER CANCER SURVIVORS

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The majority of cancers are diagnosed in older adults. Treatment and life expectancy for geriatric oncology populations depend on factors such as comorbidities, physical function, and medication use. Incidence of falls also increases greatly with age due to physical decline and comorbidities. The objective of this study was to examine factors associated with falls and fear of falling in older cancer survivors. Baseline data was available for 102 patients attending the WFUBMC Geriatric Oncology clinic. Patients reported number of falls in the past 6 months, fear of falling, how often they think about falling, and current physical activity. The Short Physical Performance Battery (SPPB) was used to assess physical function. BMI, prescription medications and comorbidities were reported by the physician. Patients (M age = 82 yrs) were mostly female (76%), overweight (M BMI = 27), and reported low levels of physical activity. Using spearman correlations, physical function was significantly better in younger, physically active patients with less comorbidities (p<.01). High prescription medication use was associated with multiple comorbidities and higher numbers of falls. Those patients that thought a lot about falling reported higher fear of falling (p<.01), with women reporting more concern with falling than men. Future research is needed to determine useful intervention strategies to decrease falling and fear of falling in geriatric oncology patients. Preventing falls would help prevent further physical decline. a critical aspect in geriatric oncology treatment and survival.

P11

MACROPHAGE DEPLETION IN MDX MICE DECREASES MUSCLE REMODELING BUT HAS NO EFFECT ON MUSCLE FUNCTION

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The inflammatory response that occurs in skeletal muscle after acute exercise and in patients with Duchenne Muscular Dystrophy (DMD) plays a critical role in muscle repair. And while macrophages are necessary for muscle repair in healthy muscle, the chronic inflammation in DMD muscle is likely detrimental. Purpose: To elucidate the role of macrophage inflammation in the pathology of DMD. Methods: Twenty-four, 4-week old male mice (mdx, n=12 and C57BL/10, n=12) were randomly assigned to macrophage depletion (n=12) or control (n=12, PBS) injection groups. Baseline measures of total body strength (TBS, N/g of body weight) were made. To deplete macrophages, mice received IP injections (100ul) of either liposome Clodronate or liposomes and PBS every third day for 5 weeks. After five weeks of treatment, baseline measures were repeated and tissues collected. Results: After five weeks of treatment, macrophage depletion was confirmed by immunohistochemistry (60% reduction). TBS was not different (P=0.12) between mdx macrophage depleted (5.30E-02 N/g ± 0.55E-2) and mdx PBS (6.04E-02 N/g ± 0.34E-02). Overall inflammation of muscle decreased (H&E) and tissue degeneration / regeneration decreased more than 2-fold (p<0.05) in clodronate treated mdx. Conclusion: Depleting macrophages of mdx skeletal muscle decreases overall muscle tissue remodeling, yet there is no effect on muscle function.

P12

TAILORED TEXT MESSAGING: HELPING WOMEN STEP IT UP IN THE WORKPLACE

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P13

The purpose of this study was to evaluate the effects of tailored text messages on physical activity (PA) levels in working women. Eleven full time employees (mean age=47.9±9.7, mean BMI=28.7±6.5), randomized to a control group in a previous study, served as participants in this study. While serving as the control group, PA was measured for seven consecutive days with the Omron pedometer at six months, 3 months and 1 week before the text message intervention. Texts were tailored based on a survey of preferred options for PA and available times to perform PA, as well as preferences for message content (e.g. motivational quote, gentle encouragement, voice of authority). Three tailored text messages per week were sent for seven weeks. Following the intervention, step counts were measured by pedometer for seven days and subjects provided qualitative feedback through a questionnaire. Repeated measures analysis indicated a significant change in mean step counts ($F=7.78$, $p<0.001$) and moderate-to-vigorous physical activity (MVPA) ($F=5.81$, $p=0.003$). Post hoc analysis showed a significant increase in mean step counts (baseline mean=2548 ±2360 vs. post mean=7646 ±2336, $p=0.02$) and MVPA (baseline mean=630±842 vs. post mean=1869±1870, $p<0.003$) after the tailored text message intervention. Qualitative feedback indicated high satisfaction rates with the tailored text messages (82% very satisfied) and 82% reported that the text messages increased their daily walking. These results provide initial evidence that a simple algorithm to tailor text messages may be a cost effective means to increase PA participation in working women.

THE EFFECTS OF EXERGAMING ON PERCEIVED HEALTH, REPORTED PHYSICAL ACTIVITY AND FITNESS

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P14

Exergames (EG) are popular, intrinsically motivating and are shown to elicit acute increases in metabolic activity. However, little is known about the chronic effects of EG. PURPOSE: To compare college-age adults' perceived health, reported physical activity, and fitness levels following 7 weeks of participating in EG and traditional physical activity (TPA). METHODS: Students enrolled in EG ($n=25$; age=21.2±5.2) and TPA (Jogging: $n=15$; age=20.6±1.1) classes completed an initial questionnaire on perceived health and physical activity status and completed a YMCA submaximal exercise test to predict VO₂max (VO₂). Following 7 weeks of monitored activity (150 min/week), participants completed a final questionnaire and VO₂ test. Group and time comparisons were made using repeated measures ANOVA. RESULTS: There were no group differences observed at baseline for any variable. After 7 weeks, no differences were found for any measurement within the EG group. However, significant group differences were observed between EG and TPA in perceived health (3.8±0.6 vs. 4.6±0.6 ; $p<0.05$), exercise frequency (3.4±1.0 vs. 4.3±1.1; $p<0.05$), and reported exercise intensity (3.0±1.2 vs. 4.3±1.1; $p<0.01$). No group or time differences in VO₂ were observed. CONCLUSION: These data indicate that fitness level can be maintained through participation in both EG and TPA. Further research is needed to determine how individuals understand EG as a form of physical activity and therefore, how EG may impact reported physical activity patterns and perceived overall health.

ARE YOU READY YET? PSYCHOLOGICAL RETURN TO PLAY AFTER INJURY

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P15

Prevalence of injury in sport is high, but understanding the psychological process of return to play remains far from complete. The purpose of this study was twofold: 1) assess the role of self-efficacy and psychological readiness to return to play within the context of Protection Motivation Theory (PMT) and Personal Investment Theory (PIT) models, and 2) investigate key factors of self-efficacy and athletic identity during rehabilitation. Twenty-one injured athletes (20.71±1.59 yr) were recruited from a NCAA Division I-FCS southern region university. During the first week of injury, participants completed the Athletic Identity Measurement Scale (AIMS), Injury Psychological Readiness to Return to Play Scale (I-PRRS), Sport Injury Rehabilitation Beliefs Survey (SIRBS), and Athlete Tracking Study. Each participant filled out the I-PRRS and SIRBS weekly while the athletic trainer (AT) completed the I-PRRS and Sport Injury Rehabilitation Adherence Scale (SIRAS). Significant positive correlations were noted between the I-PRRS and the self-efficacy (SE) subscale of the SIRBS for weeks 3 through 7 (r =range from 0.54-0.79; $p<0.01$). No significant relationships were observed for the I-PRRS and AIMS or re-injury rate. The present investigation assessed psychological readiness to return to play through constructs of the PMT and PIT frameworks and concluded with mixed results; however, correlations were found that may be of interest for future studies regarding the I-PRRS. Interventions within the context of SE and existing frameworks of PMT could assist ATs in enhancing adherence and assessing psychological readiness to return to play.

EFFECT OF MAXIMAL EXERTION ON SELECTIVE ATTENTION AND PROCESSING SPEED IN COLLEGE AGE MALES

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P16

The purpose of this paper is to evaluate the performance of college age male students on cognitive tasks when taken to VO₂ max with a Bruce protocol. Taking subjects to their maximal exertion is thought to reduce cognitive performance and hence reducing selective attention and processing speed. Volunteer students from a small Historically Black College and University in a southern state in the United States were issued a Stroops task and Random numbers test at baseline. The Stroops task congruent and in-congruent words were timed and the number incorrect was identified. The Random numbers test was a one minute timed test with numbers 0-99 randomized on a 10x10 grid, numbers were circled as they were identified. Subjects were then started on a Bruce protocol VO₂ max test. Once a Borg rating of perceived exertion of 20 (scale of 6-20) was reached, the test was stopped and without a cool down period the Stroop task and Random numbers test were again administered and timed. Analysis of pre- and post-test means resulted in significant increase in the number of random numbers identified in the pre- and post-test random numbers test ($p=0.004$), and a significant decrease in pre- and post-test in-congruent times ($p=0.001$) a positive correlation between the number of incorrect colors identified in the pre-test in-congruent Stroops test and the in-congruent time ($r=0.716$, $p=0.000$) number of incorrect colors identified in the post-test in-congruent Stroops test and the random numbers test ($r=-0.440$, $p=0.032$). Physical activity improved results of cognitive testing in both non athletic and athletic college age men. Both selective attention and narrow and broad focus were not worsened with acute maximal exertion to fatigue

THE INFLUENCE OF PERCEIVED PHYSICAL ACTIVITY STATUS ON SELF-REPORTED PHYSICAL ACTIVITY RECALL ACCURACY

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P17 This study examined the influence of perceived physical activity status on self-reported physical activity recall accuracy among college students. To quantify perceived physical activity status, 52 college students (18.7 ± 0.85 years) indicated if they engaged in regular physical activity (1) often, (2) sometimes, or (3) never on the Godin Leisure-Time Exercise Questionnaire and wore a GT1M accelerometer for 7 consecutive days. After wearing the accelerometer, participants completed physical activity questions from the Behavior Risk Factor Surveillance Survey (BRFSS) and the International Physical Activity Questionnaire (IPAQ) to assess their self-reported physical activity level. Recall accuracy was determined by subtracting the minutes of both moderate and vigorous physical activity measured by the GT1M from the reported physical activity minutes on the BRFSS and IPAQ. ANOVA was used to compare recall accuracy on the BRFSS and IPAQ by physical activity status. The recall accuracy for moderate physical activity on the BRFSS and IPAQ was similar by physical activity status ($p > .05$); all three groups over reported minutes in moderate physical activity. In contrast, vigorous physical activity recall accuracy on the BRFSS and IPAQ differed by physical activity status. Those who reported sometimes and never engaging in physical activity were able to recall their vigorous physical activity levels more accurately compared to those who often engaged in physical activity on both questionnaires ($p < .05$). No mean recall differences were observed for vigorous physical activity recall between those who sometimes (BRFSS: 23.03 ± 29.43 min/day; IPAQ: 18.50 ± 22.22 min/day) and never (BRFSS: 6.53 ± 19.74 min/day; IPAQ: 6.53 ± 19.74 min/day) engaged in physical activity. In summary, perceived physical activity status influenced recall accuracy on two physical activity questionnaires. These findings suggest the more active students had a decreased ability to accurately recall their vigorous physical activity levels.

ALLOSTATIC LOAD AND TRAINING ADAPTATION: THE IMPACT OF LIFE STRESS ON BODY COMPOSITION AND STRENGTH GAINS OVER A 16-WEEK RESISTANCE EXERCISE PROGRAM

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P18 Purpose: A relationship between life stress and training adaptation during a resistance exercise program is premised on allostatic load (or maintaining stability / homeostasis through change). This allowed for comparison to the four types of allostatic load depictions (normal, lack of adaptation, prolonged response, and inadequate response due to hyperactivity). The mediating variable for the present study was self reported life stress and social readjustment rating scales. Examining the impact of negative life stress (allostatic load) on adaptation to resistance exercise was the primary purpose of this study. Methods: Forty-two subjects (21.3 ± 2.1 yrs, 1.7 ± 0.1 m, 78.1 ± 16.3 kg) were assessed prior to and at the end of a 16-wk moderate intensity resistance exercise program. Data from stress surveys, body composition, circumference measures, and 1-repetitions maximum (1-RM) lifts for the bench press and leg press were collected. Results: No significant differences were observed between those who self-reported Low, Medium, and High stress; however, some trends were observed which may become significant with a larger sample size. 1-RM bench press increased for both the Medium (111.7 ± 77.7 122.5 \pm 76.5 lb) and High (178.7 ± 117.1 vs. 240.0 ± 95.0 lb) stress groups, but not for the Low. Health and illness stress decreased in both Low (3.0 ± 1.6 vs. 2.4 ± 2.1) and Medium (3.2 ± 2.9 vs. 2.8 ± 2.4). Conclusion: These results suggest that a 16-week moderate intensity resistance training program may be effective in alleviating stress in those with high stress, and increase perceptions of health and wellbeing in those with Low and Medium stress levels. This adaptation may aid in maintaining homeostasis and survival (allostasis) in terms of health and illness.

EFFECT OF INTERMITTENT ACTIVITY DURING CARDIOTHORACIC SURGERY ON HUMAN DIAPHRAGM MITOCHONDRIAL RESPIRATION

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P19 Recent animal and human studies have shown that even short periods of controlled mechanical ventilation (MV) use leads to ventilation induced diaphragmatic dysfunction (VIDD). Additionally, animal studies suggest that short periods of activity attenuate VIDD. We examined the effect of intermittent diaphragm activity during cardiothoracic surgery on human diaphragm by measuring mitochondrial respiration using high-resolution respirometry. In 5 patients (65 ± 6 yrs) undergoing lengthy thoracic surgery, the right or left phrenic nerve was randomly selected for 1 minute of stimulation every hour (30 pulses per minute, 15 msec pulse duration) during the surgery. Shortly before the surgery was completed, full thickness samples of diaphragm muscle were obtained from the antero-lateral regions of both hemidiaphragms. The mean duration between the start of controlled MV and sample harvest was 5.2 ± 1.0 hours. Mitochondrial respiration was measured with high-resolution respirometry. In the stimulated hemidiaphragm, the mitochondrial respiration rate (pmol O₂/sec/mg wet weight) was $14.63 + 3.31$ during state 3 and $3.79 + 1.09$ during state 4, while in the unstimulated hemidiaphragm the mitochondrial respiration rate was $11.78 + 2.28$ during state 3 and $2.48 + 1.09$ during state 4. The stimulated and control samples were different for state 3 and 4 activities, $p < .05$. Our results indicate that short periods of diaphragm activity can improve mitochondrial function during MV support/surgery. This knowledge will be valuable to developing strategies to protect the diaphragm from the deleterious effects of VIDD.

THE EFFECT OF PERIPHERAL ARTERIAL DISEASE ON VARIABILITY OF VELOCITY AND TIME COURSE OF REACTIVE HYPEREMIA

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P20 Peripheral arterial disease (PAD) is one of the major forms of vascular disease, and has contributed remarkably to physical inactivity and lower quality of life. Diagnostic tests are important for the detection of early PAD risk factors. PAD is known to reduce blood flow and alter flow velocity patterns in large arteries. The first aim of this study was to examine the variability of flow velocity in subjects with and without PAD at rest and during peak reactive hyperemia, in both femoral and brachial arteries. The second aim was to compare the time course of reactive hyperemia in femoral and brachial arteries. A significant difference was found when comparing variability of flow velocity at peak systole in the femoral artery between groups ($p < 0.05$). Time course of reactive hyperemia in the femoral artery was significantly longer in subjects with PAD when compared to non-PAD (time to peak = 42.3 ± 16.9 s for PAD vs 10.5 ± 3.6 s for non-PAD; $p = 0.005$). Ankle Brachial Index (ABI), an indicator of PAD severity, correlated with increased blood flow variability ($r = 0.8$) and the time course of reactive hyperemia ($r = 0.7$) in the diseased leg. In conclusion, the present study suggests a potential association of lower ABI and higher variability of velocity, as well as lower ABI and longer time course of reactive hyperemia in the femoral artery. Future studies will be needed to confirm these results.

SKIN TEMPERATURE RESPONSE TO WHOLE BODY VIBRATION

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To date, no study has determined if whole body vibration (WBV) increases skin temperature (ST) in able-bodied individuals as well as individuals with spinal cord injury (SCI). Furthermore, no study has investigated whether a specific WBV frequency is better for optimizing ST response. The influence of 30, 40, and 50 Hz WBV on lower leg ST in 11 individuals with SCI (injury level: C5-T6; ages: 50.39 ± 8.16) and 10 able-bodied individuals (ages: 48.17±6.78) was investigated. Skin temperatures were obtained pre-, immediately post-, 10 minute post-, and 15 minute post-WBV with an infrared thermal imaging camera. Participants stood on the WBV platform with their knees flexed at approximately 18-25° from the anatomical neutral position. A standing frame assisted standing position on the vibration platform. Each subject was passively vibrated until they reached oxygen consumption steady state (3-5 minutes). A 2 x 3x 4 (group x treatment x time) repeated measures ANCOVA was completed for skin temperature analysis. Significant treatment x time x group interactions (Wilks' Λ = 0.47; $F_{4,13}$ = 3.60, p = 0.03) were revealed. Treatment x group follow-up univariate ANOVA was statistically significant ($F_{2,32}$ = 10.54, p ≤ 0.001). Pairwise comparisons revealed a significant difference (p = 0.05) between the SCI and the able-bodied group. ST was significantly higher immediately post-40 Hz (p = 0.01) and 50 Hz WBV (p = 0.01); 10 minute post-40 Hz (p ≤ 0.01) and 50 Hz WBV (p ≤ 0.01); 15 minute post-30 Hz (p = 0.01), 40 Hz (p ≤ 0.01), and 50 Hz WBV (p ≤ 0.01) compared to pre-WBV ST only in the SCI group. No significant treatment effect was revealed in both groups. Significant increases in ST following WBV suggests increased skin blood flow in the lower legs as quantification of ST can be correlated to qualitative evaluations of skin blood flow. Future studies should be performed to determine if these increases in ST is beneficial to SCI individuals with low circulation.

GENDER DIFFERENCE IN THE ACUTE INFLUENCE OF A 2-HOUR RUN ON ARTERIAL STIFFNESS IN TRAINED RUNNERS

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P22

The purpose of this study was to compare the influence of a 2-h intensive run or rest on arterial stiffness scores in trained male ($N=8$, age 39.3±2.3 y) and female ($N=8$, 35.8±2.8 y) runners utilizing a randomized, crossover design. Subjects reported for two lab sessions from 7:30 am to 4:15 pm, separated by one or two weeks. For both sessions, breakfast was consumed at 7:30 am, and consisted of Boost Plus beverage adjusted to 12 kcal/kg. Lunch (12:30 pm) consisted of sandwiches, banana, and a sports drink, with energy intake adjusted to 12 kcal/kg on the rest day and matched to energy expended on the exercise day with the addition of Boost Plus and juice. Augmentation index standardized to a heart rate of 75 bpm (AIx75), and carotid to femoral pulse wave velocity (PWV), were measured by applanation tonometry using the SphygmoCor System (AtCor Medical, Itasca, IL) at 9:00 am, 11:15 am, 11:45 am, 12:15 pm, 1:15 pm, 2:15 pm, 3:15 pm, and 4:15 pm. On the exercise day, subjects ran for 2 h on a treadmill at 75% VO₂max from 9:15 to 11:15 am. Statistical analysis [2 (conditions) x 2 (genders) x 8 (time points) repeated measures ANOVA] showed significant interaction effects for AIx75 ($P=0.039$) and PWV ($P=0.020$). Compared to the rest condition, female runners experienced decreased AIx75 from 11:45 am to 3:15 pm, and in PWV at 11:45 am and 12:15 pm, in contrast to no change in the male runners. These data support a notable gender difference in arterial stiffness measures following an intensive 2-h bout of treadmill running, with female runners experiencing a decrease in comparison to no change in male runners.

POST-EXERCISE HYPOTENSION IN BRIEF EXERCISE

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It is well known that regular exercise and physical activity plays a vital role in preventing many of the major hypokinetic disease states as well as improving and maintaining overall health. The present investigation aimed at determining whether a 10 minute bout of treadmill exercise, performed at multiple time periods throughout the day for a total of 30 minutes, can effectively elicit a decrease in blood pressure (BP) known as post-exercise hypotension (PEH). Secondly, the investigation explored whether a light (40% VO₂R) or moderate (70% VO₂R) intensity would impact the extent of the PEH following exercise. A total of 11 subjects completed 3 sessions consisting of a VO₂max test, and 2 days of 3 sessions each (AM, Noon, PM) with 40% and 70% VO₂R. Baseline measurements in BP were recorded before each session, as well as, immediate and 20 minute post for the AM and Noon sessions with 60 minutes post measured for the PM sessions. At 40% VO₂R, SBP decreased significantly from baseline (109 mmHg) at the AM (104 mmHg), noon (105 mmHg) and PM (102 mmHg) 20 minute post intervals. Although not significantly different, SBP was observed to be lower at 60 minutes post intervals (106 mmHg). During the 70% VO₂R session, SBP was significantly lower at the AM 20 minute (104 mmHg) and PM 60 minute post measurements (102 mmHg) compared to baseline (108 mmHg). The main findings of the investigation suggest that PEH can be observed at varying intensities (40% or 70% VO₂R), BP may decrease from resting levels after 10 minute sessions, a cumulative effect may occur after multiple bouts, and a higher intensity appears to reduce BP to a greater extent for longer duration.

CARDIOVASCULAR AND METABOLIC RESPONSES TO KETTLEBELL EXERCISE

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Kettlebells were invented in the former Soviet Union as a form of training for the military and recently have become a very popular form of resistance training. Kettlebell exercises appear to produce considerable cardiovascular stress, however, only one peer-review article exists that examined effects of acute kettlebell exercise on cardiovascular and metabolic stress without standardized number of repetitions. Purpose: The purpose of this study was to determine the cardiovascular and metabolic responses during and following kettlebell circuit training using standardized protocol. It was hypothesized that kettlebells would elicit substantial increases in cardiovascular measures and caloric expenditure during and following exercise. Methods: Five males (24.6±5.59 y) and five females (21.6±2.51 y) completed the study. Each subject completed a preliminary session to determine VO₂ max, body composition, kettlebell loading (based upon ability to complete presses) and to become familiarized with the kettlebell exercises. Subject reported to the lab for a subsequent session of kettlebell exercise at least one week following the preliminary session, and consumed a liquid meal (Ensure™) two hours prior to the onset of exercise. The kettlebell session was comprised of 2 circuits of four exercises: two-arm swing, one-arm pull, around the world, and overhead press. All exercise movements were timed such that each subject completed a standardized number of movements across the session with a 1:1 exercise/rest intervals of 45s and 2 min rest between circuits for a total session time of 20 min. Results: From rest to peak exercise, there was a significant increase in heart rate (69.6±3.43 to 148.3±21.99 b/min), systolic blood pressure (117.7±2.62 to 141.4±16.96 mmHg), mean arterial pressure (90.15±1.48 to 114.25±14.52 mmHg), and VO₂ (0.22±0.01 to 1.29±0.63 L/min). Rating of perceived exertion (RPE) increased significantly during exercise to peak at (9.8±1.68). Exercise caloric expenditure during exercise was 21.14±3.61 kcal. Excess post-exercise oxygen consumption (EPOC) was 4.22±2.28 L. Conclusion: Using the loading protocol from the present study, data suggest that kettlebell exercise produces significant cardiovascular stress with a low to moderate metabolic cost.

COMPARISON OF CAROTID, BRACHIAL, AND POPLITEAL INTIMA-MEDIA THICKNESS IN SEDENTARY AND ACTIVE MEN 40 TO 60 YEARS OLD

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Carotid, brachial, and popliteal arteries in 35 men (49.7 ± 6.5yr) were assessed with B-mode ultrasonography (Mindray DC-6) to compare intima-media thickness (IMT) between long term exercisers (LE; 10+ yr of cycling/run training; n=17), recent exercisers (RE; 6 month to 2 yr of cycling/run training; n=8) and non-exercisers (SE; n=10). Height, weight, BMI, caloric intake, VO₂peak, physical activity (IPAQ) and serum C-reactive protein (CRP) were also compared. Weight and BMI were higher and VO₂peak was lower in SE compared to RE and LE (p<.05). IPAQ scores (MET-min/wk) were lower in SE than LE (p<.05). Caloric intake was not different between groups, but RE consumed about 400 kcal/d less than SE and LE suggesting that some RE subjects may have been in caloric deficit (1739 ± 605 kcal/d). No group differences were found for carotid IMT (p=.974, SE=.60 ± .22mm; RE=.60 ± .16mm; LE=.59 ± .11mm), brachial IMT (p=.069, SE=.35 ± .05mm; RE=.42 ± .09mm; LE=.42 ± .10mm), or popliteal IMT (p=.127, SE=.57 ± .08mm; RE=.46 ± .08mm; LE=.54 ± .13mm). However, when statistically adjusted for caloric intake, brachial IMT was lower in SE compared to RE and LE (p<.05), and popliteal IMT was lower in RE than SE (p<.05). CRP was higher in SE compared to RE and LE (p<.05; SE=3.80 ± 4.44 mg/L; RE=0.89 ± 0.51mg/L; LE=0.88 ± 0.61mg/L). These data suggest that IMT in middle aged men is influenced by exercise training and diet. Differences in IMT also appear to be limited to the peripheral vasculature; and, given the lower CRP in RE and LE, may be related to vascular inflammation.

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EFFECT OF DIFFERENT EXERCISE TEST PROTOCOLS ON POST-EXERCISE HYPOTENSION

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A single bout of aerobic exercise is typically accompanied by a subsequent reduction in blood pressure post-exercise, known as post-exercise hypotension (PEH). It is generally accepted that PEH is due to a persistent drop in peripheral vascular resistance that is not completely offset by an increase in cardiac output. It is unknown if this phenomena can be elicited by atypical modes of aerobic exercise, such as repetitive jumping. The purpose of this pilot study was to examine differences between two different exercise modalities: running on a treadmill and repetitive jumping on the Digi – Jump Machine. Participants (N=7; 4 females, 3 males) underwent two testing sessions – one performing the Bruce protocol on the treadmill, and another completing a 5 min Digi – Jump protocol. Systolic blood pressure measurements were obtained with a sphygmomanometer before, and after testing at 10, 20, and 30 minutes post-exercise. Statistical significance was set at $P \leq 0.05$. No significant differences were observed between either of the protocols at any time point. While no main effect for systolic blood pressure was found, values tended to be lower in the post-exercise period (Rest=118.8±3.2 mmHg, 10-min Post=116±9.6 mmHg, 20-min Post=114±6.4 mmHg, and 30-min Post=115.5±6.8 mmHg). In conclusion, we found that ~ 10-min Bruce treadmill protocol induced a similar PEH response to a 5-min repetitive jumping protocol. As this was an initial pilot investigation, testing a greater number of participants is warranted to observe the potential impact of a repetitive jumping protocol on post-exercise hypotension. In addition, the need for varying exercise modalities, extended time periods of 12h and possibly 24h for post-exercise hypotension measurement, and different durations and intensities of acute exercise bouts should be addressed in a future investigation.

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VASOREACTIVITY AND ARTERIAL FLOW PATTERNS IN HEART FAILURE

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Aging is associated with altered arterial flow patterns in peripheral conduits including increased retrograde and oscillatory flow, a hemodynamic environment which favors a proatherogenic endothelial phenotype. It is currently unknown if altered flow patterns exist in patients with known cardiovascular disease. PURPOSE: To examine arterial flow patterns in patients with chronic heart failure (CON) and healthy controls (CON), and to determine the relationship to measures of vascular reactivity. METHODS: Ultrasonography was used to assess brachial dimensions, arterial flow patterns (antegrade, retrograde antegrade/retrograde ratio) and vasoreactivity [flow mediated dilation (BAFMD) and cold-pressor test responses (CPT)]. The maximum (following FMD) and minimum (following CPT) diameter responses were combined to establish a vascular physiological operating range (VOR). The equation: $[1 - (\text{FMD absolute}/\text{VOR mm}) * 100]$ was used to calculate the base diameter as a percentage of the VOR. RESULTS: Antegrade (p=0.66) and retrograde flow (p=0.73) was not significantly different between groups. However, CHF patients had a higher antegrade/retrograde ratio (CHF=8.17±2.15 vs. CON=5.51±1.35U; p=0.01). Further, the antegrade/retrograde ratio was directly related to the base diameter as a percentage of the VOR ($r=0.55$; $p=0.03$). CONCLUSION: Less oscillatory flow is observed in the brachial artery of CHF patients which may be the consequence of a higher resting base diameter as a percentage of the VOR. Future studies should investigate the relationship of the VOR, and base diameter as a percentage of the VOR, and physical function.

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BACKGROUND STRESS AND BLOOD FLOW RESPONSE TO MENTAL STRESS: IS THERE AN ASSOCIATION?

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Social stress may contribute to the development of cardiovascular disease in some populations. Stress has been shown to increase forearm blood flow, but it is unclear whether background levels of stress are associated with blood vessel tone and subsequently have effects on forearm blood flow. This study explored the relationship between background stress and blood flow response to mental arithmetic in twenty healthy subjects. Background stress was assessed with the Morehouse School of Medicine and Emory University Project questionnaire, which targeted variables such as depression, neighborhood health, sleep quality, and religious intensity. Blood flow was measured with venous occlusion strain gauge plethysmography. Vascular reactivity was measured as the change in blood flow from baseline to blood flow during a mental stress task. Results showed weak correlations between various background stress variables and blood flow responses to mental stress. The strongest relationships were between anger and blood flow response ($r = 0.36$) and between coping and blood flow response ($r = - 0.3$). In conclusion, our data do not support a relationship between background stress and blood flow response to mental stress.

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RELATIONSHIPS AMONG VASCULAR FUNCTION MEASURES AT REST AND AFTER SUBMAXIMAL EXERCISE

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Previous studies comparing vascular function (VF) assessment methods at rest have been equivocal, as different methodologies evaluate distinct vascular regions. The relationships among VF methodologies have not been similarly evaluated after exercise. The purpose of this study was to evaluate relationships among resting and post-exercise (PostEx) measures of VF including vascular reactivity (VR) via strain gauge plethysmography (SGP), brachial artery flow mediated dilation (FMD) and blood velocity (BV) via ultrasound, and reactive hyperemia index (RHI) via peripheral artery tonometry (PAT). During three randomly assigned trials, VR, FMD, and RHI were assessed after 5 min of occlusion in 17 male subjects (24±4 yrs; 24.5±3.2 kg/m²) both at rest and within 10 min after a 20 min acute submaximal bout of treadmill exercise. There were significant associations between resting and PostEx values obtained for both VR ($r=0.742$, $p=0.004$) and FMD ($r=.753$, $p=.001$), however, resting RHI was not related to PostEx RHI. At rest, a moderate correlation was observed between VR and post-occlusion change in BV ($r=0.566$, $p=0.035$), but there were no significant relationships among VR, FMD, and RHI values obtained at rest or PostEx. In conclusion, no relationships were observed among the VF measures either at rest or after submaximal exercise in our apparently healthy subjects. Comparisons among these methods may be hindered by variable physiological mechanisms governing macro and microvascular responses to occlusive stress.

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EFFECTS OF A LOWER BACK WRAP WITH FAR INFRARED TECHNOLOGY ON CHANGES IN SKIN TEMPERATURE

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We compared the effects of a lower back compression wrap with far infrared technology (i-pure technology corporation, Taipei, Taiwan) to a sham on changes in surface skin temperature. Ten subjects completed a randomized double-blinded protocol on one occasion. After measuring baseline skin temperature using surface thermister probes one of the wraps (i-pure or sham) was placed on the subject with order randomized. Temperature was measured superior, underneath, and inferior to the wrap for 15-minutes, and then removed to reestablish baseline temperature. Identical measurements were repeated with the opposite wrap. Skin temperature (degrees Celsius) measured underneath the wrap increased significantly while wearing the i-pure (Baseline: 33.6±/1.7; 15-min: 34.8±/1.5; $p=0.004$), but not while wearing the sham (Baseline: 33.9±/1.6; 15-min: 34.3±/1.9; $p=0.57$). Similar trends were observed for temperature measured superior (33.3 to 34.3 vs 33.0 to 33.5; $p=0.085$ for condition, $p=0.096$ for time) and inferior (34.5 to 35.2 vs 34.9 to 34.9; $p=0.192$ condition x time) for the i-pure and sham respectively. These preliminary data suggest that wearing the wrap with far infrared technology increases skin temperature whereas the sham wrap does not. As back wraps are typically used to provide a combination of support and warmth, these findings may have therapeutic implications.

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INFLUENCE OF ATHLETIC WRAPS TREATED WITH NEGATIVE IONS AND FAR INFRARED ON SKIN TEMPERATURE.

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The efficacy of sports wraps treated with negative ions and far infrared (FIR) technology was compared against placebo sports wraps in their ability to modulate skin temperature as indicated by infrared thermal imaging in 30 participants (15 male, 15 female). A double blind, randomized design was used, examining four separate locations (knees, thighs, lower back and upper arms) during a single session. Following a 15-minute equilibration period, treated and placebo wraps were worn for 15 minutes. Dynamic infrared thermal (DIRT) images were taken prior to and immediately after the application of wraps. From these images temperatures were measured using thermal maps of affected area. Average temperature change of area effected by treated or placebo wraps were compared. Statistical analysis (2 time x 2 treatment ANOVA) revealed significant differences between pre and post temperature measures but no significant differences between treated and placebo wraps for all locations ($\alpha < .05$). These results indicate that the application of athletic wraps leads to significant increases in temperature (pre to post) in all areas examined. In three out of four locations (knees, thighs, and upper arms), male temperatures were significantly greater than their female counterparts. However, the results of this study suggest no significant difference between athletic wraps treated with negative ions and far IR and placebo wraps in their ability to elicit temperature change in the four locations examined.

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THERAPEUTIC ULTRASOUND DECREASES PAIN PERCEPTION AND INCREASES PAIN TOLERANCE AFTER MUSCLE DAMAGE

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Injuries can impair the ability to perform daily activities due to pain, tenderness, inflammation, and muscle stiffness as a result of muscle damage. Muscle strain due to eccentric contractions is a common injury mechanism and can be induced experimentally in a laboratory setting. Therapeutic ultrasound (TUS) is common in clinical settings and is a standard treatment modality for soft tissue injuries. However, there is a lack of evidence for TUS use in pain reduction. Purpose: To determine the effect of continuous TUS treatment on pain associated with muscle damage. Methods: Fourteen subjects, aged 18-35 yrs, were randomly assigned to an experimental (TUS) or control (sham) treatment group. Subjects underwent a muscle damage protocol of 5 sets of 10, maximal eccentric contractions of the elbow flexors. Four assessment tests for pain were used: Visual Analog Scale (VAS), Short Form McGill Pain Questionnaire 2 (SF-MPQ-2), joint angle, and pain threshold measured with an algometer. Measures were taken pre damage, at 48 hrs and four days after damage immediately before each treatment session. Results: Muscle damage was verified by increases in creatine kinase and loss of force production. Preliminary analysis of this ongoing study shows a 24% reduction in the overall VAS score in the TUS treatment group, though this did not reach statistical significance ($p = 0.17$), and a 27% increase in pain tolerance ($p = 0.04$). Conclusion: Our preliminary analysis of this ongoing study suggests that TUS has a substantial impact in increasing pain tolerance and likely decreases pain perception. This represents a critical finding for evidence-based medicine in the rehabilitation and treatment of muscle injuries.

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THE INFLUENCE OF LEG DOMINANCE, VISION AND SURFACE TYPE ON BALANCE USING A SINGLE LEG STANCE IN ACTIVE YOUTHS

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Previous research has investigated vision, surface, and leg dominance effects on balance using a single leg stance; however, few studies have investigated these factors in active youths. The purpose was to assess sway patterns in active youths while performing balance tasks under different experimental conditions. Participants ($n=6$, Mean age= 14.3, $SD=1.2$ years) in this study were youth volunteers recruited from the local community. Participants were tested using single leg stance with dominant and non-dominant legs under stable and unstable conditions with eyes open and closed on an AMTI force platform. All participants completed parental assent and informed consent documents prior to participation. Participants completed the Children's Physical Activity Questionnaire to screen for minimum levels of physical activity. A 2×2 ANOVA revealed significant ($p < 0.05$) differences for total sway area, as measured by 95% ellipse area, between visual conditions in both surface and leg dominance conditions. Significant differences were not observed ($p > 0.05$) for surface type or leg dominance. Observed differences in visual conditions were right leg eyes open stable (Mean= 6.51, $SD= 3.21$) and right leg eyes closed stable (Mean= 28.09, $SD= 19.90$) and right leg eyes open unstable (Mean= 6.79, $SD= 2.39$) and right leg eyes closed unstable (Mean= 37.67, $SD= 20.52$). Results for left leg were eyes open stable (Mean= 7.79, $SD= 2.36$), left leg eyes closed stable (Mean= 30.35, $SD= 14.70$) and left leg eyes open unstable (Mean= 30.35, $SD= 14.70$) and left leg eyes closed unstable (Mean= 35.76, $SD= 21.98$). The current study indicates vision has an important influence on balance in both stable and unstable conditions with both the dominant and non-dominant leg in single leg stance performed by active youth.

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THE EFFECTS OF LOW VERSUS HIGH CONTEXTUAL INTERFERENCE ON THE ACQUISITION OF STRENGTH AND SKILL OF THE BENCH PRESS

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Research indicates that high contextual interference (HCI) promotes greater motor learning than low contextual interference (LCI). Untrained, college-aged males ($n=15$) and females ($n=9$) were randomly assigned to Control (C), LCI, or HCI. LCI and HCI were shown proper bench press form and performed this exercise 3x/wk. for 4 sets, 10-12 reps at 50-55% of 1RM for 4 wks. HCI also completed a motor action (dart-throw) in between sets whereas LCI just stood. C just did testing. Bench press 1RMs were filmed and press technique (PT) was scored using a 13-point movement checklist by a CSCS-certified expert blind to groups. Measurements were taken at 0, 1, 2, and 4 wks., and at a retention test 9 days later. Alpha was set at 0.05. For the %1RM change, LCI had a significantly higher change than C at 4 wks. (LCI: 23.5 ± 2.9 ; HCI: 14.8 ± 2.9 ; C: $10.2 \pm 2.9\%$). At retention, both LCI and HCI had higher change than C (LCI: 21.1 ± 2.6 ; HCI: 17.9 ± 2.6 ; C: $11.1 \pm 2.6\%$) with no differences between LCI and HCI. Only HCI had higher increases within group at retention compared to 1 and 2 wks. In LCI and HCI, PT was higher than C at 1 (LCI: 12 ± 1 ; HCI: 11 ± 2 ; C: 9 ± 2) and 2 wks. (LCI: 12 ± 2 ; HCI: 12 ± 1 ; C: 8 ± 3). Also, PT was higher in HCI than C at 4 wks. (13 ± 1 vs. 9 ± 3) and retention (12 ± 1 vs. 9 ± 3), which indicates a higher retention of bench press after training that was absent in the other conditions.

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VERTEBRAL COMPRESSION WITH A PULL UP

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The pull up has been used extensively in the strength training of individuals. With the individual hanging from a bar, it is believed that a significant amount of tension occurs on the vertebrae and supporting structures. The purpose of this study was to examine if the pull up exercise has a significant effect on the change of the length of the vertebral column. Twenty three (23) currently training Army ROTC members (19.56 ± 1.30 years, 76.77 ± 9.31 kg) served as participants. Participants were measured (in inches) prior to and after three sets of pull ups to failure. Height measurements were taken between the ASIS (anterior superior iliac spine) to the ground, C7 (vertebrae prominens) to the ground, and top of the head to the ground. The data were analyzed by employing a 3 (location) x 2 (pre/post) Repeated Measures ANOVA. Results indicated a significant difference in pre and post measures taken at overall height, $t(22) = 4.34$, $p = .049$. No significant difference was noted for the ASIS measure nor C7 measure, $t(22) = .0561$, $p = .951$ and $t(22) = 3.93$, $p = .537$, respectively. The results imply that during a pull up, there is a significant decrease in overall height of an individual; however, there is no significant change in the height of C7 nor the ASIS. This suggests that while substantial axial loading is occurring over the performance of a pull up, it is not occurring within the vertebral column. Further research is needed to determine where the change in height is occurring.

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INFLUENCE OF A MARCHING SNARE DRUM SYSTEM ON CONTACT PRESSURE

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Marching music presentations require not only musicianship but also demanding movements often while carrying large awkward loads. The points of contact between loads and the body are of primary concern as this is where the load is transmitted to the body and contact pressure is an issue. Therefore, the purpose of this study was to investigate the contact pressures associated with wearing a snare drum harness and drum on the trunk, and how the implementation of a hip belt influences these effects. The protocol consisted of participants wearing a marching snare drum system (15.5kg), playing a standard rhythm for one minute, while standing still, before and after a 1 minute marching exercise. Measurements were taken during the first 5 seconds and last 5 seconds pre exercise, and the last 5 seconds post exercise. The significant results ($p < .05$) indicated that by implementing a lumbar belt to the drum system: Right Shoulder Peak Contact Pressure decreased post exercise, Left Shoulder Peak Contact Pressure decreased during all times, and Abdominal Contact Pressure increased pre exercise with a trend showing an increase in Abdominal Contact Pressure post exercise. Therefore, the results suggest that by implementing a lumbar belt to a marching snare drum system, that contact pressure at the shoulders is reduced and distributed more to the abdominal/pelvis region, but that the pressures at the abdomen/pelvis are still well below injurious levels.

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EVALUATION OF XENITH X1 AWARE-FLOW SHOCK ABSORBER CLAIMS

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The pursuit to abate sport-related concussion necessitates the continuous evaluation of protective head gear product claims. The Xenith X1 football helmet liner is comprised of multiple thin-walled air-filled chambers, each outfitted with a foam-filled pad. This study investigates claims, detailed in the patent literature, that the foam-filled pad improves impact force attenuation and durability of the Aware-Flow absorber system. Absorbers (N=18) were randomly assigned into two groups: foam pad intact (n=9) and removed (n=9). Absorber attenuation and durability were assessed across three impact velocities (V1=1.3 m/s, V2=3.0 m/s, V3=4.0 m/s) via 15 impacts at one minute intervals. Force data were obtained using an instrumented drop tower. For each impact velocity, a 2 (Condition: pad, no pad) X 15 (Trials: impacts 1-15) mixed model repeated measures ANOVA was conducted. No interaction or main effects were observed for peak compression force at V1. However, between, within and interaction effects were found at V2 (F(1,4)=70.51, p=.001, f=4.36; F(14,56)= 32.13, p=.001, f=2.84; and F(14,56)=17.25, p=.001, f=2.06, respectively). V3 elicited both a between (F(1,4)=213.43, p=.001, f=7.00) and within (F(14,56)=18.01, p=.001, f=2.13) effect, but no interaction effect. No improvement in damping or durability was provided with foam pad at V1. Absorber force attenuation degraded over multiple impacts at V2 and V3. The foam pad improved force attenuation and absorber durability at V2, but this protective effect diminished at V3. Findings provide velocity-specific support for Aware-Flow shock absorber claims.

LINEAR IMPACT ENERGY ATTENUATION OF THE XENITH X1 AWARE-FLOW SHOCK ABSORBER

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The purpose of this study was to verify, further define, and substantiate published findings and product claims related to linear impact energy attenuation of the Aware-Flow shock absorber. Absorbers (N=15) from three adult X1 football helmets were impacted at predefined velocities of V1=1.3 m/s, V2=2.3 m/s, V3=3.0 m/s, V4=4.0 m/s, and V5=4.7 m/s using an instrumented drop tower. Force data were acquired via an 88 kN load cell and compression behavior was captured via high speed video at 2100 fps. Mean peak compression forces, mean maximum compression height, and percent compression were: V1 (734.67 N \pm 30.98; 21.78 mm \pm .33; 42.6%), V2 (955 N \pm 13.11; 13.04 mm \pm .60; 65.6%), V3 (1637.67 N \pm 12.42; 7.70 mm \pm .35; 76.8%), V4 (9254.67 N \pm 297.61; 5.01 mm \pm .36; 86.8%), and V5 (15849 N \pm 401.43; 4.04 mm \pm .05; 89.4%). A bell-shaped curve was observed at V1, while V2 and V3 exhibited trapezoidal behavior. V4 and V5 curves exhibited an initial trapezoidal region followed by a leptokurtic region. Impulsive forces appear to be ideally managed up to a V3 threshold, whereas reported velocities associated with on-field outer shell impacts exceed 7.0 m/sec. Thus, focal outer shell impacts should be investigated to examine the degree to which velocity is diminished prior to liner load transfer and the extent adjacent absorbers participate. Further investigation into physical, mechanical, and thermal characteristics of shock absorber constituent materials is warranted to potentially provide higher levels of prevention of sport-related concussion.

TRANSITIONING TO A MINIMALIST SHOE: A PILOT STUDY

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Barefoot/minimal shoe running is generally believed to strengthen foot architecture and decrease injury through improved running mechanics, but the transitioning period from a traditional shoe to barefoot/minimal shoe appears to be dangerous, as many runners have sustained injuries. The purpose of this pilot study was to examine pain and biomechanical changes while transitioning to a minimalist shoe. METHODS: Two experienced female runners underwent a 6-week transitioning program utilizing the Saucony Hattori minimal shoe. Runners participated in four runs/week (3-6 miles/run) in traditional shoes or the Hattori, increasing the amount of time spent in the Hattori by 26.6 \pm 9.3% each week. Runners stretched the posterior lower-leg muscles and Achilles tendons after each run, and completed three days of muscular strengthening for the intrinsic foot, gastrocnemius, and soleus. Muscular and joint pain in the lower extremities and back was assessed weekly. Pre- and post-training measurement of ankle dorsiflexion at foot strike was assessed using video analysis software, while running in traditional running shoes, the Hattori, and un-shod. RESULTS: Neither runner experienced significant pain during the transitioning program or any pre/post change in ankle dorsiflexion. DISCUSSION: The results of this pilot study provide information that can be used for a full-scale study that would address pain and mechanical changes during a transition period with both an experimental group utilizing minimal shoes and a control group utilizing only traditional shoes. Further, impact and ground reaction forces should be measured in future studies to determine if potential biomechanical changes in minimal shoe running result in less impact on the body.

DIFFERENCE IN LANDING KINETICS DURING VERTICAL DROP DOWN MOVEMENT ACROSS DIFFERENT FOOTBALL POSITIONS

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Lower extremity kinetics have been examined during different athletic motions, primarily among healthy participants. Little research has examined these motions among elite athletes. The purpose of this study was to examine the landing kinetics among elite level football players and compare the dominant and non-dominant legs across positions. Thirty eight healthy NCAA Division I football players were classified into three groups based upon their position and body mass. The participants performed three repetitions of a vertical drop down exercise off a 45.74 cm box for both the dominant and non-dominant leg, landing on an AMTI force platform. Peak vertical, anterior/posterior, and medial/lateral ground reaction force, normalized to multiples of body weight (BW), were measured for each participant. Results revealed that the skill position group landed with greater peak vertical and peak anterior/posterior force (P<.05) than the lineman group and the linebackers and tight ends group. There also a significant difference (P<.05) in peak medial/lateral force between the dominant and non-dominant leg. These differences in forces between the groups are possibly due to the different training demands placed upon the positions.

DIFFERENCE IN LANDING KINETICS DURING SIMULATED ANKLE SPRAIN MOTION BETWEEN CHRONIC ANKLE INSTABILITY AND HEALTHY PARTICIPANTS

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Some people who suffer a lateral ankle sprain, one of the most common sports injuries, develop chronic ankle instability (CAI). The purpose of this study was to examine the ground reaction force during a simulated lateral ankle sprain among healthy participants and those with CAI. Twelve participants, which included six with CAI and six with no history of ankle sprain performed 14 repetitions of a vertical drop down movement off a 27 cm box, landing on an AMTI force platform. Seven trials were completed with a fulcrum outer sole strapped to the bottom of the participant's shoe, which caused 25° of inversion upon landing, and seven trials were performed with a flat outer sole. Outer sole assignment was randomized. Peak vertical, anterior/posterior, and medial/lateral ground reaction force, normalized to multiples of body weight (BW), were measured for each participant. Results revealed that the CAI group landed with significantly greater ($P < .05$) peak vertical and peak anterior/posterior force than the CAI group. These differences in force between the two groups may be an attempt by the CAI participants to change loading of the unstable ankle, and the altered landing kinetics potentially increase future risk of injury.

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IDENTIFYING LOWER EXTREMITY KINEMATIC AND KINETIC DIFFERENCES AMONG FOOTWEAR CONDITIONS DURING A WALKING TASK: A DESCRIPTIVE STUDY

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Toning shoes are a style of athletic footwear with an unstable sole. The differences in lower extremity biomechanics with the use of unstable footwear are largely unknown due to a lack of available literature. As a preliminary investigation studying toning shoes, we designed a study with 3 tasks; walking in a toning shoe (TS), an athletic shoe (AS), and walking barefoot (BF) in order to identify potential differences in lower extremity biomechanics during the stance phase of gait. Three-dimensional lower extremity kinematics and kinetics for 17 healthy female volunteers were quantified using an electromagnetic motion analysis system and a force plate. Data was collected during stance phase of gait (ground contact to toe off) for each footwear type while walking at a self-selected pace. The stance phase was further divided into four distinct phases based on the changes in the vertical ground reaction force (vGRF). The change in kinematic and kinetic variables was calculated for each of the four respective segments. Significant differences ($p < 0.05$) were observed in hip and knee kinematics between the two shoe conditions (TS and AS) compared to walking BF. Statistical differences ($p < 0.05$) in vGRF were also observed when the subjects walked in the TS compared to walking BF and in the AS. Additional differences occurred at each of the four segments on the vGRF curve. These findings suggest that kinematic and kinetic differences are present among the footwear types. Future studies should examine how these differences, both independently and in combination, may contribute to neuromuscular differences during gait while wearing a toning shoe.

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RELATIONSHIPS BETWEEN ANTHROPOMETRIC AND PERFORMANCE MEASURES TO VELOCITIES IN COLLEGIATE BASEBALL HITTERS

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The purpose of this study was to compare anthropometric and performance measures to bat and batted-ball velocities in collegiate baseball players. Fifteen Division I college baseball hitters (age = 20.4 yr, height = 180.9 cm, body mass = 89.6 kg, % body fat = 12.6) were assessed during the early spring before the start of the baseball season for height (Ht), body mass (BM), percent body fat (%BF), lean body mass (LBM), dominant grip strength (DGS), non-dominant grip strength (NDGS), total grip strength (TGS), bat velocity (BV), batted-ball velocity (BBV), vertical jump (VJ), and peak power (PP). Correlation coefficients were calculated for all variables. There were significant ($p < 0.05$) high positive correlations between BBV and Ht ($r = 0.81$). There were significant moderately high positive correlations between BBV and LBM ($r = 0.79$), BM ($r = 0.79$), PP ($r = 0.70$), TGS ($r = 0.70$), NDGS ($r = 0.69$), DGS ($r = 0.67$), and BV ($r = 0.66$); BV and DGS ($r = 0.79$), TGS ($r = 0.78$), and NDGS ($r = 0.73$). There were significant moderate positive correlations for BV and LBM ($r = 0.59$), Ht ($r = 0.57$), BM ($r = 0.54$), and PP ($r = 0.52$). Data suggests that there are high to moderate relationships between anthropometric and performance measures with BV and BBV. However, these relationships do not mean a cause and effect relationship, nor can these results be compared with other baseball populations of different age and skill level. Therefore, it is suggested that college baseball coaches recruit taller hitters with greater BM, LBM, PP, and grip strength since they tend to have greater BV and BBV, or develop these performance measures via a strength/power resistance training program.

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THE THROWING SHOULDER'S RESISTANCE ZONE IS GREATER FOR EXTERNAL ROTATION THAN INTERNAL ROTATION

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Shoulder internal rotation (IR) and external rotation (ER) flexibility are relevant to throwing arm injuries in baseball pitchers. Previous studies have focused primarily on the passive end range of motion. In this study we examine shoulder flexibility in greater detail by assessing the passive torque needed to internally and externally rotate the shoulder to the end range of motion. The primary purpose was to determine if the throwing shoulder's ER resistance zone (RZ) was significantly greater than the IR RZ. Fifty-nine pitchers participated in the study (28 college and 31 professional). Flexibility was assessed with pitcher lying supine on an athletic training table and the shoulder abducted 90°. The laxity zone (LZ) was the middle portion of the motion that required minimal torque to rotate the shoulder ($< 5 \text{ N}\cdot\text{m}$). The RZ was the outer portion of the motion (5 N·m to the end ROM). An independent t-test was used to determine if the RZs for ER and IR were significantly different. Pearson correlation was used to assess the relationship between the ER and IR RZs. As hypothesized, the ER RZ ($22.3^\circ \pm 5.5^\circ$) was significantly greater ($p < 0.01$) than the IR RZ ($18.9^\circ \pm 5.7^\circ$). But the ER RZ was only 3° greater. This is surprising since the ER passive range of motion is typically 50° greater than IR. These data suggest that the throwing shoulder has greater ER mobility because of an increased LZ, not an increased RZ. There was a weak relationship ($r = 0.28$) between the IR RZ the ER RZ. This suggests that the two directions are independent. It is important to further assess these flexibility measures; the RZ and LZ may be as clinically relevant or more clinically relevant as the traditional range of motion measure.

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CHANGES IN MEASURES OF POWER IN NCAA DIVISION I FEMALE SOCCER ATHLETES THROUGH COMPETITIVE SEASONS

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The short and long term monitoring of athletes is imperative for the sport coaching, strength & conditioning, and sport science staff to carry out so that they can best prepare their players for optimal performance. Jump heights (during various jumping techniques) and attributes the athletes exhibit during the jumps (power, velocity, & force) may provide valuable information that could be used to analyze the quality of their training program and how to develop future training programs. Jump analysis is also a very practical method of measuring athletic performance and improvements. These athletes were assessed using countermovement and static jumps, in both unloaded and loaded (11 kg & 20 kg) conditions, prior to and 5 weeks into 2 competitive seasons. Jump height, peak force, peak power, peak velocity, & net impulse were analyzed during the jumps. Results indicated practical and significant increases in many of the jump attributes from the beginning of the season to the 5 week testing session, for both seasons. There are, however, numerous practical and significant decreases in many of the jump attributes when examined from the end of the first season to the beginning of the second season. This indicates that there is a substantial decrease in measurable athletic attributes during the NCAA mandated period of restricted coaching hours that could lead not only to a decrease in performance, but also to a possible increase in incidence of injury.

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A COMPARISON BETWEEN THE POLAR TEAM2 TRAINING LOAD AND SESSION RPE TRIMP AS METHODS OF MONITORING TRAINING IN NCAA DIVISION I MALE SOCCER PLAYERS

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Quantifying training is an important step in the training process. Doing so means that training can be objectively analyzed, appropriate training loads identified, and suitable adjustments made in an attempt to improve performance and reduce the risk of injury and illness. This study compared an emerging method of quantifying training, the Polar Team2 Training Load (TL), with a more established form, the Session Rating of Perceived Exertion (RPE) TRIMP method. 18 NCAA division I men's soccer players wore Polar Team2 heart rate monitors for all sessions across 6 different modalities during a 12-week period in the spring season. The supplied software calculated the Polar Team2 TL from the heart rate data. The players rated each session on a modified Borg scale (0-10 RPE), which was subsequently multiplied by training duration to determine the Session RPE TRIMP. Correlations between session mean Team2 TL and Session RPE TRIMP scores ranged from very strong to nearly perfect across the 6 different modalities; cycling $r = 0.932$, running $r = 0.832$, soccer training $r = 0.930$, soccer games $r = 0.918$, performance testing $r = 0.919$, weight training $r = 0.925$. The strong relationship indicates that the Polar Team2 TL may be a useful form of monitoring a number of training modalities in collegiate soccer players, however future research needs to investigate this further. Supported by a grant from Polar Electro.

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FUTURE PHYSICAL LIMITATIONS AND COLLEGIATE ATHLETIC PARTICIPATION

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Training regimens in collegiate athletics place athletes under chronic stress. The purpose of this study was to investigate the effects of prior participation in collegiate athletics on limitations in daily life and during exercise in a population of athletes. Former Division I college athletes were followed for a period of five years after baseline testing. Athletes were surveyed concerning injuries incurred during participation in all varsity sports. Blood pressure, body composition and body weight were measured at baseline, and reported five years after the athlete ceased competition. Significant increases from baseline in reported daily limitations were found in female softball and basketball athletes and in football players ($p < .01$). Significant increases from baseline in reported physical activity limitations were present in female softball, basketball, volleyball, soccer and track athletes ($p < .01$). Significant increases from baseline in reported physical activity limitations were present in male football, basketball, baseball, and track athletes ($p < .01$). The percentage of athletes reporting daily activity limitations was 38% and 43%, for females and males, respectively ($p < 0.01$). The percentage of athletes reporting physical activity limitations was 47% and 58%, for female and male athletes, respectively ($p < 0.01$). These data suggest that prior collegiate athletics participation may result in a substantial physical cost, and indicate a potential long-term risk associated with participation in collegiate athletics.

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EFFECT OF PICKLE AND PICKLE JUICE CONSUMPTION ON ENDURANCE EXERCISE IN THE HEAT

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Pickle juice has long been used to relieve exercise-associated muscle cramps with only anecdotal evidence to support its use. Recently, scientific studies have cautiously validated the effectiveness of pickle juice in treating muscle cramps, often within 30 seconds of its consumption. People in the non-scientific community also claim eating a pickle helps sustain and improve endurance exercise performance in an acute exercise bout of long duration in the heat. It is unclear whether the reported improvements are directly due to the pickle, juice in the pickle, or other factors such as glucose transport, glutamine, or placebo effect. We conducted a pilot study to examine cycling time trial performance differences when consuming either a pickle, pickle juice, or water. Six healthy, active men ($VO_{2peak} = 55.1 \pm 3.3$ ml/kg/min) cycled for 90 min at 80% of their lactate threshold in a hot environment (38.1 ± 1.1 °C, $35 \pm 3\%$ RH), during which water was consumed to match their determined sweat rate. At this point, the subjects consumed either a pickle (145 ± 7 g, Mount Olive), an equivalent amount of pickle juice, or water before completing a 20 km cycling time trial in the same hot environment. We found no significant performance differences in any of the trial conditions ($p = .20$) and no significant difference according to the order in which the trials were completed ($p = .48$). We concluded that the ingestion of a pickle or pickle juice alone has no effect on cycling time trial performance in the heat. It is likely that if any benefit is seen as a result of the consumption of pickles or pickle juice, it is due to a placebo effect or its effect on other factors such as carbohydrate ingestion and uptake during exercise.

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EXAMINATION OF OVERSPEED TRAINING ON POWER, SPEED AND AGILITY

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P49 PURPOSE: To determine if 5 weeks of overspeed training can improve vertical jump, 40 yard dash and 3 cone drill times in high school football players. It was hypothesized that after a 5 week training intervention 40 yard dash times would decrease, vertical jump would increase and 3 cone drill time would decrease. METHODS: Participants were assigned by a coach to either the overspeed (OS, 10) or control group (C, 5). The OS group completed 5 weeks of overspeed training which consisted of a 60 foot dash, 60 foot cone weave, 20 foot side shuffle and a 20 foot backwards run with a turn with the overspeed bungees twice a week while the control group continued their normal practice routine. There were nine session of training over the 5 weeks. On average, participants in the OS group completed 6.1 (1.1) sessions. RESULTS: Two way Repeated Measures ANOVA's (condition x time) were calculated for the 40 yard dash times, the vertical jump height, and the 3 cone drill time. The results for the 40 yard dash revealed no significant differences over time or between the groups (OS pre – 5.71 (.49) and post – 5.78 (.63); C pre – 5.97 (.59) and post – 5.96 (.67)). Results for the vertical jump revealed a significant time main effect, $F(1, 13) = 4.61, p = .05$ (pre 22.68 (1.36) and post 21.91 (1.32)) such that all participants jumped lower following the treatment. Results for the 3 cone drill revealed no significant difference over time or between the groups (OS pre – 8.74 (.61) and post – 8.54 (.62); C pre – 9.36 (.65) and post – 8.99 (.85)). DISCUSSION: The results of the present investigation did not support overspeed training as a tool to improve performance on 40 yard dash, 3 cone drill and vertical jump in this population of high school athletes. While it was hoped that participants would complete all training sessions; however, no one actually completed all 9 training days. It is possible that more training time with the bungees could lead to improvements in performance variables. Additionally, the athletes had started fall practice by the time the post test took place and thus they could have been fatigued when performing the post test. This would explain the decrease in vertical jump across both the OS and C group from before treatment to following treatment. Both athletes and their coaches reported noticing a difference in the running form of the athletes following the training, but this investigation was unable to examine running technique. Future investigations could use motion analysis to determine if form improves.

MOUTHPIECE USE DECREASES LACTATE DURING HIGH-INTENSITY RESISTANCE EXERCISE

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P50 Emerging data suggests that the use of a lower performance mouthpiece (MP) can improve athletic performance by altering physiological markers of stress (decreased cortisol) during anaerobic and aerobic exercise and by improving gas exchange (O₂ utilization & CO₂ production) during aerobic exercise. This study looked at the effect of a performance mouthpiece (UnderArmour Performance Mouthwear, Baltimore, MD) on blood lactate levels in 7 collegiate males who regularly performed lower body resistance exercises. At least 7 days following determination of a one repetition maximum (1RM), subjects completed 6 sets of 10 repetitions of back squats with 2 minutes rest between sets and were given 7 days between trials. Resistance was set at 80% of each subject's 1RM for each trial and resistance was adjusted during testing to ensure 10 repetitions were completed during each set. The order of treatment (i.e. use of MP) was randomized and blood was sampled at the following 6 time points for determination of blood lactate levels (Lactate Plus, Nova Biomedical, Waltham, MA): pre exercise; after 3 sets (mid); post exercise 30 minutes; post exercise 60 minutes; post exercise 120 minutes. There was no difference in lactate levels (mmol/L) pre (0.77±0.22 (MP) vs. 0.94±0.12: P=.092) and mid exercise (10.95±1.91 (MP) vs. 12.02±2.69: P=.27) or 120 min post exercise (0.92±0.31 (MP) vs. 1.22±0.29: P=0.97), but the MP group had lower lactate levels immediately post exercise (11.21±1.7 vs. 14.74±2.67: P=.02), 30 minutes post exercise (4.04±2.04 vs. 6.53±0.97: P=.015) and 60 minutes post exercise (1.71±0.78 vs. 3.0±0.45: P=.023). This data shows that the use of a performance MP can reduce blood lactate levels following intense resistance exercise, and when viewed in light of the published effect of performance MPs on lowering cortisol levels, suggests that the use of performance MPs may be decreasing stress during exercise and thus could improve human performance. Funding for this work was provided by a grant from Bite Tech Corporation.

TESTOSTERONE CORTISOL RATIO IMPROVES IN COLLEGIATE FOOTBALL PLAYERS WITH USE OF PERFORMANCE MOUTHPIECE

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P51 Researchers are suggesting the use of lower performance mouthpieces (MP) may enhance athletic performance by improving reaction time, decreasing lactate, and improving airway dynamics. Additionally, evidence suggests that MP use may also influence stress hormones during training. This study aimed to determine if wearing a performance MP (UnderArmour Performance Mouthwear, Baltimore, MD) improved the testosterone to cortisol ratio (T:C) in college athletes. Eleven NCAA Division I football players, ages 18-22 yrs, performed 2 bouts of a 1 hour intense team resistance exercise session designed and led by the college's head strength coach. For each session the subjects were randomly assigned the use of a custom fit MP or no MP. During each exercise session, saliva was collected at 5 different time points: pre-exercise, 25 and 45 minutes into exercise, immediately post exercise, as well as 10 minutes post exercise. Each sample was labeled and stored for determination of testosterone and cortisol via ELISA. The MP group had an increase (P>0.05) in T:C from pre exercise to immediately post (0.031±0.006 to 0.045±0.007) while there was no change in the no MP group (0.043±0.011 to 0.067±0.023). The no MP group showed a decrease (P<0.05) in T:C from immediately post exercise to 10 minutes post (0.068±0.023 to 0.025±0.008) while there was no change in the MP group (0.045±0.007 to 0.032±0.01). There was an increase in cortisol from pre to 10 minutes post (P>0.05) in the no MP group, while no changes were detected in the MP group. The improvement in T:C ratio in the MP group appears to be the result of an attenuation in the increase in cortisol following exercise. This suggests that wearing the MP during intense resistance exercise may aid in recovery by creating a more favorable anabolic/catabolic hormone profile. This work was supported by Bite Tech Corporation.

EXAMINATION OF THE IMPACT OF A COOLING PRODUCT ON CYCLING PERFORMANCE IN THE HEAT

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P52 Exercising in the heat has adverse consequences for physical performance. Little evidence exists examining the impact of a cooling strategy during the event. PURPOSE: To examine if a cooling strategy during an event in the heat can reduce the negative effects commonly seen and thus positively impact performance and perception. METHODS: Six (4 male) experienced cyclists performed a graded exercise test and two time trials (TT) on 3 separate days on a Velotron. Days two and three were identical with the exception of the treatment condition. Participants were given 10 minutes to warm-up. Following the warm-up, heart rate and affect were recorded. Participants then completed a TT (30K for males and 24K for females) as fast as they could. Heart rate and affect were recorded at 1/4, 1/2, 3/4 of the way through, at the end and 15 minutes after the TT. On one day participants wore the cooling product and the order of presentation was counterbalanced. RESULTS: One way Repeated Measures ANOVAs were calculated for Average Watts, MPH, and Time across the two TT conditions. No significant results were found: Watts cooling 232.63 (42.44) and non-cooling 232.77 (43.32); MPH cooling 23.87 (1.73) and non-cooling 23.85 (1.75); and Time cooling 43:54 (4:30) and non-cooling 43:30 (4:52). A two way (2 Condition x 2 Time) RM ANOVA was calculated for lactate and a significant Time main effect was found, $F(1, 5) = 8.88, p < .05$, pre 3.23 (.90) post 8.59 (1.39). A two way (2 condition x 6 Time) RM ANOVA was calculated for affect and a significant time main effect was found, $F(5, 25) = 10.08, p < .05$. Participants felt progressively worse throughout the time trial and then rebounded to near baseline levels 15 minutes after the time trial. DISCUSSION: The cooling product did not impact performance or affect during and following a time trial in the heat. For 5 of the 6 participants' performance was better the second day in the environmental chamber regardless of condition, which suggests that participants may have been better acclimated to the procedures on the second TT day. This may have negated any positive impacts of the cooling product. Future research should consider an acclimatization day along with the cooling and non-cooling conditions.

FORCE PRODUCTION OF THREE DIFFERENT FLIP-TURN STYLES WHILE RIDING A DRY LAND CART

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Previous research has demonstrated that the turn can consume as much as one third of a freestyle swimming race. Yet relatively little research has focused on this area, particularly in the area of force production. Therefore the purpose of this project was to investigate the forces produced at the feet during different push off techniques while riding a cart on dry land. A track on level ground was placed in front of a force platform affixed to a wall. The participant laid in a supine position with legs toward the platform and performed three different push off techniques. The first required that the participant glide into the wall and allow the wall to flex the knees, inducing an eccentric contraction prior to extension to push off with the knees approximately at 90 degrees. The second required that the participant begin lower extremity extension prior to wall contact. The third required that the participant initiate the push off with one foot and then finish with the other foot. The results indicate there was a significant difference between patterns 1 and 2 ($p=0.018$), 1 and 3 ($p=0.029$), and 2 and 3 ($p=0.001$), with the second pattern yielding the highest force. Therefore, it would seem that the greatest force and consequently the greatest acceleration is achieved when the participant begins to extend prior to contact with the wall.

TURN TIME FOR FOUR DIFFERENT FLIP-TURN STYLES

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A significant amount of time is involved in the turn of swimming events, with estimates ranging from 21%-33% of total race time. Despite the large amount of time that it takes to complete the entry, flip, push-off, and exit of a well-executed flip-turn, little scientific methodology has been applied in understanding the effects of varying techniques on exit time. Therefore, the purpose of this project was to investigate the change in the flip-turn exit time of freestyle swimmers in response to varying push-off strategies. A waterproof force platform was affixed to the side of the pool and three push off patterns were investigated. Cameras were set at 2.5m and 5m to allow the calculation of time from entry to exit at those respective distances. The first technique required the swimmer to glide into the wall, allowing the wall to flex the knees (to 90 degrees) prior to lower-extremity extension. The second technique required that the swimmer began lower extremity extension prior to wall contact. The third required that the swimmer initiate the push off with one foot and then finish with the other foot. It was hypothesized that the counter movement push-off pattern would yield the fastest exit time to 2.5m and 5m. The results indicate that while there was no significant difference between any pattern, participants were typically fastest using Technique 2 (2.5m = 3.205s, 5m = 7.111s) and slowest using Technique 3 (2.5m = 3.689s, 5m = 7.700s). Therefore, it would seem that experienced swimmers exit a flip-turn fastest when leg extension begins prior to contact with the wall.

UNDERSTANDING THE EFFECTIVENESS OF TWO TRAINING METHODS TO IMPROVE JUMP PERFORMANCE

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This is a preliminary study to identify the effectiveness of two training methods depending on the peak force output from the countermovement jump (CMJ) test. If an individual does not have adequate force production to perform a series of plyometric exercises it could lead to tissue and joint overload. Low force production also limits gains in power output. Thus, it is important to assess force output to evaluate what type of training suits for the individual. The purpose of this study was to identify the effect of two training methods to improve force output and vertical jump performance. Ten Collegiate female volleyball athletes volunteered for this study. Participants were initially tested to determine their current ability of vertical CMJ height as well as peak force output. Subjects were then divided into two training groups (plyometric based and strength based) depending on their force output capability; Ground Reaction Forces (GRF) of less than 200% body weight (BW) were put into the strength group and GRF of more than 200% BW were put into the plyometric group. They were engaged in 4day/wk for 10 weeks of training. After the 10 weeks the participants reported back to the laboratory and re-tested in the same procedures. As the goal of this study was to identify the effectiveness of the two training methods for the same goal, groups were analyzed as one group. CMJ height increased significantly (pre 51.51 cm \pm 8.57 and post 57.7 cm \pm 8.61, $p = .0001$). Peak GRF also increased significantly (pre 2.09 N/BW \pm .221 and post 2.34 N/BW \pm .260, $p = .004$). Both strength based and plyometrics based training programs are valid protocols to increase CMJ height and peak GRF. Furthermore, a CMJ test is a valid way to appropriately assign training groups between strength and plyometric based programs.

EFFECT OF MUSCULAR STRENGTH ON MUSCULAR FATIGUE AND RUNNING ECONOMY IN COLLEGE AGED WOMEN

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The purpose of this project was to study the effect of muscular strength on muscular fatigue in the lower extremities in 19 females between the ages of 19 and 24 years old. Participants were divided in three classifications based on knee extension 1RM relative to body weight. Individuals with a 1RM/BW less than .75 were classified as LOW ($n=6$), between .75 and .90 as moderate (MOD) ($n=8$), greater than .90 as HIGH ($n=5$). Resistance to muscular fatigue was determined by the number of repetitions to failure in knee extensions at 30% of 1RM. Participants also completed a running economy test at 5.5, 6.0, 6.5, and 7.0 mph. A Parvo TrueOne metabolic cart was used to assess oxygen consumption during the running economy test on the treadmill. Participants ran at each speed for 5 minutes followed by a 5 min. rest. There was no significant difference in # of knee extensions to failure (LOW; 25.7 \pm 12 reps, MOD; 28.6 \pm 14 reps, HIGH; 30.8 \pm 13 reps, $p=0.79$). Additionally, the groups did not differ in running economy at 5.5 mph (LOW; 31.9 \pm 2 ml/kg/min, MOD; 32.9 \pm 3 ml/kg/min, HIGH; 35.0 \pm 2 ml/kg/min, $p=0.21$), 6.0 mph (LOW; 34.6 \pm 3 ml/kg/min, MOD; 36.8 \pm 4 ml/kg/min, HIGH; 37.6 \pm 2 ml/kg/min, $p=0.31$), 6.5 mph (LOW; 36.8 \pm 3 ml/kg/min, MOD; 36.5 \pm 8 ml/kg/min, HIGH; 40.3 \pm 2 ml/kg/min, $p=0.44$), or 7.0 mph (LOW; 36.5 \pm 7 ml/kg/min, MOD; 39.2 \pm 5 ml/kg/min, HIGH; 43.2 \pm 5 ml/kg/min, $p=0.17$). Muscular strength does not appear to influence muscular endurance or running economy in college-aged women.

LOWER LIMB ASYMMETRY IN BALANCE, FLEXIBILITY, AND STRENGTH IN ACTIVE AND INACTIVE COLLEGE WOMEN

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The purpose of this study was to examine the influence of exercise and activity on limb asymmetry in performance of balance, flexibility, and strength. Limb asymmetry for flexibility was defined as a difference in performance between the dominant and non-dominant lower limbs. Asymmetry for muscle strength was defined as the difference in performance between limbs relative to the strongest limb. Fifteen active participants (21.1±1yrs, 64.9±4 in., 131.4±21 lbs) and inactive participants (21.3±1 yr, 65.8±3 in., 164.3±31 lbs) completed the study. All testing was completed during a one-hour session with separate tests for balance, flexibility and strength of each limb. The Balance Error Scoring System (BESS) was utilized for single-leg balance measures of each limb on a hard surface and a foam surface. Participants stood on one leg for a twenty-second period and the number of errors were recorded. The test was repeated with the other limb and errors counted. Next, flexibility for both knee flexion and knee extension were measured using a standardized goniometer on each limb. Leg extension and leg curl machines were used to assess a single-leg one-repetition maximum performed separately for leg extension and leg flexion. Physically active participants had greater flexibility in the knee joint ($P<0.05$) compared to inactive; however, when examining limb to limb asymmetry there were no differences (active: $2.8\pm 2^\circ$; inactive; $3.4\pm 2^\circ$, $P=0.53$). Additionally, active participants exhibited greater asymmetry in 1RM for knee flexion ($10.5\pm 9\%$) than inactive participants ($3\pm 6\%$) ($P<0.05$). There was no difference in asymmetry for knee extension ($P=0.11$). Balance did not differ between groups on balance for the dominant ($P=0.56$, hard surface, $P=0.69$, foam surface) or non-dominant limb ($P=0.46$, hard surface, $P=0.85$, foam surface). Active individuals have indications of limb asymmetry in strength but this does not appear to be a factor in balance.

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EFFECTS OF RESISTIVE TRAINING ON STRENGTH, BALANCE, QUALITY OF LIFE, SELF-EFFICACY, AND PHYSICAL ACTIVITY IN THE ELDERLY

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Resistive exercise training results in increased strength across the lifespan and positively effects measures of quality of life and self-efficacy in older adults. These positive outcomes could result in increased physical activity in the elderly. The purpose of this study was to investigate the effect of resistive training on strength, balance, quality of life, self-efficacy, and physical activity in an independent living elderly population. Volunteers ($N=15$, $M=79$ years, $SE=3$) from a local retirement community completed the Self-Efficacy Scale (SES), the Physical Activity Scale for the Elderly (PASE), and the Satisfaction with Life Scale (SLS) pre and post program. Upper body strength was evaluated by a timed bicep curl test and hand grip dynamometry. Lower body strength was evaluated by the timed up and go test and sit to stand test. Balance was evaluated using the tandem walk test. Biweekly resistive training sessions over 8 weeks consisted of the following exercises using individually determined resistance: Chair stand, standing leg curl, knee extensions, hip abductions, bicep curls, overhead press, upward row, and toe stand. Lower body strength improved (Sit to Stand: Pre= $12.2 + .62$, Post= $14.15 + .74$; Up and Go: Pre = $6.99\text{sec} + .28$, Post = $6.2 \text{ sec} + .26$) ($p<0.05$) and self-reported physical activity increased (PASE: Pre = $94.46 + 15.04$, Post = $120.53 + 14.26$) ($p<0.05$) as a result of participation. No other changes were noted. Results support the efficacy of offering resistive training in this population and suggest that there is a need for further evaluation in a larger group to determine other potential positive outcomes.

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EFFECTS OF KNEE ALIGNMENT ON GAIT KINEMATICS IN KNEE OSTEOARTHRITIS

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The purpose of this study was to determine the association between alignment and kinematics of the hip and knee during gait in osteoarthritic older adults with specific focus on if varus thrust can be observed quantitatively. Knee alignment was measured from a full-length lower extremity anteroposterior radiograph, and 3D gait analysis was performed to obtain kinematic data. The variables of interest were peak values for abduction, adduction, flexion and extension for the hip and the knee, compressive and shear forces at the knee, stride length, walking speed, and step width. Pearson product correlations indicated that peak hip adduction, peak knee adduction, and peak knee abduction were significantly correlated with alignment. The correlation values were $-.509$, $.609$, and $.716$, respectively. Varus thrust, an abrupt movement of the knee laterally during the weight transfer phase of gait, was identified in individuals with varus alignment. This supports prior literature that used visual observation to confirm the presence of varus thrust in individuals with varus alignment. The data indicates that frontal plane kinematics are associated with alignment and had no influence on movements in the sagittal or transverse planes or on temporospatial variables. The quantification of varus thrust did not give a complete analysis that supports the use of observational gait analysis and needs further investigation.

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THE EFFECTS OF POWER BALANCE BRACELETS ON STATIC BALANCE

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This study is intended to explore the effects of Power Balance hologram bracelets on the static balance of 19 to 25 year old females. Balance assessments were performed on 7 participants using the Biodex Balance System and the Balance Error Scoring System (BESS). The Biodex assessment includes the Athletic Single Leg Test of Balance which measures subjects' stability in three dimensions, an overall index, anterior/posterior and medial lateral. The BESS requires subjects to hold three poses for twenty seconds each, once on a stable surface and once on an Airex Balance Pad: a foam surface certified for balance assessment. Lower numerical values indicate better performance on each of the assessments and presumably better static balance. All subjects performed each balance assessment in randomized order under three conditions; with a Power Balance bracelet, without a Power Balance bracelet, and with a Power Balance bracelet with the hologram removed. There was an overall effect of wearing a bracelet in the overall stability index. When individuals wore the bracelet, they exhibited an improved ($P<0.05$) overall stability index (1.29 ± 0.6 units) compared to no bracelet (1.91 ± 1.3 units) or a bracelet without the hologram included (1.95 ± 0.9 units). There were no statistically significant differences in anterior/posterior sway ($P=0.46$), medial/lateral sway ($P=0.06$), or BESS score ($P=0.27$). These findings suggest that wearing a Power Balance hologram bracelet can improve static balance in college aged women.

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EFFECT OF SKECHER SHAPE UP SHOES ON DYNAMIC BALANCE

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Skechers is the most well known manufacturers of toning shoes, producing the Skechers Shape-Up with a curved, rocker-bottom design. While the current economy has decreased sales of traditional athletic shoes by 1.4 percent, toning shoe sales have skyrocketed from \$17 million in 2008 to \$145 million in 2009 (Untapped market, 2010) with Skechers leading the way. Other rocker-bottom design shoes have been shown to increase muscle activation in the lower extremities. Observed increases in muscle activation are believed to be due to the instability the rocker-bottom design creates throughout the gait cycle (Romkes, 2006). This may have further implications for dynamic balance or the ability to maintain stability while moving. The purpose of this study was to examine the effect of wearing Skechers Shape-Up shoes on dynamic balance. Twenty-three women ages 18-65 completed a six week walking program. Dynamic balance was measured before and after the six week walking program using the Y-balance test. Results of data analysis showed a significant increase in the composite score indicating improvement in dynamic balance, $p = 0.0057$. These results suggest that walking in Skechers Shape Up shoes may be a valid therapy for maintaining and rehabilitating dynamic balance and the prevention of falls.

Supported by a grant from Glen Raven Mills.

THE INFLUENCE OF VISION AND SURFACE TYPE ON BALANCE USING A DOUBLE LEG STANCE IN ACTIVE YOUTHS

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Previous research has investigated vision and the effects of an unstable surface on balance; however, few studies have been done investigating how these factors influence balance in youths. The purpose of this study was to investigate sway patterns in active youths while being tested under different balance conditions. The participants ($n = 6$, Mean age = 14.3, $SD = 1.2$ years) in this study were youth volunteers recruited from the local community. All participants had parental assent and completed informed consent documents. Participants were asked to complete the Children's Physical Activity Questionnaire to screen for minimum levels of daily activity prior to participating in the balance testing protocol. Participants were required to complete 4 experimental conditions using a double leg stance on an AMTI force platform. These conditions were eyes open and eyes closed while standing on both a stable and unstable surface. A 2x2 ANOVA was completed to analyze the influence of vision on total sway area and the influence of surface type on sway area as assessed by 95% ellipse area. There were significant ($p < 0.05$) differences between eyes open stable (Mean = 2.61, $SD = 1.88$) and eyes closed stable (Mean = 3.70, $SD = 2.23$). There were also significant ($p < 0.05$) differences between eyes open unstable (mean = 2.65, $SD = 1.02$) and eyes closed unstable (mean = 5.53, $SD = 2.11$). These results are similar to results demonstrated in elderly samples that have commonly displayed an increase in total sway area under similar balance testing protocols. By testing balance in youths, more knowledge can be gained on the influence of known effectors throughout a person's lifespan.

THE CORRELATION BETWEEN A 1RM BENCH PRESS AND THE ACCURACY AND VELOCITY OF A LACROSSE SHOT IN FEMALE COLLEGE CLUB LACROSSE ATHLETES

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The purpose of this study is to measure the relationship between upper body strength and the accuracy and velocity of a lacrosse shot. 16 women participated in the study. During the first meeting with the participants, a maximum bench press was measured within four to five attempts. Five days after the 1RM assessment, participants attempted to hit a wooden target (0.914 meters by 0.814 meters) with a center cross mark and high contrast concentric circles. Participants were instructed to throw a standard lacrosse ball as hard and as close to the center of the target as possible. Each participant completed ten lacrosse shots standing at a distance of 10 meters from the target. During each attempt, the participant was continuously videotaped using digital cameras. The video image of the ball striking the target was analyzed using Dartfish 5.0 imaging analysis software. Accuracy was defined as the distance in meters the ball struck the target from the center cross hair. Concurrent to the video recording, a Bushnell speed gun was also used to measure the velocity of each lacrosse shot in miles per hour. Participant's 1RM was measured at 80.3 ± 18 lbs. Average velocity was 31.0 ± 4 mph and average accuracy was 0.72 ± 0.2 m from center target. There were no significant correlations between the bench press 1RM and average velocity ($r = 0.17$, $p = 0.533$) or average accuracy ($r = -0.089$, $p = 0.743$). Additionally, there was no significant relationship between average velocity or accuracy ($r = -0.29$, $p = 0.282$). Maximal bench press is not an important factor in ability to throw a 10 meter lacrosse shot accurately or with high velocity.

THE EFFECT OF COMPETITION ON FREE-THROW SHOOTING PERCENTAGE

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The purpose of this study is to examine the possible influence of competition on free throw shooting percentage. Seven female division 1 collegiate basketball players (20 ± 1 yrs, 70.1 ± 5 in., 156 ± 26 lbs) participated in the study. Each participant completed one session of 5 sets of 10 free throws, for a total of 50. Free throw shooting percentage was determined from the number of successful shots made per 50 attempts. Additionally, the percentage of the first 2 shots in each set of 10 attempts was also recorded. These 50 shots were completed in a empty gymnasium with only the participant and researchers present. This trial was considered the non-competition trial. To determine free throw percentage during competition, the published percentages provided by the sports information department for the 2010-2011 basketball season were used. A paired samples t-test was used to compare the competition vs non competition trials. There was a significant decrease in free throw shooting percentage with competition. Participants made $80.0 \pm 6\%$ of free throws compared to $61.6 \pm 13\%$ during collegiate games ($P < 0.01$). This finding did not change when comparing the 1st two shots of a set of ten ($80 \pm 16\%$) compared to the competition free throws ($P < 0.01$). Thus, free throw percentages in non-competitive settings are higher than those during actual games. Practice session may desire to add some type of competition to free throw shooting drills to attempt a more accurate reflection of in-game shooting percentage.

FATIGUE IN WALKING VERSUS RIDING A CART IN AN 18-HOLE ROUND OF GOLF

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P65

The effect of carrying a golf bag on fatigue when walking versus simulated riding in a cart during an 18-hole round of golf was investigated in 3 subjects. The test consisted of 2 trials for each participant, one walking trial, and one riding trial. In the walking trial, the participant would hit a shot and walk with a bag for a designated distance depending on the club which they used for the shot. In the riding trial, the participant would perform a golf swing and then sit and rest for two minutes. Each trial simulated an entire 18-hole round of golf with participants completing a combination of 54 golf swings and 18 putts. Heart rate was taken before each shot, and a rating of perceived exertion (RPE) was taken before each simulated golf hole. The Accusport Vector Pro and Swing View Pro golf swing analysis programs were used to collect data on each swing including ball speed, projected distance, and club head speed. There were no significant differences in ball speed, club head speed, or projected distance between trials. However, by the 54th swing of the 72 attempted, heart rate was consistently higher in the walking trial (109 ± 14 bpm) compared to the simulated cart trial (81 ± 18 bpm, $P < 0.05$). Additionally, beginning at the 10th hole, participants gave the walking trial (12.1 ± 1) a significantly higher rating of perceived exertion compared to the cart trial (7.6 ± 1) ($P < 0.05$). These findings suggest that carrying a bag is more of a stressor than riding a cart, however this does not appear to be a factor in golf swing performance over 18 holes.

A COMPARISON OF CALORIC EXPENDITURE AND RATING OF PERCEIVED EXERTION BETWEEN THE SHAKE WEIGHT® AND A REGULAR DUMBBELL

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The caloric expenditure and rating of perceived exertion (RPE) was examined while performing a two-handed rhythmic elbow flexion-extension exercise with the Shake Weight® and a regular dumbbell of similar weight in two separate trials. Ten women (21.1 ± 1 yr, 65.7 ± 3 in., 144.3 ± 26 lbs) participated in the two exercise trials. The two trials were counterbalanced and spaced one week apart. Each trial consisted of a 1 minute practice warm-up to familiarize the subject with the two exercises. After the warm-up participants completed a continuous 6 minute trial with either the Shake Weight® or dumbbell. During the 6 minute trial, participants expired air was analyzed using the PARVO Medics, TrueOne 2400 metabolic measurement system. Additionally, RPE was assessed using a Borg Perceived Exertion Scale. Prior to the practice trial, the subject's resting heart rate was measured and upon completion of the 6 minute exercise trial, heart rate and RPE was measured immediately after cessation of the exercise bout. Prior to the start of each trial, there was no difference in participants resting heart rate (78.6 ± 13 bpm vs 77.5 ± 12 bpm, $p = 0.57$). There was a significant increase in caloric expenditure for the Shake Weight® compared to the regular dumbbell (14.1 ± 3 kcals vs. 12.5 ± 2 kcals respectively, $p < 0.01$) for the 6 minute exercise bout. There was no difference in perceived exertion for the Shake Weight or dumbbell trial (10.5 ± 2 , 9.7 ± 2 respectively, $p = 0.30$). These findings show that exercising with the Shake Weight® expends more calories than a dumbbell when performing the same exercise.

INTRA-RATER AND INTER-RATER RELIABILITY OF A HAND HELD DYNAMOMETER

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P67

Muscular strength measurements are primary outcomes for numerous research studies, especially those examining whether exercise programs are effective in aiding patient recovery from illness, injury, or disease. One technique for accomplishing this task is the use of a hand held dynamometer. However, the reliability of such a device, including its intra- and inter-rater reliability, should be fully described. The purpose of this investigation was to determine the intra- and inter-rater reliability of the MicroFet 2 hand held dynamometer. Thirty adults with a mean age of 52.0 ± 22.7 yrs. and a mean body mass index of 27.9 ± 6.1 underwent elbow flexion and knee extension strength testing using a MicroFet 2 hand held dynamometer. Two raters performed repeated testing over four separate visits. Intra-class correlation coefficients (ICC) along with t-tests were used to assess intra- and inter-rater reliability. ICC for the inter-tester reliability for the elbow and knee were 0.83 and 0.73, respectively. Independent t-tests revealed no significant inter-tester strength differences for either the elbow or knee. ICC for the intra-tester reliability of tester 1 for the elbow and knee were 0.93 and 0.90, respectively. Dependent t-tests revealed no significant intra-tester strength differences for either the elbow or knee for tester 1. ICC for the intra-tester reliability of tester 2 for the elbow and knee were 0.87 and 0.89, respectively. Dependent t-tests revealed no significant intra-tester strength differences for either the elbow or knee for tester 2. The MicroFet 2 hand held dynamometer has good intra-rater and inter-rater reliability. These results suggest that the strength measures produced by the dynamometer are reproducible within one individual taking strength measurements multiple times and between two individuals taking strength measurements separately.

VARIABILITY IN RESISTANCE TRAINING REPETITIONS ACHIEVED AT SPECIFIC WORKLOADS

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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 each load. To determine if the number of reps achieved at specific loads are consistent for various pieces of cam mediated variable resistance exercise equipment (CMVREE), such as Nautilus. Nineteen college male subjects 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 48 hours rest between protocols. Rest between exercises was standardized at two minutes. On CMVREE mean reps achieved by experienced RT college age males ranged from 10.9 on the shoulder press to 35.2 on the leg curl and 7.1 on the shoulder press to 18.7 on the leg curl at 60% and 80% 1 RM respectively. Exercise professionals must recognize that variability exists between the number of reps achieved on various pieces of CMVREE and adjust their exercise prescriptions accordingly. Traditional exercise equipment has a natural sticking point due to joint angle. New exercise equipment such as CMVREE limits this sticking point by limiting the factors of joint angle and biomechanical limitations.

VALIDATION OF EXERCISE WORKLOADS ON TWO LEG ERGOMETERS

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The purpose of this study was to verify the accuracy of workloads during exercise at three workloads on Airdyne and LifeFitness 9500 HR Recumbent leg ergometers. Each of the seven recruited subjects exercised in a randomized order on both ergometers at continuous 5-minute intervals of 45, 60, and 75 watts. Data was collected with Medical Graphics metabolic system. Oxygen uptake (VO₂), ratings of perceived exertion, heart rate, caloric expenditure and respiratory exchange ratios were recorded. The average VO₂ measured during the fifth minute of each workload stage on each ergometer was compared to the VO₂ predicted by the ACSM equation for leg ergometers ($VO_2 = [(10.8 \times \text{watts}) / (\text{wt. in kg}) + 7]$). Differences in VO₂ were statistically significant for all workloads on the Lifefitness and at 60 and 75W on the Airdyne. Caloric expenditures dictated by the ergometers were also compared at each workload to those calculated from indirect calorimetry derived from expired gases ($k\text{Cal/L O}_2 = 4.686 + [((\text{RER} - .707) / .293) * .361]$) and to those estimated from ACSM's predicted VO₂. No differences in caloric expenditure for either ergometer at any workload were statistically significant. These results suggest that leg ergometer workloads are inaccurate, which consequently may compromise the goals of exercise prescriptions. The non-significant differences in caloric expenditure will be clarified as we continue to recruit more subjects for further testing.

HIGH INTENSITY TRAINING EFFECTS ON MAXIMAL POWER AND VO₂ MAX

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P70

Purpose: The purpose of this study was to determine if high intensity Wingate training will alter a subject's VO₂ max and maximal power. Methods: The testing protocol consisted of 10 recreationally active males (age= 22 ± 1.38 yrs; height= 70.5 ± .70 in; weight= 80.2 ± 4.8kg; body fat= 17.09 ± 1.42%). Each subject performed a graded exercise test to assess VO₂ max, and performed a Wingate test to determine anaerobic power prior to beginning the training protocol. The training protocol included six Wingate tests (a 30 second sprint) over 30 minutes, three times a week for four weeks. Following the completion of the training protocol, the subjects returned to the human performance lab for their final VO₂ max test, body fat measurement, and final Wingate test. T-Test were performed (pre vs post) with a significance set at $p \leq 0.05$ a priori. RESULTS: VO₂ max significantly increased from 45.0 ± 1.23 (ml/kg/m) to 51.1 ± 1.91 (ml/kg/m); and peak power significantly increased from 1025.2 ± 67.5 (watts) to 1234.3 ± 56.9 (watts). The mean anaerobic power did not significantly increase (Pre 509.5 ± 40.1 W; Post 542.8 ± 46.5 W). CONCLUSIONS: Based on our data, exclusively using anaerobic Wingate training appears to be effective in not only raising anaerobic power, but increasing aerobic capacity as well.

COMPARING PHYSICAL ACTIVITY MONITORING DEVICES

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While obesity is a growing problem throughout America, there are also many people who are determined to become more physically active. As technology increases, many people turn to the use of devices (such as an iPod) to measure their physical activity. Whether exercising or simply performing daily activities, many types of pedometers are used to assess the number of steps taken, calories expended, and distance walked. With the previously validated technology of accelerometers, this study will examine the accuracy and reliability of a popular iPod application, Pedometer FREE. METHODS: This cross sectional study involves 20 participants grouped into young adults and middle aged adults. This study asks the participants to wear both two accelerometers (clipped to the waistband) and an iPod Touch on an armband. Each participant filled out an AHA/ACSM Health/Fitness Facility Preparticipation Screening Questionnaire. After obtaining age, height, and weight (required for device programming) the participants will be asked to wear these devices while on the Reynolds Gym track for 2 sequential laps at either a walking or jogging pace. The participants will then continue to wear the devices for the remainder of the day while continuing with normal daily activities (classes, work, etc). RESULTS: The results from this study are projected on the poster with the use of graphs in order to better demonstrate the outcomes. CONCLUSION: While the iPod Pedometer FREE application may serve as a general measure of physical activity, the proven reliability of the accelerometers is not matched

MEASURING ACTIVITY PATTERNS IN VENICE STUDY (MAPS)

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P72

Cardiovascular disease (CVD) ranks first in cause of death for Americans. Studies have shown that regular physical activity can prevent CVD, however most Americans do not exercise enough. Other populations around the world, despite being modern as the United States, such as Mediterranean cultures, do not share the same problem of CVD. Many attribute this to diet and regular physical activity which is augmented by environments such as Venice, Italy. This study examines the effect of environment on inhabitants, particularly their physical activity energy expenditure by quantifying PAEE in both WFU and Venetian college students analyzing patterns of physical activity. METHODS: This was a cross-sectional study of 30 students. Height and weight measurements were taken for each participant and were instructed to wear the Lifecorder accelerometer continuously for ten days. Overall PAEE was determined in addition to PAEE through light, moderate, and vigorous activity. Data was tested for normality and independent sample T-tests were used to compare the groups (WFU students on campus and while in Venice and Venetian students). RESULTS: There was no significant difference in PAEE between WFU students while in Venice and no differences between WFU students in Venice and Venetian students. However, WFU students spent significantly more time daily in light physical activity in Venice compared to campus (77.3 min +/- 27.56, 36.9 min +/- 9.96, respectively) as well as in moderate physical activity (57.3 min +/- 25.76, 34.0 min +/- 14.03, respectively). CONCLUSION: The WFU students resembled physical activity patterns similar to Venetian students while in Venice. While on campus, their patterns were significantly different. This suggests that the environment in Venice led to higher amounts of physical activity in light and moderate intensities. Furthermore, the increase in amount of physical activity suggests that the environment whether it be conducive to physical activity may have an effect on the mortality and morbidity of CVD.

THE RELATIONSHIP OF SELF-REPORTED EXERCISE HABITS AND ORAL HYGIENE

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The purpose of this study was to examine potential relationships between exercise and habits and oral hygiene. A 34 item survey was used to identify self-reported habits of exercise and oral hygiene in college aged students between the ages of 19-24. 128 participants completed the survey. Spearman correlations were used to analyze relationships between exercise and oral hygiene habits. A frequency analysis shows that 39% report exercising 2 or fewer times/wk, 38% exercise 3 to 4 times/wk, and 23% exercise 5+ times/wk. When exercising 19% reported light intensity, 52% moderate intensity, and 26% heavy intensity. The most frequent types of exercise was aerobic (53%), strength training (44%), and competitive sports (35%). 76% of respondents reported brushing their teeth more than once a day, 23% brushed once a day, and 2% at least once a week. Additionally, 20% flossed daily, 34% weekly, 45% rarely if ever flossed. 30% self reported their teeth as in excellent condition, 59% in good condition, 9% in fair condition, and 0% as poor. 22% reported gum health as excellent, 57% as good, 18% as fair, and 1% as poor health. Those who brushed teeth regularly also flossed regularly ($r=.25, p<0.05$). Those who flossed more often reported better gum health ($r=0.53, p<0.05$). There was a significant relationship between those who reported performing aerobic exercise and self-reported condition of the teeth ($r=0.30, p<0.05$) and gum health ($r=0.28, p<0.05$). There were no significant relationships for any other type of exercise. Additionally, there was no relationship between exercise intensity and frequency on oral hygiene. These findings suggest that aerobic exercise is associated with oral hygiene regardless of exercise intensity or frequency.

THE EFFECTS OF LOCATION OF FOOD RETAILERS AND ROLE OF FOOD DESERTS IN ROCK HILL, SC

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The purpose of this study was to investigate how the accessibility of neighborhoods to their surrounding food retailers affects the residents' health. Mainstream grocery stores, fringe-retailers, and restaurants vary widely in the availability of healthy foods. Areas with limited access to healthy foods are known as food deserts. U.S. Census data were used to determine socioeconomic status of residents. ArcGIS software was used to locate surrounding food retailers. Each retailer was individually analyzed and mapped to indicate food deserts. The food desert map was designed to recognize the disadvantaged areas. Furthermore, the maps were formulated according to population density and household income to show the distribution of food retailers within the community. Mainstream grocery stores were more common in high populated areas with high income. There were fewer healthy food retailers in the disadvantaged areas. The food retailers present in the food desert areas were majority fringe retailers. Analyzing food deserts from different scopes is important because the environment of the residents differs in each community. By understanding the foundation of food deserts could prevent future occurrences of food deserts and help solve existing food deserts. Findings show there are fewer healthy food sources in disadvantaged communities. These data will be used to support policy and environmental initiatives in the City of Rock Hill.

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PHYSICAL ACTIVITY AND FOOD CONSUMPTION: IS THERE A RELATIONSHIP?

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P75

The factors consistently reported to be associated with the development of cardiovascular disease have been physical activity, obesity and aging. Obesity can be managed with increased physical activity and decreasing caloric intake. Empirical evidence has hinted that physical activity may decrease appetite, which may decrease caloric intake. However this relationship has not been fully examined. To determine if mice with access to a running wheel consume less food than those without access to a running wheel across the entire lifespan. Methods: Thirty C57Bl/6J, 15 male and 15 female, were placed in individual cages at eight weeks of age and were monitored throughout their entire lifespan. Fifteen mice were housed in cages with a running wheel, magnetic sensor and digital odometer, (RUN group). Distance was recorded daily. The remaining fifteen mice were placed in individual cages without running wheels (SED group). Every week body weight (BW) and food intake were measured on all 30 mice throughout their entire lifespan. Results: Although not significantly different ($p=0.065$) the mice with access to running wheels ate more than the mice without wheels throughout the lifespan. Additionally, there was no significant difference between the BW of the 2 groups ($p=0.42$). Food intake did not increase significantly over time ($p=0.28$), while BW did increase significantly ($p=0.015$) with time for both groups. From age 3 mo to 23 mo the RUN group exhibited a significant relationship between monthly food intake and mean monthly BW. The SED group only exhibited this relationship at 3 mo of age. Monthly food intake was not related to mean monthly distance for the RUN group. Physical activity appears to result in a strong relationship between food intake and BW, while lack of activity eliminates this relationship. The combination of physical activity and greater food consumption may explain the lack of BW differences between both groups. Further research is necessary with a larger sample size and examining body composition.

CHARLESTON PHYSICALLY ACTIVE RESIDENTIAL COMMUNITIES AND SCHOOLS (C-PARCS): A PRELIMINARY EVALUATION OF A COMMUNITY-BASED WELLNESS PARTNERSHIP

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Residents living in or near inner city areas often include under-served populations (i.e. ethnic minorities and/or low socioeconomic status) that face multiple barriers preventing their participation in physical activity including transportation, limited financial resources, childcare responsibilities, and/or ignorance of health benefits related to physical activity participation. These barriers typically result in under-served populations having the highest rates of obesity, diabetes and cardiovascular disease. In 2008, 54% of the peninsular residents in Charleston, South Carolina were classified as being overweight or obese. Charleston Physically Active Residential Communities and Schools (C-PARCS) is a community wellness program that was designed and implemented in peninsular Charleston and was modeled after the original PARCS program from Indianapolis, IN. C-PARCS offered free physical activity programming as a means to promote healthier lifestyles among individuals from under-served populations. The purpose of this project was to evaluate the ability and successfulness of implementing of a community-based program in a different geographic location. To identify the local population served by C-PARCS, demographic information was collected from 16 (n=14 females) of the 27 participants. Nine participants identified as Black, four as White, and three as Egyptian. Participants' mean age was 40 yr (range: 21-61 yr) with a mean household income of \$37,000 (range: \$9,000-\$130,000). Results show that the PARCS program can be implemented in other communities; however, logistical considerations between different geographic locations mandate the PARCS program be modified to accommodate the specific challenges. C-PARCS was successful in assisting participants in initiating wellness goals which ultimately may lead to healthier lifestyles.

RISK FOR METABOLIC SYNDROME FOLLOWING DIET-INDUCED WEIGHT LOSS OR EXERCISE IN POST MENOPAUSAL WOMEN

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P77 PURPOSE: The purpose of this study was to determine the impact of diet-induced weight loss (DWL), circuit training (CT) and diet-induced weight loss and CT (DWLCT) on risk for MetS in previously sedentary post menopausal women METHODS: Twenty-seven women were randomly assigned to either a DWL (n= 16) or CT (n =19) 9 week intervention. DWL participants met with an investigator once per week and had a total weight loss goal of 8-10% of baseline body weight. CT subjects completed a supervised circuit of resistance and aerobic exercise on 3 days per week at a moderate intensity. CT participants were weighed weekly to insure body weight (BW) remained stable (± 3 lbs). Nine (3 DWL, 6 CT) participants completed an additional 9 week protocol, after a 1-month washout period, that combined the DWL and CT protocols (DWLCT). Maximum oxygen consumption (VO₂max), waist circumference (WC), BW, height, systolic (SBP) and diastolic blood pressure (DBP) were measured at 0 (PRE) and 10 (POST) weeks for all participants. Fasted blood samples were collected PRE and POST and analyzed for high density lipoprotein cholesterol (HDL), triglycerides (TRIG), and blood glucose (BGLU). Participants' risk for MetS was determined using NCEP-III criteria. ANOVA and paired- and independent-samples t-tests were used to determine changes in risk factors for MetS. RESULTS: MetS was present in 21.1% of the CT, 25% DWL group, and 22.2 % of DWLCT group and did not change. Results of paired samples t-test indicated significant decreases in DBP (p = .025) and WC (p = 0.016) in the DWL group. HDL significantly decreased (p= 0.001) in the DWLCT group. MetS risk factors did not change in the CT group. CONCLUSIONS: This study suggests that CT is insufficient to affect MetS risk in 9 weeks, while DWL may decrease MetS risk in this relatively short time frame. DWLCT appeared to increase MetS risk by lowering HDL levels.

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DIFFERENCES IN RISK OF DISORDERED EATING AMONG DIVISION I FEMALE COLLEGE ATHLETES

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P78 The purpose of this study was to examine 1) if there was a difference between lean and non-lean sport female athletes for risk of disordered eating, and 2) what factors may contribute to disordered eating. The ATHLETE survey was given to 83 Division I female athletes from four lean sports (n = 37) and four non-lean sports (n = 46). The ATHLETE survey measured six contributing factors, including: drive for thinness and performance, social pressures on eating and body shape, athlete identity, team trust, and performance perfectionism. Independent T-tests were used to compare scores from the six subcategories and the total of the survey. Results showed a significant difference between lean and non-lean athletes for the total score for the ATHLETE survey (p = .011). Social pressures on body shape (p = .005) and team trust (p = .004) scores were significantly higher with lean sport athletes, indicating a stronger negative influence on these athletes. The results indicate that athletes who participate in a lean sport, whose focus is on body composition, performance, or whose uniforms were revealing, would have an amplified risk of developing an eating disorder. This information may help with implementing proper pre-participation screenings for coaches and athletic trainers, as well as helping the athletes to become aware of what may trigger an eating disorder.

THE EFFECTS OF GLYCINE PROPIONYL-L-CARNITINE ON ANAEROBIC POWER PRODUCTION IN RECREATIONALLY-ACTIVE WOMEN

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P79 Many people use dietary supplements to enhance the effects of exercise. This has led to the development of a billion dollar supplement industry. One such supplement, glycine propionyl-L-carnitine (GPLC), has been shown to increase anaerobic power in resistance-trained men (Jacobs et al, 2009). PURPOSE: To study the effects of GPLC supplementation on anaerobic power production in recreationally-active women. METHODS: A double-blind, repeated measures design was used in this investigation. Participants (n=8) completed four sessions. The first session served to familiarize the participants to the anaerobic power test. Subsequently, 3 testing sessions were performed separated by 1 week. Sessions were counterbalanced by supplement; 3.0 g GPLC, 1.5 g GPLC, or 200 mg brown rice powder. Ninety minutes following supplement ingestion, participants completed a 5-stage anaerobic power test on a cycle ergometer. Each stage lasted 10 seconds and was separated by 1 min of active recovery. Peak power (PP) and mean power (MP) were measured and recorded. RESULTS: A RM-GLM revealed a significant time effect for both PP (p=.001) and MP (p=.001). There was not a significant condition effect for either PP or MP (p>.05). A non-significant time*condition interaction was seen for both PP (p=.076) and MP (p=.063). Higher initial power was seen for those consuming 3.0 g GPLC. CONCLUSION: Consuming 3.0 g GPLC prior to exercise may result in an increase in power production among recreationally-active women. This may enable individuals to exercise at intensities sufficient to derive health benefit.

THE EFFECT OF GATORADE PRIME ON FATIGUE IN HIGH ANAEROBIC INTERMITTENT SPRINT RUNNING IN FEMALES

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P80 The purpose of this study was to determine if Gatorade prime prevents fatigue in high intensity anaerobic sprint running compared to Gatorade original, or water in women. Seventeen college aged women (22.0 \pm 3 yrs, 64.4 \pm 3 in., 130.8 \pm 23 lbs, 22.0 \pm 3% body fat) completed the study. The exercise bout consisted of 6 high anaerobic intermittent sprints that were 20 meters. Each participant had a twenty second rest in between each sprint during which they walked back to the starting point. Participants completed 3 trials of the 6 sprints. Fifteen minutes prior to each trial, participants consumed either 4 ounces of Gatorade Prime (25g CHO), 8 ounces of Gatorade original/performance (14 g CHO) or 8 ounces of water (0 g CHO). Each trial was counterbalanced and separated by 6 to 7 days. Researchers were blinded to the beverage given at each trial. A Brower laser timing gate system was used to measure sprint time. Fatigue was assessed as the peak sprint time minus the 6th trial time. A one way ANOVA based on beverage choice was used to detect differences in fatigue. No significant differences were detected due to pre-exercise beverage. Fatigue rates as indicated by a increase of sprint time from the peak trial were 0.31 \pm 0.3 seconds for Gatorade, 0.23 \pm 0.2 seconds for water, and 0.35 \pm 0.3 seconds for Gatorade Prime (P=0.48). These data suggest that Gatorade Prime is not superior to Gatorade or water in preventing a decline in sprint time during high intensity interval sprints.

DOSE RESPONSE ASSESSMENT OF SUSPENSION TRAINING WORKOUTS IN COLLEGE-AGED WOMEN

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Suspension training is a form of exercise that incorporates aspects of cardiovascular and resistance training in an unstable environment. Individuals use their own body mass as resistance while performing exercises in an interval method. The purpose of this study was to determine how altering work and/or rest periods affected physiological responses during and following an acute suspension training workout. Prior to testing, eleven college-aged female subjects participated in a minimum of two familiarization trials and a maximal graded treadmill test. Subjects performed four testing sessions using work:rest ratios of 30:60, 30:45, 30:30, and 45:30 sec, in a randomized order. During each testing session, subjects completed the same whole body workout that included two cycles of 23 exercises. Heart rate, blood lactate, and RPE were measured before, mid-way, immediately post, and 30 min post workout. Average heart rate was significantly different ($p < 0.05$) between both the 30:60 and 30:45 workouts as compared to the 30:30 and 45:30 workouts. Blood lactate was not significantly different ($p > 0.05$) between the workouts. Session RPE was significantly different ($p < 0.05$) during 45:30 than the other three workouts. From these results, it was determined that a 30 sec decrease in rest and/or a 15 sec increase in work was necessary to elicit a significant dose response in workout intensity during an acute suspension training workout.

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MCP-1 -/- MICE SHOW BLUNTED EXPRESSION OF INFLAMMATORY CYTOKINES IN BRAIN AND MUSCLE FOLLOWING EXERCISE-INDUCED MUSCLE DAMAGE

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The body's inflammatory response to eccentric exercise-induced muscle damage in both brain and muscle contributes to impaired performance recovery. Monocyte chemoattractant protein (MCP-1) is essential in the release of inflammatory mediators, but its role in exercise-induced muscle damage has not been determined. The purpose of this study was to determine the role of MCP-1 on brain and muscle inflammation following a novel bout of downhill running. C57BL/6 ($n=24$) and MCP-1 -/- ($n=24$) mice, 8 weeks of age were randomly assigned to one of six groups: downhill runner control (DHC), uphill runner control (UHC), sedentary control (SC), downhill runner MCP-1 -/- (DHM), uphill runner MCP-1 -/- (UHM), and sedentary MCP-1 -/- (SM). The mice were run on a treadmill at $-/+14\%$ grade and 22m/min, for a duration of 150 min. Mice were sacrificed at 24h post downhill run. The brain and gastrocnemius muscle (G) were dissected and analyzed for IL-1 β , IL-6, TNF- α and F4/80 mRNA using real time RT-PCR. Gene expression of IL-1 β , IL-6 and TNF- α was increased in the cerebellum, cortex and G in DHC relative to SC ($p < 0.05$), whereas DHM was not different from SC. A similar effect was observed for F4/80 but this only reached statistical significance in G ($p < 0.05$). No differences were found in any of the other groups. These data support a necessary role for MCP-1 on the inflammatory response to exercise-induced muscle damage.

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THE EFFECTS OF RED WINE AND ETHANOL ON GLUCOSE, INSULIN, AND C-PEPTIDE RESPONSES DURING AN ORAL GLUCOSE TOLERANCE TEST IN MEN

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We have previously reported that acute red wine consumption enhances the insulin response and leads to lower plasma glucose concentrations during oral glucose tolerance tests (OGTT) in women. In this study, we investigated whether these insulin and glucose responses also occur in men, and whether these responses were elicited by ethanol or other ingredients in wine. Four male subjects, age 35-57, visited the laboratory on three occasions, all in the fasted state. Fifteen minutes prior to each OGTT, subjects consumed water, red wine, or vodka, with the alcoholic drinks both containing 20 g ethanol. After ingestion of 75 g glucose, blood samples were collected at 30 min intervals, centrifuged immediately, and the isolated plasma was stored at -20°C until it was analyzed for glucose, insulin, and C peptide. Plasma glucose concentrations were similar at all time points in the three trials and glucose areas under the curve (AUC) did not differ. Insulin concentrations in the three trials were similar at each time point and the treatments did not produce a significant increase in insulin AUC; however, insulin AUC was 75% higher after red wine ingestion, as compared to after water, and 40% higher after vodka. C-peptide was elevated at 60 min in the wine trial ($p = 0.05$) and at both 30 and 60 min in the vodka trial ($p = 0.05$ and 0.03 , respectively). Wine and vodka increased C-peptide AUC by 3.7- ($p = 0.09$) and 4.5-fold ($p = 0.05$). These results suggest that wine and vodka only mildly affect the glucose and insulin responses during an OGTT in men, but that C-peptide is dramatically increased by the ethanol in both wine and vodka.

THE DISEASE ANALOG MODEL AND LEPTIN MAY IDENTIFY SUSCEPTIBLE PRE-OBESE AFRICAN-AMERICAN WOMEN

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Similar to a graded exercise test for clinical cardiac diagnosis, it may be possible that exercise testing can identify the most susceptible normal weight individuals based on biomarkers of chronic inflammation. We hypothesized that obesity represents a chronic disease state, and exercise mimics an acute state of physiological perturbation in predisposed but otherwise normal weight individuals. In this disease analog model, post-exercise biomarker values for chronic disease in predisposed individuals would be similar to resting values of obese subjects. Participants in this investigation were 6 healthy (age=26±4 yrs, height=165±2 cm, weight=69±4 kg), and 7 obese African-American women (age=37±4 yrs, height=166±2 cm, weight=93±6 kg). Participants performed the Bruce protocol, and blood samples were obtained at rest, immediately following, and 1-hour after exercise. Leptin was measured using a commercially available kit. The resting leptin value for obese African-American women was 17.9±2.9 ng·mL⁻¹ (SEM), and 9.0±4.8 ng·mL⁻¹ for non-obese participants (P = 0.06). As we hypothesized that following exercise, predisposed individuals would display values similar to the obese group at rest, we evaluated each non-obese participant individually. We found that two apparently healthy participants did produce post-exercise leptin values similar to the resting mean of the obese group (18.8, and 28.3 ng·mL⁻¹ respectively). We observed an elevated post-exercise leptin level in 33% of participants, which suggests that this disease analog model could show promise in identifying individuals with the propensity for developing a chronic disease such as obesity. Further investigation with a larger participant pool is warranted, as well as a longitudinal design to track identified predisposed individuals for development of chronic disease.

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PHYSICAL ACTIVITY LEVELS, INJURIES, AND PRODUCTIVITY IN LOUISIANA LABORERS

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Adequate physical activity reduces chronic disease risk factors. Inactivity predisposes an individual for numerous diseases and conditions. The purpose of this study was to examine the relationship between exercise and physical activity level, injuries on the job, and days missed at work. Subjects included employees from an air conditioning and insulation company based out of Shreveport, Louisiana. The subjects were divided into groups based on their occupational physical activity level. Subjects were given the EPAC physical activity questionnaire. Results indicated that the laborers reporting the lowest amount of elective physical activity (activity and exercise not performed as part of their job) also reported the fewest number of injuries and fewest days of work missed (p<.05). Workers who reported the highest amount of occupational physical activity reported less depression, anxiety, and less risk factors CVD (p<.05). There was a statistically significant correlation between physical activity, occupational or elective, and injury rate, CVD risk factors, and the number of sick days taken each year (p<.05). This data indicates that physical activity is an important factor to consider in the productivity of employees in any company. Employers who choose to participate in worksite health promotion and company sponsored exercise programs may be at an advantage in terms of productivity and reduced healthcare and associated disability cost. Future research should focus on establishing a relationship between injury and lack of physical activity in workers. Research on the exercise adherence in worksite health programs is also needed.

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EFFECT OF CLASSROOM-BASED PHYSICAL ACTIVITY BREAKS ON PHYSICAL ACTIVITY AND ON-TASK BEHAVIOR IN PRESCHOOL CHILDREN

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Physical activity (PA) behaviors are established in childhood and remain relatively consistent through adolescence and into adulthood, thus, it is important to promote PA in young children. The purpose of this study was to determine the effect of classroom PA breaks on moderate-to-vigorous physical activity (MVPA) and on-task behavior in preschool children. In addition, the study examined the relationship between motor skill competence and MVPA during the breaks. Children enrolled in a public, financially-subsidized childcare center (n = 9) and a private, university-based childcare center (n = 12) participated in this within-subjects study. Data were collected on two days of typical instruction and two days that included the implementation of a 10-minute PA break. MVPA was measured with Actical accelerometers and gross motor skills were assessed with the Test of Gross Motor Development 2nd Ed. (TGMD-2). Children's on-task behavior was observed and recorded as on-task or off-task (motor, noise or passive/other). Paired-samples t-tests indicated that preschoolers in each sample accumulated significantly more MVPA during the school day (p < .0125) and more MVPA indoors (p < .0125) on days that provided a physical activity break. There was a non-significant Spearman's Rho correlation between TGMD-2 percentile score and minutes spent in MVPA during the physical activity breaks (rs (20) = .06, p = .787). Thus, children's level of motor skill competence did not affect their participation in physical activity. On-task behavior increased after the PA break, indicating that MVPA facilitated academic engagement and children were able to transition from the break to academic instruction. Providing classroom-based physical activity breaks in preschool settings is an effective strategy to increase PA participation and on-task behavior in young children, regardless of motor skill competence. Preschoolers' physical activity participation would benefit from policies or curriculum that aim to incorporate daily PA breaks.

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EXAMINING LINKS BETWEEN DAILY PHYSICAL EDUCATION ON COGNITION AND FITNESS AMONG AFRICAN AMERICAN YOUTH

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Increased importance on academic achievement has resulted in many school districts reducing physical education time. However, physically active children tend to have greater academic achievement and enhanced cognition compared to their inactive peers. The primary purpose of the present study was to assess the impact of 45 minutes of daily physical education on the cognitive ability [measured by Fluid Intelligence and Perceptual Speed] of elementary and middle school participants and fitness performance of African American elementary and middle school youth attending a Title I charter school in the southeast. The secondary purpose was to evaluate the effects of 45 minutes of daily physical education on Fitnessgram physical fitness tests [e.g., aerobic capacity (PACER), muscular strength and muscular endurance (Push-up & Curl-up)]. One Title I elementary control school and one Title I middle control school were identified and utilized as comparisons. Three-hundred and thirty five experimental school participants and 195 control school participants in grades 2nd-8th were pre-tested on the cognitive measures and Fitnessgram physical fitness test items in September, 2010 and post-tested in May, 2011. This pre/post-test design used repeated measures analysis of variance to evaluate the effectiveness of 45 minutes of daily physical education on cognitive ability and fitness performance. Analyses were stratified by gender and grade level (elementary school/middle school). Experimental elementary and middle school participants observed significantly greater improvements compared with control elementary and middle school participants. Experimental school students showed significant increases in 59% of the cognitive measures, compared to only 25% for control school students. Experimental school students significantly improved on 92% of the fitness measures by the end of school year, compared to only 8% for control school students. Furthermore, control middle school students showed decreased performance on 42% of the fitness measures. Experimental school students increased their cognitive and fitness scores. Providing 45 minutes of daily physical education can increase cognitive ability while increasing fitness of African American youth.

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DOSE-RESPONSE RELATIONS BETWEEN CHANGE IN SEDENTARY TIME AND CHANGE IN CARDIOMETABOLIC RISK FACTORS

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Sedentary time is associated with an increased risk for chronic diseases independent of physical activity behavior. Few studies have examined the relation between changes in sedentary time and changes in risk factors for chronic diseases over time. The purpose of this study was to explore the relationship between changes in sedentary time and changes in cardiometabolic risk factors among participants completing a 12 week randomized controlled trial designed to reduce daily sedentary time. Fifty sedentary, overweight/obese, but apparently healthy adults were randomized to an intervention (N=25) or wait list control group (N=25). Daily sedentary time (accelerometry) and cardiometabolic risk factors including body mass index, waist circumference, percent body fat, blood pressure, estimated aerobic fitness (sub-maximal treadmill test), and fasting blood lipids (total cholesterol, HDL, LDL, triglycerides) were assessed at baseline and 12 weeks. Baseline data collection is complete with 12-week data collection underway. Preliminary findings indicate participants were middle-aged (43.8±9.7 years), overweight/obese (mean BMI=31.5±4.2 kg/m²), primarily female (94%) and sedentary (79.6% wakeful hours sedentary). Linear regressions will examine the dose-response relations between change in daily sedentary time and change in each of the measured cardiometabolic risk factors from baseline to 12 weeks. Findings from this study will shed light on whether reducing sedentary time is efficacious for improving cardiometabolic disease risk.

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FIBER TYPE CONVERSION IN VIVO: THE EFFECTS OF SIX1 GENE EXPRESSION IN MURINE SKELETAL MUSCLE

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Six1 is a gene necessary for the development of several tissues, but in adults is expressed solely in skeletal muscle. Six1 gene and protein levels decrease in response to acute exercise in humans and mice. Overexpression of Six1 can cause a slow-to-fast fiber type transition, but the effect of Six1 decrease on fiber type proportion and size is unknown. Purpose: To determine the effect of Six1 overexpression and knockdown on muscle fiber type in mice. Methods: The tibialis anterior muscle of 30 mice was transfected with vectors to increase or knockdown Six1 gene expression, or empty vector control. Muscles were collected at 2 and 14 days after transfection (n=4 or 6 mice per group at each time point). Six1 gene expression was quantified by qRT-PCR. Number of fibers and total cross-sectional area are being calculated using fluorescent microscopy for Type I, IIA, and IIB fibers. Results: Electroporation efficiency was >50% (green fluorescent protein). The Six1 vector increased Six1 mRNA expression 11.2-fold (±2.7, p<.01) compared to control, and the siRNA vector decreased Six1 mRNA expression 1.37-fold (±.09, p=.04). Preliminary analysis suggests that the proportion of IIB fibers decrease in response to decreased Six1. Conclusion: A decrease in Six1 expression affects the expression of different muscle fiber types and may be responsible for fiber type conversions after exercise.

THE EFFECT OF TUMOR BURDON ON SKELETAL MUSCLE IN CACHEXIA

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Cachexia is a metabolic condition that is characterized by significant loss of body weight in large part due to skeletal muscle wasting. We believe that the tumor burden dictates the magnitude of atrophy. To test this, we injected mice with 5x10⁶ colon carcinoma cells suspended in PBS, subcutaneously, in either one flank (1T) or two flanks (2T). Mice were euthanized when the tumor reached a diameter of 1.5 cm. This yielded a total tumor weight of 1.05 g in the 1T group and 2.2 g in the 2T group. Mice in the 2T group, but not the 1T, showed significant signs of cachexia such as loss of body weight, lethargy, and sloughing of fur. The body weight of the 1T group decreased by 3%, while the 2T group showed a 12% decrease. In the 1T group, tibialis anterior (TA) muscle weight decreased by 8%, TA muscle fiber cross sectional area decreased by 16% and gastrocnemius muscle weight decreased by 6%. However, in the 2T group, TA muscle weight and CSA decreased by 29% and 22%, respectively, and gastrocnemius muscle weight decreased by 17%. These findings confirm that the tumor burden dictates the magnitude of body weight and muscle weight loss during cachexia.

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Effect of Slow Velocities of Movement on Force and EMG Activity

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Velocity of muscle contraction influences the force production and the activation of that muscle. Typically, as velocity increases above 60°s⁻¹ there is a negative exponential decrease in force production. However, it is not known if slower velocities of muscle movement would fit the typical force velocity curve in vivo. PURPOSE: This study was designed to assess differences in EMG activity and torque production of the biceps across increasing velocities of elbow flexion. METHODS: Healthy college-aged (18-25yrs) volunteers (N = 15) completed a maximal isometric bicep contraction on an isokinetic dynamometer. They then completed three biceps contractions at 10, 30, and 120 degrees .second⁻¹ in random order while surface EMG activity recorded. A repeated measures ANOVA was utilized to analyze the data to test for differences in torque production and EMG activity across velocities using SPSS v 19. RESULTS: Isometric force demonstrated the greatest force (p< 0.01) {X =48.5 ± 7.75 Nm} while EMG activity resulted in a mean peak amplitude of X= 2.80 ± 0.25 mV. Force decrements followed the typical in vitro curve across the velocities tested with the 120°s⁻¹ demonstrating the lowest force {X= 32.87 ± 5.03 Nm} across the velocities; however, the force between 10°s⁻¹ {X= 40.69 ± 6.02 Nm} and 30°s⁻¹ {X= 40.09 ± 5.99 Nm} did not significantly differ. The EMG amplitude at 10°s⁻¹ {2.47 ± 0.22mV}, 30°s⁻¹ {2.48 ± 0.22mV}, and 120°s⁻¹ {2.53 ± 0.224mV} approached significance (p= 0.072) compared to isometric with no difference across these three velocities. Women demonstrated less peak force and EMG amplitude compared to the men but demonstrated similar relationships. CONCLUSIONS: This pilot study demonstrated force declines with increased velocities of movements (independent of gender). In contrast, EMG activity showed only modest decreases in mV amplitude during the velocities examined compared to the isometric action. This suggests that the slow velocity movement of the biceps follows the typical force velocity relationship in vivo. However, the EMG amplitude does not follow this relationship.

RELATIONSHIP BETWEEN BODY COMPOSITION 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 and strength. This cross-sectional study examined the relationships between total and regional bone mineral density (BMD), lean mass (LM) and fat mass (FM), and strength in BCS. Thirty-nine women between the ages of 49 and 75 years participated. Body composition and BMD of the total body, lumbar (L1-L4), hip (femur), and radius were measured by DXA. Upper and lower body strength was measured using the chest press and leg extension machines. Hand grip (HG) strength was assessed using a HG dynamometer. Pearson product moment correlations and multiple regressions were used to analyze the data. All significance was accepted at $p < 0.05$. Upper body strength was significantly associated with total ($r=0.423$), lumbar ($r=0.371$), femur ($r=0.407$), and radius ($r=0.432$) BMD. HG and lower body strength were not associated with body composition measurements except HG and LM ($r=0.596$). Both LM and FM were significantly associated with BMD of total body (LM: $r=0.503$ FM: $r=0.503$), femur (LM: $r=0.421$; FM: $r=0.421$), and radius (LM: $r=0.479$; FM: $r=0.593$). After controlling for age, height, medications affecting bone metabolism, and hormone suppressant therapy, FM was a significant determinant of BMD at radius. Upper body strength was a positive predictor of BMD at total body and lumbar spine. Lower body strength and LM were not associated with BMD at any skeletal sites. These results suggest the importance of upper body strength in maintaining BMD at total body and lumbar spine, while indicating the importance of adequate FM in maintaining BMD at the forearm in BCS.

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EMG AND ANAEROBIC POWER RESPONSES TO ACUTE WHOLE BODY VIBRATION

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Whole body vibration (WBV) has shown to positively impact muscle function. Studies have shown significant improvements in muscular strength and power following acute bouts of WBV in trained participants (Cochrane et al., 2009; Cochrane et al., 2008; Stewart et al., 2009). Less is understood regarding the effectiveness of acute WBV in untrained individuals (de Ruijter et al., 2003). The purpose of this research is to explore the physiological mechanisms underlying changes in contractile function following an acute bout of WBV. It was hypothesized that WBV may alter muscle activation resulting in changes to anaerobic power production. Twelve non-resistance trained male and female college-aged participants completed this study. The vibration protocol required three days of testing for each participant. Day one was a familiarization trial. On days two and three, participants were randomly assigned and counter-balanced to either no vibration or WBV condition. Participants then completed a 6-stage cycle ergometer anaerobic power test. EMG was recorded during each stage and average power and peak power were measured. Preliminary results showed no condition effect for average or peak power ($P > .05$), there was however a time effect ($p < .05$). There was a trend towards significance for lower EMG activity following the WBV condition compared to the no vibration condition at the later stages of the anaerobic power test ($P < .08$). This preliminary evidence supporting the hypothesis that WBV does impact muscle function perhaps contributing to muscular efficiency.

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THE INFLUENCE OF STIMULATION CURRENT ON NIRS MEASURED METABOLIC RATE

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Near infrared spectroscopy (NIRS) has been used to evaluate skeletal muscle oxygen levels and metabolic rates. This study tested the effect of different electrical stimulation current levels on NIRS measured metabolic rate. Healthy subjects (7 F, 1 M, ages 23-32) were tested. A dual channel NIRS device (Oxymon, Artinis) was used with separation distances between 3.0 and 4.5 cm, placed over either the medial gastrocnemius or vastus lateralis. Surface electrical stimulation produced muscle activation. Each subject was stimulated for three 2 minute stimulation periods at 4 Hz with randomized current levels (for example: 40, 50, 60 mAmps). Between levels, a 10 second ischemic period was used to measure metabolic rate. A 5 minute duration ischemic cuff with reactive hyperemia was used to calibrate NIRS signals. Oxygen saturation during stimulation was not different between current levels ($69.8 \pm 9.0\%$, $68.6 \pm 9.8\%$, $69.6 \pm 8.2\%$ low, med, high current) and was similar to resting oxygen saturation ($69.3 \pm 10.2\%$). Metabolic rate was not significantly different between current levels (964%, 1070%, 1170% of resting metabolic rate for low, med, high current). Longer separation distances gave results similar to those reported for shorter separation distances. In conclusion small differences in current levels at or above 50 mA did not influence, on average, muscle oxygen saturation or metabolic rate following electrical stimulation. Separation distance also did not influence these measurements. This suggests that electrical stimulation is a feasible method of activating skeletal muscle for NIRS-based measurements of muscle metabolism.

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DOES A SECONDARY LOSS OF STRENGTH OCCUR FOLLOWING INDUCTION OF MUSCLE INJURY?

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It is known that there is an immediate loss of strength following virtually all types of muscle injury. There is debate as to whether a secondary loss of strength occurs in the ensuing 1 to 3 days. Objective: Conduct a systematic review and meta-analysis of the research literature to determine if a secondary loss of strength occurs after muscle injury. Methods: Searches were performed using 4 electronic databases. 106 peer-reviewed articles were deemed suitable for analysis. Meta-analyses were run using a random-effects model and standardized mean differences calculated from data in the articles. Results: For all studies combined, a significant increase in strength was found to occur between immediately post and days 1, 2 and/or 3 post-injury (overall effect size [ES] = 0.40, $p < 0.0001$). Because heterogeneity of between-study ES was large ($I^2 = 84\%$; $p < 0.0001$), moderator variables that could potentially explain this heterogeneity were probed using subgroup analysis or meta-regression. There was no significant difference in overall ES between studies using humans and those using animals ($p=0.81$). Additionally, there were no significant differences among studies using differing muscle groups ($p > 0.22$). The only moderator variable showing a significant effect was gender ($p=0.01$); studies utilizing females exhibited a slower rate of strength recovery after injury (overall ES = 0.29) compared to studies using males only (overall ES = 0.55). Conclusion: Our analysis overall does not support the occurrence of a secondary loss of strength following muscle injury. In fact, the data indicate that a significant increase in strength occurs over the first 3 days after injury.

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THE IMPACT OF A 6-WEEK RESISTANCE TRAINING PROGRAM WITH PRE- AND POST-EXERCISE PERFORMANCE SUPPLEMENTATION ON CARDIOVASCULAR RISK IN RESISTANCE-TRAINED MEN

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The potential cardiovascular or metabolic health risks or benefits associated with consumption of performance enhancing supplements containing multiple ingredients over the course of a periodized resistance training (RT) regimen are unknown. The purpose of this study was to investigate the combined effect of resistance training (RT) and commercial pre- and post-exercise performance supplements, NO-Shotgun® (SHOT) and NO-Synthesize® (SYN), respectively, on cardiovascular (CV) risk in resistance-trained men. Twenty-four resistance-trained men completed 6 wks (3d/wk) of whole-body periodized RT. The participants were randomly assigned to 2 groups. Group 1 (n=13; Performance Supplement; PS) consumed one serving of SHOT before and 1 serving of SYN immediately after each RT session; SYN was also consumed on all non-RT days. Group 2 (n=11; Placebo; PL) consumed an isocaloric maltodextrin placebo in an identical manner as utilized by PS. Pre and post-RT measures included: resting heart rate (HR), blood pressures (BP), fasting blood lipids, total body fat, android fat, gynoid fat and plasma nitrate concentrations. Statistical analysis was conducted using a 2 x 2 (group x time) repeated measures ANOVA. Significance is set at $p < 0.05$. There were no group x time interactions for HR, BP, blood lipids or plasma nitrate concentrations. However, there were significant decreases in body fat (PS: $-1.2 \pm 1.2\%$; PL: $-0.9 \pm 1.1\%$), android fat (PS: $-1.8 \pm 2.1\%$; PL: $-1.6 \pm 2.0\%$), and gynoid fat (PS: $-1.3 \pm 1.6\%$; PL: $-1.0 \pm 1.4\%$) for both groups. There were also no significant group, time, or group x time effects for plasma nitrate concentrations. Six wks of SHOT and SYN supplementation during RT does not alter CV health parameters in healthy, resistance-trained men.

This study was supported by a supplement donation from Vital Pharmaceuticals, Inc.

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NUTRITION AND PHYSICAL ACTIVITY ENVIRONMENTS IN RURAL AREA CHILD CARE CENTERS

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Recent studies suggest environmental influences at child care centers may impact nutritional habits and physical activity levels among children. **PURPOSE:** The purpose of this study was to evaluate the nutrition and physical activity practices in rural area child care centers. **METHODS:** Directors from 29 child care centers located in 3 counties were asked to complete the Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC). The self-assessment is divided into a nutrition (NUT) section (9 categories, 37 questions) and physical activity (PA) section (5 categories, 17 questions). Responses were scored on a 4-point Likert scale where 1=barely met, 2=met, 3=exceeded, and 4=far exceeded child care standards. Prevalence estimates were calculated for categories and questions within each section based on meeting/exceeding (i.e., ≥ 2) child care standards. **RESULTS:** Overall 83% and 66% of the centers reported having written policies for NUT and PA, respectively. However, less than 50% met the standards for beverages (48%), foods for holidays/celebrations (38%), supporting healthy eating (35%), nutrition education (41%), and PA education (48%). **CONCLUSIONS:** While the majority of rural area child care centers have policies in place, they did not meet recommendations in 4 categories in NUT and one in PA. Therefore, it is suggested that more work is needed to strengthen the current policies and practices to ensure a healthy start for the children they serve. In particular, the focus may be on education for children, staff, and parents concerning nutrition and physical activity.

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CARDIOMETABOLIC RISK FACTORS AND FITNESS IN RURAL, LOW SOCIO-ECONOMIC CHILDREN: A DESCRIPTIVE STUDY

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Although cardiovascular disease occurs later in life, the precursor of this disease originates during the childhood years. Thus, the purpose of this study was to examine cardiometabolic risk factors and fitness levels in rural, low socioeconomic children. Participants were 113 (68 females; 11.03 ± 1.39 years) elementary school children. Body mass index (BMI), fasting blood serum levels [cholesterol; blood glucose], resting blood pressure, and fitness were assessed. Findings indicate that more than half ($n = 61$) of the children had a normal resting blood pressure, 17% of the participants were pre-hypertensive while stage 1 and stage 2 hypertension was detected in 24.8% and 3.2% of the population, respectively. A majority of the children (57.5%) had a normal BMI, and 28.3% were classified as obese. Mean total cholesterol was considered acceptable for 97% of children ($M = 152.18 \pm 26.57$ mg/dL), while 3% were classified as borderline for dyslipidemia (170-199 mg/dL). Fifteen percent of the children's fasting blood glucose levels exceeded 100 mg/dL ($M = 108.5 \pm 8.62$ mg/dL). The multistage shuttle run for fitness indicated that 54% of children completed less than 15 laps, which demonstrates a minimal level of fitness for this age group. These descriptive findings provide initial evidence that cardiometabolic risk factors are present in children who reside in a rural, low socioeconomic area. Based on the results of this study, screenings for cardiometabolic diseases and appropriate intervention strategies are warranted.

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BREAKFAST IS RELATED TO A HIGHER TOTAL DAILY CALORIE INTAKE AND LOWER BMI IN NORMAL WEIGHT ADOLESCENTS. IT IS NOT KNOWN WHETHER THIS ASSOCIATION HOLDS TRUE FOR LATINO POPULATIONS OF NON MEXICAN DESCENT

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Purpose. The purpose of this study is to determine whether or not eating breakfast is associated with lower daily total calorie intake and BMI. **Method.** A total of 25 students from a predominantly Latino middle school (12 male, 13 female, age of 11), volunteered to participate in the study. Adolescents completed a 24 hour recall on everything they had eaten the day before. A computerized nutrient analysis system, Nutritionist 5, was used to analyze nutrients ingested. Height and weight was used to calculate Body Mass Index. Pearson product-moment correlation coefficient was used to examine the relationship between calories consumed during breakfast in relation to total calories consumed for the day, as well as Body Mass Index. $P \leq 0.05$ was accepted as a level of significance. **Results.** Findings showed a significant correlation between calories consumed for breakfast and for the entire day (Pearson $r = 0.641$; $p = 0.001$). There was also a significant correlation between calories consumed during breakfast and BMI (Pearson $r = 0.535$; $p = 0.006$). Analysis by gender also indicated a positive correlation between calories consumed during breakfast and total calories (Pearson $r = 0.756$; $p = 0.004$) and for BMI (Pearson $r = .577$; $p = 0.049$) for boys. For girls, although calories consumed during breakfast was positively correlated to total daily calorie intake, (Pearson $r = 0.583$; $p = 0.037$), BMI was not (Pearson $r = 0.431$; $p = N.S.$). Breakfast calories consumption was not related to BMI. **Conclusion.** In accordance with the literature in normal weight white adolescents, calories consumed during breakfast was positively related to total calories consumed in a sample of middle school Latino adolescents. In contrast to previous literature, our sample showed an additional positive relationship between calories consumed for breakfast and BMI which was driven by the positive relationship observed in boys. More research should be conducted on larger populations of middle school adolescents Latinos to determine if calories consumed during breakfast is positively related to BMI.

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EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION I: BODY COMPOSITION AND HEMODYNAMIC CHANGES (PRELIMINARY DATA)

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XanthigenTM [100 mg brown seaweed extract (0.8 % fucoxanthin) and 100 mg pomegranate seed oil (70 % punicic acid)] has been shown to significantly reduce body fat, liver fat, and blood pressure (BP) in obese females. Nineteen obese men and women (28.2±7.5 y; 37.57±6.85 kg/m²; 41.54±7.93 % body fat) were matched on gender, age, and body fat percentage and randomized to either a XanthigenTM (X; n=9) or olive oil placebo (P; n=10) group. Participants were instructed to ingest 200 mg capsules of their given supplement 3x per day for 16 wk while consuming a reduced calorie diet (equivalent to their resting energy expenditure) with exercise recommended. Preliminary data were analyzed with repeated measures ANOVA and presented as means ± SD changes from baseline. Body mass (X:-2.29±4.11 kg; P:-6.26±9.41 kg) and body mass index (X:-0.79±1.39 kg/m²; P:-2.18±3.31 kg/m²) were reduced over the 16 wk (p=0.031; p=0.032) with no group differences. Diastolic BP was reduced (X:-5±9 mmHg; P:-6±15 mmHg; p=0.013), while there was a trend for a reduction of systolic BP (p=0.088). There were trends for reductions of lean mass (p=0.056) and total body water (p=0.055). No significant within- or between-group effects were observed in body fat percentage. Preliminary data indicate that 16 weeks of XanthigenTM supplementation (600 mg/d) does not augment the effects of exercise and a reduced calorie diet on weight and BP in this obese population.

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EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION II: METABOLISM (PRELIMINARY DATA)

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XanthigenTM [100 mg brown seaweed extract (0.8 % fucoxanthin) and 100 mg pomegranate seed oil (70 % punicic acid)] has been shown to significantly reduce body fat and liver fat assumedly by increasing metabolism. Nineteen obese men and women (28.2±7.5 y; 37.57±6.85 kg/m²; 41.54±7.93 % body fat) were matched on gender, age, and body fat percentage and randomized to either a XanthigenTM (X; n=9) or olive oil (200 mg) placebo (P; n=10) group. Participants were instructed to ingest 200 mg capsules of their given supplement 3x/day for 16 wk while consuming a reduced calorie diet (equivalent to their resting energy expenditure) with exercise recommended. Preliminary data were analyzed with repeated measures ANOVA and presented as means ± SD changes from baseline. Significant reductions in resting energy expenditure (REE; X:-115±94 kcal-d⁻¹; P:-135±183 kcal-d⁻¹), absolute VO₂ (X:-0.015±0.012 L·min⁻¹; P:-0.019±0.023 L·min⁻¹), relative VO₂ (X:-0.10±0.13 ml·kg⁻¹·min⁻¹; P:-0.02±0.24 ml·kg⁻¹·min⁻¹), and VCO₂ (X:-0.019±0.017 L·min⁻¹; P:-0.021±0.036 L·min⁻¹) were observed over the 16 wk (p<0.001; p<0.001; p=0.047; p<0.001) with no between-group effects. No within- or between-group effects were observed with respiratory quotient. As expected, weight loss resulted in a reduced REE; however, preliminary data indicate that 16 weeks of Xanthigen supplementation (600 mg/d) did not prevent reductions in REE typically occurring with weight loss.

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EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION III: SERUM LIPIDS CHANGES (PRELIMINARY DATA)

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XanthigenTM [100 mg brown seaweed extract (0.8 % fucoxanthin) and 100 mg pomegranate seed oil (70 % punicic acid)] has been shown to significantly reduce body fat, liver fat, and serum lipids in obese females. Nineteen obese men and women (28.2±7.5 y; 37.57±6.85 kg/m²; 41.54±7.93 % body fat) were matched on gender, age, and body fat percentage and randomized to either a XanthigenTM (X; n=9) or olive oil (200 mg) placebo (P; n=10) group. Participants were instructed to ingest 200 mg capsules of their given supplement 3x per day for 16 wk while consuming a reduced calorie diet (equivalent to their resting energy expenditure) with exercise recommended. Preliminary data were analyzed with repeated measures ANOVA and presented as means ± SD changes from baseline. Serum high-density lipoprotein (HDL) was significantly increased (X:7±7 mg-dl⁻¹; P:6±6 mg-dl⁻¹; p<0.001), while serum triglycerides were significantly reduced (X:-30±45 mg-dl⁻¹; P:-15±28 mg-dl⁻¹; p=0.021) over the 16 wk with no between-group differences. No significant within- or between-group effects were observed in serum total cholesterol or low-density lipoprotein levels. Preliminary data indicate that 16 weeks of XanthigenTM supplementation (600 mg/d) does not augment the beneficial effects of exercise and a reduced calorie diet on serum cholesterol and triglyceride levels in this obese population.

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EFFECTS OF 16WK XANTHIGEN SUPPLEMENTATION IV: SERUM MARKERS OF LIVER AND KIDNEY FUNCTION (PRELIMINARY DATA)

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XanthigenTM [100 mg brown seaweed extract (0.8 % fucoxanthin) and 100 mg pomegranate seed oil (70 % punicic acid)] has been shown to significantly reduce body fat, liver fat, and improve serum markers of liver function in obese females. Nineteen obese men and women (28.2±7.5 y; 37.57±6.85 kg/m²; 41.54±7.93 % body fat) were matched on gender, age, and body fat percentage and randomized to either a XanthigenTM (X; n=9) or olive oil (200 mg) placebo (P; n=10) group. Participants were instructed to ingest 200 mg capsules of their supplement 3x/day for 16 wk while consuming a reduced calorie diet (equivalent to their resting energy expenditure) with exercise recommended. Preliminary data were analyzed with repeated measures ANOVA and presented as means ± SD changes from baseline. Significant reductions in serum levels of alkaline phosphatase (ALP; X:-5±8 U·L⁻¹; P:-11±15 U·L⁻¹; p=0.004), alanine aminotransferase (ALT; X:-7±14 U·L⁻¹; P:-1±6 U·L⁻¹; p=0.020), total protein (X:-0.3±0.3 g-dl⁻¹; P:-0.4±0.6 g-dl⁻¹; p<0.001), albumin (X:-0.2±0.2 g-dl⁻¹; P: X:-0.2±0.4 g-dl⁻¹; p=0.002) were observed over the 16 wk with no between-group effects. No within- or between-group effects were observed in serum aspartate aminotransferase, total bilirubin, creatinine, or blood urea nitrogen levels. Preliminary data indicate that 16 weeks of XanthigenTM supplementation (600 mg/d) did not affect these liver and kidney function markers in this obese population.

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DEHYDRATION AND ACUTE WEIGHT GAIN IN MIXED MARTIAL ARTS FIGHTERS PRIOR COMPETITION

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Purpose: The purpose of this investigation was to characterize the magnitude of dehydration and acute weight gain (AWG) in mixed martial arts (MMA) fighters prior competition. Methods: Urinary measures of hydration status and body mass were determined at ~ 24 h prior and then again ~2 h prior to competition in 40 MMA fighters (mean \pm SD, age: 25.2 ± 4.1 yr, height: 1.77 ± 0.07 m, body mass: 75.80 ± 9.17 kg). AWG was defined as the amount of body weight the fighters gained in the ~22 h period between the official weigh-in and the actual competition. Results: On average, the MMA fighters gained 3.40 ± 2.18 kg or 4.4% of their body weight in the ~22 h period prior to competition. Urine specific gravity (Usg) significantly decreased ($p < 0.001$) from 1.028 ± 0.007 to 1.020 ± 0.009 during the rehydration period. 40 % of the MMA fighters presented with a Usg of greater than 1.021 immediately prior to competition indicating significant or serious dehydration. Conclusions: MMA fighters undergo significant dehydration and fluctuations in body mass (4.4 % avg) in the 24 h period prior to competition. Urinary measures of hydration status indicate that a significant proportion (40%) of MMA fighters are not successfully rehydrating prior competition and subsequently competing in a dehydrated state.

COMPARING THE ENERGY COST OF TWO BODY SHAPER UNDERGARMENTS DURING WALKING

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We previously reported that wearing a body shaper undergarment with built in resistance bands increased the energy cost of walking by 3-5% compared to wearing usual undergarments. The present study compared the energy cost of wearing the resistance band body shaper undergarment (ShaToBu, Mayfair Tech Montreal Canada) to a commercially available shaper undergarment without resistance bands. Fifteen women completed testing (mean \pm SD; age= 41.3 ± 14.0 yr; BMI= 28.4 ± 3.4 kg/m²). Subjects completed two continuous 10-min treadmill walking tests separated by 15-min of seated rest. Treadmill percent grade was 5% over the first 5-min and increased to 10% over the last 5-min. The ShaToBu body shaper undergarment was worn during one of the walking tests and a commercially available shaper was worn during the other with order randomized. Indirect calorimetry assessed energy expenditure (EE) throughout the walk (Oxycon Mobile, Cardinal Health, Yorba Linda, CA). Wearing the undergarment with resistance bands resulted in a 4.6% higher EE at 5% grade, 5.9 ± 1.3 kcal vs. 5.6 ± 1.2 kcal ($p=0.01$). The body shaper with resistance bands increased the energy cost of walking uphill at 5% grade (typical of an activity of daily living) by 4.6%. This difference in EE is virtually identical to the differences reported previously with usual undergarments and suggests that the resistance bands, rather than the compressive nature of the garment, accounts for the increased EE.

EFFECTS OF THE WALKING WORKSTATION ON WORK PRODUCTIVITY AND SELECTED PHYSIOLOGICAL VARIABLES

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Purpose: To observe the effects of the walking workstation on work productivity (mouse clicking and typing test) and selected physiological variables (resting blood pressure and heart rate, body composition, and glycosylated hemoglobin (HgA1c)). Methods: Eight sedentary university workers (42.4 ± 13 yr, 73.9 ± 10.6 kg) completed an eight week intervention incorporating the walking workstation into their normal day. Subject access to the workstations was not restricted; there was no time requirement for use. All subjects completed and submitted weekly logs of time used and walking speed. Measurements were tested at the beginning and end of the eight weeks. Work productivity variables were also measured at four weeks. Results: No significant differences were found in the physiological variables. Decreases were found in average BP (SBP: 6.3 ± 4.17 mmHg, DBP: 3.0 ± 2.39 mmHg), weight (0.86 ± 0.71 kg), and percent body fat (0.05 ± 0.40). No significant ($p=0.70$) differences were found on the corrected typing percent based on body position (standing or walking) or time of test (pre, mid, post). An interaction between the mid and post testing from standing to walking was found. A significant difference ($p=0.023$) was found from pre to post mouse clicking speed. However, no significant difference was found between time of test and body position on mouse clicking speed. Conclusions: The walking workstation did not hinder work productivity. If workstation use was consistent and long term, the walking workstation has the potential to improve physiological variables.

DIFFERENCES IN ENERGY EXPENDITURE BETWEEN RESISTANCE SHOES AND RUNNING SHOES

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The purpose of this study was to examine the energy demand and perceived effort while using "resistance running" shoes. In a cross-over design, Nineteen female participants (19.4 ± 1.1 yrs, 62.1 ± 7.3 kg, 1.66 ± 0.06 m) completed two 10-minute treadmill runs. Participants were randomly assigned a pair of Skechers Resistance Runner Shoes (SRR) or their personal running shoe (RS). After a 3-minute warm up, each participant ran at a self-selected pace utilizing a 1% incline. During the 10-minute run, oxygen consumption (VO₂) and rate of perceived exertion (RPE, 6-20 scale) were measured. Differences between shoe types were assessed using a paired samples t-test. Results indicate no significant difference ($p > 0.05$) for VO₂ (RS: 36.2 ± 5.9 ml/kg/min; SSR: 36.6 ± 6.5 ml/kg/min), RPE (RS: 12.6 ± 1.7 ; SSR: 12.5 ± 2.1), or energy expenditure (RS: 11.1 ± 2.0 kcal/min; SSR: 11.2 ± 2.03 kcal/min). Despite marketing claims of up to 13.8% increase in energy expenditure the use of the SRR did not lead to any significant differences in caloric expenditure. The shoe is said to help create a more fluid stride which is counter intuitive relative to energy expenditure in that a more fluid stride would seem to result in increased efficiency and a decrease in energy expenditure for a given speed.

DETERMINING THE CALORIC EXPENDITURE OF FEMALE COLLEGIATE VOLLEYBALL PLAYERS

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The growth in female athletics in all ages and sports has increased. This has created a rising need for strength and conditioning coaches, coaches, athletic trainers, and dieticians to monitor caloric intake and expenditure of their players not just for sports performance, but also for general health. The purpose of this study was to determine the caloric expenditure of female collegiate volleyball players during an in-season practice session. All players' heart rates (HR) were observed during normal practices and then averaged by activity (ie: serving, passing, etc.). After players were observed during practices they then completed a maximal oxygen consumption test using the Bruce Treadmill Protocol. HR readings from the practice session were matched with HR readings from the exercise test, and liters per minute of oxygen and the Respiratory Exchange Ratio (RER) were determined for each HR level. RER was then converted to kilocalories expended and multiplied per liter of oxygen for each drill. That figure was then multiplied by time spent at that drill to get total calories for each drill. This was repeated for each drill and then totaled. Knowing that weight is a huge factor in caloric expenditure results are given in cal/kg/min. The average for the 8 subjects tested was .11414 cal/kg/min. The highest relative calories (RC) per minute expended recorded was .1424 cal/kg/min by a setter and the lowest was .07646 cal/kg/min by a libero. Overall setters expend the most RC and liberos expend the least amount of RC. Middle blockers and outside hitters fall in between. However, they usually weigh the most giving them the greatest absolute caloric expenditure. Based upon these findings setters should consume more calories per kilogram than either middle blockers, hitters, or liberos.

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REGULATION OF LIPOLYSIS BY BETA-ADRENERGIC ACTIVATION AND EXERCISE IN OBESE AFRICAN-AMERICAN AND CAUCASIAN WOMEN

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African-American women (AAW) are twice as likely to be obese as Caucasian women (CW); however, previous in-vitro studies have shown that AAW have higher densities of beta-adrenergic receptors (B-AR) in the subcutaneous (SC) adipose tissue and an increased lipolytic response to B-AR stimulation when compared to CW. There are no in-vivo studies to help resolve this apparent contradiction between in-vitro lipolytic response and the incidence of obesity. The purpose of this study is therefore to determine if AAW, as compared to CW, have a larger lipolytic response to pharmacological (isoproterenol) and physiological (exercise) stimulation. Methods: 23 obese women (10 AAW; 13 CW) participated in the microdialysis (MD) study. MD consisted of two probes placed in SC abdominal adipose tissue and perfused with either isoproterenol (ISO) or a control solution. Dialysate glycerol (index of lipolysis) was measured from probes at rest and, from the control probe, during exercise. Results: Dialysate glycerol increased 160 $\mu\text{mol/L}$ in AAW and 98 $\mu\text{mol/L}$ in CW in response to ISO ($p=0.064$ AAW vs CW). Dialysate glycerol increased 62.7 $\mu\text{mol/L}$ in AAW and 93.3 $\mu\text{mol/L}$ in CW in response to exercise ($p=0.304$ AAW vs CW). Conclusion: AAW have a higher lipolytic response to pharmacological B-AR stimulation, but have a similar lipolytic response to exercise, as compared to CW. These findings suggest that lipolytic response to B-AR stimulation and exercise are likely not contributing factors to the higher incidence of obesity in AAW as compared to CW.

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SKELETAL MUSCLE MITOCHONDRIAL RESPIRATION AND TYPE 2 DIABETES DURATION

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Type 2 diabetes (T2DM) resolution following Roux-en Y gastric bypass (RYGB) surgery is poorer in patients with longer duration T2DM and lower pre-RYGB insulin sensitivity. Skeletal muscle mitochondrial function is impaired in T2DM. It was hypothesized that skeletal muscle mitochondrial respiration (JO2) would be lowest in T2DM patients with long-duration (LD; ≥ 8 y) compared to medium-duration (MD; 4-7) and short-duration (SD; ≤ 3 y). Vastus lateralis biopsies were obtained from T2DM patients (N = 12). Muscle mitochondrial JO2 was measured using the permeabilized fiber technique under basal (State 2) and ADP stimulated (State 3) conditions with glutamate+malate (GM) or palmitoylcarnitine+malate (PM) as substrate. Respiratory control index (RCI), an index of mitochondrial coupling, was calculated as State 3/State 2 JO2. There was a non-significant ($p = 0.10$) trend of lower GM State 2 JO2 with longer T2DM duration (LD: 9.7 \pm 1.7; MD: 13.5 \pm 1.0; SD: 17.8 \pm 4.7 pmol/sec/mg dry wt.). GM RCI was greater in LD than MD or SD (LD: 21.3 \pm 1.8; MD: 12.6 \pm 2.4; SD: 13.8 \pm 1.3). There was a significant correlation between T2DM duration and GM RCI ($r = 0.59$; $p \leq 0.05$). There was no difference in JO2 or RCI for PM conditions between groups. In conclusion, skeletal muscle mitochondrial coupling is higher in longer compared to shorter duration T2DM patients. Also, there may be a trend toward lower basal skeletal muscle mitochondrial respiration in patients with longer compared to shorter duration T2DM.

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EFFECTS OF MULTIPLE DAILY BOUTS OF MODERATE AEROBIC EXERCISE ON GLUCOSE TOLERANCE AND INSULIN RESISTANCE IN PERSONS WITH TYPE 2 DIABETES MELLITUS

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Studies have shown that aerobic exercise training can improve glucose (GLU) tolerance and control in persons with type 2 diabetes mellitus (T2DM), though the threshold level of exercise necessary to improve clinical status may pose a formidable challenge to this population. Additionally, while T2DM is typically characterized by insulin resistance, even in those with profound T2DM demonstrate near normal capacity for muscle contraction-mediated GLU uptake. The purpose of this pilot study was to examine the effects of the accumulation of 40-50 minutes of moderate-intensity exercise across two sessions per day (thereby stimulating contraction-mediated GLU uptake twice each day), four days per week, on GLU control and tolerance in persons with T2DM. Four people (55.5 \pm 7.9 years) with T2DM underwent assessments of GLU tolerance, fasting lipids, and anthropometric and physiologic measures before and after a 12-week exercise program (20-25 min, two times per day, four days per week). Exercise training resulted in reduced weight (from 103.1 \pm 18.1 to 101.4 \pm 18.3 kg, $p=0.022$) and body mass index (34.0 \pm 7.9 to 33.5 \pm 8.0 kg \cdot m⁻², $p=0.018$). Heart rate during identical absolute treadmill workloads was reduced after training (111.0 \pm 24.1 to 105.8 \pm 23.2 beats per minute, $p=0.05$). Though mean values did not differ significantly, two subjects experienced a clinically relevant reduction in A1c (8.2 to 7.6%, and 7.7 to 6.9%). Mean fasting plasma GLU was reduced after training (13.7 \pm 4.4 to 10.1 \pm 3.2 mM \cdot L⁻¹, $p=0.083$). Training resulted in a tendency toward improved insulin sensitivity, with homeostasis model assessment for insulin resistance (HOMA-IR) decreasing from 5.59 \pm 1.6 to 3.4 \pm 1.1 ($p=0.10$) and insulin sensitivity index (ISI) increasing from 20.36 \pm 1.9 to 26.35 \pm 4.2 ($p=0.12$). In conclusion, 20-25 minutes of moderate treadmill exercise twice per day, four days per week for 12 weeks was effective at improving measures of GLU tolerance and control in a small sample of people with T2DM, and may be more effective at improving clinical status of persons with T2DM than the equivalent volume of exercise undertaken in a single session.

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FATTY ACID OXIDATION IS DEPRESSED FOLLOWING CHRONIC HYPERINSULINEMIA AND HYPERLIPIDEMIA IN HUMAN MYOTUBES FROM SEVERELY OBESE INDIVIDUALS

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Purpose: The purpose of this study was to determine the effects of chronic hyperinsulinemia and hyperlipidemia on fatty acid oxidation (FAO) in human skeletal muscle cell cultures (HskMC). Methods: Fatty acid oxidation was measured in lean insulin sensitive (BMI=23.0 ± 1.6kg/m², HOMA=1.25±0.3) and severely obese insulin resistant (BMI=41.4 ± 3.8kg/m², HOMA=5.77±1.1) pooled primary myotubes following a 4d incubation of either 1) insulin (5000pmol), 2) fat (250µM oleate:palmitate), or 3) insulin + fat. In all experimental conditions, FAO was measured by radiolabeled 14CO₂ production after a 3hr exposure to 250µM radiolabeled oleate. Results: FAO in myotubes from severely obese individuals was reduced in all conditions (insulin: obese 0.404 vs. lean 0.571 [nmol/mg/hr], p<0.001; fat: obese 0.995 vs. lean 1.428 [nmol/mg/hr], p<0.001; and insulin + fat: obese 0.385 vs. lean 0.837 [nmol/mg/hr], p<0.001). In addition FAO efficiency, as measured by the ratio of incomplete ([14C]ASM) to complete (14CO₂), also was depressed in the myotubes from the severely obese relative to the lean (p<0.05). Conclusion: Depressed FAO in myotubes from severely obese insulin resistant individuals, compared to lean insulin resistant individuals, persists in chronic hyperinsulinemic and hyperlipidemic conditions.

THE EFFECT OF QUERCETIN SUPPLEMENTATION ON VOLITIONAL FATIGUE AND SKELETAL MUSCLE MASS RETENTION DURING CANCER CACHEXIA

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Cancer cachexia (CC) has been defined as an unintentional 10% loss of body weight (BW) over a 12-month period that occurs in the presence of an underlying disease. Two common hallmarks of CC are decreased muscle mass and hypoandrogenism. The APCMin/+ mouse is an IL-6 dependent model of CC. The purpose of this study was to determine the effects of quercetin supplementation on volitional grip strength, muscle mass, and testes size during the progression of CC. At 15 weeks of age, male C57BL/6 and APCMin/+ mice were randomly assigned to vehicle (B6 and Min-V) or quercetin supplementation (Min-Q) for 3 weeks. Quercetin was administered via oral gavage daily at a dose of 25 mg/kg of BW. Grip strength was measured pre- and post-supplementation. Cachexia decreased grip strength 19.9% (B6: 2.42 ± 0.07 N vs Min: 2.01 ± 0.08 N; p < 0.001); however, quercetin maintained grip strength over 3 weeks (Min-V: 1.67 ± 0.08 N vs Min-Q: 2.09 ± 0.13 N). Bodyweight decreased 13.7% (p < 0.001) with cachexia; while quercetin attenuated BW loss (Min-Q: -7.9%). Cachexia decreased gastrocnemius (GAS) muscle mass 33.3% and rectus femoris (RF) muscle mass 37.9% (p < 0.05); whereas quercetin attenuated muscle mass loss. Cachexia reduced testes size 29.9% (p < 0.01) and quercetin attenuated the loss (Min-Q: 12.5%). Min GAS and RF muscle mass were correlated with testes size (R² = 0.68 and 0.62, p < 0.05, respectively). Quercetin supplementation for 3 weeks maintained volitional grip strength in mice undergoing cachexia, which may be due to the retention of muscle mass and testes size.

RELIABILITY AND VALIDITY OF TWO DIGITAL REFRACTOMETERS TO A CLINICAL REFRACTOMETER

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Urine specific gravity (Usg) has traditionally been measured using a hand-held clinical refractometer (CLIN). The CLIN can be subjective, has a greater potential for contamination by the specimen, and requires some training. Digital refractometers have recently been developed and promoted as user friendly, but these tools are costly and may require several attempts before displaying a reading. Our purpose was to examine the reliability and validity among 2 different digital refractometer models to a CLIN. A convenient sample of participants were recruited from the local university (n = 57). Participants were asked to provide urine samples as often as they wanted over 4 months. Each sample was analyzed immediately for Usg by a digital pocket refractometer (DIG) (PAL-10S, Atago Co., Ltd, Tokyo, Japan), a digital pen refractometer (PEN) (PEN-PRO, Atago Co., Ltd, Tokyo, Japan) and a CLIN (model 300CL, Atago Co., Ltd, Tokyo, Japan). Total urine samples = 225. Spearman rho correlations were calculated to determine relationships between the refractometers. Overall, there was a strong correlation for CLIN to PEN (r = 0.99, p < 0.001, n = 111 samples) and the CLIN to DIG (r = 0.97, p < 0.001, n = 174 samples). The sample was not large enough for an overall comparison of DIG to PEN. Data was then categorized into euhydrated (Usg < 1.020µG) or hypohydrated (Usg > 1.020µG). A strong correlation was present between the euhydrated group for CLIN to PEN (r = 0.98, p < 0.001, n = 67 samples) and CLIN to DIG (r = 0.95, p < 0.001, n = 73 samples). In the hypohydrated group there was a strong, but slightly lower, correlation for CLIN to PEN (r = 0.91, p < 0.001, n = 44 samples) and the CLIN to DIG (r = 0.93, p < 0.001, n = 101 samples). Overall, the 2 digital refractometers were reliable and valid compared to the CLIN. However, there was a decrease in the relationships in the hypohydrated group, suggesting that when individuals are more hypohydrated the digital refractometers may not be as accurate.

THE EFFECTS OF SURGE WORKOUT FUEL ON ANAEROBIC SPRINT PERFORMANCE

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INTRODUCTION: Power and performance athletes rely on their anaerobic energy systems to rephosphorylate ADP to ATP rapidly. The glycolytic system requires a continual supply of carbohydrates to be able to create ATP anaerobically. Accumulated lactate causes a decrease in the participant's muscle and blood pH, which disturbs the sarcomere on a cellular level. Both glycogen depletion and lactate accumulation negatively affect performance. PURPOSE: To test a supplement which contains 64 grams of carbohydrates on its claim that it has the ability to buffer the accumulation of hydrogen ions, as well as extends anaerobic threshold and performance. METHODS: One male kinesiology graduate student participated in this pilot study. The subject performed a familiarization period, a control trial (entire protocol and no supplementation) and a supplemental trial (protocol with supplementation). The subject's heart rate, RPE, and blood lactate were measured. The procedure included a 10 minute warm-up, 8 80 second sprints at 10.0 mph separated by an active recovery at 3.0 mph for 2 minutes and 40 seconds, and a 10 minute cool down at 3.0 mph. RESULTS: The participant had the following percent difference for his blood lactate after sprints 2, 4, 6, and 8 between the control and supplemental session: 12.5% increase, 25.8% increase, 63.7% increase, and 18.75% decrease. DISCUSSION: This is pilot data for a study currently in process. The study will account for the participant's sleep patterns, dietary factors, muscle soreness, and fatigue. CONCLUSION: Future studies should aim to determine the supplement's true effects on buffering lactate.

FEMALE RUNNERS UNDERESTIMATE SWEAT LOSSES DURING 1 H OUTDOOR RUN

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Runners infrequently incorporate the recommended practice of determining sweat losses using pre- vs. post-run changes in body weight. The purpose of this study was to determine how accurately female runners estimate their sweat losses. Twenty women (age 41 ± 9 y, % body fat 22.6 ± 4.3 , VO_{2max} 52.3 ± 7.2 ml/kg/min) who routinely ran outdoors (22 ± 11 mile/week) completed an ~ 1 h (58.9 ± 3.3 min) self-paced (9.55 ± 1.1 min/mile) run in the early morning or late evening in August (WBGT = 23.9 ± 1.9 °C). Participants ran on a rigorous 5-km loop, completing the number of laps or half laps leading to an exercise duration of 55-65 min. Water was available every 2.5 km. Before and after the run participants estimated their sweat loss volume using a stack of 8 oz paper cups (similar to those used in organized runs) and large water pitcher. Runners were allowed to see the weight of their filled cups and alter their estimations. Runners consumed 177 ± 161 mL during running. Pre (647 ± 253 mL) and post (552 ± 254 mL) run estimations did not differ ($P = 0.11$) and were strongly correlated ($r = .73$). Both estimations were significantly lower ($P < 0.001$) than actual sweat losses (1155 ± 257 mL, $1.9 \pm 0.3\%$ of body weight) with average pre-run and post-run accuracy underestimations of 42 ± 23 and $52 \pm 18\%$ respectively. Only $22 \pm 12\%$ of total loss was retained in clothing or remained on runners' skin. We hypothesize these underestimations were likely the result of runners not accounting for evaporated sweat. Despite being instructed to hydrate as if preparing for a race, 47% of runners had pre-run USG levels > 1.020 , which could possibly be attributed to an inaccurate perception of how much fluid was needed to replace losses between runs. Results clearly reflect lack of attention to hydration partially due to inadequate realization of true sweat losses.

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INFLUENCE OF ACUTE RPE ON SESSION RPE

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Session RPE (SRPE) may be used to monitor overtraining; however, mediating factors are not well-understood. SRPE may be linked with final acute RPE prior to exercise cessation. This study investigated the potential link between terminal acute RPE (TRPE) and SRPE using cycling trials of equated work volume. Subjects ($N=15$) 24.3 ± 5.1 y completed a maximal exertion cycle trial followed by two (counterbalanced) 40 min cycling trials at $\sim 75\%$ of individualized VO_{2max} . By manipulating warm-up and cool-down, trials resulted in a high-TRPE (HITRPE) and low-TRPE (LOTTRPE). Heart rate (HR) and RPE were recorded every 5 min during exercise, with SRPE recorded 20 min post-exercise. Mean RPE (MeanRPE) during exercise (min 10-40 HITRPE, min 5-35 for LOTTRPE) was calculated by averaging all RPE recorded during exercise at 75% VO_{2max} . Two-way (trial x time) repeated measures ANOVA and Bonferroni post-hoc tests were used to compare MeanRPE, SRPE, and TRPE with results considered significant at ($P < 0.05$). MeanRPE, mean HR, and mean power output (paired t-test) for exercise at 75% VO_{2max} did not differ between HITRPE and LOTTRPE. TRPE at min 40 was significantly lower for LOTTRPE (3.1 ± 2.6) vs. HITRPE (8.2 ± 1.7). No significant difference was found for SRPE (LOTTRPE: 7.6 ± 2.0 vs. HITRPE 7.4 ± 1.7). Findings indicate SRPE is not linked to TRPE when a cool-down is included. Greater congruence was observed between SRPE and MeanRPE. Further research is warranted using various modalities to extend the understanding of potential mediating factors of SRPE.

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THE EFFECTS OF PRE-EXERCISE CARBOHYDRATE SUPPLEMENTATION ON ACUTE RESISTANCE TRAINING PERFORMANCE IN RESISTANCE-TRAINED FEMALES

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It appears that "carb-loading" enhances endurance performance, but studies on carbohydrate supplementation prior to a resistance-training bout are limited. PURPOSE: To investigate the effects of pre-exercise carbohydrate supplementation on high-intensity ($>75\%$ 1RM) resistance exercise [RE] performance for resistance-trained females during an acute bout of exercise. METHODS: 13 resistance-trained females (21.9 ± 4.8 yrs; 163.8 ± 7.6 cm; 62.1 ± 6.7 kg) participated in 3 separate testing sessions; a Familiarization Trial (FT) and two Exercise Testing sessions all separated by seven days. The FT determined each participant's 1RM of the bench press and leg press. Following the FT, the participants were randomly assigned to either the carbohydrate or placebo treatment session using a double-blind, counterbalanced, cross-over design with each participant consuming 1.0g CHO/kg (CHO) or a non-caloric placebo beverage 60 minutes before exercise. The source of CHO was waxy maize CHO. The RE workout required each participant to perform 5 sets of bench press at 75% 1RM and 5 sets of leg press at 85% of 1RM. Total lifting volume was calculated for the bench press, leg press, and the entire body (bench press total lifting volume + leg press total lifting volume). Data were analyzed by a two-way repeated measures within subjects ANOVA ($P < .05$). RESULTS: No statistically significant differences existed between treatments in the three variables analyzed. Total volume of weight lifted during 5 sets of the bench press was $1,451.5 (\pm 413.7)$ kgs and $1,429.7 (\pm 386.5)$ kgs ($p = 0.655$), total volume of weight lifted during 5 sets of the leg press was $19,959.5 (\pm 13,476.7)$ kgs and $17,102.7 (\pm 8,927.2)$ kgs ($p = 0.136$), and total lifting volume was $21,411.4 (\pm 13,788.7)$ kgs and $18,532.4 (\pm 9268.7)$ kgs for the CHO and placebo treatments, respectively ($p = 0.138$). CONCLUSIONS: Pre-exercise CHO supplementation (in the form of waxy maize CHO) does not improve high-intensity RE performance in resistance-trained women.

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EFFECTS OF PRE- AND POST-EXERCISE INTAKE OF PERFORMANCE SUPPLEMENTS ON BODY COMPOSITION, CIRCUMFERENCES, AND MUSCLE STRENGTH IN TRAINED MEN DURING 6 WEEKS OF RESISTANCE TRAINING

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Resistance training (RT) enhances muscle protein synthesis and increases muscle strength and hypertrophy. Performance supplements have been shown to augment the physiological improvements associated with RT. The purpose of this study was to investigate the impact of pre- and post-workout performance supplements on body composition, muscle strength, and power. Twenty-four (24.6 ± 4.9 yrs; 180.4 ± 5.5 cm; 80.7 ± 8.8 kg), resistance trained men completed 6 wks of periodized RT (3x/wk). They were assigned to one of two groups based upon maximal voluntary contraction of the quadriceps (Biodex) to lean mass (LM) ratio. Group 1 ($n=13$; Performance Supplement; PS) consumed NO-Shotgun® before each workout and NO-Synthesize® (Vital Pharmaceuticals, Inc., Davie, FL) immediately after each workout as well as on non-RT days, while Group 2 ($n= 11$; Placebo; PLA) consumed a flavor-matched isocaloric placebo. Body composition (DXA) and circumferences, 1-repetition maximal strength (1RM) of the upper (chest press; CP) and lower body (leg press; LP), and anaerobic power (Wingate test) were assessed. A 2×2 (group x time) ANOVA with repeated measures was used. Tukey LSD post hoc tests were used to examine pairwise difference. Significance was set at ($p < 0.05$). The PS group increased LM by 4.7% with no change for PLA. LP 1RM increased in the PS group with training by 19.56% and the PLA group increased by 25.94%. BP 1RM increased in the PS group by 8.4% and the PLA group increased by 6.9%. There were no significant differences between groups for 1RM in either BP or LP. Circumferences increased for the arm in both groups (PS 2.2%, PLA 2.6%), but only the PS group increased thigh measures by 2.5%. The PS group significantly increased relative anaerobic power by 938%, while PLA remained unchanged. Pre- and post-exercise consumption of NO-Shotgun® and NO-Synthesize® during 6 wk-periodized RT facilitated RT-induced improvements in LM and anaerobic power in trained males. These supplements do not appear to alter 1RM muscle strength or reduce body fat mass. This project was supported by supplement donation from Vital Pharmaceuticals, Inc

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EFFECTS OF SODIUM BICARBONATE SUPPLEMENTATION WITH ACUTE CAFFEINE INGESTION ON VENTILATORY COMPENSATION AND EXERCISE EFFICIENCY

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Sodium bicarbonate (SB) has been reported to increase extracellular pH and base excess after supplementation. This can delay the onset of fatigue and maintain a more favorable pH for ongoing glycolytic metabolism. Enhanced performance in endurance activity is associated with caffeine (CAFF) as mediated through the CNS and periphery. There is limited information about the combined use of these two ergogenic aids. In this study the effects of concomitant use of these supplements was measured on V O₂max, the ventilatory compensation point, exercise efficiency and V CO₂. Male volunteers (n=5, 28.2 ± 10.03 yrs, 64.84 ± 6.54 ml/kg/min), in a double-blind, placebo (PL) controlled, crossover protocol, were randomly assigned three treatments (SB+CAFF, SB, PL). The exercises consisted of cycle ramp testing to V O₂max as well as separate bouts to volitional exhaustion at 110% of ventilatory threshold. Data was analyzed using a one-way ANOVA for repeated measures (p<0.05) and reported as mean ± SD. There were no statistically significant results among the measured variables. V O₂max (ml/kg/min) were PL (61.8 ± 8.1), SB (58.72 ± 6.75) and SB+ CAFF (60.08 ± 6.31). Total V E (L/min) were, PL (1768.26 ± 429.75), SB (1667.11 ± 417.68) and SB+CAFF (1899.74 ± 507.38). V CO₂ (L/min) values were similar among groups, PL (172.85 ± 37.21), SB (167.34 ± 35.17) and SB+CAFF (167.92 ± 24.03). Finally, exercise efficiency showed no significant differences across trials. With a limited sample size these data show no statistical significance for the concomitant use of sodium bicarbonate and caffeine to alter V O₂max, to shift the ventilatory compensation during intense cycle exercise, or to increase exercise time to volitional exhaustion. Alternative exercise paradigms as well as a larger sample may be necessary to provide a more definitive description for the use of these supplements.

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EFFECTS OF ACUTE HYPOXIA ON EXERCISE-INDUCED BLOOD OXIDATIVE STRESS.

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Hypoxia has been characterized by a decrement in exercise performance or decreased maximal workload. Exercise and acute exposure to altitude have been shown to elicit cellular hypoxia independently and combined. Similarly, these stimuli also elicit perturbations in redox balance. Therefore, the purpose of this study was to examine the effect of hypoxia, induced by simulated elevation, on exercise induced blood oxidative stress at variable relative exercise intensities. Physically active males (n=12) were used to complete the study. VO₂peak and Wmax was measured during a graded exercise test on an electronically braked cycle ergometer starting at 95 W, increasing 35 W every 3 min until volitional fatigue or cadence < 50 rpm. VO₂peak and Wmax were measured at low altitude (975 m, "lowALT") and high altitude (3000 m, "highALT") simulated in a hypobaric chamber. Wmax at both simulated altitudes was used to program workloads for subsequent trials. In a randomized counterbalanced cross-over design, subjects completed three 60 min exercise bouts at combinations of lowALT or highALT at workloads corresponding to 60% VO₂peak measured at 975 m or 3000 m (lowINT and highINT). The three conditions were paired as such: lowALT:highINT, lowALT:lowINT, and highALT:lowINT. Subjects remained in the ambient altitude for 4 hr recovery period. Blood was drawn from the antecubital vein pre-exercise, immediately post, 2 and 4 hours post and analyzed for biochemical markers of oxidative stress. Samples were assayed for Ferric Reducing Ability of Plasma (FRAP), Trolox Equivalent Antioxidant Capacity (TEAC), Lipid Hydroperoxides (LOOH) and Protein Carbonyls (PCs). Results were adjusted for plasma volume shift and were analyzed with a repeated measures ANOVA with significance set at p < 0.05. LOOH were elevated in the highALT:lowINT group immediately post and 2HR post exercise. highALT:lowINT was significantly elevated from lowALT:highINT at 2HR post. Main effects were seen in FRAP (for TRIAL, lowALT:highINT vs. lowALT:lowINT), PC's (for TIME), LOOH (for TRIAL & TIME) and TEAC (for TIME). These results suggest that acute hypoxia induced by simulated elevation increases the oxidative stress during exercise.

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THERMOREGULATORY ADAPTATIONS FOLLOWING SPRINT INTERVAL TRAINING

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Traditional endurance training (TET) typically involves weeks of long duration (60-90 min) exercise performed at a moderate to vigorous intensity. Recently, attention has focused on sprint interval training (SIT), a paradigm characterized by multiple bouts of short-duration, high-intensity exercise. Similar fitness benefits from TET and SIT have been demonstrated, but whether SIT, like TET, promotes heat acclimation, remains unclear. The purpose of this study was to test the hypothesis that SIT performed over 6 sessions results in measureable thermoregulatory and cardiovascular adaptations consistent with heat acclimation. Seven active men [mean ± SD, 12.9 ± 4.6% body fat, 22 ± 3 yrs, 3.1 ± 0.3 L/min peak oxygen uptake (VO₂peak)] performed 6 SIT sessions over 12 days with 48-72 h between sessions. Each session consisted of 4-6 30-s Wingate Anaerobic Tests separated by ~4 min. Four individuals performed SIT in ~40 °C while 3 performed SIT in ~25 °C. Before and after the 2-week SIT protocol, participants cycled for 30 min at 65% VO₂peak in 25 °C to assess the effects of SIT on heat acclimation. Group outcomes were not different, so data were combined for simplification. There were no differences from pre- to post-training for any of the main outcome variables tested (onset of sweating, sweat sensitivity, heart rate at end of exercise, and rectal temperature change from pre- to post-exercise; all P > 0.05). These results indicate that 2 weeks of SIT performed under the conditions specified does not result in heat acclimation.

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CHANNELED FABRIC CLOTHING EFFECTS ON THERMOREGULATION, HEART RATE, AND THERMAL COMFORT

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Clothing can be a barrier to heat transfer and can hinder sweat evaporation from the skin; thus, the purpose of the present study was to evaluate the effects of a channeled synthetic t-shirt (CHS) and a regular synthetic cycling t-shirt (RSC) on thermoregulation, heart rate, sweat loss, thermal comfort sensation, and rating of perceived exertion during a 30-km cycling trial in a hot (35.1 ± 0.2 °C, relative humidity 40 ± 1.6%) environment with 2.8 m/s air flow. In a counterbalanced repeated-measures design, eight participants attempted two 30-km cycling trials, separated by 72 hours, wearing two different shirts. All clothing worn during the trials was the same except for shirt type. Only 5 participants were able to complete the 30-km trial under our rectal temperature limit (39.3 °C). In one trial, participants wore RSC, in another trial, participants wore CHS that had inner and outer channels incorporated into the fabric. Results indicated that change in rectal temperature (ΔTre) was lower (p = 0.04, n = 8) for CHS compared to RSC from the baseline to 15th km. Wearing CHS resulted in significantly lower change in chest skin temperature from baseline to 30th km (p = 0.01, n = 5), decreased change in micro-environment temperature inside the front of the shirt from baseline to 15th km (p < 0.01, n = 8), and better change in thermal comfort from baseline to 30th km (p = 0.03, n = 5) compared to RSC. There was no significant (p > 0.05) change in heart rate, forearm and quadriceps skin temperatures, RPE, and sweat loss. In conclusion, wearing CHS provided better thermoregulatory and thermal comfort response compared to RSC, however heart rate response was not affected.

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EFFECT OF A CHanneled FABRIC GARMENT UNDER A BALLISTIC VEST ON PHYSIOLOGICAL AND COMFORT RESPONSES DURING EXERCISE

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Ballistic vests (BV) provide upper-body protection, however, BV are constructed with soft padding that acts as an insulator, increasing heat storage and mitigating convection and moisture resistance which reduce evaporation. The current study examined the effects of wearing a synthetic t-shirt (SYN) and a channeled synthetic t-shirt (CHS) under a BV on thermoregulatory, heart rate, and comfort responses. Participants completed two simulated "industrial" protocols that included moderate paced walking and bicep curls for three hours in a hot environment (35.2 ± 0.3 °C with relative humidity of 40.7 ± 1.4 %). Trials were separated by one week, and SYN and CHS were worn in a counter-balanced order. Participants wore full-length poly-cotton pants, running shoes, and a long-sleeved button-up poly-cotton shirt was worn over the BV. Change in rectal temperature was significantly ($p = 0.04$) lower from baseline (0 min) to 180 min with CHS compared to SYN. Similarly, overall change in heart rate approached being significantly lower ($p = 0.07$) with CHS compared to SYN. Although there was no significant difference ($p = 0.49$) in sweat loss between the two t-shirts, change in subjective measure of sweating sensation was more favorable ($p = 0.056$) with CHS compare to SYN during the trial. Additionally, overall changes in clothing comfort ($p = 0.07$) and thermal comfort ($p = 0.05$) were more favorable during the exercise when wearing CHS compared to SYN. In conclusion, CHS resulted in modest decreases in core temperature and heart rate compared to a synthetic garment, but facilitated overall improved thermal comfort and sweating sensation.

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IMPACT OF VARYING LEVELS OF SIMULATED ALTITUDE ON REACTION TIME

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The purpose of this study was to compare the visual and auditory reaction times while exposed to varying levels of simulated altitude. Twenty-one subjects performed 10 visual and auditory reaction time trials at various levels of simulated altitude [base (20.9% O₂); 1500 m (17.2% O₂); 3000 m (14.2% O₂); 4500 m (11.8% O₂); and 6000 m (9.8% O₂)] in a seated position. The SpO₂ (%) levels were significantly different ($p < 0.05$) when comparing the pre-simulation vs. the simulation SpO₂ levels at the following simulated altitudes: 1500m (98 vs. 96%), 3000m (98 vs. 93%), 4500m (98 vs. 87%), and 6000m (98 vs. 81%). The subjects' HR (bpm) were significantly different ($p < 0.05$) when comparing the pre-simulation vs. the simulation HR at the following simulated altitudes: 3000m (70 vs. 78 bpm), 4500m (73 vs. 85 bpm), and 6000m (73 vs. 91 bpm). No significant differences in visual or auditory reaction times were noted between any of the levels of simulated altitude. While the visual and auditory reaction time results did not demonstrate any significant differences, it should be noted that the subjects completed the reaction time trials while in a seated position, which limited the amount of physical exertion and stress on the body.

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PASSIVE COOLING EFFECTS ON MICROENVIRONMENTAL AND THERMOREGULATORY RESPONSES IN SOFT BODY ARMOR IN HOT ENVIRONMENTS

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The purpose of this study was to investigate the effects of adding 1.27 cm standoffs to a Class II Soft Body Armor (SBA) on heat strain and perceived comfort compared to traditionally worn SBA. A counterbalanced, repeated measures protocol was performed with seven volunteers (20 ± 2 yr). Prior to each trial, participants were outfitted with a SBA in a traditional vest carrier or one fitted with 1.27 cm standoffs which moved the SBA off the body. Each participant performed cycles of 12 minutes of walking (1.25 L/min) and three min of arm curls (14.3 kg, 0.6 L/min) with a five min rest after every other cycle for a total of 120 min in a hot, humid environment (32°C, 80% RH). During each trial the following variables were recorded every six min: core temperature (Trec); SBA microclimate (temperature and humidity [iButtons]); skin temp (forearm, chest); heart rate; thermal comfort; and perceived exertion. Sweat rate was calculated at the end of each trial. Paired t-tests were used to evaluate: Trec (main determinant); microclimate; heart rate; sweat rate; perceived exertion; and comfort. No significant differences were noted between the standoff condition and the control in any of the variables tested. The microclimate under the SBA was warmer than the macroclimate during the majority of the tests. The results indicate that in a controlled environment, the addition of standoffs on Class II SBA did not improve the body's ability to dissipate heat relative to traditional SBA.

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DOES PHYSICAL ACTIVITY EXPLAIN RACIAL/ETHNIC DIFFERENCES IN CARDIORESPIRATORY FITNESS IN 18-49 YEAR OLDS?

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Cardiorespiratory fitness (CRF), an outcome of regular physical activity (PA), decreases the risk of heart disease in adults. Expressed as maximal oxygen uptake (VO₂max), previous research has shown differences in (CRF) levels among racial groups. However, it is unclear how much of these differences in fitness can be explained by physical activity; Thus, we sought to answer this question. A total of 3115 adults (18-49 years) completed a submaximal graded treadmill exercise test from NHANES (1999-2004) to estimate VO₂max, the dependent measure. Independent variables included demographics (race, education, gender, partner, and waist circumference), behavioral measures (smoking and alcohol consumption), self-reported PA (MET-min/week), and the proportion of PA of a vigorous intensity (VMET) from three different domains: leisure-time, domestic, and transportation PA. Multiple linear regression was performed using SUDDAN statistical software. Results indicated that VO₂ max was significantly higher among Mexican Americans (40.9 ± 0.5 ml/ kg/ min), and Non-Hispanic Whites (40.2 ± 0.3 ml/ kg/ min) than Non-Hispanic Blacks (37.9 ± 0.6 ml/ kg/ min) ($P = 0.01$). Demographics including race explained 18.5% of the variance in VO₂max, with race being significant ($P < 0.01$) in the model. When PA was added, the variance in VO₂max explained by the model increased by 2.2% ($P = 0.004$). The combination of PA and demographics explained 19.3% of the variance in VO₂max. VMET was more predictive of VO₂max than overall PA, and the model including VMET explained 20.49% of the variance in VO₂max. Race remained a significant, independent predictor of VO₂max. These results suggest that PA partially mediates race/ethnic differences in CRF, but does not eliminate the difference, and vigorous PA may be more important for CRF than the total volume of PA.

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VALIDITY AND RELIABILITY OF A MODIFIED UPPER-BODY MUSCULAR ENDURANCE TEST

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Currently there are multiple upper body endurance tests using different time lengths and norms. Pushups are the standard exercise used to measure arm and shoulder girdle endurance in field tests. Two different protocols were compared in attempt to validate a new upper body muscular endurance test. An intermittent protocol (IP, or modified intermittent protocol) was compared to the military standard two-minute push up test (MP) to determine correlation. Three sessions were performed with two sessions devoted to IP to determine reliability. Heart rate and ratings of perceived exertion (RPE) were recorded at the end of each 20 s stage of the IP. Heart rate and RPE were recorded every 20 s during the MP. Paired t-tests and Pearson correlations were run on total repetitions for both IP trials. The IP trials were found to be highly correlated ($R = .932$, $p = .007$) and not statistically different from each other ($p = .767$). IP scores were averaged and then ranked along with the MP scores. Scores from both the IP results and MP results were converted to z-scores for comparison by correlation. A moderately high, to high, correlation was noted between IP and MP after 3 sets ($r = 0.83$) and 4 sets ($r = 0.72$). These data show evidence of reliability for IP as a sufficient muscular endurance test as well as a potentially more practical and time efficient substitute for the MP utilizing the same exercise and accomplishing testing focused on specificity.

ASSESSMENT OF CAROTID VERSUS RADIAL HEART RATE PALPATION ACCURACY FOLLOWING A SUBMAXIMAL THREE MINUTE STEP TEST

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Previous studies have evaluated the accuracy of subjects palpating their carotid heart rate (HR) post-submaximal exercise. But, very few studies have assessed the accuracy of palpating HR at different artery sites. Post-exercise recovery (PER) HR has a critical and symbiotic relationship with step tests and accurate palpation of PER HR is extremely important. Therefore, the current study's purpose was to evaluate subjects' ability to accurately palpate their step test PER HR at the carotid and radial sites. Above average fit male subjects ($n = 26$) were connected to an Electrocardiogram (EKG) and completed two 3-min step tests at a cadence of 24 steps/min, separated by 48-72 hours, in a counterbalanced order. Upon completion of stepping activity, subjects palpated their HR at the carotid and/or radial sites within 5 secs and then counted their PER HR for the next 15 secs. The PER EKG HR (CARekg and RADekg) was compared with their respective PER palpated carotid (CARpal) and radial (RADpal) HR using MANOVA statistical methods with significant differences considered at $p < 0.05$. Differences between CARekg vs CARpal and RADekg vs RADpal were significant. Despite the results suggesting that subjects palpated their CARpal (2.4 bts off) more accurately than RADpal (4.0 bts off), subjects were not 100% accurate at palpating their PER HR when compared to the PER HR EKG recording. Future research may be required to determine whether longer familiarization trials of pre-exercise HR palpation are needed to ensure greater accuracy in palpating post exercise recovery HR.

ACTIVE VS. PASSIVE RECOVERY FOLLOWING AN AEROBIC EXERCISE BOUT: A PILOT STUDY

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Recovery is extremely important in injury prevention, nutrient re-uptake, and return to normal physiologic levels. The purpose of this study was to test whether passive or active recovery is more effective at returning participant's heart rate and blood pressure to resting. Participants included Louisiana Tech University graduate students. The study was designed to last two (2) days, equaling two (2) sessions per participant. Upon arrival each session, each participant, with the aid of a practitioner, adjusted the Monark 828E Cycling Ergometer to fit their individual height. After the proper adjustments were made to the cycle ergometer, each participant was fitted with a Polar E600 Heart Rate monitor. Subjects were placed in a supine position for five minutes to establish a resting heart rate and blood pressure prior to activity. During the first session, each participant utilized an active method of recovery; in the second session, each participant utilized a passive mode of recovery. Heart rate was with passive recovery (+26.03%), while blood pressure was lower using active recovery (+8.13/+2.70%). The results were statistically significant for both variables ($p < .05$). Through this limited pilot study, there were significant differences between protocols. When considering active versus passive recovery as modes of cooling-down post-aerobic activity, the study proved that both methods have benefits in recovery.

VALIDATION OF THE ZEPHYR BIOHARNESS USING THE COSMED CPET METABOLIC CART

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The Zephyr Bioharness is a device that can be used in the field to measure real-time heart rate, respiratory rate, body temperature, body position, and acceleration. The purpose of this study was to validate heart rate (HR) and respiratory rates (RR) obtained with the Bioharness to values obtained while respiratory gases and heartrate (ECG) were measured using the Cosmed system. Group 1 performed a VO2 max test on a Woodway treadmill using a traditional Bruce protocol. Group 2 performed a VO2 economy test on a Monark cycle ergometer. Group 3 performed a pre-designed VO2 max test protocol. All test were performed while wearing the device and with ventilatory gases being measured. A 12-lead ECG was attached to the subjects during the tests. No statistical difference was noted using the black model Bioharness from for HR or RR. In the gray model Bioharness, there was a statistically significant difference found in HR and RR for the VO2 max tests and in the economy test, when comparing values found with the Cosmed system and the Bioharness. Although the Zephyr Bioharness provides important physiological data in a cost effective manner in any environment, the data obtained from the device is difficult to interpret for the average person. The statistically significant differences found in the gray model device may indicate that further work towards perfecting the device is needed. The black model devices were similar to values found with the Cosmed. This indicates that the Zephyr would be a great replacement for traditional facemask laboratory VO2 max testing. Further research is needed to determine the validity of the Bioharness device.

THE EFFECT OF STRETCHING ON SQUAT VELOCITY OF NCAA D1 VOLLEYBALL PLAYERS

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P133

The purpose of this study was to determine the effects of stretching on squat velocity of NCAA D1 volleyball players. The eight subjects were 19.5 ± 0.5 yrs, height 1.789 ± 0.079 m, weight 70.45 ± 10.90 kg. After completing a 5-minute warm up on a treadmill, the subjects either went directly to the squat or performed a stretching routine that consisted of both dynamic and static stretching. After warm-up sets the subjects performed a 3 rep set at 70% 1-RM. The velocity of the bar was measured using a Tendo Weightlifting Analyzer. The mean average velocity of the stretching group was 0.62 ± 0.09 m/s, while the mean velocity of the non-stretching group was 0.62 ± 0.09 m/s, $p=0.886$. The mean peak velocity of the stretching group was 1.28 ± 0.11 m/s, while the mean peak velocity of the non-stretching group was 1.23 ± 0.10 m/s, $p=0.026$. The combined static/dynamic stretching routine did not have any impact on the average velocity during the concentric phase of the squat. The stretching did have a positive impact on the peak velocity during the concentric phase of the squat.

BODY COMPOSITION HAS A NEGATIVE EFFECT ON AEROBIC AND ANAEROBIC POWER TESTS IN MIDDLE SCHOOL STUDENTS

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Middle school students (N=154 boys, N=94 girls) from four school districts in the greater Charlotte, NC, area were tested for a battery of physical fitness tests including muscular strength (lower back and leg dynamometer), anaerobic peak and sustained power (Wingate 30-second test), treadmill VO₂max, and percent body fat. The 30-second Wingate test was conducted on a Lode Excalibur Sport cycle ergometer using the Lode Wingate software system (Lode BV, Groningen, The Netherlands). The treadmill VO₂max test was administered using the Bruce protocol with continuous metabolic measurement through a facemask and the Cosmed Fitmate metabolic system (Cosmed, Rome, Italy). Body composition was assessed using the BOD POD Gold Standard Body Composition Tracking System (Life Measurement Inc., Concord, CA). Subjects ranged in age from 12 to 15 years (mean±SD, 13.1±0.5 years). Body mass index (BMI) averaged 22.7 ± 5.4 and 22.6 ± 5.3 kg/m² in boys and girls, respectively ($P=0.864$), with 47% of boys and 39% of girls classified as overweight/obese using CDC BMI-for-age growth charts. Percent body fat averaged 20.3 ± 10.4 and $24.8 \pm 8.8\%$ in boys and girls, respectively ($P=0.001$), and was negatively associated with muscular strength (kg/kg body mass) in both male and female students ($r=-0.48$ and -0.39 , $P<0.001$, respectively), anaerobic sustained power (Watts/kg body mass) ($r=-0.77$ and -0.66 , $P<0.001$, respectively), and VO₂max ($r=-0.69$ and -0.61 , $P<0.001$, respectively). In summary, a high proportion of middle school-aged boys and girls were classified as overweight/obese, and percent body fat was inversely related to strength, anaerobic power, and aerobic power tests.

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ACTIVE GAMING COMPARISONS WITH TRADITIONAL EXERCISE IN HIGH AND LOW INTENSITY EXERCISERS

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Active gaming research studies suggest that active gaming is beneficial as an exercise tool, producing similar cardiovascular responses as aerobic fitness activities. Most research efforts have focused on low active adolescent or youth populations. The objective of this study was to determine the cardiovascular and affective effects of Wii games compared to traditional cardiovascular activities (treadmill walking and biking) in different types of exercisers. Specifically, cardiovascular intensity (Percent of maximum HR (PHRmax)), rate of perceived exertion (RPE) scores, and level of enjoyment were compared between active young adults who report exercising frequently at a high intensity (HI) (N=13) and those reporting exercising at a low intensity (LI) (N=13). Participants completed six 20-minute exercise sessions, including walking on a treadmill, riding a stationary bike, Wii Tennis, Boxing, Cycling, and Step. Results indicated that bike and treadmill lead to greater PHRmax in both groups compared to the HI group on all Wii games and the LI group on Wii tennis, step, and cycling ($p's<.05$). Wii boxing produced greater PHRmax compared to Wii tennis in the LI group and all Wii games in the HI group ($p's<.05$). Correlations indicated that LI exercisers relative to HI exercisers had a greater PHRmax ($r=.544$) and greater enjoyment ($r=.451$) when playing Wii games. Results suggest Wii boxing can produce a similar cardiovascular response compared to traditional forms of exercise in LI exercisers.

VALIDITY OF HEART RATE MEASUREMENT USING AN EARBUD SENSOR: A PILOT STUDY

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Exercise professionals often use heart rate (HR) training to prescribe exercise intensities. Heart rate monitors utilizing a chest strap are widely used. Chest strap units are highly accurate but somewhat invasive. Earbud technology using light sensing algorithms would eliminate the need for the chest strap. The purpose of the current examination was to examine the validity of an earbud sensor for measurement of heart rate. Ten fit adults (6 M, 4 F, 34 ± 3.5 years, 68.0 ± 10.1 kg) ran for 45-min on a track ($n=7$) or treadmill ($n=3$) at self-selected paces while wearing a chest strap and earbud heart rate sensor. Heart rate data was collected at a recording interval of every 5-seconds. Results indicated high correlation between the chest strap and earbud sensor ($r = 0.96$, $r^2 = 0.91$, $SEE = 4.5$). This preliminary data indicates that earbud sensors provide an accurate and valid measure of heart rate.

RESVERATROL IMPROVES MUSCLE FUNCTION, INCREASES UTROPHIN EXPRESSION, AND DECREASES INFLAMMATION IN THE MDX MOUSE

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D1

Duchenne Muscular Dystrophy (DMD) is fatal X-linked genetic muscle disease characterized by reduced muscle function, increased oxidative stress, and inflammation for which there is no good treatment. Resveratrol is a compound found in various foods that has anti-inflammatory and antioxidant effects. Purpose: Examine the effect of resveratrol in the mdx mouse model of DMD on muscle function and pathology. Methods: Mice were given resveratrol (100 mg/kg) via oral gavage everyday for 10 days or every other day for 8 weeks. Rotarod performance and in-situ muscle function were examined before and after 8 weeks of treatment. Inflammation was quantified from H&E stained gastrocnemius muscle samples after 10 days of treatment. PGC-1 α and utrophin mRNA expression, and total utrophin protein were analyzed by qRT-PCR and western blot respectively after 10 days of treatment. Results: Resveratrol treatment increased Rotarod performance $53 \pm 15\%$ ($p < 0.05$). In-situ peak tension of the triceps surae muscle complex increased $9.5 \pm 2\%$ with resveratrol treatment ($p < 0.05$). Time to fatigue during a tetanic contraction of the triceps surae muscle complex increased $44 \pm 18\%$ with resveratrol treatment ($p < 0.05$). Overall inflammation was reduced $20.7 \pm 6\%$ after 10 days of resveratrol treatment ($p < 0.05$). PGC-1 α and utrophin mRNA expression increased 1.4 ± 0.2 fold and 1.7 ± 0.2 fold respectively after 10 days of resveratrol treatment ($p < 0.05$). We conclude that resveratrol improves muscle function and decreases muscle pathology in the mdx mouse. The improvement is likely due to increases in oxidative capacity, improved membrane integrity (utrophin), and decreased inflammation.

ESTRADIOL AND REGIONAL LIPOLYSIS IN PREMENOPAUSAL WOMEN

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D2

Estradiol (E2) influences local fat metabolism as well as regional distribution of adipose tissue. However, the effect local subcutaneous adipose tissue E2 concentrations have on in-vivo lipolysis in humans is uncertain. The purpose of this study was to determine the effect of increased local E2 on resting and stimulated lipolysis in Caucasian and African American premenopausal women (CW, AAW). We measured in-vivo lipolysis (indicated by dialysate glycerol) via microdialysis of subcutaneous abdominal (AB) and gluteal (GL) adipose tissue in 10 overweight/ obese women: 5 CW (age: 31.2 ± 10 , BMI: 29.6 ± 2.2) and 5 AAW (age: 27.2 ± 8.3 , BMI: 29.7 ± 2.3). Dialysate was collected from each probe at baseline and after 60min local perfusion of Isoproterenol (Iso) or Iso+E2. Iso increased dialysate glycerol in all probes ($p < 0.01$) but the stimulatory response was significantly lower in GL vs AB ($102 \pm 17\%$ vs $231 \pm 40\%$, effect of region $p = 0.007$). Co-perfusion of E2 with Iso led to a reduced stimulatory response vs Iso alone in AB of both races (CW: Iso $270 \pm 147\%$ vs Iso+E2 $223 \pm 137\%$; AAW: $250 \pm 77\%$ vs $168 \pm 117\%$) as well as GL of CW ($120 \pm 64\%$ vs $98 \pm 46\%$), but tended to increase the Iso response in the GL of AAW ($93 \pm 40\%$ vs $111 \pm 57\%$) (effect of probe $p = 0.07$, probe*region $p = 0.025$). We conclude the local effect of E2 on lipolysis is dependent on race and adipose tissue depot. In CW, E2 blunted pharmacologically stimulated lipolysis in both regions. On the other hand, in AAW, E2 blunted stimulated lipolysis in abdominal, but enhanced stimulated lipolysis in gluteal, adipose tissue.

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BENEFITS OF VOLUNTARY EXERCISE ON BREAST CANCER PROGRESSION IN C3(1)SV40TAG MICE

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D3

Background. Many observational epidemiologic studies suggest an association between exercise and breast cancer risk. However, the optimal mode, intensity and duration of exercise for such an effect have yet to be determined. The purpose of this study was to examine the relationship between voluntary wheel-running (VWR) and breast cancer progression in C3(1)SV40Tag mice. Methods. C3(1)SV40Tag mice were assigned to either exercise (Ex) or sedentary (Sed) treatment ($n = 9$ /group). Beginning at 4wks of age C3(1)SV40Tag mice were either placed in a cage with free access to a running wheel (Ex) or in a cage with a locked running wheel (Sed). Data was analyzed for running distance, time and peak speed. Mice were examined weekly and at sacrifice (24wks) for palpable tumors, and tumor number and volume were recorded. Heart & body wt were recorded as an indicator of training status. Results. VWR significantly reduced average (avg) tumor volume at sacrifice (24wks) by approximately 40% ($P < 0.05$), but not tumor number. When Ex mice were grouped by avg wheel running distance, a dose dependent effect of exercise on tumorigenesis was apparent; mice running $\geq 3,000$ m/d (avg= 4195.4 m/d) ($n = 3$) had a $\sim 70\%$ reduction in tumor volume at sacrifice compared with those mice running an avg of 1555.9 m/d ($n = 6$). Heart wt/body wt ratio was increased following Ex ($p < 0.05$) providing evidence of a sufficient training effect. Conclusion. These data show a beneficial effect of VWR on tumor progression and provide preliminary evidence of a dose-dependent effect of exercise in the C3(1)SV40Tag mouse.

THE EFFECTS OF SUPRAPHYSIOLOGIC TESTOSTERONE ADMINISTRATION ON SERUM ADIPONECTIN

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D4

Adiponectin is an adipokine that is typically secreted in an inverse manner to adiposity, low concentrations of which are an independent risk factor for type II diabetes and metabolic syndrome. The loss of endogenous sex-hormones increases adiposity in both males and females and testosterone administration reduces body fat. We evaluated the effects of gonadectomy (GX) and supraphysiologic testosterone-enanthate (TE) administration on serum adiponectin in young (3 mo) male and female rats. Animals underwent GX or sham surgery and received either vehicle or TE (7.0 mg/wk) intramuscularly for 28 days. In males, serum adiponectin concentrations were 5760 ± 561 ng/ml (SHAM), 7418 ± 429 ng/ml (GX), and 3132 ± 179 ng/ml (GX+TE). In females, adiponectin concentrations were 7999 ± 840 ng/ml (SHAM), 10683 ± 697 ng/ml (GX), and 3738 ± 255 ng/ml (GX+TE). GX elevated adiponectin in males (29%; $p \leq 0.001$) and females (34%; $p < 0.01$) compared to SHAM, while TE reduced adiponectin compared to both GNX (58% male, 65% female; $p < 0.001$) and SHAM (46% male, 53% female; $p < 0.001$). These changes are at odds with the fact that GX increases adiposity, and that testosterone, especially at high doses, is lipolytic; suggesting that adiponectin is regulated not only by adiposity, but also by sex-hormones and in particular, testosterone. Additionally, these data highlight the potential metabolic disease risk associated with high-dose testosterone.

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HAT AND HDAC EXPRESSION DURING MUSCLE ATROPHY

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Muscle atrophy occurs as a consequence of various debilitating diseases, as well as during periods of muscle disuse. This atrophy is due, in part, to changes in skeletal muscle gene expression. Two classes of enzymes that play an important role in transcriptional regulation are histone acetyltransferases (HATs) and histone deacetylases (HDACs), which add and remove acetyl groups, respectively, on target proteins. In this regard, acetylation of transcription factors can alter transcription factor activity, and histone acetylation can alter the accessibility of transcription factors to their target genes through relaxation or condensation of chromatin. Yet despite the important role that HATs and HDACs play in regulating gene transcription, the extent to which these enzymes are altered during conditions of muscle atrophy are not well defined. We therefore harvested skeletal muscles from weight bearing and 10-day immobilized (imm) mice, and control and colon carcinoma (C-26) tumor bearing (TB) mice to determine the mRNA expression of various HAT and HDACs. The expression levels of the HATs p300, CBP and PCAF were increased in the muscles of TB mice, and CBP and PCAF were increased in muscles from imm mice. Imm caused a significant increase in the expression of HDACs 1-6 and SIRT 1, yet no changes in any HDACs were found in the muscles of TB mice. These results suggest that the cellular acetylation balance may be tilted more towards deacetylation during imm but more towards acetylation during cancer cachexia. This difference in the cellular acetylation balance during two distinct atrophy conditions could be a mechanism to dictate which target genes are activated in response to each condition.

D5

THE EFFECT OF EXERCISE TRAINING ON MUSCLE ENERGY STATUS IN IL-6 INDUCED CACHEXIA

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Cachexia is a condition involved with the loss of bodyweight, muscle mass, and adipose tissue mass. The *ApcMin/+* mouse develops an IL-6 dependent cachexia which can be accelerated with IL-6 overexpression. The purpose of this study was to determine the effect of moderate intensity treadmill exercise training on skeletal muscle energy status in cachectic mice. Mice were randomly assigned to exercise training (Ex) or cage control (CC) groups. Starting at 6wks of age, exercised mice ran on a treadmill at a moderate intensity (18 m/min, 1h, 6 days/wk, 5% grade) until 14wks of age. At 12wks of age, the mice were electroporated with either a vector (V) or IL-6 over-expression plasmid (IL-6) in the right quadriceps muscle and at 14wks of age were sacrificed. Cachexia induced a 12% decrease in quadriceps weight and moderate aerobic exercise training attenuated muscle mass loss. Cachexia induced a 3 fold increase in the activation of the energy sensor AMPK and exercise training attenuated this induction; however, the combination of exercise and cachexia still stimulated a 2 fold increase in AMPK activation compared to control animals. Neither exercise nor cachexia had an effect on total AMPK levels. Activation of a downstream target of AMPK, ACC, was also increased with cachexia and exercise was able to attenuate this increase. Our data demonstrated that the decrease in skeletal muscle mass with cachexia is associated with an altered energy state of the muscle. Exercise needs to be explored further as potential a therapy to alleviate muscle energy imbalance with cachexia. Funded by RO1CA121249-01

D6

EFFECTS OF ACUTE MODERATE- AND HIGH-INTENSITY EXERCISE ON GLUCOSE DISPOSAL AND BETA-CELL FUNCTION.

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The effects of prior isoenergetic high (HIE) and moderate intensity (MIE) cycle ergometer exercise on postprandial glucose disposal and beta-cell function were examined in nine sedentary pre-diabetic adults. On 3 separate occasions, subjects were randomly assigned among 3 conditions: HIE (84% VO₂peak), MIE (51% VO₂peak), and seated rest (C). One-hour post-exercise (or rest), subjects received a 3-hr OGTT. Plasma glucose, insulin, and C-peptide concentrations were measured before and at 5-10min intervals after glucose ingestion. The incremental area under the glucose curve was calculated for the 0-60min (AUC-1), 60-120min (AUC-2), and 120-180min (AUC-3) time intervals. Deconvolution analysis of plasma C-peptide quantified insulin secretion rate. Beta-cell function was assessed using the recently described insulin secretion/insulin resistance disposition index. Compared to control, a single bout of HIE decreased the mean glucose AUC-2 by 36% (p=0.03) and AUC-3 by 42% (p=0.003) whereas MIE tended to reduce AUC-3 by 21% (p=0.06). Glucose AUC-2 was 27% lower after HIE compared to MIE (p=0.008). A trend for improved beta-cell function was observed after high intensity exercise (C=0.34±0.05; MIE=0.36±0.16; HIE=0.42±0.17; p=0.17, C vs. HIE). These results suggest that exercise has an intensity dependent effect on improving postprandial glycemic excursion, which may in part be related to acute enhancements in beta-cell function.

D7

THERAPEUTIC ULTRASOUND AFFECTS MUSCLE CELL PROLIFERATION: IMPLICATIONS FOR MUSCLE REHABILITATION

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Therapeutic ultrasound (TUS) is a common modality in the rehabilitation of muscle injuries. In-vivo models of skeletal muscle have demonstrated that TUS increases satellite cell proliferation, a requirement for skeletal muscle repair. Current studies have attempted to determine the autonomous response of muscle cells to TUS; however their results are controversial due to the diversity of techniques and parameter used to deliver TUS (indirect sonification of the cells). Purpose: To examine the dose-response of muscle cell proliferation due to TUS. Methods: C2C12 cells were propagated in 10% FBS growth medium and incubated under sterile standard conditions. Equal numbers of cells were seeded in 100-mm culture dishes. Once cells achieved 50% confluence, TUS was delivered for 5 consecutive days. 24-h after the last treatment, cells were collected and counted with a hemocytometer. TUS delivery (continuous; 3MHz) was performed under sterile conditions; the ultrasound probe was positioned perpendicular to the dish and lowered to full contact with the medium (distance between the probe and the bottom of the dish = 4-5 mm). Nine combinations of output intensities and treatment durations were studied. Intensities: 0.2, 0.5 and 1.0W/cm². Treatment durations: 2, 5, and 10 min. The sham cells was exposed to TUS as described with output intensity of 0W/cm² for 5min and control cells were untreated. Media temperature was measured immediately before and after each TUS exposure. Results: Temperature increased only in response to the highest intensity (1.0W/cm²) when delivered for 5 or 10 min. TUS increased cell proliferation when compared to Sham and control in all groups, being greater at lower output intensities (0.2 and 0.5W/cm²). Conclusion: These data demonstrate that the direct delivery of ultrasonic waves to muscle cells in culture is feasible and produces positive effects. TUS enhances muscle cell proliferation in an autonomous manner by a mechanism other than heating. Our results support an evidence-based mechanism for the use of TUS for the treatment of skeletal muscle injuries.

D8

MALE RUNNERS DEMONSTRATE POOR SWEAT LOSS ESTIMATION ACCURACY

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M1

ACSM guidelines promote fluid intake during and between exercise bouts to be dictated by volume of sweat loss determined by change in body weight during exercise. This study examined how accurately a group of male runners ($n = 19$, age = 41 ± 11 y, body fat = $14.0 \pm 4.7\%$, $VO_{2max} = 61.2 \pm 8.8$ ml/kg/min) accustomed to runs in hot and humid conditions estimated their sweat losses. Participants completed 10 or 12.5 km runs on a challenging road course with (finishing time = 59.4 ± 3.6 min) beginning at ~6:45 am or pm during the late summer in the southeastern US. Environmental conditions were similar for all sessions (WBGT = 24.4 ± 1.2 °C), and water was available every 2.5 km. Before and after the run participants estimated their sweat loss volume using 8 ounce paper cups and a large pitcher of water. Runners were allowed to alter their estimations which were displayed on a digital scale. Participants consumed 272 ± 196 mL or 15% of total sweat loss (1797 ± 449 mL) fluid while running. Pre (942 ± 668 mL) and post (934 ± 564 mL) run estimations were significantly lower than sweat losses ($P < 0.001$), with 47% of runners underestimating by $> 50\%$ post-run. Pre and post estimations were strongly correlated ($r = .90$) suggesting a strong false confidence in runners' perception of sweat loss. Participants were encouraged to hydrate as if preparing for a race in the day prior to testing but still reported with USG levels of $1.021 \pm .008$ ($56\% > 1.020$). These numbers are not unexpected considering the significant uncoupling of perception to actual sweat losses ($2.3 \pm 0.6\%$ of body weight). Sweat towed off the body and retained in clothing was equal to only $26 \pm 11\%$ of losses. Runners commonly indicated during recovery their underestimations were related to not taking into account evaporative sweat losses.

ABILITY OF THE PACER TO ELICIT PEAK EXERCISE RESPONSES IN YOUTH

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M2

A graded exercise test (GXT) is the standard method of determining peak aerobic fitness (VO_{2peak}). The FITNESSGRAM's Progressive Aerobic Cardiovascular Endurance Run (PACER) test is commonly used to estimate VO_{2peak} in youth; however, little research has determined whether the PACER elicits a peak exercise response. The purpose of this study was to compare peak physiological variables and peak ratings of perceived exertion (RPE_{peak}) during a treadmill GXT and the PACER in 10-15 year old youth. The study included 43 participants (20 boys, 23 girls; 12.7 ± 1.7 y) who visited the lab twice. Participants completed the PACER, a progressive, multistage, 20-meter shuttle run and a treadmill GXT protocol (Children's Mercy Hospital Max protocol; Sabath et al., 2010) in which intensity was gradually increased by speed or grade at 1-minute intervals. Assessments were completed in a randomized order, separated by a minimum of 24 hours. Physiological variables including VO_{2peak} and peak respiratory exchange ratio (RER_{peak}) were measured using a portable metabolic system (Oxycon Mobile, CareFusion, Inc.), and peak heart rate (HR_{peak}) monitored via telemetry. At the end of each test, participants reported RPE_{peak} using the Children's OMNI Scale. Paired samples t-tests were used to compare outcome variables between the PACER and GXT. No significant differences were found between PACER and GXT HR_{peak} (195 vs. 197 bpm; $P = 0.497$), RER_{peak} (1.12 vs. 1.13 ; $P = 0.560$), VO_{2peak} (46.0 vs. 45.2 mL/kg/min; $P = 0.285$), and RPE_{peak} (8.3 vs. 8.4 ; $P = 0.375$). It appears that the PACER protocol elicits similar peak exercise responses compared to a treadmill GXT.

PHYSICAL ACTIVITY AND MOTOR SKILL DEVELOPMENT IN YOUNG CHILDREN

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M3

Young children should accumulate at least 60 minutes of moderate-to-vigorous physical activity (MVPA) daily. Physical activity (PA) contributes to motor skill development, particularly for tasks requiring complex movement patterns thought to underlie skill-related activity and PA later in life (e.g., sport and dance). The purpose of the study was to assess the association between MVPA and motor skill development in young children. Participants were 40 children (4.8 ± 0.8 years) enrolled in a university research laboratory school. MVPA was assessed using an accelerometer (Actigraph GT3X) set to collect data at 15 s epochs. These data were used to calculate average daily time (min) spent in MVPA for one week (Pate et al., 2006). The Tests of Gross Motor Development-2 (TGMD2) was used to assess 8 gross motor skills that were considered to represent complex skills (CS). CS tests were TGMD2 subtests that show the lowest percentage of mastery for 3-5 year old children. The CS tests were 4 locomotor (galloping, unipedal hopping, leaping, and horizontal jumping) and 4 object control (stationary basketball dribble, catching, kicking, and underhand rolling) skills. Relationships between MVPA and CS scores were examined using Pearson correlations. Results showed significant correlations between MVPA and galloping ($r=0.372$; $P=0.028$), hopping ($r=0.471$; $P=0.004$), dribbling ($r=0.393$; $P=0.020$), and catching ($r=0.337$; $P=0.048$). These correlations indicate that further research is warranted to determine a causal link between MVPA and CS competency. It is important to determine if PA drives CS competency or if CS competency supports PA efforts. This relationship is important given the recognition that motor skill development and CS competency are critical to success in lifetime PA. This study was funded by a grant from the University of Tennessee Korn Learning, Assessment, and Social Skills (KLASS) Center.

FAST-TO-SLOW: MUSCLE FIBER TYPE TRANSFORMATION IN RESPONSE TO ALTERED SIX1 GENE EXPRESSION

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M4

Muscle activation patterns, like exercise and disuse, can cause alterations in muscle fiber type proportions in skeletal muscle. However, little is known of the molecular events that cause this shift. Six1 is a developmental gene that has been shown to be altered by exercise in humans. Further, Six1 causes a fiber type shift in mice. Yet, little is known of how it functions. Purpose: Examine the effect of Six1 expression on the myosin heavy chain (MyHC) genes during muscle fiber formation. Methods: C2C12 mouse myoblasts were grown in standard conditions. When cells reached 80% confluence, they were transfected with Six1 expression vectors, to increase Six1 expression, or empty vector control. 24 hours later, cells were switched to differentiation medium. After four days, cells were harvested. Six1 and MyHC gene expression was analyzed by qRT-PCR. Results: Six1 expression vector (A) increased Six1 expression 700 ± 243.4 fold ($p=0.02$) and Six1 expression vector (B) increased Six1 expression 875 ± 83.7 fold ($p<0.01$). MyHC-IIb expression decreased 2 ± 0.12 fold ($p=0.01$) and 3 ± 0.02 fold ($p<0.01$) by vectors (A) and (B) respectively. MyHC-IIx decreased 1.5 ± 0.09 fold ($p=0.05$) and 1.5 ± 0.05 fold ($p=0.02$) by vectors (A) and (B) respectively. MyHC-I increased 2 ± 0.24 fold ($p=0.03$) and 1.5 ± 0.12 fold ($p=0.05$) by vectors (A) and (B) respectively. MyHC-IIa expression was not affected. Conclusion: Six1 overexpression alters the muscle fiber-type gene program during the formation of a muscle fiber. This suggests that altered Six1 expression, in response to exercise, controls muscle fiber-type in humans.

THE ENERGY EXPENDITURE OF DRUMMING: A RHYTHMIC ALTERNATIVE

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The compendium for physical activities provides a metabolic equivalent (MET) value for various activities ranging from traditional exercises to non-traditional activities such as household chores, gardening, and music playing. However, the compendium lacks clear methodology on how the MET values were determined for many of the recorded activities. Therefore, the purpose of this study was to provide clear methodology for determining a MET value specifically for drumming as a leisure-time physical activity (LTPA). The participants (N = 15) were drummers aged 22.5 +/- 2.8 years who had at least 2 years experience and could consistently play for two 40-minute trials. The first trial was for familiarization to a prerecorded music sample and a provided full drum set. The second trial consisted of collecting baseline VO₂ and then drumming to the same music sample while VO₂ and heart rate (HR) were monitored with a Cosmed K4 b2 metabolic device. Baseline VO₂ was 6.7 +/- 0.9 ml/kg/min. An average VO₂ of 15.83 +/- 3.94 ml/kg/min and average HR of 118 +/- 21 bpm were found during a 40 minute drumming bout. Additionally, an average MET value of 4.5 +/- 1.1 was found compared to the 4.0 MET value provided by the compendium of physical activities. In this investigation, drumming elicited a significantly greater metabolic cost compared to baseline (p < 0.001) while increasing HR up to approximately 64% of the age-predicted maximum HR in this sample. These data provide evidence that the actual MET value for drumming may be higher than what is provided in the compendium of physical activities. Drumming should continue to be considered as an alternate form of moderate intensity physical activity and future research should investigate other types of instruments as alternatives for LTPA.

M5

THE EFFECTS OF WEIGHT LOSS ON RELATIVE BONE MINERAL DENSITY IN PREMENOPAUSAL WOMEN

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Heavier individuals have higher bone mineral density (BMD) than individuals of lower body weight, but it is unclear whether BMD changes in proportion to body weight during weight loss. This study compared BMD relative to body weight following a six month weight loss program and a one-year weight maintenance phase in premenopausal women and determined whether African American (AA) and European-American (EA) women's BMD respond similarly during weight loss. Premenopausal women (n=115, 34 ± 5 yrs.) were evaluated in an overweight state (BMI between 27-30 kg/m²), following an 800 kcal/day diet/exercise program designed to reduce BMI <25 kg/m², and one year following weight loss. Results indicated that BMD relative to body weight (Z-scores) increased after weight loss, but decreased during the one year weight maintenance phase. All one year follow up BMD Z-scores were increased (except Ward's triangle and L1) compared to baseline measurements (P < 0.05). These sites included the hip neck (0.088, P=0.014), the greater trochanter (0.089, P=0.003), total hip (0.099, P=0.001), L2 (0.127, P=0.013), L3 (0.135, P=0.014), and L4 (0.199, P=0.002). AAs had significantly higher absolute BMD at all sites (P<0.05), with the exception of the greater trochanter, compared to EAs, but no time by race interactions were evident during weight loss (except in L3). These results may indicate that weight loss is safe with regard to bone health for overweight premenopausal women.

M6

CONCUSSION DOES NOT IMPAIR GAIT STEPPING CHARACTERISTICS

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Postural instability is a cardinal symptom of concussion and impairments are known to persist for at least three to five days post injury. Previous post-concussion gait studies have used intermittent testing dates and lacked the subjects' pre-injury gait characteristics. The purpose of this study was to perform a longitudinal assessment of gait stepping characteristics following a sports-related concussion. 15 subjects (age: 19.7 + 1.5 years; height: 172.7 + 15.5cm; weight: 79.6 + 24.3kg; Grade II-Cantu Evidence Based grading scale) performed 10 trials of gait daily post-concussion utilizing a valid and reliable instrumented walkway. The primary outcomes measures were the mean step velocity, cadence, step length, and percentage of the gait cycle in swing phase. The baseline pre-injury gait performance was compared to the performance for the first 10 consecutive days post-concussion using separate repeated measures ANOVAs. The repeated measures ANOVAs failed to identify a main effect for step velocity (F=1.672, P=0.096), cadence (F=0.426, P=0.931), step length (F=1.226, P=0.283), or the percentage of the gait cycle in the swing phase (F=0.920, P=0.518). Exploratory analysis, utilizing a Tukey post-hoc, identified a significant difference in step velocity between the pre-test and Day 1 post-injury (1.48 +/- 0.15m/s and 1.17 +/- 0.17m/s respectively, P=0.017), but no differences were identified between any other days for any of the outcome measures. The results of this study suggest that the stepping characteristics of gait are not a sensitive measure of impaired postural control following a concussion. A potential explanation is that overground level walking is theorized to be controlled by central pattern generators in the spinal cord which may be unaffected by a sports-related concussion. These results suggest that postural control tests which challenge supraspinal structures are likely to be more sensitive measures of postural control post-concussion. Supported by a grant from the National Institute of Health.

M7

EFFECTS OF SIMPLE AND COMPLEX MOVEMENTS ON COGNITIVE FUNCTION

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Previous research has found associations between physical activity and various aspects of cognitive function. Little research has examined the specific type of movement that might be associated with increased cognitive function. The purpose of this study was to examine the effects of simple movement and complex movement compared to a non-movement control condition on cognitive function. Cognitive function was assessed using the CogState Research computerized assessment program on 20 college-aged individuals before and after each condition. CogState tasks were used to measure visual attention, processing speed, working memory, and learning. Conditions included 20-min sessions of simple movement (walking and/or jogging on a treadmill), complex movement (performing a complex movement course), and control (viewing television). The complex movement course consisted of 14 stations that required balance, reaction time, and quick vertical, horizontal, and anterior/posterior movements. Paired t-tests were used to compare differences in various measures of cognitive function before and after each condition. Effect sizes (ES) were calculated with Cohen's delta. Participants (mean age=22.3±2.9 yrs; BMI=23.2±3.2 kg/m²; estimated VO₂max=51.8±4.5 ml/kg/min) averaged 20 minutes of moderate to vigorous physical activity assessed via accelerometer for both simple and complex movement conditions and heart rates of 67±11, 150±11, and 155±12 b/min for control, simple, and complex movement conditions, respectively. No changes were seen in any measure of cognitive function for the complex movement or control condition (p>.05). An improvement in learning (p=.08, ES=0.38) was seen during the simple movement condition. No other measure of cognitive function was impacted during the simple movement condition. In conclusion, 20 minutes of simple or complex movements performed at moderate to vigorous intensity did not substantially impact most of the measures of cognitive function assessed in this study.

M8

CALORIC RESTRICTION CAUSES DIFFERENTIAL BRAIN GENE EXPRESSION IN WHEEL RUNNING AND SEDENTARY MICE

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U1

The biological and central mechanisms controlling voluntary wheel running (WR) in mice are not well understood. Caloric restriction (CR) has been shown to increase WR in rodents, and previous studies have indicated brain signaling molecules such as brain derived neurotrophic factor (Bdnf) may be involved. Eight-week old male C57BL/6J mice were randomized into five groups: CR without running or sedentary (CRS) (n=8), CR with running (CRR) (15 d) (n=8), CR with restricted running (CRRR) (n=8), ad libitum feeding (AL) with no running (n=8), and AL with running (ALR) (n=7). Expression of the genes Sirt1, dopamine receptor 1 (Drd1), and Bdnf in the striatum/nucleus accumbens region of the brain was analyzed using real time PCR. CRR compared to ALR animals ran significantly farther (10.0 ± 2.3 and 5.6 ± 1.7 km/day, respectively, $p=0.002$), longer (278 ± 54 and 193 ± 44 min/day, $p=0.005$), and faster (2.1 ± 0.17 and 1.8 ± 0.87 km/hr, $p=0.004$). Messenger RNA expression was not different between groups for Sirt1 ($p=0.867$) and Drd1 ($p=0.582$); however, Bdnf was significantly different between all CR groups vs. AL groups ($p=0.002$). In summary, caloric restriction increases running activity in mice which may be linked to increased Bdnf expression. Supported by Internal Funding (ASU).

DISTINCTIONS IN PHYSICAL ACTIVITY HABITS AMONGST ACADEMIC MAJOR AND YEAR IN UNDERGRADUATE STUDENTS

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U2

The purpose of this study was to examine the physical activity levels of undergraduate students for possible differences amongst academic majors and years in university. The Physical Activity and Nutrition Questionnaire was emailed to 3070 undergraduate students, 386 subjects (20.1 ± 3.8 years, 168.9 ± 12.3 cm, 71.5 ± 17.9 kg) completed the survey. Differences between academic major and year were assessed using a one-way ANOVA, and Fisher's LSD test was used for post-hoc analyses. Results indicated a significant difference in participation in moderate activity ($p = 0.053$) and vigorous activity ($p = 0.005$) by year, with second year students performing more moderate and vigorous activity than 3rd year (moderate, $p = 0.014$; vigorous, $p < 0.001$) and 4th year (moderate, $p = 0.015$; vigorous, $p = 0.007$) students. Significant differences amongst academic major were found for participant's perception of his/her weight ($p = 0.038$), amount of moderate activity ($p = 0.047$), amount of vigorous activity ($p = 0.042$), and participant's satisfaction with his/her typical amount of physical activity ($p = 0.004$). Further analyses showed that students in the exercise science department scored significantly ($p < 0.05$) higher than those in several other majors, indicating a greater participation in moderate/vigorous activity and greater satisfaction in amount of physical activity performed and perception of body weight. Speculatively, the more active second year students may have adjusted to life at college, but have not yet entered into more demanding upper-level courses. Also, exercise science majors may perceive physical activity differently based on their understanding of what defines physical activity and its role in maintaining a healthy lifestyle.

EXAMINATION OF THE IMPACT OF AN ACTIVE VIDEO GAME ON ACADEMIC TESTING

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U3

As childhood obesity rates rise to new levels there is an increasing need for research on the impact physical activity has upon children's cognitive function and academic achievement. ExerGaming, in which the person becomes the controller and is required to move to be successful in a game, is becoming more popular and requiring more movement to be successful. PURPOSE: To compare cognitive function assessed with a standardized test following an active video game and an inactive video game. METHODS: Fourteen participants (12 male) with a mean age of 10.9 (0.93) completed 2 days of testing. Each day was the same with the exception of the video game played. One day participants' played an active game using the Xbox Kinect system and the other day they played an inactive game on the Xbox. The order of days was counterbalanced. Participants played the video game assigned for that day for between 20 – 25 minutes depending on when a level ended. Following completion of the video game participants participated in an Electroencephalographic (EEG) study which took 20 minutes. Participants' then completed the Wide Range Achievement Test 4 (WRAT4), which is a measure used to assess Word Reading (WR), Sentence Comprehension (SC), Spelling (S), Math Computation (MC), and Reading Composite (RC). When the WRAT was completed the participants were free to leave. RESULTS: Repeated Measures ANOVA revealed non-significant differences on all measures between the active and non-active games; WR, $F(1, 12) = 2.71$, $p = .15$; SC, $F(1, 11) = .029$, $p = .87$; S, $F(1, 12) = .48$, $p = .50$; MC, $F(1, 12) = .04$, $p = .85$; RC, $F(1, 12) = 1.47$, $p = .25$. DISCUSSION: At current, the results do not support the idea that active video games can improve performance on standardized testing compared to inactive video games. While this is contrary to the hypothesis for this study and previous literature, the sample size is small with large variation in the scores achieved. Active video games hold promise to increase the physical activity of children regardless of whether or not improvements in standardized testing occur. At worst, participants will see health benefits from participation in active games when compared to inactive games.

THE EFFECT OF BREATHING FREQUENCY ON BARORECEPTOR SENSITIVITY

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U4

Background: Diminished baroreceptor sensitivity (BRS) has been associated with cardiovascular morbidity and mortality. Studies suggest that BRS may be influenced by breathing frequency; however, most studies have been conducted without control of breathing frequency and none has compared the effects of different breathing frequencies with spontaneous (non-paced) breathing on BRS. Purpose: to compare BRS measured during spontaneous, 6 and 15 breaths per minute Methods: 32 healthy 18-25 year olds recruited from the Wake Forest Community obtained informed consent according to institutional guidelines. Continuous measurement of blood pressure and ECG were made using a CNAP device and Biopac system for 5-minute intervals of spontaneous and paced (6 bpm and 15 bpm) breathing, the order of which was randomly assigned. BRS was determined in both time (BRS_tot) and frequency (α -LF and α -HF) domains using Nevrokard Software. Within group comparisons were made using the Friedman Test for related samples. Results: 30 subjects (16 M) had valid BRS data across the 3 breathing conditions. Values are expressed as median (minimum, maximum). Analyses revealed that α -LF was significantly different among the 3 breathing conditions with 15 bpm [20.00 (6.55, 166.0)] < spontaneous [29.13 (9.9, 178.2)] < 6 bpm [34.83 (16.2, 143.5)]. For α -HF, only the 15 bpm [31.1 (7.1, 261.7)] and spontaneous [43.3 (9.7, 208.4)] conditions differed. BRS_tot did not differ significantly among breathing conditions. Conclusion: The results suggest that spontaneous breathing yields different BRS values vs. paced breathing, supporting the need to standardize breathing frequency in clinical studies of BRS.

HSP70 IS NECESSARY FOR NORMAL SKELETAL MUSCLE GROWTH

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U5

Heat shock protein (Hsp70) is a cytoprotective protein whose expression is up regulated in multiple cell types, including skeletal muscle, in response to stress. However, Hsp70 is down regulated in skeletal muscle during periods of muscle disuse. Since restoration of Hsp70 protein levels via overexpression rescues disuse muscle fiber atrophy, it is hypothesized that the decrease in Hsp70 may contribute to the fiber atrophy associated with muscle disuse. The purpose of the current study was to determine whether skeletal muscles from Hsp70 knockout (Hsp70 *-/-*) mice are phenotypically different from their wild type (WT) counterparts under weight-bearing conditions, and following 10 days of skeletal muscle disuse, induced via hind limb cast immobilization. Hind limb muscles were removed for immunohistological analysis of type I, IIa, and IIb/x fiber distribution and size. The muscle fiber cross sectional area of type I, IIa, and IIb/x fibers in Hsp70 *-/-* mice was 20%, 18.6% and 22.5% smaller, respectively, than age matched WT mice. Following 10 days of cast immobilization all muscle fiber types of WT mice showed significant atrophy. However, only the type IIb/x fibers atrophied following immobilization in Hsp70 *-/-* mice. This lack of atrophy in the type I and IIa fibers of Hsp70 *-/-* mice in response to immobilization may be due to their smaller size prior to disuse. Combined, these findings suggest that Hsp70 is necessary for normal muscle growth, and that decreases in Hsp70 contribute to disuse atrophy. Supported by NIH grant R03AR056418 (to A.R. Judge).

CATECHOL-O-METHYLTRANSFERASE GENOTYPE INFLUENCES COGNITIVE PERFORMANCE AND CONCUSSION HISTORY IN COLLEGE FOOTBALL PLAYERS

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U6

Catechol-O-Methyltransferase (COMT) is a gene that is active in the breakdown of dopamine and norepinephrine in the prefrontal cortex. It has two alleles, Val and Met, yielding three possible genotypes (Val/Val, Val/Met, Met/Met). The Val allele promotes higher enzyme activity resulting in greater levels of dopamine degradation and lower dopamine levels in the prefrontal cortex. Research suggests that those with Met/Met and Val/Met genotypes have better cognitive performance due to the lower enzyme activity associated with the Met allele. Additionally, previous findings show that Val/Val and Val/Met populations have higher concussion rates, which may be due to higher levels of dopamine degradation due to the Val allele. Purpose: To investigate association between COMT and executive cognitive function in student-athletes and how certain genotypes affect concussion history. Methods: 18 college football players (age 18 ± 0.77 years) were genotyped for COMT. Participants then performed cognitive tests using Immediate Post-Concussion Assessment Cognitive Testing (ImPACT). ImPACT obtains concussion history and measures cognitive function by using several neuropsychological tests involving word discrimination, attention span, response variability, working memory and recall, and reaction time. Results: 7 subjects were Met/Met genotype and 11 were Val/Met. Met/Met subjects scored higher on verbal memory test ($p = .329$), visual memory test ($p = .080$), and visual motor test ($p = .163$). Results also show that only 14% of Met/Met subjects reported history of concussions while 27% of Met/Val subjects reported suffering at least one concussion. Conclusions: While data collection is ongoing, our preliminary data supports previous findings that the Val allele decreases cognitive performance and increases risk of concussions.

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EFFECTS OF BODY-IMAGE AND SELF-ESTEEM ON PHYSICAL ACTIVITY LEVELS IN ADOLESCENTS

Ashley Cancer, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL.*

U7

The purpose of this study was to examine the relationship between body-image/self-esteem and participation in physical activities in adolescents ages 12-15. Subjects were given a modified version of the Physical Self-Description Questionnaire (PSDQ) during a class period. The PSDQ was administered by teachers within each school. Teachers read the directions of how to complete the questionnaire out loud to the subjects. The modified PSDQ was a 44-item instrument that consisted of single-statement items and a 6-point Likert scale. The instrument was divided into 7 components: physical activity participation, body fat, sports competence, appearance/attractiveness, cardiovascular endurance—plus two subscales assessing overall physical self-concept and global self-concept. For most domains, the highest possible score was a 36 indicating high levels of the attribute (exception, global self concept high score of 48). The one exception in scoring was the body fatness domain where higher scores indicated a self concept of high body fatness. 155 participants completed all parts of the survey. Spearman's correlations were used to identify relationships between physical activity attributes to body image/self esteem. There was a significant correlation between physical activity participation and physical-self concept ($r=0.46, p<0.05$). Participants self-reported perception of endurance was related to self-reported physical self concept ($r=0.48, p<0.05$), perceived attractiveness/appearance ($r=0.31, p<0.05$), and global self-concept ($r=0.24, p<0.05$). These data suggest that one's perceived confidence in physical ability is related to self-reported physical activity. Future studies should examine whether interventions that change self-reported abilities or attractiveness can influence participation in physical activities.

DIFFERENCES IN EMG ACTIVITY OF FIVE LOWER LIMB MUSCLES DURING ONE-LEGGED AND TWO-LEGGED SQUATS

Jeremy Towns, Thomas Broussard, RW Hensarling, JK Petrella. *Samford University, Birmingham, AL.*

U8

Neuromuscular activation of the gluteal muscle group while executing the single-leg squat has been well studied. The electrical activity of other major muscle groups of the lower leg during single-leg squats is not as well known. The purpose of this study was to examine the electrical activity of the quadriceps, hamstrings, adductors, gastrocnemius, and tibialis anterior during a single-leg and double-leg squat. Eleven male intercollegiate athletes participated in the study. Electromyography (EMG) of the quadriceps, hamstrings, adductors, gastrocnemius, and tibialis anterior were recorded during 5 repetitions of dual-legged squats and single-leg squats. Participants performed the squat in time with a metronome such that each complete squat occurred in 2 seconds resulting in total of 10 seconds of activity for each trial. For the dual-leg movement, participants were instructed to squat until the thigh was parallel to the ground and then return to a standing position. Subjects then recovered for 3-5 minutes and performed five single-legged squats. These squats were completed while standing on a 17inch high bench with the dominant leg only. Participants were instructed to lower themselves until their non-dominant leg touched the floor, then return to a standing position using only the dominant leg. This movement was repeated 5 times at a cadence of 2 seconds per single-leg squat. All EMG activity was recorded, transformed, and reported as root mean square (RMS) activity. Mean RMS EMG activity for the hamstring (121% increase, $p<0.01$) and gastrocnemius (108% increase, $p<0.01$) was significantly higher during the single leg squat compared to the dual-leg squat. There was also a trend for greater quadriceps activation (29%, $p=0.07$) with the single-leg movement. No differences were detected in adductor activity (25%, $p=0.42$) or tibialis anterior activity (6%, $p=0.48$). These results suggest that single-leg squats result in greater lower limb activation for the same number of repetitions. These findings may be useful for developing rehabilitation or training techniques that focus on lower limb activation.

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Smith & Nephew Clinical Therapies

<http://global.smith-nephew.com/us/9650.htm>

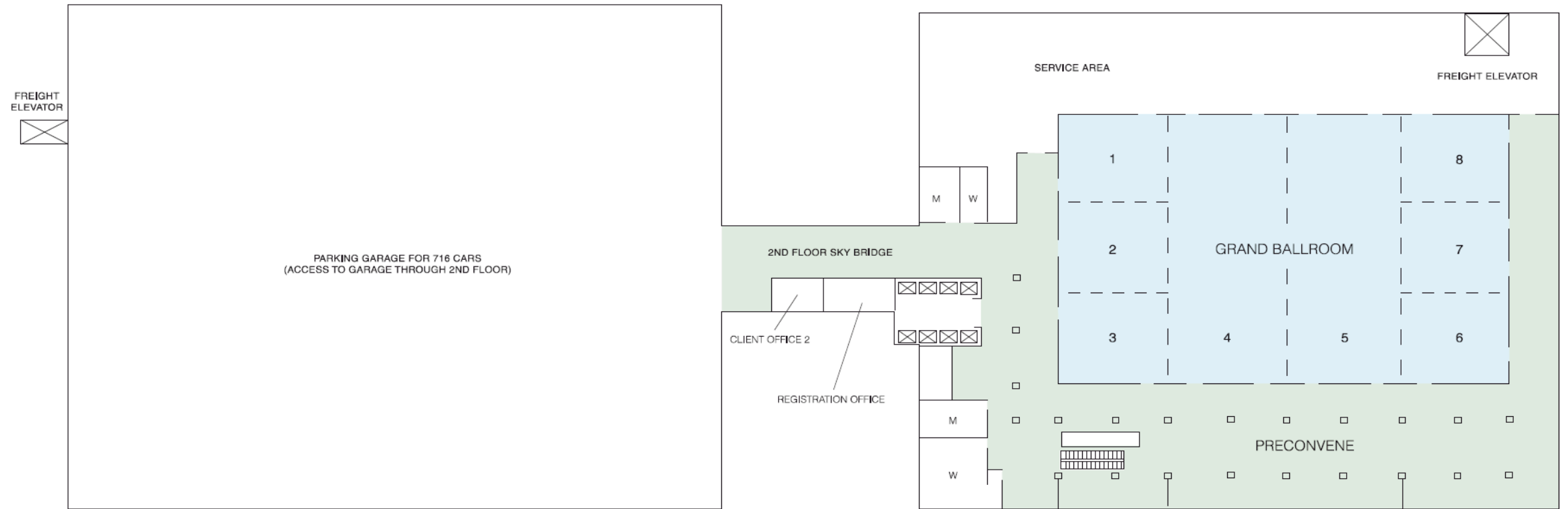
Phone: 800-876-1261

VacuMed

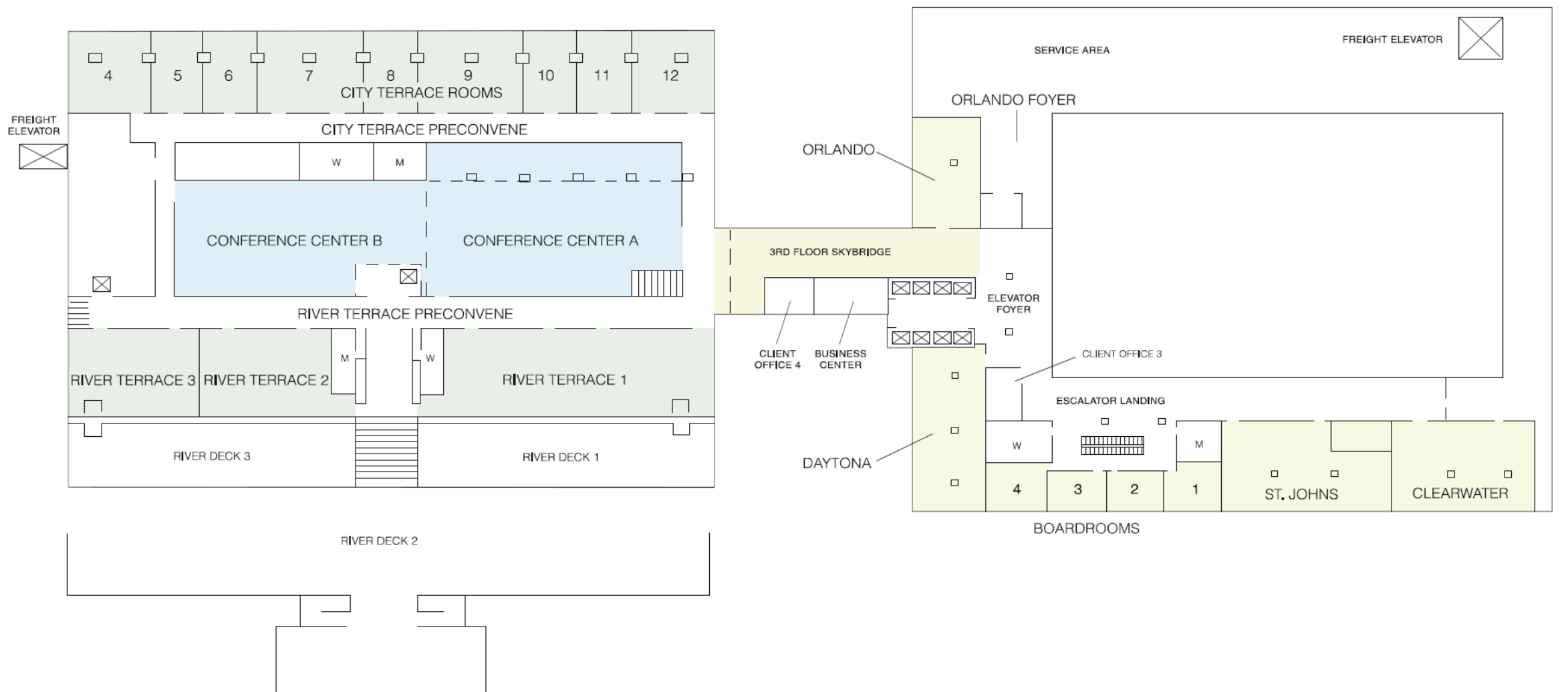
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