

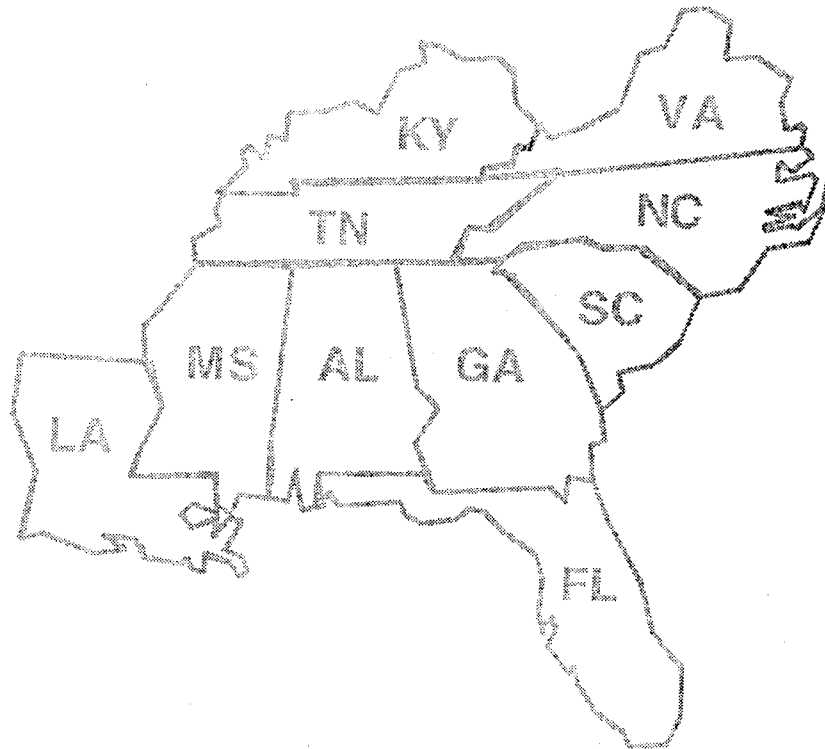


AMERICAN COLLEGE of SPORTS MEDICINE

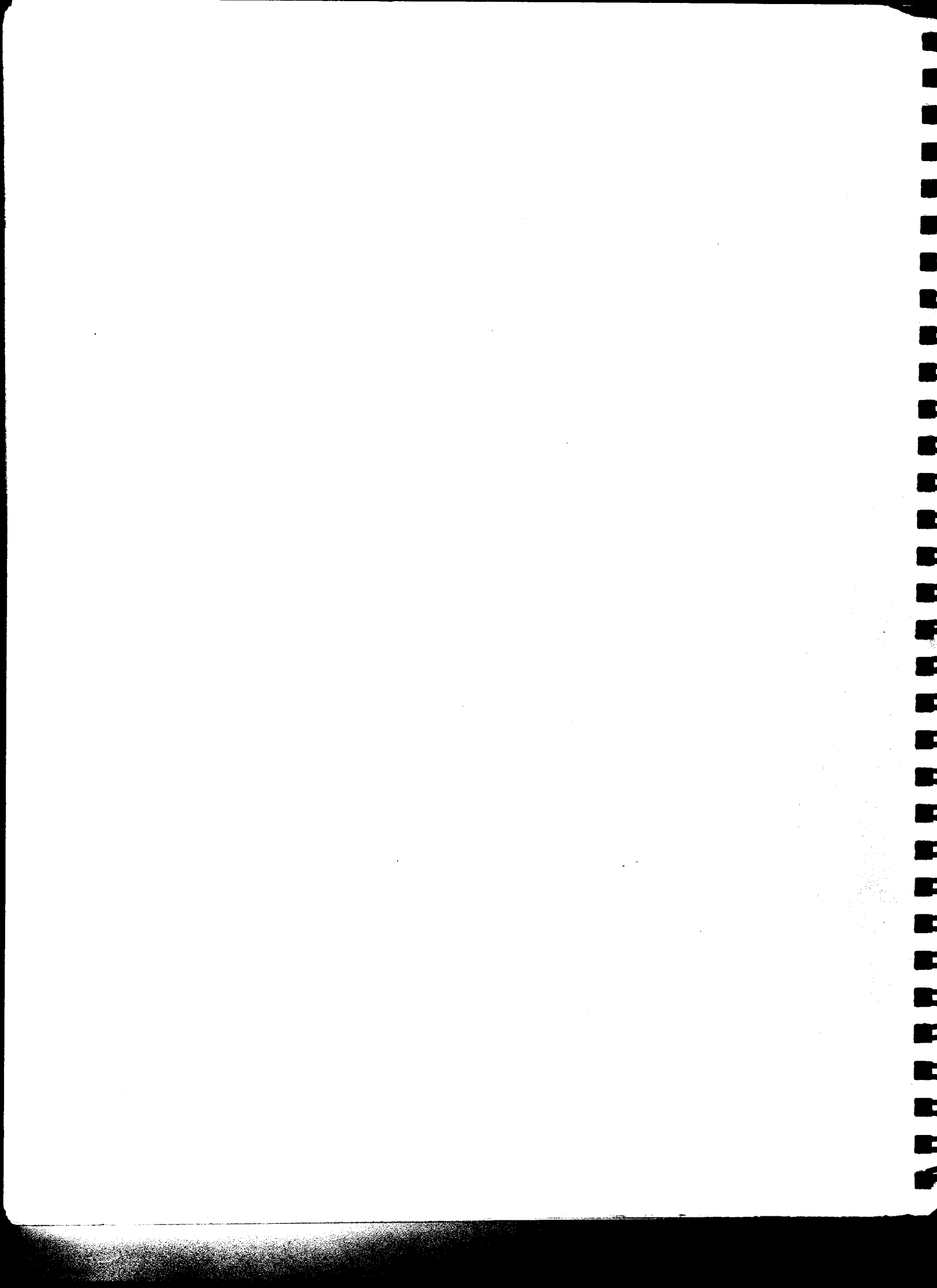
SOUTHEAST REGIONAL CHAPTER

January 31-February 2, 2002
30th Annual Meeting
The Westin Peachtree Plaza
Atlanta, Georgia

ABSTRACTS



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



Thirtieth Annual Meeting

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

**The Westin Peachtree Plaza
210 Peachtree Street, Atlanta, GA 30303
January 31 – February 2, 2002**

Officers

President:

David Nieman, Appalachian State University

Past President:

Mindy Millard-Stafford, Georgia Institute of Technology

President-Elect:

Michael Berry, Wake Forest University

Executive Board:

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Pat Nixon, Wake Forest University

Ray Thompson, University of South Carolina (Student Rep.)

Executive Director:

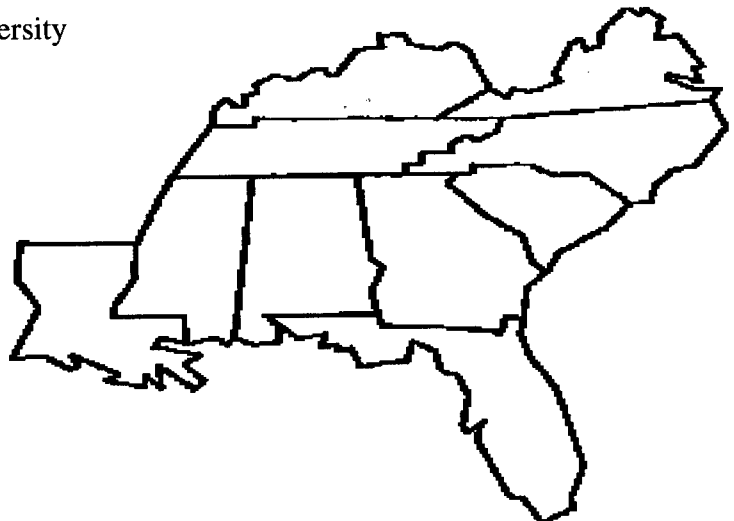
Vaughn Christian, Appalachian State University

Exhibits, Sponsorships & Fund Raising:

Liz Dowling, Old Dominion University

Publisher and Editor:

Don Torok, Florida Atlantic University



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

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 American College of Sports Medicine and the Southeast Chapter of the American College of Sports Medicine. The American College of Sports Medicine is accredited by the ACCME to provide continuing medical education for physicians.

AMA/PRA

The American College of Sports Medicine designates this educational activity for a maximum of 14.75 hours in category I credit towards the AMA Physician's Recognition Award. Each physician should claim only those hours of credit that he/she actually spent in the educational activity.

Continuing Education Credits

SEACSM is an approved provider for ACSM and NATA (P788). 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 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. Therefore, the following information is provided:

J.Mark Davis has received grants and research support from the Gatorade Sports Science Institute, Quaker Oats Company and is a member of the Gatorade Sports Science Institute Sports Medicine Review Board.

Boyd Eaton and Michael Smith are employees with MRI & Imaging of Georgia.

All other faculty returned disclosure forms indicate that they have no affiliation or financial interest in any organization(s) that may have a direct interest in the subject matter of their presentation(s).

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 Commerical Support

The Southeast Chapter of the American College of Sports Medicine gratefully acknowledges the unrestricted educational grants from: Pharmacia, Pfizer, Coca-Cola Company:Powerade, Gatorade Sports Science Institute, MRI and Imaging of Georgia, Encore Orthopedics.

Planning Committee

Michael Berry, Anne Allen, David Nieman, Mindy Millard-Stafford, Liz Dowling, Pat Nixon, Bruce Gladden, Greg Hand, Craig Broeder, Vaughn Christian, Don Torok

SEACSM List of Reviewers

Carolynn Berry, Tony Marsh, Pat Nixon, Mindy Millard-Stafford

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 |

| | <u>Date/Place</u> | <u>Pres./PastPres./PresElect</u> | <u>Executive Board</u> |
|------|--|--|--|
| 12th | Feb. 3-4, 1984 Auburn, AL | Kirk Cureton Russ Pate Chris Zauner | Ron Bos (ES) Emily Haymes Phil Sparling Mike Stone |
| 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) |

| | <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) |
| 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) |
| 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) |
| 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) |
| 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 |

ES = Executive Secretary
N = National Representative

S = Student Representative
MD = Physician Representative

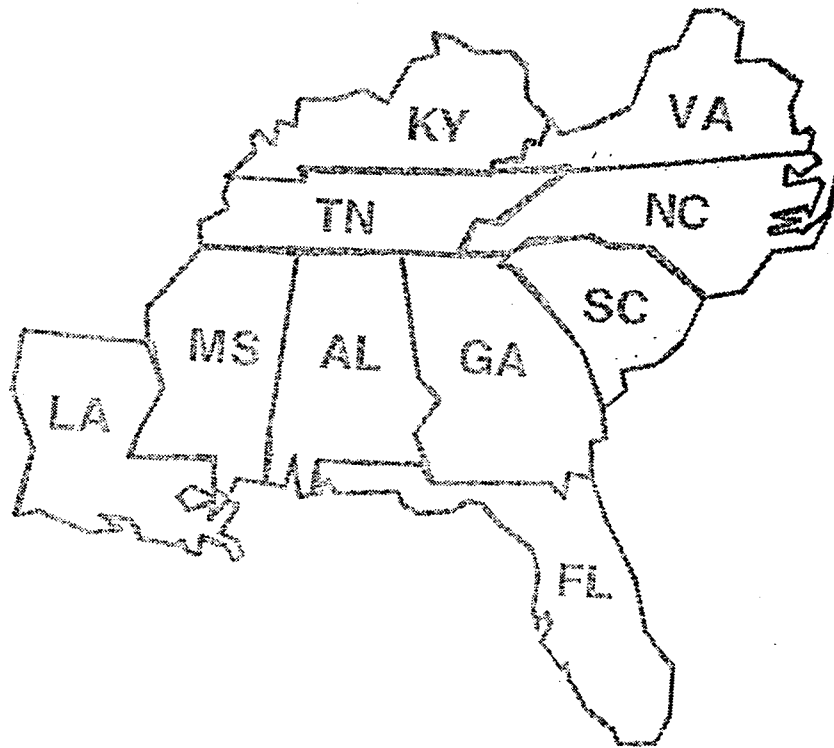
CC = Clinical Consultant
ED = Executive Director

SEACSM Award Winners

| | <u>Scholar Award</u> | <u>Service Award</u> | <u>Student Award</u> |
|------|----------------------|----------------------|-----------------------|
| 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 | | Joseph M. McClung |



is proud to support ACSM in their 30th Annual Meeting of the Southeast Chapter (SEACSM)



| | Atlanta A | Atlanta B | Atlanta C | Atlanta D | Atlanta E | Atlanta F | Atlanta G | Atlanta H | Peachtree Terrace | Peachtree DEF |
|-------------|------------------|-----------|-----------|-----------|-----------|-----------|-----------|--------------|-------------------|---------------------|
| Thursday | | | | | | | | | | |
| 4:00-4:30 | S2 | T1* | T1* | T2* | O1-O2 | O6-O7 | S1 | S3 | P1-P12 | |
| 4:30-5:15 | S2 | T1* | T1* | T2* | O3-O5 | O8-O10 | S1 | S3 | P1-P12 | |
| 5:15-6:00 | S2 | O11-O13 | O11-O13 | | | | S1 | S3 | P1-P12 | |
| 7:30-9:00 | | | | | | | | | | KEYNOTE/* |
| 9:00-11:00 | | | | | | | | | SOCIAL-ABC | |
| Friday | | | | | | | | | | |
| 7:00-8:30 | | | | | | | WOMEN'S | Breakfast | | |
| 8:00-8:30 | | | | | | | | | P13-P22 | |
| 8:30-9:00 | | | | | | | | | P13-P22 | Basic Science |
| 9:00-9:30 | | | | | | | | | P13-P22 | Basic Science |
| 9:30-10:00 | | T3 | T4 | T5 | T6 | T7 | O14-O15 | T8* | | |
| 10:00-10:30 | | T3 | T4 | T5 | T6 | T7 | O16-O17 | T8* | | |
| 10:45-11:45 | | | | | | | | | | Montoye Lecture* |
| 11:45-1:00 | Past President's | | | | | | | | | Montoye Lecture* |
| 12:30-1:00 | | | | | | | | | P23-P31 | |
| 1:00-1:30 | | S4* | | O24 | O29 | O34 | S5 | O18-O19 | P23-P31 | |
| 1:30-2:00 | | S4* | T9 | O25-O26 | O30-O31 | O35-O36 | S5 | O20-O21 | P23-P31 | |
| 2:00-2:30 | | S4* | T9 | O27-O28 | O32-O33 | O37 | S5 | O22-O23 | | |
| 2:45-3:45 | | | | | | | | | | Invited Lecture* |
| 4:00-4:30 | | CME* | CME* | | | | O38-O39 | O42-O43 | | Student Symposium |
| 4:30-5:00 | | CME* | CME* | | | | O40-O41 | O44-O45 | | Student Symposium |
| 5:00-5:30 | | CME* | CME* | | | | | | Graduate Fair | |
| 5:30-6:00 | | CME* | CME* | | | | | | Graduate Fair | |
| 6:00-9:00 | | | | | | | | | | Clinical Track* |
| Saturday | | | | | | | | | | |
| 8:00-9:00 | | | T10 | T11* | T12* | T13* | T14* | Biomechanics | | |
| 9:15-10:15 | | | | | | | | | | ACSM Presidential * |
| 10:15-10:30 | | | | | | | | | P32-P42 | |
| 10:30-11:00 | | CME* | CME* | T15 | T16 | T17 | O46-O47 | S6 | P32-P42 | |
| 11:00-11:30 | | CME* | CME* | T15 | T16 | T17 | O48-O49 | S6 | P32-P42 | |
| 11:30-12:00 | | CME* | CME* | | | | | S6 | P32-P42 | |
| 12:00-2:00 | | CME* | CME* | | | | | | LUNCHEON-ABC | |

**SOUTHEAST CHAPTER OF THE AMERICAN COLLEGE OF SPORTS MEDICINE
2002 MEETING SCHEDULE SUMMARY**

Sessions for which CME 1 credit is available are noted below as (CME1*)

THURSDAY, JANUARY 31, 2002

- 12:00 - 2:00 PM **BOARD MEETING (Atlanta H)**
- 12:00 - 6:00 PM **REGISTRATION (Atlanta Pre-Function)**
- 12:00 - 9:00 PM **SPEAKER READY ROOM – (Peachtree G)**
- 5:00 - 9:00 PM **EXHIBITS (Peachtree Terrace)**
- 4:00 - 6:00 PM **POSTER PRESENTATIONS I. (Authors present from 5:00 – 6:00) (Peachtree F)**
Exercise Evaluation
Body Composition
Psychology/Psychiatry
- 4:00 - 5:30 PM **SYMPOSIA**
(Atlanta G) Physical Activity in Women - the Cross-Cultural Activity Participation Study.
(Atlanta A) Interviews to Internships.
(Atlanta H) Infrared Thermography in the Study of Physiology.
- 4:00 - 5:00 PM **TUTORIALS**
(Atlanta BC) Adventure Racing - A Multi-Discipline Competition in Extreme Environments.(CME1*)
(Atlanta D) Physical Activity In The Prevention And Management Of Diabetes: A Translation For Public Health.(CME1*)
- 4:00 - 5:15 PM **ORAL FREE COMMUNICATIONS**
(Atlanta E) Cardiovascular Function
(Atlanta F) Biomechanics
- 5:15 - 6:00 PM **ORAL FREE COMMUNICATIONS-STUDENT AWARD WINNERS**
(Atlanta BC)
- 7:30 - 9:00 PM **BUSINESS MEETING AND KEYNOTE ADDRESS**
(Peachtree DEF) Presiding – David Nieman,
Introduction of Speaker – Paul Ribisl, Wake Forest University
Speaker: William H. Dietz, M.D., Ph.D
"The Role Of Physical Activity In The Prevention And Treatment Of Childhood Obesity."(CME1*)
- 9:00 - 11:00 PM **SEACSM SOCIAL**
(Peachtree ABC) Supported by a grant from Powerade

FRIDAY, FEBRUARY 1, 2002

- 7:00 - 8:30 AM **WOMEN'S BREAKFAST- (REGISTRATION REQUIRED)**
(Atlanta GH) Introduction – Elizabeth Dowling, Old Dominion University
Speaker: Angela Smith, M.D. "A Focused Pathway - But Notice the Doors"
Supported by donations and grants from Procter and Gamble Pharmaceuticals ,Jen Averill Field Hockey Camp, Barbara Ainsworth, SensorMedics
- 7:00 - 6:00 PM **SPEAKER READY ROOM – (Peachtree G)**
- 8:00 - 6:00 PM **REGISTRATION – (Atlanta Pre-Function)**
- 8:00 - 6:00 PM **EXHIBITS – (Peachtree Terrace)**
- 8:30 - 10:30 AM **POSTER FREE COMMUNICATIONS II. Authors present 9:30 – 10:30 (Peachtree Terrace).**
Biomechanics
Cardiovascular Function
Cellular Regulatory Mechanisms
Nutrition and Sports

- 8:30 - 9:30 AM
(Peachtree DEF) **SEACSM BASIC SCIENCE LECTURE**
Introduction of Speaker – L. Bruce Gladden, Auburn University
Michael Hogan, Ph.D., University of California San Diego, San Diego, CA
“Oxygen Dependence Of Skeletal Muscle Function: From Whole Body To Single Cell.”
- 9:30 – 10:30 AM
(Atlanta B)
(Atlanta C)
(Atlanta D)
(Atlanta E)
(Atlanta F)
(Atlanta H) **TUTORIALS**
Factors Influencing Energy Expenditure Of Youth.
Exercise Neuroscience
Muscle Oxygen Uptake On-Kinetics: Why Is There A Lag In Oxygen Uptake At The Onset Of Exercise?
Publishing in Strength and Conditioning Journal
The Role of Exercise in Managing Blood Lipids and Lipoproteins.
Death on the Field: Tragedy To Be Averted. (CME1*)
- 9:30 – 10:30 AM
(Atlanta G) **ORAL FREE COMMUNICATIONS**
Growth, Development and Aging
- 10:45 - 11:45 AM
(Peachtree DEF) **HENRY J. MONTOYE SCHOLAR LECTURE**
Presiding – Mindy Millard-Stafford, Georgia Institute of Technology
Introduction of Speaker – Steve Bailey, Elon University
J. Mark Davis, Ph.D., University of South Carolina, Columbia, SC (CME1*)
“Nutrition and the Brain: Influence on Performance.”
- 11:45 – 1:00 PM
12:30 – 2:30 PM
(Peachtree Terrace) **PAST PRESIDENT’S LUNCH – (Atlanta A)**
POSTER FREE COMMUNICATIONS III. Authors present 1:30 to 2:30..
Skeletal Muscle
Growth, Development and Aging
Fluids and Electrolytes
- 1:00 – 2:30 PM
(Atlanta B)
(Atlanta G) **SYMPOSIA**
Resistive Training And Type 2 Diabetes (CME1*)
Physical Activity Interventions For Juveniles: Research Results And Practical Implementation,
- 1:30 – 2:30 PM
(Atlanta C) **TUTORIAL**
Cognitive Function: Its Relationship with Physical Activity and Cerebral Blood Flow in Older Adults
- 1:00 – 2:30 PM
(Atlanta H) **ORAL FREE COMMUNICATIONS**
Body Composition, Lipids and Nutrition
- 1:15 – 2:30 PM
(Atlanta D)
(Atlanta E) **ORAL FREE COMMUNICATIONS**
Athletic Care and Trauma, and Competitive Athletes
Endocrinology
- 1:15 – 2:15 PM
(Atlanta F) **ORAL FREE COMMUNICATIONS**
Exercise Evaluation
- 2:45 – 3:45 PM
(Peachtree DEF) **SEACSM INVITED LECTURE**
Introduction of Speaker – Tony Marsh, Wake Forest University
Physical Performance And Disability In Older Populations. (CME1*)
Jack Guralnik, M.D., Ph.D., National Institute of Aging, Bethesda, MD.
- 4:00 – 6:00 PM
(Atlanta BC) **CLINICAL TRACK - Weekend Warrior Knee Module (CME1*)**
Epidemiology of Injury- Bill Kohl, Ph.D.,FACSM, ILSI Center for Health Promotion, Atlanta, GA
Clinical Management of Knee Pain- Angela Smith, M.D.,FACSM, Children’s Hospital, Philadelphia, F
- 4:00 – 5:00 PM
(Atlanta F)
(Atlanta H) **ORAL FREE COMMUNICATIONS**
Pediatric Exercise
Cellular Regulatory Mechanisms and Skeletal Muscle
- 4:00 - 5:00 PM
(Peachtree DEF) **STUDENT SYMPOSIUM**
Introduction of Speaker – Ray Thompson, University of South Carolina
Gregory Heath, Ph.D., Centers for Disease Control & Prevention, Atlanta, GA
Malaria, the Environment, and Chronic Disease: Where does Exercise Science Fit at the CDC?
- 5:00 - 6:00 PM
(Peachtree ABC) **SEACSM GRADUATE STUDENT FAIR**

6:00 – 9:00 PM **CLINICAL TRACK - Weekend Warrior Knee Module* (CME1*)**
(Atlanta DEF) Behavioral Modification - Connie Lebrun, M.D.,FACSM, Fowler Kennedy Clinic, London, Ontario, Canada
 The Knee Exam - Letha Griffin, M.D., Peachtree Orthopedic Clinic, Georgia State University Team Physician, Atlanta, GA
 Radiological Evaluation - Boyd Eaton, M.D., MRI and Imaging of GA, Atlanta, GA
 Rehabilitation - Heloise Belarmino-Jones, ATC
 *includes cocktails and dinner - by invitation only

SATURDAY, FEBRUARY 2, 2002

7:00 - 12:00 **SPEAKER READY ROOM – (Peachtree G)**

8:00 - 9:00 AM **TUTORIALS**
(Atlanta C) Perceptions of Exertion. Implications for the Sport Scientist
(Atlanta D) Exercise and Diabetes Control: A Winning Combination(CME1*)
(Atlanta E) Diastolic Dysfunction: The "Other" Heart Failure. (CME1*)
(Atlanta F) Metabolic Bone Disease In The Athlete: Evaluation And Treatment. (CME1*)
(Atlanta G) The Persistent Effect Of Acute Exercise On Postprandial Lipemia.

8:00 – 9:15 AM **BIOMECHANICS STUDENT SYMPOSIUM**
(Atlanta H)

9:15 – 10:15 AM **ACSM PRESIDENTIAL ADDRESS**
(Peachtree DEF) Introduction of Speaker – Mindy Millard-Stafford, Georgia Institute of Technology
 Angela Smith, M.D., Children’s Hospital, Philadelphia, PA (CME1*)
 “Risks and Benefits of Exercise for Women”

10:15 – 12:00 **POSTER FREE COMMUNICATIONS IV -Authors present 11:00 to 12:00**
(Peachtree Terrace) .Lipid and Protein Metabolism
 Fitness
 Energy Balance and Weight Control

10:30 – 12:30 PM **CLINICAL TRACK - Weekend Warrior Low Back Pain Module (CME1*)**
(Atlanta BC) Clinical Management of Low Back Pain - Ray Cody, M.D., Anne Allen, M.D.
 The Lumbar Spine Exam – Kim Fagan, M.D.
 Radiological Evaluation – Michael Smith, M.D.
 Rehabilitation – Karen Davis, P.T., A.T.C.

1030–11:30AM **TUTORIALS**
(Atlanta D) The Relationship Between Muscle Activation And The Slow Component Rise In Oxygen Uptake Before And After Training
(Atlanta E) The Angina Warning System and Exercise Prescription.
(Atlanta F) The Influence of the Italian Renaissance on the Study of Anatomy and Biomechanics

1030–11:30AM **ORAL FREE COMMUNICATIONS**
(Atlanta G) Hematology/Immunology

10:30 – 12:00 **SYMPOSIUM**
(Atlanta H) Vascular Function In Health And Disease.

12:00 - 2:00 PM **SEACSM LUNCHEON & LECTURE**
(Peachtree ABC) Introduction of Speaker – Michael Berry, Wake Forest University
 Beating Stress Together: The Best Way to Work/Life Balance.
 Wayne M. Sotile, Ph.D., Sotile Associates, Winston-Salem, NC

2:30 – 4:00 PM **SEACSM EXECUTIVE BOARD MEETING**

**SOUTHEAST CHAPTER OF THE AMERICAN COLLEGE OF SPORTS MEDICINE
THIRTYYTH ANNUAL MEETING SCHEDULE SUMMARY**

January 31 – February 2, 2002
The Westin Peachtree Plaza
210 Peachtree Street, Atlanta, GA 30303

Meeting Objectives

The objectives of this annual meeting are to provide students, scientists, educators and sports medicine practitioners with new research findings, a synthesis of current theories and applications, and contemporary approaches in clinical practice. These objectives will be accomplished with featured addresses, poster presentations, tutorials, symposia and free communications.

Learning Objectives

At the conclusion of this course participants should be able to:

1. Understand the biological, biochemical and psychological bases for changes that occur during and following exercise in both normal and pathological states.
2. Identify new approaches to problems in exercise science and sports medicine through interaction among scientists and clinicians.
3. Recognize contemporary controversial issues related to sports medicine and exercise science.
4. 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.

Learning Objectives for Weekend Warrior Module:

At the conclusion of this course participants should be able to:

1. Describe the inter-relationships among exercise, fitness, health and physical performance for active and inactive individuals
2. Evaluate and formulate a treatment plan and provide rehabilitation for exercise-related injury to the knee and lower back
3. Diagnose and formulate a treatment plan for exercise related problems

Sessions for which CME 1 credit is available are noted below as (CME1*)

THURSDAY, JANUARY 31, 2002

- 12:00 - 2:00 BOARD MEETING – (Atlanta H)
- 12:00 - 6:00 REGISTRATION – (Atlanta Pre-Function)
- 12:00 - 9:00 SPEAKER READY ROOM – (Peachtree G)
- 5:00 - 9:00 EXHIBITS – (Peachtree Terrace)
- 4:00 - 6:00 **POSTER PRESENTATIONS I.** Authors present from 5:00 – 6:00.
(Peachtree F)

Exercise Evaluation

- [P1] PALPATED HEART RATE MEASUREMENT ACCURACY IN EXERCISE AND SPORTS SCIENCE STUDENTS. C.M. DeWitt, S.L. Whisenhunt, J.L. Cook, and B.P. Thomas. Exercise and Sports Science. University of South Carolina Aiken, Aiken, SC
- [P2] VALIDITY AND RELIABILITY OF THE COMPUTRAINER CYCLE SIMULATOR. L.C. Eschbach (1), C. Bulla, L. Gillory, R.K. Evans, J.C. Boyd, M. Magal, M.T. Whitehead, and M.J. Webster. (1) Dept. of Health, Physical Education, Dance, Meredith College, Raleigh, NC, Dept. of Human Performance and Recreation, The University of Southern Mississippi, Hattiesburg, MS
- [P3] COMPARISON OF THREE DIFFERENT PEDALING CADENCES ON PREDICTING MAXIMAL OXYGEN UPTAKE. P. Reneau, A. Bryant, L. Davis. Department of Exercise & Sports Sciences, Tennessee Wesleyan College, Athens, TN

- [P4] PHYSIOLOGICAL PROFILE OF AN ELITE FREESTYLE WRESTLER PREPARING FOR COMPETITION: A CASE STUDY. Alan C. Utter, Harold S. O'Bryant, G. Gregory Haff and Gregory A. Trone. Department of Health, Leisure, and Exercise Science, Appalachian State University, Boone, NC
- Body Composition**
- [P5] EFFECTS OF A 24-MONTH RESISTIVE TRAINING PROGRAM ON SUBCUTANEOUS AND CENTRAL FAT DEPOSITS IN OLDER ADULTS. L. Jerome Brandon, Adreinne Lloyd, Dept. of Kinesiology and Health, Georgia State Univ., Atlanta, GA and Rehab R&D Center, VA Medical Center, Decatur, GA
- [P6] USE OF BMI TO SCREEN FOR OBESITY IN GIRLS AND WOMEN. S.G. Cartee, G. Nichols-English, M.S. Litaker, C.A. Howe, P. Barbeau, B. Gutin, FACSM. Georgia Prevention Institute, Department of Pediatrics and Office of Biostatistics and Bioinformatics, Medical College of Georgia, Augusta, GA
- [P7] FOOD INTAKE FOLLOWING EXERCISE IN THERMONEUTRAL AND COOL WATER. Lesley J. White, Erik Holland, and Michael Ferguson. Department of Exercise & Sport Sciences, University of Florida, Gainesville, FL
- [P8] BIA AS A SUBSTITUTE FOR HYDROSTATIC WEIGHING TO PREDICT PERCENT BODY FAT IN COLLEGE FOOTBALL PLAYERS. J. Wingo, J. Bolles, W. Daly, J. Dobridge, and B. Marks. Dept. of Exercise and Sport Science, The University of North Carolina at Chapel Hill, Chapel Hill, NC
- Psychology/Psychiatry**
- [P9] COMPARISON IN RATING OF PERCEIVED EXERTION BETWEEN CARDIAC PATIENTS AND HEALTHY ADULTS DURING TREADMILL WALKING. T.L. Jenkins and A.C. Utter. Dept. of Health, Leisure, and Exercise Science, Appalachian State University, Boone, NC
- [P10] ADHERENCE RATES OF LONG BOUTS VERSUS SHORT BOUTS OF EXERCISE IN HEALTHY, ADULT FEMALES. KD Dukes, JS Hallam, SJ Kinzey. Exercise Science Division, The University of Mississippi, University, MS
- [P11] SEX DIFFERENCES ON CARDIORESPIRATORY RESPONSES, DECISION-MAKING, AND PSYCHOMOTOR PERFORMANCE DURING EXERCISE WITH PSYCHOLOGICAL STRESS. H.E. Webb, M.A. Starks, M.L. Weldy, E.C. Fabianke, G.R. Orndorff, E.O. Acevedo, FACSM, Applied Physiology Lab, University of Mississippi, University, MS
- [P12] PSYCHOLOGICAL STRESS, CARDIORESPIRATORY RESPONSES AND DECISION MAKING DURING EXERCISE. M.L. Weldy, E.C. Fabianke, G.R. Orndorff, H.E. Webb, M.A. Starks, E.O. Acevedo, FACSM, Applied Physiology Laboratory, University of Mississippi, University, MS

4:00-5:30 PM

SYMPOSIA

- [S1] Physical Activity in Women - the Cross-Cultural Activity Participation Study. Barbara E. Ainsworth, J. Larry Durstine, Katrina D. DuBose. The University of South Carolina, Columbia, SC.
Chair - Bonita Marks, The University of North Carolina at Chapel Hill
(Atlanta G)
- [S2] Interviews to Internships.
Donna Scales, Joshua Simmons. East Carolina University, Greenville, NC.
Chair - Paul Reneau, Tennessee Wesleyan College
(Atlanta A)
- [S3] Infrared Thermography in the Study of Physiology.
David D. Pascoe, Joe Molloy, John Eric Smith, Ram C. Purohit. Auburn University, Auburn, AL.
Chair - Linda Chitwood, The University of Mississippi
(Atlanta H)

- 4:00-5:00 PM
[T1] **TUTORIALS**
Adventure Racing - A Multi-Discipline Competition in Extreme Environments. George Wortley. Lynchburg Family Practice Residency, Big Island, VA. (CME1*)
Chair -Carolynn Berry, Winston-Salem State University
(Atlanta BC)
- [T2] Physical Activity In The Prevention And Management Of Diabetes: A Translation For Public Health. Edward W. Gregg, Centers for Disease Control and Prevention, Atlanta, GA. (CME1*)
Chair - Sheri Colberg, Old Dominion University
(Atlanta D)
- 4:00 - 5:15 **ORAL FREE COMMUNICATIONS**
Cardiovascular Function
Chair: Matt Feigenbaum, Furman University
(Atlanta E)
- [O1] 4:00-4:15 SHORT-TERM HANDGRIP TRAINING AUGMENTS VASOREACTIVITY WITHOUT CHANGES IN AUTONOMIC MODULATION OR CENTRAL HEMODYNAMICS.
L. Johnson, J. Allen, A. DeLage, F. Greenway, and M. Welsch. Dept of Kinesiology and Pennington Biomedical Research Cntr, Louisiana State Univ., Baton Rouge, LA
- [O2] 4:15-4:30 VAGAL MODULATION AND CENTRAL HEMODYNAMIC RESPONSE TO COMMON DOSES OF ORALLY ADMINISTERED ASPIRIN DURING DYNAMIC HANDGRIP EXERCISE AND FOREARM OCCLUSION.
H.A. Kluess, R.H. Wood, D. J.Stone, K. O. Wilson, M.A. Welsch. Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA
- [O3] 4:30-4:45 ASSOCIATIONS BETWEEN INDICES OF AUTONOMIC BALANCE, CENTRAL HEMODYNAMICS, FOREARM VASCULAR FUNCTION AND UPPER EXTREMITY EXERCISE PERFORMANCE.
T. Parish, L. Johnson, R. Wood, and M. Welsch. Department of Kinesiology, Louisiana State University, Baton Rouge, LA
- [O4] 4:45-5:00 EVALUATION OF VASOREACTIVITY IN HEART FAILURE PATIENTS ON LONG-TERM ANGIOTENSIN CONVERTING ENZYME INHIBITION AND BETA-BLOCKING THERAPY.
T. Rice, G. Welch, and M. Welsch. Maine Medical Center and Department of Kinesiology, Louisiana State University, Baton Rouge, LA
- [O5] 5:00-5:15 CORRELATION BETWEEN ANKLE-BRACHIAL INDEX, RECOVERY OF OXYGEN SATURATION AND FUNCTION IN PEOPLE AT RISK FOR VASCULAR DISEASE.
Lee Stoner, M. Elaine Cress, FACSM, and Kevin. McCully, FACSM. Dept. of Exercise Science, The University of Georgia, Athens, GA
- 4:00-5:15 PM **ORAL FREE COMMUNICATIONS**
Biomechanics
Chair: Jean McCrory, University of Kentucky
(Atlanta F)
- [O6] 4:00-4:15 THE INFLUENCE OF CONTRACTION VELOCITY AND CONTRACTION TYPE ON ANTAGONIST MUSCLE COACTIVITY DURING ISOKINETIC KNEE EXTENSION
K. Smith, J. Jolla, S. Beam, P. DeVita, FACSM, and T. Hortobagyi, FACSM. Dept. of Exercise & Sport Science, East Carolina University, Greenville, NC
- [O7] 4:15-4:30 THE INFLUENCES OF MODE AND SPEED OF LOCOMOTION ON THE SPEED OF TREADMILL BELT.
L. Ogden, and L. Li. Department of Kinesiology, Louisiana State University, Baton Rouge, LA
- [O8] 4:30-4:45 FREQUENCY AND LOAD EFFECTS ON LOWER EXTREMITY CYCLING KINEMATICS.
L. Mooney, B. Baum, & L. Li. Dept of Kinesiology, Louisiana State Univ., Baton Rouge, LA
- [O9] 4:45-5:00 RELIABILITY TESTS FOR LOCOMOTION STABILITY AND VARIABILITY.
J. Grodesky, and L. Li. Dept of Kinesiology, Louisiana State University, Baton Rouge, LA

- [O10] 5:00-5:15 **STRENGTH TRAINING EXERCISE DID NOT ALTER LOWER EXTREMITY JOINT TORQUES DURING STAIR ASCENT IN PEOPLE WITH KNEE OSTEOARTHRITIS.**
J. Jolla, S. Beam, K. Smith, J. Moody, T. Hortobagyi, FACSM and P. DeVita, FACSM, Dept. of Exercise & Sport Science, East Carolina University, Greenville, NC
- 5:15-6:00 PM **STUDENT AWARD WINNERS-ORAL PRESENTATIONS**
Chair: Ray Thompson, University of South Carolina
(Atlanta BC)
- [O11] 5:15-5:30 **EFFECTS OF OAT BETA-GLUCAN ON SUSCEPTIBILITY TO INFECTION AND MACROPHAGE ANTI-VIRAL RESISTANCE FOLLOWING STRENUOUS EXERCISE.**
Angela Murphy, University of South Carolina
- [O12] 5:30-5:45 **PRIMARY SKELETAL MUSCLE CELL CULTURES: ENDURANCE TRAINED VS. SEDENTARY HUMANS.**
Jason R. Berggren, East Carolina University.
- [O13] 5:45-6:00 **RhoA INDUCTION BY FUNCTIONAL OVERLOAD AND NANDROLONE DECANOATE IN RAT SKELETAL MUSCLE.**
Joseph M. McClung, University of South Carolina
- 7:30-9:00 PM
(Peachtree DEF) **BUSINESS MEETING AND KEYNOTE ADDRESS**
Presiding: David Nieman, Appalachian State University
Introduction of Speaker - Paul Ribisl, Wake Forest University
The Role Of Physical Activity In The Prevention And Treatment Of Childhood Obesity.
William H. Dietz, M.D., Ph.D., Centers for Disease Control and Prevention, Atlanta, GA.
(CME1*)
- 9:00-11:00 PM **SEACSM SOCIAL (Peachtree ABC)**
Supported by a grant from Powerade

FRIDAY, FEBRUARY 1, 2002

- 7:00 - 8:30 AM
(Atlanta GH) **WOMEN'S BREAKFAST (Registration required)**
Introduction - Elizabeth Dowling, Old Dominion University
Speaker: Angela Smith, M.D., Children's Hospital, Philadelphia, PA
"A Focused Pathway - But Notice the Doors"
Supported by donations and grants from Procter and Gamble Pharmaceuticals, Jen Averill Field Hockey Camp, Barbara Ainsworth, SensorMedics
- 7:00 AM-6:00 PM **SPEAKER READY ROOM (Peachtree G)**
- 8:00 AM -6:00 PM **REGISTRATION (Atlanta Pre-Function)**
- 8:00 AM -6:00 PM **EXHIBITS (Peachtree Terrace)**
- 8:00-9:30 AM **POSTER PRESENTATIONS II (Peachtree Terrace)**
Authors present 9:30-10:30 AM
- Biomechanics**
- [P13] **HAMSTRING COACTIVITY DURING QUADRICEPS CONTRACTIONS DIFFERS ACCORDING TO THE METHOD OF COMPUTATION.**
L. Westerkamp, K. Smith, J. Jolla, S. Beam, P. DeVita, FACSM, and T. Hortobagyi, FACSM. Department of Exercise and Sport Science, East Carolina University, Greenville, NC
- Cardiovascular Function**
- [P14] **HEART RATE AND BLOOD PRESSURE RESPONSES DURING ACTIVE STANDING AFTER A HIGH FAT MEAL.**
V. Castellano, L. Stoner, S. Anderson, L. Chambers and K.K. McCully, FACSM. Dept. of Exercise Science, The University of Georgia, Athens, GA

- [P15] THE MAXIMAL PHYSIOLOGICAL RESPONSE OF HEALTHY PARAPLEGICS IN ARM ERGOMETRY VS. AN ACTIVE-PUSH AND PULL MOTION OF THE ARMS USING A SEMIRECUMBENT DEVICE: A PRELIMINARY STUDY.
S. Cormier, P.L. Jacobs*, E.T. Mahoney*, B. Johnson*, P.C. Miller. Department of Sports Medicine, Elon University, Elon, NC & *The Miami Project to Cure Paralysis, University of Miami, Miami, FL
- [P16] FITNESS, FATNESS AND HEART RATE VARIABILITY (HRV) IN 8-11 Y OLD AFRICAN-AMERICAN (AA) GIRLS.
C.A. Howe, P. Barbeau, M.C. Humpries, W. Hoffman, W. Wiggins, B. Gutin, FACSM. Gerogia Prevention Inst., Dept. of Pediatrics, Medical College of Georgia, Augusta, GA
- Cellular Regulatory Mechanisms**
- [P17] PASSIVE SKELETAL MUSCLE ACTIVITY INCREASES SPINAL C-FOS PREDOMINANTLY IN THE SUPERFICIAL DORSAL HORN LAMINA. L.J. Fulk, J. Buggy, J.L. Durstine, and G.A. Hand, Depts of Exercise Science and Pharmacology and Physiology, Univ. of South Carolina, Columbia, SC
- [P18] AGED RAT SOLEUS MUSCLES RESPONSE TO FUNCTIONAL OVERLOAD AND ANABOLIC STEROID ADMINISTRATION.
Won Jun. Lee, Joe. M. McClung, and James. A. Carson. Integrative Muscle Biology Laboratory, Exercise Science Department, University of South Carolina, SC
- [P19] LACTATE DEHYDROGENASE ACTIVITY IN FUNCTIONALLY OVERLOADED RAT PLANTARIS MUSCLE.
T.A. Washington, J.M. McClung, *L.L.Lowe, PhD, and J.A. Carson, PhD, Integrative Muscle Biology Laboratory Department of Exercise Science, University of South Carolina, Columbia, SC 29205, *Department of Biology and Physical Sciences, Benedict College, Columbia, SC
- Nutrition and Sports**
- [P20] EFFECTS OF A DIETARY MILK OR CARBOHYDRATE SUPPLEMENT WITH RESISTANCE TRAINING ON BODY COMPOSITION, MUSCLE STRENGTH AND ANABOLIC HORMONES IN UNTRAINED MEN.
L. Goldman, J.W. Rankin, M. Puglisi, F. Gwazdauskas, S. Nickols-Richardson. Human Nutrition Foods and Exercise, Virginia Tech, Blacksburg, VA
- [P21] EFFECT OF PHYTOCHEMICALS AND ASCORBATE ON EXERCISE-INDUCED OXIDATIVE STRESS.
McAnulty, S.R.* , L. McAnulty*, S. Swick**, G. George*, J.D. Morrow***, C. Dumke**, B. Proulx*, A. Utter FACSM**, and D.C. Neiman FACSM**. *Dept. of Family and Consumer Sciences, Appalachian State University, Boone, NC; **Dept. of Health, Leisure, and Exercise Science, Appalachian State University, Boone, NC; ***Dept. of Medicine and Pharmacology, Vanderbilt University School of Medicine, Nashville, TN
- [P22] EFFECT OF ASCORBATE SUPPLEMENTATION ON OXIDATIVE STRESS DURING AN ULTRAMARATHON.
Swick, S.* , S.R. McAnulty**, L. McAnulty**, J.D. Morrow***, A. Utter FACSM*, D.Vinci*, and D.C. Neiman FACSM*. *Dept. of Health, Leisure, and Exercise Science, Appalachian State University, Boone, NC; **Dept. of Family and Consumer Sciences, Appalachian State University, Boone, NC; ***Dept. of Medicine and Pharmacology, Vanderbilt University School of Medicine, Nashville, TN
- 8:30-9:30 AM
(Peachtree DEF) **SEACSM BASIC SCIENCE LECTURE**
Introduction of Speaker - L. Bruce Gladden, Auburn University
Michael Hogan, Ph.D., University of California San Diego, San Diego, CA
Oxygen Dependence Of Skeletal Muscle Function: From Whole Body To Single Cell.
- 9:30 - 10:30 AM
[T3] **TUTORIALS**
Factors Influencing Energy Expenditure Of Youth.
Robert G. McMurray, University of North Carolina, Chapel Hill, NC
Chair - Beverly Warren, Virginia Commonwealth University
(Atlanta B)

- [T4] Exercise Neuroscience.
Arne Dietrich, Georgia Institute of Technology, Atlanta, GA
Chair - Allan Goldfarb, University of North Carolina Greensboro
(Atlanta C)
- [T5] Muscle Oxygen Uptake On-Kinetics: Why Is There A Lag In Oxygen Uptake At The Onset Of Exercise?
L. Bruce Gladden, Auburn University, Auburn, AL
Chair - Stephen Dodd, University of Florida
(Atlanta D)
- [T6] Publishing in Strength and Conditioning Journal.
T. J. Chandler, Marshall University, Huntington, WV
Chair - Harold O'Bryant, Appalachian State University
(Atlanta E)
- [T7] The Role of Exercise in Managing Blood Lipids and Lipoproteins.
Peter W. Grandjean, Auburn University, Auburn, AL
Chair - Robert Moffat, Florida State University
(Atlanta F)
- [T8] Death on the Field: Tragedy To Be Averted
Walter R. Thompson, Talal Nofal, C. Eric Arnold, Georgia State University, Atlanta, GA (CME1*)
Chair - Alan Utter, Appalachian State University
(Atlanta H)
- 9:30-10:30 AM **ORAL FREE COMMUNICATIONS**
Chair - M. Elaine Cress, University of Georgia.
(Atlanta G)
- [O14] 9:30-9:45 **Growth, Development, and Aging**
A COMPARISON OF STRENGTH IN 20, 30, 40, AND 50 YR OLD TRAINED WEIGHT LIFTERS.
G.J. Abboud and R.P. Tobin. Dept. of HPPERLS. Montclair St. Univ. NJ
- [O15] 9:45-10:00 BIORHYTHMIC VARIATION DURING RESISTANCE EXERCISE IN AGED MEN.
L.L. Bronson, J.E. Powers, M.P. Cadorette, and M.R. Deschenes. Dept. of Kinesiology, The College of William & Mary, Williamsburg, VA
- [O16] 10:00-10:15 OLDER ADULTS USE GREATER RELATIVE EFFORT FOR STAIR ASCENT COMPARED TO YOUNG ADULTS.
C. Mizelle, P. DeVita, FACSM, S. Beam, A. Vestal, J. Jolla, K. Smith, T. Hortobagyi, FACSM. Dept of Exercise and Sports Science, East Carolina University, Greenville, NC
- [O17] 10:15-10:30 MAGNITUDE OF STRENGTH LOSS THROUGHOUT THE VELOCITY RANGE IN YOUNG AND OLD ADULTS.
M. Sabatier, R. Wood., J. Sabatier and M. Welsch. Dept. of Kinesiology, Louisiana State University, Baton Rouge, LA
- * 10:45 - 11:45 AM **HENRY J. MONTOYE SCHOLAR LECTURE**
(Peachtree DEF)
Presiding - Mindy Millard-Stafford, Georgia Institute of Technology
Introduction of Speaker - Steve Bailey, Elon University
Nutrition and the Brain: Influence on Performance. J. Mark Davis, Ph.D., University of South Carolina, Columbia, SC (CME1*)
- 11:45-1:00 PM PAST PRESIDENT'S LUNCH (Atlanta A)
- 12:30 - 2:30 PM **POSTER PRESENTATIONS III** Authors present 1:30 to 2:30 PM
(Peachtree Terrace)
- [P23] **Skeletal Muscle**
A PILOT STUDY ON THE EFFECTS OF MENSTRUAL CYCLE ON MUSCLE FATIGUE.
S. Drake, T.K. Evetovich, L.C. Eschbach, and M.J. Webster, Dept of Kinesiology and Physical Education, Valdosta State University, Valdosta GA

- [P24] THE ROLE OF NITRIC OXIDE IN BLOOD FLOW DIFFERENCES BETWEEN FIBROMYALGIA PATIENTS AND HEALTHY INDIVIDUALS.
McIver, K.* , G. Kemeny*, and R.C. Hickner* , FACSM. Human Performance Laboratory, Department of Exercise and Sport Science* and the Department of Physiology . East Carolina University, Greenville, NC
- [P25] SKELETAL MUSCLE INFLAMMATORY RESPONSES DURING RECOVERY FROM STRENUOUS EXERCISE.
R.W. Thompson, J.M. McClung, L.J. Fulk, G.A. Hand, J.A. Carson, Integrative Muscle Biology Laboratory, Department of Exercise Science, University of South Carolina, Columbia, SC
- Growth, Development and Aging**
- [P26] COMBINING PHYSICAL FUNCTIONAL ABILITY TASKS AND SELF-REPORT OF ADLs PREDICTS HEALTH-RELATED QUALITY OF LIFE IN OLDER ADULTS.
Amy E. Dunbar, Kathryn O. Wilson, Kellye A. Ferachi, Robert H. Wood. Louisiana State University Department of Kinesiology, Baton Rouge, LA
- [P27] RECOVERY FROM RESISTANCE EXERCISE IN MIDDLE-AGED MALES.
J.R. McLester, P. Bishop, J. Smith, L. Wyers, and M. Nevett. Dept. of Kinesiology, The University of Alabama, Tuscaloosa, AL
- [P28] THE EFFECT OF CIRCUIT WEIGHT TRAINING ON FUNCTIONAL FITNESS IN OLDER ADULTS.
P.B. Schuler, The University of West Florida, Pensacola FL
- [P29] RELATIONSHIP BETWEEN LEG-EXTENSOR STRENGTH AND CONTINUOUS SCALE-PHYSICAL FUNCTIONAL PERFORMANCE ITEMS IN INDEPENDENT LIVING VERY-OLD ADULTS.
Kathryn O. Wilson, Amy E. Dunbar, Kellye A. Ferachi, Robert H. Wood, Louisiana State University Department of Kinesiology, Baton Rouge, LA
- Fluids and Electrolytes**
- [P30] AD LIBITUM INGESTION OF WATER FOLLOWING PRESCRIBED VOLUME OF ACETIC ACID (PICKLE JUICE) SOLUTION IN A POST-EXERCISE PERIOD.
R.B. Dale, University of Alabama, Tuscaloosa, AL
- [P31] THE EFFECTS OF GLYCEROL-INDUCED HYPERHYDRATION ON SELECTED SKILL-RELATED PHYSICAL FITNESS VARIABLES.
M. Magal, L. Sistrunk, M.T. Whitehead, R.K. Evans, J.C. Boyd and M.J. Webster. University of Southern Mississippi, Hattiesburg, MS
- 1:00 - 2:30 PM
[S4] **SYMPOSIA**
Resistive Training And Type 2 Diabetes.
L. Jerome Brandon, Ph.D., Eric Arnold, Ph.D., Georgia State University, Atlanta, GA and VA Medical Center, Decatur, GA (CME1*)
Chair - Robert Hickner, East Carolina University
(Atlanta B)
- [S5] Physical Activity Interventions For Juveniles: Research Results And Practical Implementation.
Bernard Gutin, Ph.D., Paule Barbeau, Ph.D., Medical College of Georgia, Augusta, GA
Chair - Pat Nixon, Wake Forest University
(Atlanta G)
- 1:30 - 2:30 PM
[T9] **TUTORIAL**
Cognitive Function: Its Relationship with Physical Activity and Cerebral Blood Flow in Older Adults.
Bonita L. Marks, Ph.D, University of North Carolina, Chapel Hill, NC
Chair - Kevin McCully, University of Georgia
(Atlanta C)
- 1:00-2:30 PM **ORAL FREE COMMUNICATIONS**
Body Composition, Lipids and Nutrition
(Atlanta H)
Chair - Deborah Vinci, Appalachian State University

- [O18] 1:00-1:15 COMPARISON OF HYDRODENSITOMETRY, DUAL-ENERGY X-RAY ABSORPTIOMETRY, AND A FOUR-COMPONENT MODEL FOR THE ESTIMATION OF PERCENT BODY FAT IN FEMALE MASTERS SWIMMERS.
G. Tuuri, M. J. Loftin, University of New Orleans, New Orleans, LA
- [O19] 1:15-1:30 COLLEGE-AGED MALE BODY COMPOSITION IS NOT DIFFERENT BETWEEN AIR DISPLACEMENT PLETHYSMOGRAPHY VS. HYDROSTATIC WEIGHING.
D. Cerasi, M.J. Turner, K.A. DeBate, and A.B. Littrell. Department of Health Promotion and Kinesiology, University of North Carolina at Charlotte, Charlotte, NC
- [O20] 1:30-1:45 DIFFERENCES IN BODY COMPOSITION OF COLLEGE-AGED WOMEN ASSESSED WITH AIR DISPLACEMENT PLETHYSMOGRAPHY.
A.B. Littrell, M.J. Turner, K.A. DeBate, D. Cerasi. Department of Health Promotion and Kinesiology, University of North Carolina at Charlotte, Charlotte, NC
- [O21] 1:45-2:00 CARBOHYDRATE-ELECTROLYTE INGESTION MINIMIZES THE DETRIMENTAL EFFECT OF HEAT ON PROLONGED CYCLING PERFORMANCE.
T.J. Rogozinski, D.J. Stewart, S.A. Arngrimsson, D. Jorgensen, and K.J. Cureton. Dept. of Exercise Science, The University of Georgia, Athens, GA
- [O22] 2:00-2:15 THE EFFECT OF DIETARY RESTRICTION AND EXERCISE ON HOMOCYSTEINE IN MILD TO MODERATELY OBESE ADULTS.
B. Marks, L. Katz, S. Allen, L. Williams, D. Culmer, M. Mahr, S. Zeisel. Depts. of Exercise & Sport Science, Emergency Medicine, & Nutrition, Univ. of North Carolina at Chapel Hill, NC
- [O23] 2:15-2:30 CAFFEINE EFFECTS ON MOTOR CORTICAL EXCITABILITY AS MEASURED BY TRANSCRANIAL MAGNETIC STIMULATION.
M.D. Carmichael, E.A. Murphy, and J.M. Davis. Dept. of Exercise Science, The University of South Carolina, SC
- 1:15-2:30 PM **ORAL FREE COMMUNICATIONS**
Athletic Care and Trauma, and Competitive Athletes
(Atlanta D)
Chair - Jeff Chandler, Marshall University
- [O24] 1:15-1:30 ACUTE EFFECTS OF MASSAGE ON RECOVERY AND JUMPING PERFORMANCE.
J.M. Carlock, H.S. O'Bryant and M.K. Erixon. Biomechanics Laboratory, Appalachian State University, Boone, NC
- [O25] 1:30-1:45 MEDICAL COVERAGE OF HIGH SCHOOL ATHLETICS IN NORTH CAROLINA.
D.F. Aukerman, M.D and D.G. Browning, M.D., ATC-L. Department of Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, NC
- [O26] 1:45-2:00 EFFECTS OF PASSIVE STRETCHING ON VOLLEYBALL BLOCK JUMPING.
M.K. Erixon, H.S. O'Bryant, J. Carlock and C.F. Redding. Biomechanics Laboratory, Appalachian State University, Boone, NC
- [O27] 2:00-2:15 PREVALENCE OF EXERCISE INDUCED MUSCLE CRAMPS DURING ULTRADISTANCE RUNNING EVENTS.
C.L. Dumke, Department of Health, Leisure, and Exercise Science, Appalachian State University, Boone, NC
- [O28] 2:15-2:30 AEROBIC BENEFITS OF ANAEROBIC TRAINING IN FEMALE COLLEGIATE VOLLEYBALL PLAYERS.
R. Adams, P. Bryant, G. May. University of West Alabama, Livingston, AL
- 1:15-2:30 PM **ORAL FREE COMMUNICATIONS**
Endocrinology
(Atlanta E)
Chair - Dean Jacks, Winston-Salem State University
- [O29] 1:15-1:30 THE IMPACT OF PHYSICAL ACTIVITY DIFFERENCES ON SEX HORMONE VALUES BETWEEN TWO COLLEGE FEMALE POPULATIONS.
W.R. Barfield,* J.F. Otteni, A.M. McBryde, J.S. Carter, and P.J. Nietert, *College of Chas & Dept of Orthopaedics, MUSC, Charleston, SC

- [O30] 1:30-1:45 SEROTONERGIC MEDIATION OF THE HYPOTHALAMIC-PITUITARY-ADRENAL RESPONSE TO PROLONGED EXERCISE.
C.A. Seegers, D.K. Williams & A.C. Hackney, FACSM. Dept. Exercise & Sport Science, University of North Carolina, Chapel Hill, NC
- [O31] 1:45-2:00 THE INSULIN RESPONSE TO A MODERATE INTENSITY 30-MINUTE SWIM IN HEALTHY ADULTS.
D.A. Rubin, R.G. McMurray and A.C. Hackney. University of North Carolina, Chapel Hill, NC
- [O32] 2:00-2:15 INFLUENCE OF ESTROGEN REPLACEMENT ON SUBSTRATE METABOLISM IN EXERCISING POSTMENOPAUSAL WOMEN.
J. Dobridge, C. Williams, W. Meyer, and A.C. Hackney, FACSM. Applied Physiology Laboratory, University of North Carolina, Chapel Hill, NC
- [O33] 2:15-2:30 INFLUENCE OF EXERCISE INDUCED HYPERCORTISOLISM ON TESTOSTERONE.
W. Daly, C.A. Seegers, J. Dobridge, and A.C. Hackney FACSM. Applied Physiology Laboratory. Department of Exercise & Sports Science, The University of North Carolina at Chapel Hill, Chapel Hill, NC
- 1:15-2:15 PM **ORAL FREE COMMUNICATIONS**
Exercise Evaluation
(Atlanta F)
Chair - Walt Thompson, Georgia State University
- [O34] 1:15-1:30 VO2 MAX COMPARISON BETWEEN SEATED AND STANDING CYCLE ERGOMETRY.
AM Bosak, JM Green, TR Crews, RE Deere. Dept. of Physical Education and Recreation, Western Kentucky University, Bowling Green, KY, Dept. of Kinesiology, University of Alabama, Tuscaloosa, AL
- [O35] 1:30-1:45 PHYSIOLOGICAL AND PERCEPTUAL RESPONSES BETWEEN TREADMILL AND ELLIPTICAL EXERCISE.
JM Green, TR Crews, R Pritchett, C Mathfield, L Hall, Dept of Physical Education and Recreation, Western Kentucky University Bowling Green, KY, Dept of Health Promotion and Physical Education, University of Louisville, Louisville KY
- [O36] 1:45-2:00 RELIABILITY OF THE 30-SECOND CYCLE WINGATE ANAEROBIC TEST IN UNTRAINED, COLLEGE-AGED WOMEN.
M.R. Kushnick, C.S. Katsanos, J.P. Berwick, R.J. Moffatt. Exercise Physiology Laboratory, Florida State University, Tallahassee, FL
- [O37] 2:00-2:15 THE EFFECTS OF LONG DURATION CONCENTRIC OR ECCENTRIC CONTRACTIONS ON MAXIMAL STRENGTH, MUSCULAR ENDURANCE, AND OXYGEN CONSUMPTION.
T. Brown, B. Hickner, C. Evans, K. Rehm, J. Lore, S. Keller, T. Hortobagyi. Department of Exercise & Sport Science, East Carolina University, Greenville, NC
- * 2:45 - 3:45 PM **SEACSM INVITED LECTURE**
(Peachtree DEF)
Introduction of Speaker - Tony Marsh, Wake Forest University
Physical Performance And Disability In Older Populations.
Jack Guralnik, M.D., Ph.D., National Institute of Aging, Bethesda, MD. (CME1*)
- 4:00 - 6:00 PM **CLINICAL TRACK - Weekend Warrior Knee Module (CME1*)**
(Atlanta BC)
Supported by grants from Pharmacia, MRI & Imaging of Georgia, and Encore Orthopedics
Epidemiology of Injury- Harold W. Kohl Ph.D, ILSI Center for Health Promotion, Atlanta, GA
Clinical Management of Knee Pain- Angela Smith, M.D., Children's Hospital, Philadelphia, PA
- 4:00 - 5:00 PM **ORAL FREE COMMUNICATIONS**
Pediatric Exercise
(Atlanta F)
Chair - Robert McMurray, The University of North Carolina
- [O38] 4:00-4:15 OBESITY AS A MAJOR DETERMINANT OF AEROBIC FITNESS IN CHILDREN WITH ASTHMA.
M.L. McManama, P.A. Nixon, I.M. Hoffman, and J.W. Georgitis, Wake Forest University School of Medicine, Winston-Salem, NC

- [O39] 4:15-4:30 BODY SHAPE AND FITNESS LEVELS OF MIDDLE SCHOOL STUDENTS.
J.L. Bergen & S. Ryan. University of West Florida, Pensacola, FL
- [O40] 4:30-4:45 UPPER BODY STRENGTH IN 11-13 YEAR OLD STUDENTS IS INCREASED WITH 12 WEEKS OF GRAVITRON TRAINING.
N.Howard, D.Torok, FACSM, M.Sirounis, S.Graves, FACSM, J.O'Kroy, FACSM, Department of Exercise Science & Health Promotion, Florida Atlantic University, Davie, FL
- [O41] 4:45-5:00 NUTRITION AND PHYSICAL ACTIVITY NEEDS ASSESSMENT IN ELEMENTARY SCHOOLS -PUTTING LESSONS LEARNED INTO PRACTICE.
T.E. Tanner, J.A. Stewart*, D. Stokes, A.R. Scott*, & S.F. Wetterhall. DeKalb County Board of Health, Decatur GA, *Dept. Kinesiology and Health, Georgia State University, Atlanta, GA
- 4:00 - 5:00 PM **ORAL FREE COMMUNICATIONS**
Cellular Regulatory Mechanisms and Skeletal Muscle
(Atlanta H)
Chair - Chris Ingalls, Georgia State University
- [O42] 4:00-4:15 EFFECTS OF UNLOADING ON SYNAPTIC STRUCTURE IN AGED AND YOUNG ADULT MUSCLE.
Meredith H. Wilson and Michael R. Deschenes. Dept. of Kinesiology, College of William and Mary, Williamsburg, VA
- [O43] 4:15-4:30 INFLUENCE OF GENDER ON RESISTANCE TRAINING-INDUCED MYOSIN ISOFORM SHIFTS AND MYOFIBER HYPERTROPHY IN OLDER ADULTS.
MM Bamman(1,2), VJ Hill(2), BA Gower(3), & GR Hunter(4) (1)Geriatric Research, Education, & Clinical Center, VA Medical Center, Departments of (2)Physiology & Biophysics, (3)Nutrition Sciences, & (4)Human Studies, The Univ. of Alabama at Birmingham, Birmingham, AL
- [O44] 4:30-4:45 VALIDATION OF AN IN VIVO RAT MODEL FOR DETERMINATION OF MUSCLE FUNCTION.
Andrew Judge, Tony Payne, Stephen Dodd, Center for Exercise Science, University of Florida, Gainesville, FL
- [O45] 4:45-5:00 CONTRACTILE PROPERTIES OF BOTULINUM NEUROTOXIN A-TREATED SKELETAL MUSCLE.
Payne AM, Judge AR, Selsby JT, Smith IJ, and Dodd SL. Center for Exercise Science, College of Health and Human Performance, University of Florida, Gainesville, FL
- 4:00 - 5:00 PM **STUDENT SYMPOSIUM**
(Peachtree DEF)
Introduction of Speaker - Ray Thompson, University of South Carolina
Malaria, the Environment, and Chronic Disease: Where does Exercise Science Fit at the CDC?
Gregory Heath, Ph.D., Centers for Disease Control & Prevention, Atlanta, GA
- 5:00 - 6:00 PM **SEACSM GRADUATE STUDENT FAIR**
(Peachtree ABC)
Chair: Craig Broeder, East Tennessee State University
- 6:00 - 9:00 PM **CLINICAL TRACK - Weekend Warrior Knee Module* (CME1*)**
(Atlanta DEF)
Behavioral Modification - Constance Lebrun MD, FACSM, Fowler Kennedy Clinic, London, Ontario/Canada, London, Ontario, Canada and Jennifer Kelly PhD., Atlanta Center for Behavioral Medicine, Atlanta, GA
The Knee Exam - Letha "Etty" Griffen MD, Peachtree Orthopedic Clinic, Georgia State University Team Physician, Atlanta, GA
Radiological Evaluation - Boyd Eaton, M.D., Radiology, MRI and Imaging of Georgia, Atlanta, GA
Rehabilitation - Heloise Belarmino-Jones, A.T.C., Head Womens Trainer, University of Alabama Birmingham, Birmingham, AL
*includes cocktails and dinner - by invitation only

SATURDAY, FEBRUARY 2, 2002

- 7:30-9:00 AM REGISTRATION (Atlanta Pre-Function)
- 7:00 - 12:00 SPEAKER READY ROOM (Peachtree G)

- 8:00 - 9:00 AM
[T10] **TUTORIALS**
Perceptions of Exertion. Implications for the Sport Scientist.
John Meis, Ph.D., and David Pargam, Ph.D., Florida State University, Tallahassee, FL
Chair - Shannon Mihalko, Wake Forest University
(Atlanta C)
- [T11] Exercise and Diabetes Control: A Winning Combination.
Sheri R. Colberg, Ph.D., Old Dominion University, Norfolk, VA (CME1*)
Chair - Jerry Brandon, Georgia State University
(Atlanta D)
- [T12] Diastolic Dysfunction: The "Other" Heart Failure.
Peter H. Brubaker, Ph.D., Wake Forest University, Winston-Salem, NC (CME1*)
Chair - Michael Welsch, Louisiana State University
(Atlanta E)
- [T13] Metabolic Bone Disease In The Athlete: Evaluation And Treatment.
Ron R. Lee, M.D., University of South Alabama, Mobile, AL (CME1*)
Chair - George Wortley, Lynchburg Family Practice Residency
(Atlanta F)
- [T14] The Persistent Effect Of Acute Exercise On Postprandial Lipemia.
Darby J. Stewart, Ph.D., The University of Georgia, Athens, GA (CME1*)
Chair - Dixie Thompson, The University of Tennessee
(Atlanta G)
- 8:00 - 9:15 AM **ACSM BIOMECHANICS STUDENT SYMPOSIUM**
(Atlanta H)
Chair - Kathy Simpson
- 9:15 - 10:15 AM **ACSM ACSM PRESIDENTIAL ADDRESS**
(Peachtree DEF)
Introduction of Speaker - Mindy Millard-Stafford, Georgia Institute of Technology
"Risks and Benefits of Exercise for Women."
Angela Smith, M.D., Children's Hospital, Philadelphia, PA (CME1*)
- 10:15 - 12:00 **POSTER PRESENTATIONS IV** Authors present 11:00 to 12:00
(Peachtree Terrace)
- Lipid and Protein Metabolism**
- [P32] NUTRIENT INTAKE AND THE EFFECT OF A NUTRITION EDUCATION PROGRAM IN OLDER ADULTS WITH CARDIOVASCULAR DISEASE.
G.E. Austin, G.D. Miller, K. Meyer, P.H. Brubaker, W.J. Rejeski, Department of Health and Exercise Science, Wake Forest University, Winston-Salem, NC
- [P33] ROLES OF AGE AND GENDER ON ENERGY EXPENDITURE DURING REST AND FOLLOWING A MEAL.
J.A. Genin, T.L. Bonoffski, G.D. Miller, Department of Health and Exercise Science, Wake Forest University, Winston-Salem, NC
- [P34] THE INFLUENCE OF RACE AND BODY COMPOSITION ON PHYSICAL ACTIVITY LEVEL IN COLLEGE-AGE FEMALES.
M.M. Graves, L.F. Chitwood*, M.J. Comeau, J.S. Hallam*, S.J. Kinzey*, & D.A. Frate*.
Dept. of Health, Physical Education, & Sports Sciences, Arkansas State University, Jonesboro, AR. *Dept. of Health, Exercise Science & Recreation Management, The University of Mississippi, Oxford, MS
- [P35] EFFICACY OF A PHYSICIAN DIRECTED WEIGHT LOSS PROGRAM IN OVERWEIGHT/OBESE WOMEN.
A. Zuckerman, A. Faul, L. Marsh, P. Martin and M. Welsch. Pennington Biomedical Research Cntr and Dept. of Kinesiology, Louisiana State Univ., Baton Rouge, LA.
- [P36] DIETARY INTAKE IN WOMEN FOLLOWING TREATMENT FOR BREAST CANCER.
C.P. O'Brien, G.D. Miller, S. Mihalko, G. Brenes, Department of Health and Exercise Science, Wake Forest University, Winston-Salem, NC.

Fitness

- [P37] VO2-170 AS AN INDEX OF CARDIOVASCULAR FITNESS IN 8-11 Y OLD GIRLS. M.C. Humphries, P. Barbeau, C.A. Howe, M.S. Litaker, R.Bassali, B. Gutin, FACSM, Georgia Prevention Institute, Dept. of Pediatrics, and Office of Biostatistics and Bioinformatics, Medical College of Georgia, Augusta, GA
- [P38] COMPARATIVE EFFECTS OF AN INTERVAL TRAINING AND A CONTINUOUS TRAINING PROGRAM OF EQUAL BOUT DURATION. Gene May. Department of Physical Education and Athletic Training, University of West Alabama, Livingston, AL
- [P39] PHYSICAL EDUCATION IMPROVES ONE-MILE RUN PERFORMANCE OF MIDDLE SCHOOL BOYS AND GIRLS. C. M. Mier, FACSM and D. Dunning. Dept Sport and Exercise Sciences, Barry University, Miami Shores, FL
- [P40] VARIABILITY OF THE CSA ACCELEROMETER MOTION SENSOR. D.K. Williams, R.G. McMurray, & D.J. Catellier. Dept. of Exercise and Sport Science & CSCC, University of North Carolina, Chapel Hill, NC

Energy Balance and Weight Control

- [P41] DIFFERENTIAL EXPRESSION OF eNOS PROTEIN IN ADIPOSE TISSUE OF OBESE AND NON-OBESE HUMANS. Kemeny, G, V. Galvin, H. Barakat, J. Privette, and R.C. Hickner, FACSM. Human Performance Laboratory, Department of Exercise and Sport Science, Department of Physiology, and Department of Biochemistry, East Carolina University, Greenville, NC
- [P42] EFFECT OF EXERCISE INTENSITY AND MENSTRUAL CYCLE STATUS ON PLASMA PROTEIN CARBONYLS. T. You, A.H. Goldfarb, FACSM, R. Bloomer, C. Murphy and S. Landes. Department of Exercise and Sport Science, University of North Carolina at Greensboro, Greensboro, NC

10:30 - 12:30 AM
(Atlanta BC)

CLINICAL TRACK - Weekend Warrior Low Back Pain Module (CME1*)

Clinical Management of Low Back Pain - Raydon C. Cody, M.D., Assistant Prof PM&R, University of Vermont, Burlington, VT, and Joanne B. "Anne" Allen M.D., Private Practice, Physical Medicine and Rehabilitation, SailSportMed, Atlanta, GA and Constance Lebrun M.D., FACSM, Fowler Kennedy Clinic, London, Ontario, Canada
The Lumbar Spine Exam - Kim Fagan, M.D., Private Practice, Internal Medicine/Sports Medicine, Birmingham, AL
Radiological Evaluation - Michael Smith, M.D., Radiology, MRI and Imaging of Georgia, Atlanta, GA
Rehabilitation - Karen E. Davis M.P.T., O.C.S., A.T.C., Sports Rehabilitation Specialists, Decatur, GA

10:30 - 11:30 AM
[T15]

TUTORIALS

The Relationship Between Muscle Activation And The Slow Component Rise In Oxygen Uptake Before And After Training.

Michael J. Saunders, Ph.D., James Madison University, Harrisonburg, VA
Chair - David Bassett, University of Tennessee
(Atlanta D)

[T16]

The Angina Warning System and Exercise Prescription.

Matt S. Feigenbaum, Ph.D., J. Larry Durstine, Ph.D., Furman University, Greenville, SC and the University of South Carolina, Columbia, SC
Chair - Don Bergey, Wake Forest University
(Atlanta E)

[T17]

The Influence of the Italian Renaissance on the Study of Anatomy and Biomechanics.

Kristinn I. Heinrichs, Ph.D., Armstrong Atlantic State University, Savannah, GA
Chair - Tibor Hortobagyi, East Carolina University
(Atlanta F)

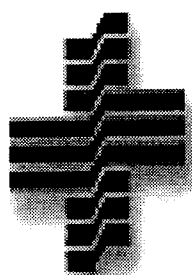
10:30-11:30 AM ORAL FREE COMMUNICATIONS

Hematology/Immunology

(Atlanta G)

Chair - David Nieman, Appalachian State University

- [O46] 10:30-10:45 **EFFECTS OF GENDER AND FATIGUING EXERCISE ON SUSCEPTIBILITY TO RESPIRATORY INFECTION.**
A.S. Brown, J.M. Davis, E.A. Murphy, K.A. Mehl, A. Ghaffar, and E. Mayer. Departments of Exercise Science and Microbiology and Immunology, The University of South Carolina, Columbia, SC
- [O47] 10:45-11:00 **EFFECT OF SAMPLING TECHNIQUE ON PLASMA ENDOTHELIN-1 CONCENTRATION.**
R.J. Bloomer, T. You, P.G. Davis, The University of North Carolina at Greensboro, Greensboro, NC
- [O48] 11:00-11:15 **INFLUENCE OF VITAMIN C SUPPLEMENTATION ON OXIDATIVE AND SALIVARY IGA CHANGES FOLLOWING AN ULTRAMARATHON.**
Zika Palmer, Appalachian State University, Boone, NC
- [O49] 11:15-11:30 **THE EFFECTS OF ACUTE EXERCISE ON NEUTROPHIL-INDUCED OXIDATIVE STRESS. C**
Quindry, W Stone, J King, and C E Broeder, Biomedical Sciences - Dept. of Physiology, East Tennessee State University, Johnson City, TN
- 10:30 - 12:00
[S6] **SYMPOSIA**
Vascular Function In Health And Disease.
Michael Welsch, Ph.D., Kevin McCully, Ph.D., Jennifer Olive, M.S., Jason Allen, M.S., Louisiana State University, Baton Rouge, LA, University of Georgia, Athens, GA, Duke University, Durham, NC
Chair - Paul Davis, University of North Carolina - Greensboro
(Atlanta H)
- Noon-2:00 PM
(Peachtree ABC) **SEACSM LUNCHEON AND LECTURE**
Introduction of Speaker - Michael Berry, Wake Forest University
Wayne M. Sotile, Ph.D., Sotile Associates, Winston-Salem, NC
" Beating Stress Together: The Best Way to Work/Life Balance"
- 2:30-4:00 PM **SEACSM EXECUTIVE BOARD MEETING**



SENSORMEDICS
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ADVENTURE RACING - A MULTI-DISCIPLINE COMPETITION IN EXTREME ENVIRONMENTS

George Wortley, FACSM, Lynchburg Family Practice Residency, Lynchburg, VA

- Purpose: 1) Describe the multi-discipline sport of Adventure Racing.
 2) Discuss the sport science and medical aspects of athletic competitions at extremes of altitude, barometric pressure, heat, cold, distance and sleep deprivation.
 3) Discuss medical care at such events.

T1

Content: Adventure Racing typically includes elements of running, mountain biking, whitewater sports, climbing and navigation. Events range from 3 hours to 2 weeks in duration. In several events athletes compete at high elevation (19,700 feet), high pressure (underwater SCUBA), and extremes of heat and cold. Adventure Racing is one of the few sports in which physical and cognitive functions are tested under conditions of sleep deprivation and environmental stress. This presentation will present data from ongoing studies of injury rates and biochemical abnormalities during competition. The difficulty of providing medical and safety coverage for such events in a wilderness environment will be discussed. Ideas for future research will be presented.

Target Audience - Physicians, Exercise Physiologists, Athletic Trainers, Competitors

PHYSICAL ACTIVITY IN THE PREVENTION AND MANAGEMENT OF DIABETES: A TRANSLATION FOR PUBLIC HEALTH

E.W. Gregg, Centers for Disease Control and Prevention, Atlanta, GA

T2

Physical activity has been part of recommended therapy for patients with diabetes for several decades. However, only recently have epidemiologic studies and controlled trials begun to clarify the role of physical activity in the prevention of diabetes and its complications.

Recent randomized controlled trials conducted in China, Finland, and the United States have shown that lifestyle interventions employing regular exercise can reduce diabetes incidence by 30 to 60% in high-risk individuals. For people who already have diabetes, regular physical activity improves cardiovascular risk factors, such as HDL cholesterol, blood pressure, and fibrinogen levels. Meta-analyses suggest that short-term exercise programs improve glycosylated hemoglobin levels by about 0.7 percentage points, an effect that if sustained, could lead to significant reductions in risk for diabetic eye, kidney, and nerve disease. Recent epidemiologic studies also suggest that physical activity increases the life span of people with diabetes.

Several important questions remain about physical activity and secondary prevention for people with diabetes. The direct relationship between physical activity and incidence of microvascular and macrovascular complications of the disease has not been established. Similarly, the feasibility and relative effectiveness of physical activity interventions for people who already have diabetic complications is not established, and the ideal types and dosages of physical activity for optimal benefit is unclear. Perhaps most importantly, effective strategies for increasing physical activity levels across the broad and increasing population of people with diabetes have not been identified.

FACTORS INFLUENCING ENERGY EXPENDITURE OF YOUTH

Robert G. McMurray, Department of Exercise and Sport Science, University of North Carolina, Chapel Hill, NC

T3

Research has noted that youth are not simply small adults; they have their own physiology that changes as they grow. The differences result in higher resting and exercise energy expenditures than adults. The purpose of this tutorial is to discuss factors that influence exercise energy expenditure in youth. The presentation is divided into three sections. The first focuses on the standardization or normalization of energy expenditure to account for differences in the size of youth. The second examines the relationship between chronological and biological maturity and energy expenditure. The third section considers the influence of gender, resting energy expenditure, mechanical efficiency, substrate use, gait kinematics, stride frequency, ventilation, and body composition on energy expenditure during exercise. Finally, conclusions will be made regarding which factors are most important when attempting to compare the exercise energy expenditure of youth to adults. The presentation is appropriate for anyone working with developmental exercise physiology or nutrition.

EXERCISE NEUROSCIENCE

Arne Dietrich, Ph.D., Visiting Faculty, Department of Health & Performance Sciences, Georgia Institute of Technology, Atlanta, GA

T4

The purpose of this tutorial is to introduce interested researchers in the field of exercise science to recent developments in the neurosciences. There is a large body of evidence demonstrating that exercise is beneficial to mental health. The positive effects of exercise on stress, anxiety, depression, attention, and general well being are well documented. Despite this knowledge base, few researchers have designed studies to investigate possible brain mechanisms. From a neuroscientific perspective, this is wholly unsatisfactory. Instead of using global chemical explanations such as the serotonin or endorphin hypotheses, which have sweeping effects on brain function, it would be advisable to focus on the functions of the specific neural structures implicated in these mental health problems. A working knowledge of the neurobiology of these disorders is indispensable if we are to gain insight into how exercise affects them. At the most basic level, exercise must affect brain function to change mood and cognition, even when considering entirely psychological explanations such as the distraction hypothesis. Methodological problems and shortcomings of current explanations will be illustrated with the endorphin hypothesis.

MUSCLE OXYGEN UPTAKE ON-KINETICS: WHY IS THERE A LAG IN OXYGEN UPTAKE AT THE ONSET OF EXERCISE?

L. Bruce Gladden, Department of Health & Human Performance, Auburn University

T5

Upon the transition from rest to exercise or from a lower to a higher work rate, the increase in muscle oxygen uptake is not instantaneous. Instead, the rise in oxygen uptake lags behind a square wave increase in work rate; the pattern of the oxygen uptake time course is called "oxygen uptake on-kinetics". What is the cause of this lag in the adjustment of oxidative metabolism? Historically, there have been two competing hypotheses: 1) there is a lag in the adjustment of blood flow and therefore oxygen delivery to active muscle thus limiting the rate of rise of oxygen uptake, and 2) oxygen uptake lags because time is required for the accumulation of stimuli to activate oxidative phosphorylation. It is the purpose of this tutorial to provide some history of oxygen uptake on-kinetics.

PUBLISHING IN STRENGTH AND CONDITIONING JOURNAL

TJ Chandler, EdD, CSCS*D, FACSM, Marshall University, Huntington, WV.

T6

The purpose of this tutorial is to provide insight in the process of submitting a paper to a professional journal. Strength and Conditioning Journal (SCJ) is the professional journal of the National Strength and Conditioning Association (NSCA). SCJ is a peer reviewed journal that publishes papers on topics related to strength and conditioning of both athletes and non-athletes. The NSCA provides certifications in both strength and conditioning (CSCS) and personal training (NSCA-CPT), so articles are written primarily to meet the needs of these groups. SCJ will accept for peer review both full length articles and columns, which are short with a practical "take home" message. This tutorial will review the appropriate procedures for writing and submitting an article or a column. Information will be provided on writing style, photographs, figures and tables, references, choosing a title, the review process, and the process of submitting to a professional journal. The target audience for this presentation will be young faculty and graduate students with an interest in strength and conditioning.

THE ROLE OF EXERCISE IN MANAGING BLOOD LIPIDS AND LIPOPROTEINS

Peter W. Grandjean, Ph.D., Auburn University, Auburn AL 36849

T7

The recent update by the National Cholesterol Education Program, Adult Treatment Panel III (ATP III) includes recommendations for a more aggressive approach to managing dyslipidemias. The ATP III recommendations are primarily aimed at reducing high levels of LDL cholesterol, but include well defined strategies for managing other common forms of dyslipidemias. Physical activity and, in particular, endurance exercise are recognized by the ATP III as part of an overall strategy for modifying blood lipid and lipoprotein concentrations.

The purpose of this presentation is to explain our current understanding of the blood lipid and lipoprotein responses to exercise in normal and dyslipidemic individuals and to explore possible mechanisms by which exercise alters lipid transport. The information covered in this presentation should be of interest to exercise scientists, exercise science graduate students, nutritionists and other sports medicine professionals.

DEATH ON THE FIELD: TRAGEDY TO BE AVERTED

Walter R. Thompson, Ph.D., FACSM, Talal Nofal, P.T., M.S., C. Eric Arnold, M.S. Department of Kinesiology and Health, Georgia State University, Atlanta, Georgia 30303.

T8

On August 1, 2001 a 27-year old professional football player collapsed and died after practicing in the heat on a day the Heat Index was 110. Just six days earlier, a college football player died after collapsing on the field from heatstroke. Since 1995, 19 high school and college football players have died from heat-related deaths. Most medical experts, trainers, physiologists, public health officials and the players themselves believe these are senseless deaths that are entirely preventable. The purpose of this tutorial will be to review and analyze exercise heat-related mortality and morbidity statistics, current exercise guidelines of the ACSM, the NATA, and the American Football Coaches Association and the conditions under which these guidelines are violated. A concurrent purpose will be to review heat stress physiology and how it relates to the current guidelines. The target audience includes students of physiology, sport, athletic training, and public health policy professionals.

COGNITIVE FUNCTION: ITS RELATIONSHIP WITH PHYSICAL ACTIVITY AND CEREBRAL BLOOD FLOW IN OLDER ADULTS.

Bonita L. Marks, Ph.D, FACSM, University of North Carolina at Chapel Hill.

T9

Cognitive impairment has long been acknowledged as one of the top three risk factors contributing to declining health in older adults. However, determining the biological mechanisms behind declining cognitive function using non-invasive methods has been slow to emerge. The development of more reliable, less invasive, and less costly monitoring devices such as the transcranial doppler (TCD) has made the process much more attainable for evaluation in clinical settings. This tutorial will highlight the potential inter-relationships between cerebral blood flow, cognitive function, and physical activity in older adults. It will also include a brief audience participation segment where the audience will get to take a visual-spatial memory recall test used by the author in her cerebral blood flow studies which was evaluated by TCD sonograms.

TARGET AUDIENCE: Students and faculty/professionals with an interest in aging and the effect regular physical activity may have on maintaining cognitive function.

PERCEPTIONS OF EXERTION. IMPLICATIONS FOR THE SPORT SCIENTIST

John Meis and David Pargam, Department of Educational Research, Florida State University, Tallahassee, Florida

T10

The process of perception has been addressed by sport scientists from a variety of different disciplines, and from a variety of theoretical foundations. This presentation will examine the approaches which appear the most efficacious in sport and physical activity, and hold the most promise for providing understanding of the process of perception. A comprehensive conceptual model based on a systems approach will be presented which traces the perceptual process from detection of a stimulus through its transmission, the conscious recognition of the stimulus, to the final behavioral reaction to the stimulus. Potential points of intervention in this process will be discussed, and studies presented detailing methods of modifying perceptions of difficulty, enjoyment and exertion during aerobic exercise. Implications of perception modification strategies for the improvement of exercise and rehabilitation program adherence rates will be addressed.

EXERCISE AND DIABETES CONTROL: A WINNING COMBINATION

Sheri R. Colberg, Ph.D., FACSM, Old Dominion University

T11

The purpose of this tutorial is to educate the audience about the safe and effective use of exercise as a management tool for all forms of diabetes. Diabetes is increasing to epidemic proportions in the U.S. and abroad. This tutorial will address this growing problem and how exercise is a winning part of the overall solution. Topics covered will include: types and causes of diabetes, prevention of type 2 diabetes with exercise, acute and chronic effects of exercise on diabetes control, hormonal responses and glycemia during exercise, exercise recommendations and guidelines for maintaining glycemia, exercise prescription for diabetic individuals, exercise precautions, and management of exercise with diabetic complications. The intended target audience is diabetic exercisers, healthcare professionals, exercise leaders, physical educators, personal trainers, coaches, friends and family of diabetic individuals, and other interested parties.

DIASTOLIC DYSFUNCTION: THE "OTHER" HEART FAILURE

Peter H. Brubaker PhD FACSM. Wake Forest University

T12

Heart Failure (HF) is a major cause of mortality and morbidity in the United States and is the leading cause of hospitalization in the elderly. Several recent epidemiological studies (1-6) have confirmed that many older patients who present with HF symptoms have preserved left ventricular systolic function. In both the Framingham and Cardiovascular Health Studies (CHS), preserved systolic function (i.e. EF > 50%) was present in over 50% of subjects with CHF (2,3). In these population-based studies, the mean age of the subjects with this syndrome was >70 years and it was significantly more common in women than men. The diagnosis of this syndrome, presumptively termed diastolic heart failure (DHF), is controversial and problematic due to several factors. In fact, it has been suggested that this syndrome is over-diagnosed and some have questioned whether it even represents "real" heart failure all. Consequently, the purpose of this tutorial is to; 1) Describe the underlying pathology that results in diastolic heart failure and how it differs from systolic heart failure, 2) Provide evidence that diastolic heart failure results in similar pathophysiologic (exercise intolerance, neurohormones, quality of life) derangements as systolic heart failure, 3) Describe important differences in the pharmacologic management of these two conditions, 4) Describe acute and chronic exercise responses with emphasis on implications for exercise programming in patients with diastolic heart failure (compare/contrast to SHF).

Much of the information presented in this session will be based on the results of recent NIH funded studies on diastolic heart failure conducted at Wake Forest University.

METABOLIC BONE DISEASE IN THE ATHLETE: EVALUATION AND TREATMENT

Ron R. Lee, M.D., M.S., University of South Alabama

Purpose: Osteoporosis affects more than 75 million people in the United States. Risks associated with the athletic lifestyle can have profound effects on bone metabolism and risk of osteoporotic fractures. Exercised-induced amenorrhea, poor nutrition, and female gender are risk factors for low bone mineral density in the athlete.

T13 The purpose of this presentation will be to discuss the physiology of bone metabolism and the pathophysiology of osteoporosis. A review of the clinical work-up of metabolic bone disease will be presented. In addition, participants will gain an understanding of the importance of balancing exercise benefits with bone risks in the athlete. Lastly, the goal of this presentation will be to discuss the prevention and treatment of osteoporosis.

Content: I. Basic concepts and definitions; II. Physiology of bone metabolism; III. Metabolic bone disorders; IV. Risk factors for osteoporosis; V. Clinical work-up; VI. Prevention; VII. Treatment.

Target audience for this presentation includes physicians, nurses, coaches, athletic trainers, and athletes.

THE PERSISTENT EFFECT OF ACUTE EXERCISE ON POSTPRANDIAL LIPEMIA

D.J. Stewart, Department of Exercise Science, The University of Georgia, Athens, GA

T14 The purpose of this tutorial is to discuss the role of exercise in reducing postprandial lipemia and the implications for health. Postprandial lipemia is an increase in blood triglycerides after a meal that contains fat. A hyperlipemic response is associated with the metabolic syndrome, increasing the risk of cardiovascular disease. High levels of postprandial triglycerides are believed to affect endothelial function and to contribute to atherosclerotic plaque formation. Since much of the day is spent in the postprandial state, acute exercise may help to alleviate the high levels of postprandial triglycerides by increasing enzyme activities that increase the breakdown of triglycerides following ingestion. The presentation will review the effect of acute and chronic exercise on the postprandial lipemic response to a high-fat meal. The target audience for this tutorial includes students and professionals who are interested in exercise as an intervention for disease risk factors.

THE RELATIONSHIP BETWEEN MUSCLE ACTIVATION AND THE SLOW COMPONENT RISE IN OXYGEN UPTAKE BEFORE AND AFTER TRAINING

Michael J. Saunders, School of Kinesiology and Recreation Studies, James Madison University, Harrisonburg, VA

T15 During constant-load exercise below lactate threshold, oxygen uptake (VO₂) rapidly increases with exercise onset, obtaining a steady state within about 3 minutes. However, during constant-load exercise above lactate threshold, an additional "slow component" VO₂ response is present, which elevates oxygen uptake. Endurance training reduces the magnitude of the VO₂ slow component, lowering end-exercise VO₂. The purpose of this tutorial is to present current information regarding potential causes of the VO₂ slow component. Specifically, the hypothesis that the VO₂ slow component is related to an additional recruitment of motor units that occurs at intensities above lactate threshold will be discussed. Current evidence will be examined to determine the strength of the causal association between changes in muscle activity and changes in VO₂ during high-intensity constant-load exercise, both before and after training. The target audience includes all exercise scientists and students who have an interest in this area of exercise science.

THE ANGINA WARNING SYSTEM AND EXERCISE PRESCRIPTION

Matt S. Feigenbaum (Furman Univ.), J. Larry Durstine (Univ. South Carolina)

T16 The purpose of this session is twofold: (1) to improve the clinician's ability to identify CAD patients who present with atypical angina and develop an individualized angina warning system that will enable patients to accurately monitor their symptoms, particularly in unsupervised settings; and (2) to improve the clinician's ability to design an appropriate exercise prescription for CAD patients with stable angina. Chest pain has been reported as the cardinal clinical angina symptom among CAD patients. However, possible gender, age, race, and disease-specific (e.g., diabetes mellitus) differences exist in angina presentation and these patients may be more likely to delay seeking medical treatment. Consequently, many patients with atypical angina presentation are increasingly vulnerable to irreversible myocardial damage leading to ventricular dysfunction and heart failure. Exercise is a vital component in the rehabilitation process and an increasing number of CAD patients are enrolling in extended outpatient and/or unsupervised programs. The ability of the clinician (and patient) to detect the onset of angina should result in timely diagnostic and therapeutic interventions known to improve survival. The target audience for this tutorial are clinicians working in (and students preparing for) careers in comprehensive rehabilitation programs

THE INFLUENCE OF THE ITALIAN RENAISSANCE ON THE STUDY OF ANATOMY AND BIOMECHANICS

Kristinn I. Heinrichs, Armstrong Atlantic State University, Savannah, GA

Students of sport, human movement, rehabilitation, athletic performance must develop the same visual and perceptual skills in human movement analysis as the young art student who is beginning to learn to portray the human body as it moves. The same skills in qualitative biomechanical analysis of a sport technique can be used by the young artist who seeks to accurately portray the human body in movement. Artists during the Italian Renaissance made a break from the surreal, stylized art of the medieval era to usher in an age of realism-both artistically and psychologically to give a "rebirth" of Classical values. The purpose of this presentation is to compare the historical sculpture, frescoes, and paintings with current principles underlying biomechanical analysis of sport performance and injury rehabilitation.

T17

Renaissance artists were among the first to study anatomy and spatial relationships from the perspective of human movement-skills central to the practice of modern-day movement science. The artist during the Renaissance was interested in mathematical and visual perspective. The humanist values of knowledge and reason were reflected in the study of anatomy by the great mechanical mind of Leonardo DaVinci, whose functional and systematic approach laid the foundation for present day anatomical studies. This presentation explores the legacy of the Quattrocento by tracing the study of human anatomy, the development of the portrayal of movement and perspective, and the views of medicine during the Florentine Renaissance.

Note: This is an expanded version of a 10 minute history presentation given at the European Congress for Sport Science in Cologne Germany, August, 2001

PHYSICAL ACTIVITY IN WOMEN - THE CROSS-CULTURAL ACTIVITY PARTICIPATION STUDY

Barbara E. Ainsworth, Ph.D., MPH, J. Larry Durstine, Ph.D., & Katrina D. DuBose, M.S.

Physical activity provides a protective effect for many adverse health outcomes. Even though the benefits of physical activity are well known, past research has indicated that certain groups, especially women and minorities, are not physically active at levels recommended for reduced disease risk. To identify better ways to assess physical activity in minority women, the Cross-Cultural Activity Participation Study (CAPS) was completed. The purpose of this presentation is to summarize and disseminate the results from the CAPS study. Discussion topics will include assessment of activity patterns and development of the CAPS - Typical Week Physical Activity Survey and a review of observed associations between physical activity and cardiovascular disease risk factors among the CAPS cohort. The target audience for this presentation includes people who study physical activity measurement and those who study diseases, which are impacted by physical activity.

S1

INTERVIEWS TO INTERNSHIPS

Donna Scales, MAEd, East Carolina University & Joshua Simmons, BS, East Carolina University

The purpose of this presentation is to provide students information that may will be beneficial in securing an internship experience in physical activity, fitness, exercise physiology or related fields. The experience gained during the internship is considered by many to be the most important part of professional preparation. Choosing an internship site that suits the student's interests and abilities is vital.

S2

Fundamental components to finding an internship (or future employment) can make this process easier for the student. This symposium will show students how to develop a resume and provide knowledge of the resources for finding a position. Discussion of the initial contact of site and interview techniques will be included.

The target audience for this presentation would be juniors and seniors in college, graduate students, and faculty members who may be involved in the internship process. Distributing this knowledge will make the process less stressful for the student who is about to embark on the transition from student to professional.

INFRARED THERMOGRAPHY IN THE STUDY OF PHYSIOLOGY

David D. Pascoe, Joe Molloy, JohnEric Smith, Ram C. Purohit, Auburn University, Auburn, AL

This symposium will demonstrate applications of infrared thermography when investigating animal and human thermal processes, and as a medical diagnostic aid. Infrared thermography provides a non-invasive measure of surface temperatures that enhances the understanding of physiology and medicine. Current technology enables researchers to measure dynamic physiological influences on skin temperature in response to the environment, medications, neural, and vascular impairments. Infrared thermography's ability to account for dynamic physiological influences distinguishes this technique from standard imaging (x-ray, MRI, CT Scan).

S3

Infrared thermography will be presented from a historical perspective that emphasizes principles of measurement and equipment used in the field. Further discussion will include standards required for interpretation and evaluation of infrared thermograms (images). Specific examples of thermographic studies will be addressed to demonstrate this technique's efficacy. These discussions will emphasize the relevance of thermographic techniques in clinical and research settings

RESISTIVE TRAINING AND TYPE 2 DIABETES

L. Jerome Brandon, Eric Arnold, Department of Kinesiology and Health, Georgia State University, Atlanta, GA & Rehabilitation Research and Development Center, VA Medical Center, Decatur, GA

S4

Type 2 diabetes is a disease with serious health implications and is a comorbidity associated with other diseases such as cardiovascular, renal failure and obesity. Early detection and lifestyle choices are important for controlling this disease. Since healthy lifestyle choices for this population are typically based on aerobic exercise and diet, questions exist as to the benefits of a resistive training program for persons with type 2 diabetes. Therefore, the purpose of this symposium is to discuss related literature and recent experiments investigating the effects of resistive training on short- and long-term glycemic control and physical functions in older persons with type 2 diabetes. In our laboratory, resistive training was found to have minimal influence on daily glucose levels, but produced a significant reduction in HbA1c. Physical functions improved in a manner consistent with that of non-diabetics following training. Target audience includes undergraduate students, graduate students, health professionals and faculty.

Supported by VA Medical Center contract number E721-4RA

PHYSICAL ACTIVITY INTERVENTIONS FOR CHILDREN AND ADOLESCENTS: RESEARCH RESULTS AND PRACTICAL IMPLEMENTATION.

Bernard Gutin FACSM and Paule Barbeau. Medical College of Georgia, Augusta, GA

S5

(1) Purposes: (A) To describe the rationale, design and key outcome data from three NIH-sponsored intervention projects dealing with the effect of lifestyle interventions on adiposity, and risk factors for cardiovascular (CV) disease and type 2 diabetes; and (B) To discuss the practical issues involved in implementing lifestyle interventions.

(2) Content: Dr. Gutin will present data showing that after-school interventions in obese children and adolescents led to improvements in CV fitness (measured with a multi-stage treadmill test), total body composition (measured with dual-energy x-ray absorptiometry), visceral adipose tissue (measured with magnetic resonance imaging), and CV disease risk factors such as fasting insulin and LDL particle size. Then Dr. Barbeau will describe practical aspects of implementing exercise interventions, including how to work with schools, recruit subjects, select physical activities, monitor intensity of exercise, and assess outcome variables. Then there will be a general discussion to exchange ideas of value to exercise researchers and practitioners.

(3) Target audience: People interested in conducting intervention research and practitioners interested in implementing exercise interventions.

Supported by NIH (HL49549, HL55564 and HL64972)

VASCULAR FUNCTION IN HEALTH AND DISEASE

Michael Welsch, Louisiana State University, Kevin McCully, University of Georgia, Jennifer Olive, University of Georgia and Jason Allen, Duke University Medical Center

S6

Mechanisms for the vasculoprotective properties of therapeutic interventions such as exercise training are not fully understood. Consequently, development of appropriate strategies aimed at maintaining or improving vascular function are in large dependent on a thorough understanding of the complex nature of vasoregulation. Accordingly, the objectives of this symposium are to: review those factors involved in vasoregulation (Welsch), examine the functional implications of altered muscle blood flow in older adults (McCully), discuss the consequence of macro versus microvascular disease on circulation (Olive), and review recent successes and failures aimed at improving vasoreactivity (Allen). The information presented aims to provide basic scientists with further insight into the complex nature of vasoregulation and clinicians with practical information regarding the potential of interventions aimed at improving vascular function.

PALPATED HEART RATE MEASUREMENT ACCURACY IN EXERCISE AND SPORTS SCIENCE STUDENTS

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P1

At the University of South Carolina Aiken, 82 Exercise and Sports Science students participated in a study designed to determine how accurate they were at palpating their resting and exercise heart rate (HR). The subjects were 17-32 year old males (n=43) and females (n=39) with some- to extensive-experience in HR measurement. After consent, each subject sat comfortably and palpated his or her HR for a 30-second period with simultaneous with telemetry monitoring. Subsequently, each subject performed steady state submaximal exercise at a rated perceived exertion (RPE) of "fairly light" on a stationary bicycle; while exercising they palpated their HR for 30 seconds with concomitant telemetry monitoring. Linear regression analysis was used to compare palpated versus telemetry measured HRs. The average absolute value difference in palpated versus telemetry measured HR at rest was 10.5 beats/minute. The correlation coefficient at rest was 0.522 (moderate, positive relationship). The average absolute value difference in palpated versus telemetry measured HR during submaximal exercise was 19.9 beats/minute. The correlation coefficient during submaximal exercise was 0.116 (weak, positive relationship). The results show that Exercise and Sports Science students are able to self-measure their HR with only a moderate degree of accuracy at rest and with a weak degree of accuracy during submaximal exercise.

VALIDITY AND RELIABILITY OF THE COMPUTRAINER CYCLE SIMULATOR
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P2

The purpose of this study was to investigate the validity and reliability of the Computrainer cycle simulator. A Monark cycle ergometer was utilized as the standard of comparison while a bicycle with the same geometry was employed on the Computrainer. Following an orientation trial, twenty-five untrained, healthy subjects (age 20 ± 3 yrs; body mass 68.2 ± 10.2 kg; height 1.81 ± 0.1 m; mean ± SD) performed three sub-maximal graded exercise tests (GXT) on each of the two ergometers. The Computrainer was outfitted with a bicycle of the same geometry as that of the Monark. Each trial began at a workload of 60-W and increased 30-W every 3-min until 85% of predicted maximal heart rate was reached. The following physiological parameters were evaluated: HR, RPE, VE, VO₂, VCO₂, and RER. All measures were obtained during the final 30-sec. of each stage. Validity was examined utilizing the 3rd test of each ergometer and applying two-way ANOVA, Pearson correlation, and coefficient of variation. Reliability was studied by analyzing ANOVA, correlation and individual coefficients of variation. Examination of the physiological parameters at each workload during the three Computrainer sessions revealed no significant differences (p > .05) and high correlations (r > 0.60) for all variables between tests of a magnitude similar to that of the Monark ergometer. In a similar fashion, examinations of the 3rd test of each the Computrainer and Monark resulted in no significant differences and high correlations between ergometers for all variables. Furthermore, low to moderate, coefficients of variation (CV < 10%) were observed with all variables on both ergometers demonstrating similar variance between the units. Based on the comparisons, the results of this study suggest that the Computrainer is both valid and reliable for examining the selected physiological variables. Supported by a grant from Racermate/Computrainer

COMPARISON OF THREE DIFFERENT PEDALING CADENCES ON PREDICTING MAXIMAL OXYGEN UPTAKE.
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P3

The purpose of this study was to compare three different pedaling cadences prediction of Maximal oxygen consumption to a measured maximal VO₂. Ten subjects, five male and five female, (age=21.3±0.9 yrs; ht=174.5±11.2 cm; wt=74.5±13.6 kg) participated in a total of 4 random ordered exercise tests. The tests consisted of 3 submaximal cycle ergometer tests and a Bruce protocol treadmill (Max) test. Submaximal tests were conducted at 50, 60, and 70 rpms. Each test consisted of three min stages at 1.0, 1.5, and 2.0 kp resistance, resulting in a total of nine min for each test. HR's were recorded during the last minute of each stage and graphed corresponding to appropriate work rate. Max VO₂ was estimated using an extrapolated line connecting the three points and projecting to age based max HR. Data was analyzed using a repeated measures ANOVA. Tukeys post-hoc follow-up test was performed as needed. Data is presented in table below and expressed as ml/kg/min. Letters indicate "group" based on Tukeys follow-up test.

| | Pooled | Females | Males |
|--------|-------------|--------------|--------------|
| 50 rpm | 42.2 (16.1) | 27.4 (2.9)a | 50.9 (10.1)a |
| 60 rpm | 39.5 (14.8) | 27.9 (2.2)a | 51.0 (12.6)a |
| 70 rpm | 36.4 (7.6) | 30.6 (2.8)ab | 42.1 (6.4) b |
| Max | 38.7 (5.2) | 34.8 (3.2) b | 42.6 (3.5) b |

NSD (p>.05) was found between any submax rpm test and Max when data were pooled. A significant difference (p<.05) was found between both 50 & 60 rpms and Max for both females and males, with females being underestimated and males overestimated. NSD (p>.05) was found between 70 rpms and Max for either males or females. These results indicate that 70 rpms appears to most accurately predict treadmill Max when working at these rates.

PHYSIOLOGICAL PROFILE OF AN ELITE FREESTYLE WRESTLER PREPARING FOR COMPETITION: A CASE STUDY.

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P4

Purpose: The purpose of the present investigation was to describe the physiological changes of a nationally ranked older elite freestyle wrestler during a 7 month observation period as he prepared for the 2000 Olympic Freestyle Wrestling Trials. Methods: A 33-year-old male wrestler was evaluated three times during the study for measurements of body composition, resting energy expenditure, maximal oxygen consumption, isometric strength, anaerobic power and capacity, nutritional intake, and various serum plasma constituents. Results: Body weight decreased by 1 kg of which consisted of fat-free mass, while body fat remained stable at 5.8%. Muscular strength and aerobic power were maintained throughout the study. Measures of anaerobic work capacity tended to be higher and blood lactate lower as the subject progressed throughout the investigation. All serum plasma constituents were within clinically normal ranges and remained relatively stable. Conclusions: Despite a small loss of FFM, the subject was able to maintain muscular strength and aerobic fitness while concomitantly enhancing anaerobic capacity and power capabilities throughout the study period as he prepared for the 2000 Olympic Freestyle

EFFECTS OF A 24-MONTH RESISTIVE TRAINING PROGRAM ON SUBCUTANEOUS AND CENTRAL FAT DEPOSITS IN OLDER ADULTS
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P5

The purpose of this study was to determine if 24 months of resistive training altered the subcutaneous and central fat deposits of older adults. Fifty-nine volunteers (mean age 71.6 years) (30 exercisers ES; 25 females and 5 males and 29 comparison CS; 14 females and 11 males) served as subjects. The ES resistive trained 3 times a week, an hour a day for the first 6 months and 2 days a week the last 18 months. The subjects trained at 50%, 60% and 70% of their one repetition maximum (1RM) and the training sessions consisted of 10 minutes of warm-up and flexibility exercises, and 50 minutes of resistive training. The subjects trained 5 upper extremity (biceps, triceps, arm cross, pullover and lateral raises), 3 trunk (abdomen, low back and torso arm) and 3 lower extremity (knee extensors, knee flexors and plantar flexor) muscle groups on a multi-station Nautilus system. The subjects were measured for strength, skinfolds and circumferences before and after training. The data were evaluated for differences with an ANOVA. Each of the 11 muscle groups improved in strength (p<0.5) and there was an overall increase in strength of 28.5% for the ES, but no change for the CS. No changes were observed for the sum of seven skinfolds, weight, percent body fat, or hip circumference for the ES or CS. However, the ES experienced a decrease (p < 0.05) in waist circumference. These data suggest that resistive training produces a reduction of central obesity as measured by waist circumference and a significant increase in strength, but the increase is not due to muscle hypertrophy in older adults.

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USE OF BMI TO SCREEN FOR OBESITY IN GIRLS AND WOMEN

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P6

Use of body mass index (BMI) as a surrogate for percent body fat (%BF) may result in misclassification of some individuals, decreasing the likelihood of early intervention for obesity-related conditions. Ninety 8-11 y old African American (AA) girls, and 69 27-52 y old AA women were recruited to evaluate BMI in screening for %BF³⁰, and to determine if those in the higher %BF category had higher systolic (SBP) and diastolic (DBP) blood pressures on average than those in the lower %BF category. BMI was calculated as weight (kg)/height(m²). %BF was determined by dual-energy x-ray absorptiometry. Cutpoints for obesity were BMI ³⁰ for girls and ²⁵ for women, and ³⁰ %BF for both groups. BMI correctly identified 87.8% and 91.3% of the girls and women, respectively. The positive predictive value of BMI was 84.2% and 100%, and the negative predictive value 90.4% and 45.5% among girls and women, respectively. Sensitivity was 86.5% and 90.6%, while specificity was 88.7% and 100% among girls and women, respectively.

In girls, mean SBP was 103.2±8.7 mmHg and 107.4±7.1 mmHg (p=0.018), while mean DBP was 59.4±5.3 mmHg and 61.7±6.8 mmHg (p=0.1022) in the <30% and ³⁰%BF groups, respectively. In women, mean SBP was 117.1±18.2 mmHg and 131.7±27.3 mmHg (p=0.1604), while mean DBP was 74.4±9.9 mmHg and 78.8±10.5 mmHg (p=0.3626) in the <30% and ³⁰%BF groups, respectively. Thus, BMI may be useful in screening for obesity, and potentially for obesity-related elevated BP and cardiovascular risk.

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FOOD INTAKE FOLLOWING EXERCISE IN THERMONEUTRAL AND COOL WATER

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P7

The purpose of this study was to evaluate the effects of acute exercise on post-exercise energy intake (EI) and nutrient selection under different environmental conditions. Nine healthy male (mean ± SE: age 25 ± 2 yr, VO₂max 44 ± 2.9 ml/kg/min) volunteers performed head-out cycle ergometry in thermoneutral (N, 33 C) and cool (C, 20 C) water conditions. Subjects exercised continuously at 60 ± 2% of VO₂max for 45 minutes. Subjects also completed a non-exercise control session. Subjects reported to the lab in a 12-hour fasted state and were randomized to the three different conditions. Expired gases were collected throughout exercise to estimate energy expenditure and respiratory exchange ratio (RER). Following exercise and control conditions, subjects were allowed to consume snacks ad libitum for 60 minutes and remained unaware of EI monitoring. Caloric expenditure during exercise was similar between N and C trials, representing 403 ± 20 and 422 ± 29 kcals, respectively, p=NS). However, immediate post exercise EI was 15% higher in C (801 ± 106) compared to N (677 ± 105) exercise trials (control 560 ± 110 kcals). Subjects consumed 10% more fat calories following the C vs both N and control conditions. Exercise in cool water appears to stimulate both appetite and fat consumption when compared to equivalent energy expenditure exercise in thermoneutral water. The results of this study have potential implications for exercise programs designed to modify body composition.

BIA AS A SUBSTITUTE FOR HYDROSTATIC WEIGHING TO PREDICT PERCENT BODY FAT IN COLLEGE FOOTBALL PLAYERS

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P8

Percent body fat (%BF) determined by hydrostatic weighing (UWW) is often impractical because it involves large, expensive equipment and a lengthy procedure whereas %BF determined by bioelectrical impedance analysis (BIA) is often practical because it involves small, transportable equipment and a swift procedure. PURPOSE: To determine if leg-to-leg BIA could be a valid substitute for UWW in predicting %BF in college football players. METHODS: 10 NCAA Division I football players underwent a prediction of %BF using a leg-to-leg BIA system and UWW with an electronic load cell measurement system. Subjects arrived at the laboratory in a euhydrated state 12 hours post-prandial to ensure accuracy of the BIA system. RESULTS (means ± SD): Body mass index (35.9 ± 2.8 kg/sq. m), %BF from BIA, %BF(BIA), (23.6 ± 4.4), and %BF from UWW (Siri equation), %BF(UWW), (22.5 ± 7.7). A paired samples t-test showed no significant difference between %BF(BIA) and %BF(UWW) (p > 0.05). A simple, linear regression was calculated predicting %BF(UWW) based on %BF(BIA). A significant regression equation was found (p = 0.008) and predicted %BF(UWW) was equal to $9.448 + 1.355(\%BF(BIA))$. CONCLUSIONS: These results suggest that in college football players, %BF from leg-to-leg BIA can be used to predict or substitute %BF from UWW when UWW is impractical or unavailable.

COMPARISON IN RATING OF PERCEIVED EXERTION BETWEEN CARDIAC PATIENTS AND HEALTHY ADULTS DURING TREADMILL WALKING

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P9

The purpose of this study was to determine if cardiac patients and apparently healthy subjects walking at the same relative intensity perceived their levels of exertion differently. A secondary purpose was to determine the validity of generalized rating of perceived exertion (RPE) recommendations in both groups of subjects at 50% of heart rate reserve (HRR). Seventeen apparently healthy subjects (45.5±8.6 yr.) and 10 cardiac patients (62.1±10.5 yr.) were studied. Subjects participated in a ten-minute walking session on a treadmill at 50% of HRR. During the 10 minutes, heart rate and RPE were taken at the end of every minute. Results revealed a significantly higher (p<0.05) mean RPE over 10 minutes for the cardiac patients when compared with the healthy subjects (11.8±2.4 versus 10.3±2.2, respectively). In addition, a large interindividual variability in RPE was found. Specifically, 76% of healthy subjects and 80% of cardiac subjects reported an RPE outside the recommended range of 12 to 13 for 50% of HRR. The results of the present study reveal that cardiac patients perceive the same relative walking intensity to be more strenuous compared to healthy individuals. Therefore, changes in RPE recommendations for the cardiac population may be warranted.

ADHERENCE RATES OF LONG BOUTS VERSUS SHORT BOUTS OF EXERCISE IN HEALTHY, ADULT FEMALES

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P10

The purpose of this study was twofold: (1) to examine the adherence rates to short-bouts and long-bouts of exercise, and (2) to investigate the effect of a behavioral session on adherence to short-bouts and long-bouts of walking in healthy, sedentary, middle-aged females. Sixty women, aged 30-60, were recruited to participate in the study. The subjects were randomly assigned to one of four brisk walking groups after baseline testing: (1) short-bout walking with behavioral treatment (BSB), (2) long-bout walking with behavioral treatment (BLB), (3) short-bout walking (SB), (4) long-bout walking (LB). Observations were made at baseline, 6-weeks and 12-weeks. A 4 (group) x 3 (time) repeated measures ANOVA was used to analyze the data. There was a difference in self-regulation at 6-weeks and 12-weeks when compared to baseline ($p < 0.001$). The 12-week observation was significantly lower than the 6-week observation ($p = 0.014$). There was a main effect of time for self-regulation ($p < 0.001$). There was a difference in self-efficacy at 6-weeks & 12-weeks when compared to baseline ($p < 0.002$). There was a main effect of time for self-efficacy ($p < 0.001$). There was no difference in the average number of sessions per week ($p = 0.10$). There was a difference between the long-bout groups and the short-bout groups in the average minutes per session ($p < 0.00$). There was no difference in the total number of minutes exercised over the 12-week period ($p = 0.50$). There was no difference in the total number of days exercised over the 12-week period ($p = 0.64$). There was a difference between BSB group and BLB group for total completion of prescribed sessions ($p < 0.03$). The collapsed group means were significantly lower between the baseline and 12-week observation on heart rate ($p < 0.01$), body mass index ($p = 0.047$), and body weight ($p = 0.033$). These data indicate that sedentary healthy women can gain health benefit by engaging in brisk walking activity, three days a week for 20 minutes. Furthermore, the behavioral intervention was not sufficient to increase the self-regulation skills or self-efficacy of the behavioral groups beyond the non-behavioral groups. In terms of adherence, subjects walked, whether they were in the short-bout or long-bout groups, on average, one time a day for approximately 20 minutes, three days a week.

SEX DIFFERENCES ON CARDIORESPIRATORY RESPONSES, DECISION-MAKING, AND PSYCHOMOTOR PERFORMANCE DURING EXERCISE WITH PSYCHOLOGICAL STRESS

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PURPOSE: To examine differences between male and female cardiorespiratory responses, decision-making, and psychomotor performance to a psychological stress while engaged in exercise. **METHODS:** Ten female (Mean \pm SD: age = 23.3 \pm 4.42; VO₂max = 39.16 \pm 10.25 ml/kg/min) and 9 male (age = 24.56 \pm 2.92; VO₂max = 48.89 \pm 9.14) participants completed a randomized protocol consisting of two counter-balanced 30-minute cycle ergometer rides at 65% of maximal oxygen consumption. During the stress condition (S) subjects rode while participating in psychologically stressful tasks (Stroop Color-Word task and mental arithmetic) from 6 min to 14 min. In the no stress condition (NS) the subjects simply exercised at the same duration and intensity. During both conditions, from 15 min to 23 min participants completed a decision-making task (Lexical word identification) and an anticipation-timing task. HR, VE, VE/VO₂, VO₂, RER, RR, effort sense (RPE), and state anxiety (SAI) were assessed at 5, 14, 23, and 30 min. The NASA task load index (NTLI) was used to assess perceived psychological load/stress during each condition. **RESULTS:** For the statistical analysis, fitness level (VO₂max) was used as a covariate in repeated measure ANCOVAs. **Results of the NTLI demonstrated that the S condition was perceived as more stressful than the NS condition. An examination of the effects of stress during exercise between males and females approached significance, $p < .10$. Further, males in the NS condition responded with greater anticipation prior to the reaction time stimulus, suggesting that males improve accuracy under stressful conditions. CONCLUSION:** Although significance was not found for interaction effects, these results approached significance, and suggest that there may be differences in how males and females physiologically react to psychological stress during exercise. The mechanisms responsible for the impact of psychological stress on cardiorespiratory responses, potential metabolic inefficiency, and human performance in males and females warrants further investigation.

P11

PSYCHOLOGICAL STRESS, CARDIORESPIRATORY RESPONSES AND DECISION MAKING DURING EXERCISE

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P12

Psychological states influence cardiorespiratory efficiency during exercise. Acevedo and colleagues (1999) have demonstrated that fitness seems to attenuate the effects of psychological stress on physiological responses during a physical task in fit individuals. However, an examination of the uneconomical cardiorespiratory responses of individuals of average fitness to psychological stress during exercise and the potential impact on decision making have not been addressed. The purpose of this study was to examine the effects of a psychological stressor on cardiorespiratory responses and decision-making. **METHODS:** Nineteen subjects (Mean \pm SD: age = 23.89 \pm 3.74; VO₂max = 43.77 \pm 10.73 ml/kg/min) participated in two 30 min cycle ergometer rides at 65% of maximal oxygen consumption. In the stress condition (SC) subjects rode while participating in psychologically stressful tasks (Stroop Color-Word task and mental arithmetic) from 6 to 14 min. Decision-making was assessed at 15 through 19 min. In the no stress condition (NSC) the subjects exercised at the same intensity and duration without a stressor. Conditions were counterbalanced between subjects. HR, VE, VE/VO₂ (a measure of ventilatory efficiency), RER, RR, effort sense (RPE), and the state anxiety (SAI) were assessed at 5, 14, 23, and 30 min during both sessions. Also, the NASA Task Load Index (NTLI) was used to assess perceived psychological load/stress during each condition. **RESULTS:** Results demonstrated that HR, VE, VE/VO₂, and RR were significantly elevated during the psychological stress condition at 14 min. Furthermore, SAI increased at 14 min and NTLI scores were elevated in the SC. **CONCLUSION:** These results suggest that psychological stress during physical activity has adverse cardiorespiratory effects. The mechanisms responsible for the impact of psychological stress on cardiorespiratory responses, potential metabolic inefficiency, and human performance

HAMSTRING COACTIVITY DURING QUADRICEPS CONTRACTIONS DIFFERS ACCORDING TO THE METHOD OF COMPUTATION

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Coactivity is the result of simultaneous activity in the agonist-antagonist muscle sets around a joint. The amount of antagonistic, for example, hamstring (H), coactivity is normally expressed as an antagonist to agonist EMG ratio during an agonist, quadriceps (Q), contraction (H/Q ratio). This ratio assumes the agonist muscle scales the magnitude of H coactivity. By referencing coactivity to the antagonist muscle, its own maximum EMG (H/Hmax), and thus shifting the source of scaling, it is conceivable that the two methods would yield different coactivity ratios. Healthy male subjects (N=21) performed maximal Q and H contractions on a KinCom dynamometer under 5 conditions: concentric (C) and eccentric (E), 60 and 180°/s, and isometric (I). EMG data were collected from the VL, VM, BF, and SM of the dominant leg and summed to form a Q and H activation value. Table 1 shows the significant condition (5) by ratio (2) interaction ($F = 3.7, p = 0.0087$) followed by a Tukey, s post-hoc contrast (% ratio, mean, \pm SD). The significant differences between the two ratios indicate that hamstring muscle coactivity does differ according to the method of computation during quadriceps contractions.

Table 1. Hamstring coactivity ratio (%) during Q contraction (* $p < 0.05$ between ratios)

| | E60 | I | E180 | C60 | C180 |
|--------|-------------|------------|------------|------------|------------|
| H/Q | 17.1(10.1)* | 12.8(6.5) | 12.0(4.6)* | 14.8(7.0)* | 21.5(6.3)* |
| H/HMAX | 25.5(11.4) | 15.3(10.6) | 19.0(6.1) | 23.3(5.6) | 35.6(8.8) |

HEART RATE AND BLOOD PRESSURE RESPONSES DURING ACTIVE STANDING AFTER A HIGH FAT MEAL

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P14

The influence of a high fat meal and time of day on heart rate and blood pressure responses during active standing were investigated in 6 college students (20-26 years old). The test consisted in sitting for 5 minutes, followed by two minutes of standing in three different conditions: 1) Low fat meal within two hours of waking up 2) Low fat meal between 4-6pm 3) High fat meal within two hours of waking up. Heart rate, blood pressure, pulse pressure and an electromyogram were taken during 5 minutes while the subject was sitting and during 2 minutes of standing. Peak heart rate was significantly elevated ($p=0.03$) by 2.9% when a high fat meal was ingested than when a low fat meal was ingested (108 ± 8 bpm vs. 105 ± 8 bpm). Resting systolic blood pressure was also elevated by 5% after a high fat meal compared to low fat, but it was not significant ($p=0.14$). These results suggest that cardiovascular control upon standing is relatively insensitive to time of day but maybe sensitive to a high fat meal. This is consistent with high fat meals interfering with endothelial function.

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THE MAXIMAL PHYSIOLOGICAL RESPONSE OF HEALTHY PARAPLEGICS IN ARM ERGOMETRY VS. AN ACTIVE-PUSH AND PULL MOTION OF THE ARMS USING A SEMIRECUMBENT DEVICE: A PRELIMINARY STUDY.

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The purpose of the study was to compare the peak physiological responses of healthy paraplegic subjects during maximal active push-and pull movements of the arms using the NuSTEP @TRS 4000 (NS) with those of conventional arm ergometry (AE). Nine healthy men and two healthy women with chronic neurologically stable complete spinal cord injuries at the T4 to T11 level participated. Subjects performed a multistage, graded discontinuous exercise test on both devices. Both exercise tests were performed using progressive discontinuous protocols to the point of volitional exhaustion. The initial 3 minute stage of AE testing was performed without resistance. Subsequent stages were 3 minutes in duration, with increments of 10 watts /stage. Subjects were guided to the appropriate AE crank speed of 50 rpm with a metronome. Subjects began the NS testing with an initial stage with resistance set at level 1 and a power output of 33 1/3 watts for 3 minutes. Subsequent stages were performed with resistance augmented 2 increment settings and power output increased 33 1/3 watts per stage. Termination points for both tests (AE and NS) were in accordance with ACSM Guidelines. Peak physiological responses including relative and absolute VO_{2peak} , minute ventilation (VE) and heart rate (HR) were compared between AC and NS. The results indicate that subjects on the NS reached a significantly greater peak relative and absolute VO_{2peak} on the NS, reflected by a 13.8% and 12.9% difference, respectively. The subjects also reached a significantly greater peak VE on the NS, while the peak HR did not differ significantly. The results of this investigation indicate that NS may allow persons with paraplegia to reach greater peak levels of metabolic work (VO_2) than conventional AE.

FITNESS, FATNESS AND HEART RATE VARIABILITY (HRV) IN 8-11 Y OLD AFRICAN-AMERICAN (AA) GIRLS.

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Analysis of beat-to-beat variation in heart periods (HRV) provides a non-invasive method of assessing parasympathetic (PNA) and sympathetic (SNA) neural activity of the heart. High levels of PNA and low levels of SNA have been linked to lower cardiovascular mortality and morbidity. Healthy AA girls ($n=94$), 8-11 y of age, were recruited to examine the relationship between HRV and cardiovascular (CV) fitness, total percent body fat (%BF), and visceral fat (VAT). HRV parameters included: two indices of PNA \wedge root mean square of successive differences (RMSSD) and high frequency power (HFP); one index of SNA \wedge low frequency power (LFP); and one index of autonomic balance (LFP/HFP ratio). CV fitness was represented by peak VO_2 (mL/kg/min) from a maximal treadmill test and resting heart rate (HRrest; beats/min). VAT was determined by magnetic resonance imaging and %BF by dual-energy x-ray absorptiometry. Spearman correlation analysis found a significant relationship between peak VO_2 and RMSSD ($r=0.22$, $p=0.04$). There was a negative correlation between HRrest and RMSSD ($r=-0.63$, $p<0.01$) and HFP ($r=-0.32$, $p<0.01$). There was a positive correlation between HRrest and LFP ($r=0.25$, $p<0.01$) and LFP/HFP ratio ($r=-0.20$, $p=0.056$). These results are similar to those obtained in adults, suggesting that the influence of fitness and fatness on the neural control of the heart may begin at an early age in AA girls.

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PASSIVE SKELETAL MUSCLE ACTIVITY INCREASES SPINAL C-FOS PREDOMINANTLY IN THE SUPERFICIAL DORSAL HORN LAMINA

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P17

Muscle activation reflexly increases sympathetic nervous system activity, blood pressure and heart rate. This reflex is mediated through synaptic transmission within the dorsal horn of the spinal cord. A large number of modulatory factors located within the dorsal horn regulate these reflex responses. Dorsal horn lamina have differential inputs and function relatively independently. Superficial lamina act as a peripheral sensory input relay region while the deep lamina integrate and modulate signals coming from superficial lamina, higher CNS centers in the brain, and interneurons. Our previous data indicate that peripheral sensory input is inhibited at the superficial lamina level by cholinergic cells found in deep dorsal horn lamina. We tested the hypothesis that strictly mechanical activation of skeletal muscle would activate cell bodies found predominantly in the superficial lamina while a fewer number of activated cell bodies would be found in deep lamina. After mechanically stretching the hindlimb for one hour, immunohistochemistry indicated a significantly higher number ($p<0.05$) of C-FOS stained cells in superficial lamina (especially lamina II). A small number of cells in deep lamina in proximity to the central canal were also stained. These results support our general hypothesis that the majority of sensory input coming from skeletal muscle synapses in the superficial lamina. This further supports our contention that cells in integration regions are activated, however in much smaller numbers than in superficial regions.

AGED RAT SOLEUS MUSCLES RESPONSE TO FUNCTIONAL OVERLOAD AND ANABOLIC STEROID ADMINISTRATION.

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The purpose of this study was to determine the effect of nandrolone decanoate (ND) administration & functional overload on slow rat skeletal muscle from adult (5-m) & aged (25-m) Fisher 344/Brown Norway rats. Control rats received a sesame seed oil injection. ND (6mg/kg bw) was injected once a week for 4-weeks. Functional overload of the hindlimb soleus (SOL) & plantaris (PLAN) was induced by ablation of the synergistic gastrocnemius muscle during the 4th week of ND treatment. Adult and aged rats were randomly assigned to 4 groups: control (C), overload (OV), control/ND (C-S), & overload/ND (OV-S). Muscle to body weight ratios of SOL & PLAN were significantly reduced control 25-m animal. ND treatment had no effect on SOL & PLAN muscle to body weight ratio in controls regardless of age. 4-m SOL weight significantly increased (40%, $p < 0.001$) by 7 days of functional overload, while the 25-m SOL muscle had no change in muscle weight with 7 days of functional overload. However, 25-m SOL receiving ND significantly increased in SOL muscle weight (17%, $p = 0.006$). Androgen receptor (AR) protein concentration determined by western blot analysis significantly decreased 65% in 25-m SOL muscles ($p = 0.006$). Both ND treatment & functional overload significantly induced 25-m SOL AR concentration. The 25-m OV-S group was able to increase SOL AR protein concentration above either ND treatment or functional overload alone ($p < 0.001$). There was no effect of aging on glucocorticoid receptor (GR) protein concentration in the SOL muscle and GR concentration was not affected by ND treatment regardless of age. Functional overload induced a significant increase in 5-m (34%, $p < 0.001$) and 25-m (40%, $p < 0.001$) GR concentration in the SOL muscle. ND administration can rescue the aged SOL response to 7 days of functional overload & the synergistic induction of AR protein concentration may be important for this response.

LACTATE DEHYDROGENASE ACTIVITY IN FUNCTIONALLY OVERLOADED RAT PLANTARIS MUSCLE

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Lactate Dehydrogenase (LDH) is an important enzyme involved in anaerobic glycolysis, and catalyzes the conversion of lactate to pyruvate. Functionally overloading the rat plantaris muscle induces a shift from a primarily fast-type phenotype muscle towards a slow-type phenotype. The purpose of this study was to measure the specific activity of LDH over a time course of functional overload in rat plantaris muscle. The plantaris muscle from Sprague Dawley rats were functionally overloaded for 3, 7, and 21 days by the partial removal of the synergist gastrocnemius muscles. Sham operated rats served as controls. Plantaris wet weights were significantly higher in the ablation group compared to the controls at 3 days (143 ± 3 mg, $n = 10$ vs. 109 ± 4 mg, $n = 8$, $p < .05$), 7 days (261.8 ± 7 mg, $n = 10$ vs. 180.3 ± 9 mg, $n = 10$, $p < .05$) and 21 days ($401.5 \pm .041$, $n = 10$ vs. $264.5 \pm .007$, $n = 8$, $p < .05$). LDH specific activity was 62% lower than the controls at 21 days ($.022$ units/mg protein $\pm .002$ vs. $.0134$ units/mg protein $\pm .001$, $p > .05$). LDH specific activity also showed a trend of being decreased relative to controls at 7 days ($p = .1$) of overload. LDH activity does not appear altered at the onset of functional overload. However, later in the time course it is significantly decreased. Further research is needed to determine if changes in muscle LDH activity are more related to altered muscle phenotype than load-induced growth.

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EFFECTS OF A DIETARY MILK OR CARBOHYDRATE SUPPLEMENT WITH RESISTANCE TRAINING ON BODY COMPOSITION, MUSCLE STRENGTH AND ANABOLIC HORMONES IN UNTRAINED MEN

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P20

Twenty untrained men (18-25 y) were assigned to consume either a milk supplement (MILK) or a carbohydrate-electrolyte supplement (CHO) immediately following each resistance workout during a 10 wk resistance training program. Subjects trained 3 d/wk beginning with an intensity of 55% 1-RM and progressing to 97% 1-RM by week 10. Muscle strength (1-RM), body composition (DEXA) and resting, fasted concentrations of total and free testosterone and IGF-1 were measured pre- and post-training. CHO tended to reduce, while MILK increased body weight ($P = 0.10$). All subjects significantly reduced percent body fat (1.1%) and significantly increased lean body mass (1.21 kg) as a result of the resistance training with no significant differences between treatments. However, MILK tended to increase lean body mass ($P = 0.1$) more than CHO (1.6 and 0.8 kg, respectively). About 39% of lean mass gain for all subjects was in the leg region, while the arms accounted for about 28% of lean gain. Resistance training also caused a similar significant 44% increase in muscle strength for the seven exercises combined for both groups. Resting total and free testosterone concentrations significantly decreased from baseline values in both groups of subjects (16.7%, 11%, respectively). There were no significant changes in resting, fasted IGF-1 concentrations. In summary, dietary supplementation with a MILK or CHO beverage immediately following resistance exercise resulted in similar changes in muscle strength and hormone concentrations following a 10 wk periodized resistance training program. MILK tended to increase body weight and lean body mass more so than CHO.

EFFECT OF PHYTOCHEMICALS & ASCORBATE ON EXERCISE-INDUCED OXIDATIVE STRESS

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The purpose of this study was to examine exercise-induced oxidative stress markers in 9 male healthy subjects. Treatments consisted of administration of 1.2 grams ascorbate, 2/3 cup blueberries, or placebo, respectively, for 7 days in a double-blind crossover design. The subjects underwent moderate-intensity exercise (70% VO2MAX) on a motor driven treadmill in a hyperthermic environment (35 deg C, 70%RH) until a core temperature of 39.5 deg C was reached, & for an equivalent time in the 2 remaining treatments. Each treatment & exercise bout was followed by a washout period of one week. Blood samples were drawn before & immediately after exercise, at 15 min & 30 min following exercise. Samples were placed on ice & spun at 10,000 g for 10 min at 4 deg C. The plasma was removed & snap frozen in liquid nitrogen. Plasma samples were analyzed for F2-Isoprostanes (FIP) & lipid hydroperoxides (ROOH). FIP was analyzed by gas chromatography-mass spectrometry & ROOH by a spectrophotometric method following extraction. Values were corrected for plasma volume change. Although FIP was significantly elevated ($p < 0.05$) post & 15 min after exercise during all 3 treatments, there was no significant difference in FIP levels between placebo & antioxidant groups. ROOH values were also significantly elevated ($p < 0.05$) post & 30 min after exercise during all three treatments. Although there was no significant difference between placebo & antioxidant treatments, ROOH concentration was significantly ($p < 0.05$) less following phytochemical administration versus ascorbate. The reason for this cannot be discerned from this study. It is possible that ascorbate acted as a prooxidant due to the high core temperatures. Additionally, some phytochemicals are known to have hydrophilic & hydrophobic properties which may have enhanced the effectiveness of the blueberry supplement. These results suggest that antioxidant supplementation does not suppress oxidative stress associated with exercise & elevated body temperature, although phytochemicals may be more efficient at suppressing certain types of oxidative damage.

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EFFECT OF ASCORBATE SUPPLEMENTATION ON OXIDATIVE STRESS DURING AN ULTRAMARATHON

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The purpose of this study was to examine the influence of ascorbate supplementation (n=15) compared to placebo (n=13) on oxidative stress markers following an ultramarathon. During the 7 day period prior to the race, subjects ingested in randomized, double-blind fashion 3, 500-mg tablets of ascorbate or placebo each day. On race day, blood samples were collected 1 hr pre-race, after 32 km of running, & then again immediately post-race. Samples were placed on ice & spun at 10,000 g for 10 min at 4 deg C. The plasma was removed & snap frozen in liquid nitrogen. During the race, runners received 1 L/hr carbohydrate beverages with (150 mg/ L) or without ascorbate in a double-blinded design. Subjects in both groups maintained an intensity of approximately 75% HRmax throughout the ultramarathon race & ran a mean of 69 km (range 48 to 80 km) in 9.8 hours (range 5-12 hours). To determine oxidative stress, samples were analyzed for F2-Isoprostanes (FIP) & lipid hydroperoxides (ROOH). FIP was analyzed by gas chromatography-mass spectrometry & ROOH by a spectrophotometric method following extraction. Ascorbate was determined by the spectrophotometric method of Omay. Plasma ascorbate was markedly higher in the ascorbate compared to placebo group pre-race, & rose more strongly in the ascorbate group during the race (post-race, 3.21 ± 0.29 & 1.28 ± 0.12 ug/100 uL, respectively, $p < 0.001$). No significant group or interaction effects were observed for ROOH or FIP, but both oxidative measures rose significantly during the race. No significant correlations were found between post-race plasma ascorbate & oxidative measures. These results indicate that ultramarathon running imposes significant oxidative stress and that ascorbate supplementation in carbohydrate-fed runners does not suppress oxidative stress during or following a competitive ultramarathon race.

A PILOT STUDY ON THE EFFECTS OF MENSTRUAL CYCLE ON MUSCLE FATIGUE

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The purpose of this pilot investigation was to determine the effect of the menstrual cycle on fatigue. Two groups of healthy, active women were recruited and tested five times through one complete menstrual cycle: The first group (n=6) were not taking any form of hormonal treatment (NOC) and all had normal menstrual cycles lasting between 26 and 32 days. The second group (n=5) had been taking oral contraceptives (OC) for at least 6 months. Each participant performed 25-maximal concentric leg extension muscle actions at 90 deg-sec-1 on a Cybex II isokinetic dynamometer. The OC group tested on days 1, 5, 10, 15, and 20 of their menstrual cycle. The NOC group tested on days 1, 5, 10, ovulation and 5-days post ovulation. Ovulation was predicted using ovulation kits that tested for leutenizing hormone. Bipolar surface EMG electrodes were placed mid-thigh over the rectus femoris with a piezoelectric MMG recording device placed between the two electrodes. Three separate three-way (group x day x rep) mixed factorial repeated measures ANOVAs were used to determine differences in EMG amplitude (mV), MMG amplitude (mV) and torque (Nm) across the menstrual cycle for both the NOC and OC groups. There were no significant three-way or two-way interactions involving "group" for EMG amplitude, MMG amplitude, or torque during fatigue. Therefore, the subjects exhibited the same pattern of responses across the menstrual cycle for fatigue.

THE ROLE OF NITRIC OXIDE IN BLOOD FLOW DIFFERENCES BETWEEN FIBROMYALGIA PATIENTS AND HEALTHY INDIVIDUALS.

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The purpose of this study was therefore to determine if an altered nitric oxide vasodilator system may account for the altered muscle blood flow in Fibromyalgia patients. Fibromyalgia patients (n=8) and healthy control subjects (n=8) were recruited for this study. Body composition, aerobic capacity and blood lipid levels were all measured during the preliminary screening. Body fat percentage as determined by skinfolds was $36.9 \pm 6.1617; 4.06$ % and $32.8 \pm 6.1617; 3.1$ % in the fibromyalgia and control groups, respectively (means \pm SD; $p < 0.05$). VO_2 peak was lower in the fibromyalgia group compared to the control group ($1.22 \pm 6.1617; 0.20$ and $1.57 \pm 6.1617; 0.27$ L/min, respectively; $p < 0.05$). Muscle biopsies were taken from the vastus lateralis of the quadriceps femoris muscle group and analyzed for eNOS by ELISA. Nutritive muscle blood flow was determined using the microdialysis ethanol technique in the vastus lateralis. The ethanol outflow/inflow ratio (inversely related to local blood flow) was lower (indicating higher blood flow) in the fibromyalgia group than the control group under resting conditions (outflow/inflow ratio: 0.566 ± 0.153 and 0.679 ± 0.079 , respectively; $p < 0.05$). There was no difference in local blood flow response to acetylcholine (an endothelium-dependent vasodilator) and sodium nitroprusside (an endothelium-independent nitric oxide donor). Muscle eNOS content was also not different between the fibromyalgia and control groups (121.5 ± 57.1 and 116.1 ± 34.4 pg/mg total protein, respectively; $p = 0.8$). There is therefore an increased resting muscle blood flow in fibromyalgia patients under these study conditions that is not related to the nitric oxide vasodilator system. Further research is needed to determine the effect of other regulatory systems on blood flow in this population.

SKELETAL MUSCLE INFLAMMATORY RESPONSES DURING RECOVERY FROM STRENUOUS EXERCISE

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P25

Indices of inflammation are generally elevated following strenuous exercise by untrained skeletal muscle. Mediators of the inflammatory response are known to be elevated in plasma following strenuous exercise. Recent evidence points to the importance of inflammation in the recovery from strenuous exercise. This study's purpose was to evaluate the local inflammatory response in untrained skeletal muscle during recovery from high-intensity treadmill exercise. Following acclimation to the treadmill environment, untrained, 10 wk-old, male Sprague-Dawley rats were run (5% grade, beginning at 15 m/min-1 and ending at 32 m/min-1) for 1 hr. The soleus (Sol) muscle was excised from control animals (Con) (n=), and from animals at 0 hr (n=6), and 12 hr (n=9) post exercise. Body mass did not differ from Con to 12 hr post exercise (311.9 ± 3.7 , 312.9 ± 4.6 , 322.6 ± 4.3 g, $p > .05$). Muscle wet weights did not change from Con to 0 hr and 12 hr (134.4 ± 5.7 , 123.6 ± 7.1 , 150.5 ± 6.6 mg, $p > .05$). Total muscle protein concentration was not changed from Con to 0 hr and 12 hr post exercise (339.0 ± 23.0 vs 319.0 ± 21.0 or 338.8 ± 17.1 mg/g muscle weight, $p > .05$). Total RNA concentration, which reflects translational capacity, ($p > .05$) was unaltered from Con during 12 hr post exercise. Total DNA content which reflects cell proliferation, was also not changed from Con at 0 hr or 12 hr (96.78 ± 8.9 , 99.3 ± 8.1 , 112.8 ± 6.6 ug per muscle, $p > .05$). Glucocorticoid receptor (GCR) levels, involved in protein catabolism, were unchanged (1.0 ± 0.12 vs 1.28 ± 0.14 normalized, n=4) during recovery from exercise ($p > .05$). Immediately post exercise, there were no signs of muscle edema, changes in translational capacity, signs of cell infiltration, or alterations in protein catabolism in untrained skeletal muscle. In conclusion, a novel session of strenuous endurance exercise does not elicit signs of muscle damage or inflammation immediately post exercise in the untrained rat soleus muscle.

COMBINING PHYSICAL FUNCTIONAL ABILITY TASKS AND SELF-REPORT OF ADLs PREDICTS HEALTH-RELATED QUALITY OF LIFE IN OLDER ADULTS.

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Aging is typically associated with a deterioration in physical function & health-related quality of life (HRQL). Thus, it has been of interest to identify aspects of function that relate well to HRQL. The purpose of this study was to model HRQL using objective measures of physical function & ADL surveys. Thirty-six independent-living (n= 23) & assisted-living (n= 13) residents of a continuing care retirement community (age range= 65-94) completed the study. HRQL was assessed using the SF-36. The Barthel & Functional Status Index (FSI) were used to assess ADLs. Physical function was measured using the reduced Continuous Scale-Physical Functional Performance test (CS-PFP 10). Test-retest data (n=5) revealed good stability of the CS-PFP items (ICCs=0.84-0.99), except for the Laundry 2 item (ICC= 0.44). ANOVA revealed independent-living seniors had better scores on the grocery & endurance items of the CS-PFP10 (p<0.005). After correcting for multiple comparisons, simple correlation revealed no significant relationships between age & function or HRQL. The scarves & endurance items of the CS-PFP10 were related to the physical composite score of the SF-36 (PCS)(r= -0.54, & r= 0.48, respectively, p< 0.005). In addition, the FSI pain & difficulty indicators were closely associated with PCS (r= -0.37, & r= -0.51, p< 0.05). Multiple regression of these predictors on PCS revealed that the scarves & FSI pain indicator items provide a strong model of the PCS component of the SF-36 (F= 9.51, p< 0.001). The results of this study suggest that combinations of objective & subjective measures of function may provide a strong model of physical aspects of HRQL in relatively healthy older adults. Future studies must investigate whether changes in such functional indicators over time will be associated with changes in HRQL.

RECOVERY FROM RESISTANCE EXERCISE IN MIDDLE-AGED MALES

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The purpose of this study was to investigate the course of recovery after 3 sets to momentary muscular failure of eight different exercises in ten healthy male subjects aged 50 to 65 years recreationally experienced in resistance training. The number of repetitions performed with the weight load for approximately 10-RM was recorded for each of the eight exercises during session 1. Recovery status as indicated by number of repetitions performed with the same weight load was observed at 24, 48, 72, and 96 hours (randomized among subjects) after the previous bout. Repeated measures analysis of variance was used to investigate differences in recovery over time and differences between upper- and lower- body values over time. For group mean comparisons, performance was significantly (p<0.05) lower after 24 hours of recovery. At 48-hours, 70% of the subjects were performing below baseline values. After 72 hours of recovery, 1 subject had moved above baseline, the 3 subjects previously above baseline at 48 hours were returning to session 1 values, and 6 were still not recovered to baseline. At 96-hours, 1 subject was still showing an increase in the number of repetitions performed, the 3 subjects above baseline at 48-hours had returned to near session 1 values, 5 of the subjects had recovered almost to baseline, and 1 subject was still not back to baseline performance. No significant difference (p>0.05) in recovery was found between the upper- and lower-body regions over time. Large inter-subject variability in recovery was observed at all time points. In contrast to our previous observations in subjects aged 18 to 30 years, middle-aged subjects may require a longer period of recovery from 3 sets of exercise and do not show as large an increase in number of repetitions completed. In addition, in order to derive maximum training benefit, individualized recovery testing may be useful for exercise prescription.

THE EFFECT OF CIRCUIT WEIGHT TRAINING ON FUNCTIONAL FITNESS IN OLDER ADULTS

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The purpose of this study was to determine the effect of an 8-week circuit weight training program on functional fitness in healthy older adults. Nineteen older adults (12 women/7 men) 59-83 years of age (mean age 72+7 yrs women/73+7 men) volunteered. The study lasted a total of 9 weeks, with 2 training session/week (Tuesday/Thursday), lasting 1 hour each. Functional fitness was assessed during week 1 (day 1); proper form was demonstrated, & initial weight settings were determined on day 2 (week 1). Initial weight settings were determined by identifying a weight, which could be lifted (while maintaining proper form) 8-10 times. Week 1 was followed by 8 weeks of training & a post functional fitness assessment (last day of the program). Functional fitness was estimated using a test developed by Rikli & Jones (1999) for use in community residing older adults. The test provides a total of 6 measures including estimates of upper & lower body flexibility & strength, cardiovascular endurance, & speed, agility, & balance. Each training session started with a 10-minute warm-up, followed by a 30-minute circuit-training phase, & a 10-minute cool-down. The circuit consisted of 20 stations (12 muscular strength & 8 cardiovascular endurance stations) with 50 seconds of exercise & 40 seconds or rest. A 2 (gender) by 6 (measures) by 2 (time) ANOVA with repeated measures on the last two factors revealed a significant main effect for time (F=72.8; df=2), & measures (F=507;df=5), & a significant interaction between time & measures (F=17.8; df=5). Since there was no significant main effect for gender & no significant interaction between measures, time, & gender, dependent t-tests were used to compare pre- & post-test scores for the group. The results showed that participants performed significantly better on all six post-test measures. Even though, the significance of these findings is limited by the lack of a control group, we believe that these results suggest that 8 weeks of circuit training significantly improved functional fitness for the sample of older adults participating in this study.

RELATIONSHIP BETWEEN LEG-EXTENSOR STRENGTH AND CONTINUOUS SCALE-PHYSICAL FUNCTIONAL PERFORMANCE ITEMS IN INDEPENDENT LIVING VERY-OLD ADULTS

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A clear relationship between age-related decrements in leg strength and physical function have been reported. The purpose of this investigation was to describe the relationship between quadriceps strength and the CS-PFP10 items. Fifteen very-old adults (ages 70-89 years) were assessed using the CS-PFP10 test battery and performed quadriceps strength testing at 0, 90, and 180 degrees/sec using the Biodex dynamometer. Values for torque are reported as peak torque (PT) and relative peak torque (RPT) in Nm/kg. body weight. The range of values for PT were (PT-0: 46-122 Nm; PT-90: 42-80 Nm; PT-180: 34-64 Nm). Simple correlation revealed age was inversely related to quadriceps strength (with PT-0, r= -0.57; PT-90, r= -0.54; PT-180, r= -0.68; RPT-180, r= -0.57). Age was also related to CS-PFP10 items (with Laundry 1, r= 0.68; Laundry 2, r= 0.56; and Jacket, r= 0.56). Results also revealed relationships between PT-0 and Laundry 1 (r= -0.60), Jacket (r= -0.57), and Weight Carry (r= -0.53). PT-90 was associated with Laundry 1 (r= -0.61), and Jacket (r= -0.54). PT-180 was associated with Laundry 1 (r= -0.61). RPT-0 was associated with the Jacket (r= -0.54), and RPT-90 with 6-minute walk (r= -0.54). The results are consistent with age-related decrements in functional fitness and quadriceps strength. In each case these correlation coefficients suggest that greater levels of strength were associated with greater functional performance. Furthermore, these data suggest that absolute strength may be associated with upper body function, and relative strength may be more appropriate for predicting performance of functional tasks requiring lower body strength. Future research should continue to search for thresholds of strength as it relates to physical functional ability.

AD LIBITUM INGESTION OF WATER FOLLOWING PRESCRIBED VOLUME OF ACETIC ACID (PICKLE JUICE) SOLUTION IN A POST-EXERCISE PERIOD.

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Acetic acid solutions have gained notoriety among some sports medicine professionals as concoctions that relieve or prevent exercise-associated muscle cramps. A particular acetic acid solution that has gained popularity is pickle juice (PJ). It is not known whether these solutions have a direct effect upon muscle cramps but more importantly are the unknown effects that these solutions have upon fluid balance. In a repeated measures design, 6 males exercised intermittently (3 min. run at 9.7 km/hr, 5 min. walk at 4.8 km/hr followed by 5 minutes of seated rest) on a treadmill in a warm environment (34 C dry bulb, 50% rh) until they lost 2% of body mass. Subjects rehydrated ad libitum for 3 hours while ingesting one of 3 beverage conditions: 1) plain water (W), 2) hourly ingestion of 59 ml of PJ followed by ad libitum plain water ingestion (PJW), and 3) a commercial electrolyte-beverage (CHO). MANOVA corrected for repeated measures was used to test for differences followed by the Bonferroni Multiple Comparison Procedure to test for differences between conditions. Ad libitum ingestion volumes differed ($p < 0.05$) between the CHO (2373 + 390 ml) and W (1107 + 202 ml) (mean + SEM). The PJW condition (1639 + 58 ml) did not differ with the other conditions with respect to ingestion volume. Urine production was less ($p < 0.05$) in the PJW trial (268 + 58 ml) than W (332 + 109 ml) and the CHO conditions (933 + 165 ml). The PJW resulted in larger relative rehydration percentage values due to decreased urine production. Ad libitum ingestion of plain-water following fixed volume of PJ did not stimulate drinking volumes sufficient for dilution of its sodium content to levels suggested by current ACSM and NATA rehydration fluid recommendations. More research is warranted to elucidate the fate of ingested fluids following acetic acid administration and the effects encountered in the post-exercise period.

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THE EFFECTS OF GLYCEROL-INDUCED HYPERHYDRATION ON SELECTED SKILL-RELATED PHYSICAL FITNESS VARIABLES

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The aim of this study was to examine the effects of glycerol-induced hyperhydration on selected skill-related physical fitness variables. Eleven male subjects (age 26.5 ± 2.1 yrs; weight 77.4 ± 3.1 kg; percent body fat 12.3 ± 2.0 %) volunteered and completed two counter-balanced, double blind identical trials. Each experimental trial was divided into two phases: (1) a hyperhydration phase in which subjects were given glycerol (G) (1.0 g/kg together with 4.0 ml/kg water and sugar free flavoring) or placebo (P) (4.0 ml/kg water with sugar free flavoring), followed by water (18.0 ml/kg) over a 150 minute period; and (2) a 120 min exercise-induced dehydration phase. Following each phase, subjects performed 5 and 10 m sprint tests and a repeated-effort agility test. Fluid retention was determined from the difference between fluid intake and urinary production. Fluid retention was significantly enhanced following G (71%) compared to P (46%) ($p < 0.01$). Body weight was reduced in both groups following the exercise-induced dehydration, however, there was no significant difference between groups (G: 2.71, P: 2.67%). Following the exercise-induced dehydration, power output calculated from 5 m (G: 4582 vs. 4429 and P: 4456 vs. 4242 W) and 10 m sprints (G: 4696 vs. 4558 and P: 4688 vs. 4382 W) was significantly reduced ($p < 0.01$) for both trials. More importantly, 10 m sprint power output was significantly greater in the glycerol group (G: 4558 vs. P: 4382 W; $p < 0.05$) following the exercise-induced dehydration. No significant difference existed between the two groups for the repeated-effort agility test. The results suggest that small reductions in body weight (~2.7%) as a result of exercise-induced dehydration, significantly reduce power output. Furthermore, glycerol may enhance fluid retention thereby maintaining maximal power output following exercise-induced dehydration.

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NUTRIENT INTAKE & THE EFFECT OF A NUTRITION EDUCATION PROGRAM IN OLDER ADULTS WITH CARDIOVASCULAR DISEASE

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The purpose of the study was to study the effect of a nutrition education program aimed at secondary prevention of cardiovascular disease. A total of 132 older adults (> 60 years; 70 men, 62 women) were enrolled in a 12 month randomized clinical controlled trial (Cardiovascular Health & Maintenance Program- CHAMP). The main objective was to promote physical activity in older adults with cardiovascular disease. The treatment arms included a traditional cardiac rehabilitation program & a behavior based lifestyle activity program. Both treatment groups, underwent 3 similar monthly nutrition education sessions. These dietary sessions emphasized: a low saturated fat & low cholesterol diet; promotion of healthy body weight; & choosing sensibly from the food guide pyramid. Dietary assessment using 3-day food records were performed at baseline & at 3 months & 12 months. Since both treatments received the same nutritional counseling & there were no differences between groups in the nutrition assessment, data were pooled between the groups for analysis. Values are presented as means (S.D.). At baseline, nutrient intakes included: total energy, 1996 (634) kcals; total fat, 66.2 (31.3) g; % kcals from fat, 29.1 (7.8)%; saturated fat, 20.9 (10.0) g; % kcals from saturated fat, 9.1 (3.1)%; cholesterol, 223.8 (126.3) mg; sodium, 3240.3 (1235.7) mg; & fiber, 21.5 (9.0) g. After the 3 monthly sessions, statistically significant changes were apparent for total energy, fat (g), saturated fat (g), & sodium. Mean intake at this period were: total energy, 1795 (561) kcals; total fat, 55.8 (23.3) g; fat, 27.7 (8.5)% of total kcals; total saturated fat; 16.7 (7.0) g; saturated fat, 8.5 (3.4)% of total kcals; cholesterol, 212.0 (128.3) mg; sodium, 2734.0 (943.1) mg; & fiber, 21.3 (9.3) g. These results demonstrate that a nutrition education program in a cardiac rehabilitation setting for older adults produces significant short term changes in nutrient intake consistent with the American Heart Association guidelines.

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ROLES OF AGE AND GENDER ON ENERGY EXPENDITURE DURING REST AND FOLLOWING A MEAL

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The purpose of this investigation was to examine the roles of age and gender on energy expenditure during resting and post-prandial conditions. Subjects ($n=20$) of normal BMI, waist circumference, and body fat were divided into four groups of 5 subjects each: young men (mean age = 22.5 yrs), young women (22.8 yrs), older men (73.7 yrs), and older women (68.6 yrs). Body composition was assessed via air displacement plethysmograph (BodPod®). Energy expenditure was taken during basal conditions and following consumption of a standardized meal. For the basal state, participants reported in the morning, following a 12-hour overnight fast. The participants were asked to lie quietly and awake in the supine position for 60 minutes. Gas exchange was measured during the last 15 minutes via a ventilated hood system (MedGraphics). For the post-prandial condition, participants consumed a standardized 650 kcal meal (60% carbohydrate, 25% fat, 15% protein) prior to the initiation of the data collection period. Daily energy expenditure was determined for the analysis. For all groups, post-prandial expenditure was higher than for fasting conditions. Comparison of the energy expenditure during rest and post-prandial among groups (expressed in kcals/day and kcals/kg body mass/day), the energy expenditure was highest for the young groups. However, when expressed per kg fat free mass, there were no differences between the groups for resting or resting conditions. In conclusion, from main effect analysis we observed an age and gender effect on energy expenditure when expressed in kcals/day and kcals/body weight/day. There does not appear to be a gender and age effect for data expressed on a fat-free mass basis.

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THE INFLUENCE OF RACE AND BODY COMPOSITION ON PHYSICAL ACTIVITY LEVEL IN COLLEGE-AGE FEMALES

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The purpose of this study was to examine differences in physical activity levels among black (n=42) and white (n=48), obese (bodyfat>30%) and lean (bodyfat<25%) college-age females (age=20±3 yrs). Subjects recorded their physical activity over a 7 day period in an activity diary which divided each day into 15-minute time intervals for a total of 96 intervals per day. Subjects matched each time interval with a number that corresponded to a list of standard activities which progressed in intensity from sleep (level 1) to maximal exercise (level 9). Minutes spent at each activity level were calculated by multiplying the activity units spent at that level by 15 minutes. A 2(black;white)x 2(obese;lean)x 9(activity levels) MANOVA indicated that obese females spent more time sitting (p=0.00) and less time in light home activity (p=0.03) compared to lean females while differences between blacks and whites among the 9 activity categories were not significant (p>0.05). Metabolic activity index (MAI) was calculated to estimate total energy expenditure over the 7-day period by multiplying time spent in each activity by that activity's MET equivalent and summing the products. A 2(black;white) x 2 (lean;obese) ANOVA indicated a lower MAI for blacks (16,155±1,945 MET min; p=0.01) than whites (17,375±2,253 MET min), and for obese (16,168±1,780 MET min; p=0.01) compared to leans (17,424±2,398 MET min). Results indicate that college aged black females and obese females are less physically active than their white and lean counterparts. Over time, this inactivity may be a primary factor in the development and/or maintenance of obesity among these groups.

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EFFICACY OF A PHYSICIAN DIRECTED WEIGHT LOSS PROGRAM IN OVERWEIGHT/OBESE WOMEN

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This study examined the efficacy of a physician directed weight loss program for overweight/obese, predominantly african-american women from lower socio- economic areas. Patients were randomized to intervention (INT:n=22;Age:48±11 yrs) or standard care (SC:n=13;Age:49±9 yrs) and followed for 6 months. INT included monthly physician visits to address issues concerning diet, exercise, barriers, and motivation. Assessments included weight, HR, BP, and fitness (1min heart rate recovery after 3-min step test). Those in INT had significant weight loss compared to SC (see table). However, BP increased and fitness scores did not change in the intervention group.

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| | Intervention (n=22) | | Standard Care (n=13) | |
|--------------------------|---------------------|-------------|----------------------|------------|
| | Baseline | 6-Months | Baseline | 6-Months |
| Weight (kg) | 93.7±18.6 | 91.6±15.8*+ | 95.3±15.9 | 95.0±15.8 |
| BMI (kg/m ²) | 37.0± 5.9 | 36.2± 4.9* | 37.8± 6.1 | 37.3± 6.1 |
| Systolic BP (mmHg) | 133.1±18.3 | 143.0±19.6* | 132.2±22.8 | 137.2±14.4 |
| Diastolic BP(mmHg) | 76.0±13.0 | 86.1±11.0* | 81.7±16.1 | 87.5± 7.6 |
| HR (bts/min) Rest | 72.0± 7.2 | 70.6±10.5 | 74.5±12.0 | 73.2±10.4 |
| Peak | 129.8±18.0 | 142.9±17.6 | 134.1±14.6 | 137.7±16.1 |
| 1-min Rec | 104.6±18.0 | 107.4±18.6 | 102.7±16.5 | 109.8±16.0 |

*p<0.05 vs Baseline; +p<0.10 vs Standard Care

This study is the first to show weight loss following a physician directed program in predominantly african-american overweight/obese women of lower socioeconomic class. However, it does not appear the changes in bodyweight resulted in concomitant decreases in other cardiovascular disease risk factors. Funded by NIH NIDDK57476-01; NIH ORWH. CDC & Prevention, Center for Chronic Disease Prevention & Health Promotion, Div. of Nutrition & Physical Activity.

DIETARY INTAKE IN WOMEN FOLLOWING TREATMENT FOR BREAST CANCER

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Weight gain and concerns of nutritional intake are reported to be primary causes of anxiety for women during and following chemotherapy and radiation treatment for breast cancer. The purpose of this study was to assess nutrient intake in women that are 3 to 24 months post-surgical treatment for breast cancer. Women (n = 15) were currently enrolled in a behavioral lifestyle intervention program to promote self-efficacy and improve adherence to an exercise and dietary intervention. Dietary intake was assessed at baseline and after 5 weeks of the intervention using self-reported 3 day food records. The food records were analyzed using Food Processor (v. 7.7, ESHA Research). Paired samples t-test was used to compare changes in dietary intake between the baseline and 5 week period. Values are shown as mean (SD). At baseline, calorie intake was 1787 (402) kcals with a macronutrient distribution (as % of total energy) of 29.9 (6.9)% from fat, 53.2 (9.1)% from carbohydrates, and 17.7 (5.6)% from protein. Values for other nutrients analyzed include 10.6 (3.2)% kcals from saturated fat, 19.3 (8.4) g of fiber, and 295.4 (167.2) mg of cholesterol. After 5 weeks of intervention, total calorie intake was 1435 (262) kcals. Macronutrient intake (as % of total energy) was 27.5 (11.9), 56.7 (14.9), and 15.8 (4.4)% for fat, carbohydrates, and protein, respectively. There were no statistical differences between the 2 time points for calorie and macronutrient intake. Likewise, results for the intake of other nutrients, including saturated fat, fiber, and cholesterol were not changed at the 5 week time point. In conclusion, the dietary intakes of women enrolled in the current study were meeting current recommended guidelines for total energy intake as well as the distribution of these calories. Although the differences were not statistically significant, improvements were made consistent with weight loss and reduction of chronic disease risk as evident by the lowering of total fat, saturated fat, and cholesterol intake.

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VO2-170 AS AN INDEX OF CARDIOVASCULAR FITNESS IN 8-11 Y OLD GIRLS

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Cardiovascular (CV) fitness is often expressed as maximal oxygen consumption (VO₂max). However, the practical value of VO₂max testing is weakened because many subjects do not meet objective criteria and frequently find maximal testing to be aversive. This study evaluated the use of oxygen consumption at a heart rate of 170bpm (VO₂-170) as a submaximal index of CV fitness. VO₂-170 and VO₂max (mL/kg/min) were obtained with a multi-stage treadmill test, percent body fat (%BF) with dual-energy x-ray absorptiometry and visceral adipose tissue (VAT) with magnetic resonance imaging in black 8-11 y old girls (n=83). Forty-three subjects met objective physiologic criteria for VO₂max (MAX), and 40 did not (NOMAX). However, there were no significant differences between these two groups in VO₂-170 peak VO₂, peak heart rate, respiratory exchange ratio, %BF, or VAT. Correlation between VO₂-270 and peak VO₂ (same as VO₂max in the MAX group) was 0.82 in the MAX group and 0.78 in the NOMAX group. Correlation of peak CO₂ with %BF was 0.62 and 0.58, for the MAX and NOMAX groups respectively. Peak VO₂ was similar in those who did (27.8±7.9) and did not (26.9±5.9) attain physiologic criteria for VO₂ max, so it appears that almost all of the subjects gave close to a maximal effort. Peak VO₂ was not as strongly correlated with %BF and VAT in the NOMAX groups as in the MAX group. Correlations between VO₂-170 and %BF and VAT were similar in the two groups. Thus, VO₂-170 may be preferable to peak VO₂ as an index of CV fitness in young girls.

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COMPARATIVE EFFECTS OF AN INTERVAL TRAINING AND A CONTINUOUS TRAINING PROGRAM OF EQUAL BOUT DURATION

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It has long been a recommendation of ACSM that exercise for improving cardiorespiratory fitness should be engaged in a minimum of three times/week for at least 20 minutes per session (bout). This study compared two methods of utilizing three 20 minutes bouts of exercise per week for improving cardiorespiratory fitness. The subjects were 14 male college students ranging in age from 18 to 24 years. The subjects were pretested submaximally utilizing the Balke Protocol treadmill test to predict maximum oxygen consumption (VO₂max) as a measure of cardiorespiratory fitness. Subsequently, the subjects were placed into 2 groups of 7 matched by initial predicted VO₂max. One group, the interval group (I) (n=7, performed 20 minutes of treadmill walking and running 3 times per week for 6 weeks with graduating heart rate (HR) work intervals of 150-180 beats per minute (bpm) for 30 seconds each interspersed with relief intervals that terminated when the heart rate reached 120. A second group, the continuous group (C) (n=7), also worked for 20 minutes 3 times per week, but worked at a steady HR for the duration of each bout. After 6 weeks the subjects were retested for predicted VO₂max. The dependent t test was used to test for improvement and for difference between the matched groups. Pretraining values for I were means (M) of 20.3 for age and 46.3 for VO₂max. Pretraining values for C were 20.3 for age and 46.7 for VO₂max. Posttreatment M for I was 59.8 for VO₂max. Posttreatment M for C was 53.5 for VO₂max. Null hypotheses were rejected for pre/post test improvement within each group (I, p=.0003) (C, p=.03). The null hypothesis for posttreatment VO₂max between groups was rejected (p=.05). These data suggest that the selected interval training program is superior to the selected continuous training program in improving cardiorespiratory fitness utilizing the 3 X 20 criteria, although both are effective.

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PHYSICAL EDUCATION IMPROVES ONE-MILE RUN PERFORMANCE OF MIDDLE SCHOOL BOYS AND GIRLS

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The importance of physical activity has become an important issue as enrollment in physical education classes declines. There is little doubt that an increase in sedentary lifestyle is related to the rising obesity among children. It has become increasingly important that the positive effects of a physical education program be demonstrated. Our purpose was to study the effects of an 8-mon physical education class consisting of 6th and 7th grade girls and boys on the performance of a 1-mile run. The data presented here are preliminary to the investigation of the long-term effects of physical education on lifestyle physical activities among boys and girls as they approach adulthood. 142 girls (N=79) and boys (N=63) participated in this study. At the beginning of the fall semester & at the end of the spring semester, all students performed a 1-mile run test. In addition, body weight and height were measured. Each student participated in 10 physical education classes/month (2-3 days per week), 1.5 hrs / class. Repeated measures ANOVA determined significant (p < 0.001) treatment & gender effects. Body weight increased in both boys (51.4 ± 18.2 kg to 53.6 ± 18.8 kg, mean ± SD) & girls (49.0 ± 14.7 to 50.2 ± 12.0 kg). Body height also increased in both boys (151.9 ± 8.3 cm to 153.7 ± 8.5 cm) & girls (152.1 ± 7.3 to 153.4 ± 6.9 cm). The increase in body weight & height were similar between boys and girls. One-mile run times improved in both boys (12.2 ± 3.1 to 11.0 ± 2.8 min) & girls (13.9 ± 3.4 to 11.6 ± 2.2 min). These improvements were similar between boys and girls. Pearson correlation indicated a relationship between initial mile run time & improvement, favoring those with the slowest initial run times (R = 0.67). These data suggest that physical education does improve aerobic fitness of boys and girls. Limitations to these results are that a control group was not included & the run tests were performed outside where environment could not be controlled. In addition, motivation may have been a strong contributor to the improvements observed. The data are encouraging however, as we continue to investigate the long-term effects of physical education on lifestyle physical activity.

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VARIABILITY OF THE CSA ACCELEROMETER MOTION SENSOR

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Accelerometers are commonly used to determine physical activity levels in a number of populations; however little is known about the expected variation in response between units. Thus, the purpose of this study was to determine the inter-unit variability of the CSA accelerometer (Computer Science and Applications, Shalimar, FL). Two hundred and ninety nine monitors were placed on a mechanical shaker that agitated the accelerometer for 15 min at a speed (comparable to walking) and 15 min at a speed (comparable to run). The mean (±SD) response at the low speed was 331±28 counts per 30 s (ct/30s), with a 95% confidence interval (CI) of 277-386 ct/30s. At the high speed the response was 460±45 ct/30s, with a 95% CI of 377-548 ct/30s. Although the shaker speed was increased by 100% at the high speed (102±2 vs. 51±1 ct/30 sec), the CSA counts only increased by an average of 39%, suggesting that the CSA responses is not linear with respect to motion. Of the 299 units tested, 29 (8.4%) were found to be outside the CI at the low speed, while 35 (11.7%) were outside the CI at the high speed. These results suggest, 1) all units should be tested using a standardized procedure prior to use in any study, and 2) when multiple units are used they should be tested for comparative results prior to use, to account for any inter-unit variability.

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DIFFERENTIAL EXPRESSION OF ENOS PROTEIN IN ADIPOSE TISSUE OF OBESE AND NON-OBESE HUMANS.

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Recent research has demonstrated that the enzyme nitric oxide synthase (eNOS) is present in adipose tissue, resulting in nitric oxide production and subsequent inhibition of lipolysis. There have been no reports to our knowledge of eNOS protein content in omental adipose tissue from both lean and obese individuals, despite previously reported differences in lipolytic rate in these groups. The purpose of this study was to measure the mass of eNOS protein in membrane preparations from subcutaneous and omental adipose tissue from 6 lean and 7 obese patients. Membrane fractions were pelleted from whole adipose tissue homogenates by centrifugation (100,000g, 90 min), and were resuspended. The relative eNOS mass was measured by ELISA (Quantikine immunoassay, R & D Systems). Protein levels for eNOS in nonobese and obese patients, respectively, were 552±202 and 662±260 pg/mg membrane protein (mean±SD; p=0.409) in subcutaneous adipose tissue and 420±66 and 767±255 pg/mg membrane protein (p=0.011) in omental adipose tissue. These data demonstrate a difference in omental, but not subcutaneous, adipose tissue eNOS protein content between lean and obese individuals. Regionally increased NO production via eNOS may therefore be involved in the previously reported differences in lipolysis between obese and lean individuals.

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EFFECT OF EXERCISE INTENSITY AND MENSTRUAL CYCLE STATUS ON PLASMA PROTEIN CARBOXYLS

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This study examined both intensity of exercise & menstrual cycle status effect on plasma protein carbonyls (PC) in young healthy women to determine if either had an influence on the exercise response. Protein carbonyls are an indicator of amino acid oxidation which suggests oxidative-stress has occurred. Previous studies have shown that exercise can result in a transient increase in plasma PC. It is unknown if intensity of exercise influences this response. In addition, estrogen has been shown to be an antioxidant in vitro and thus may influence the exercise-induced oxidative-stress. Eleven women (26.8 +/- 1.4 yr) reported to the laboratory (0700-0900 h) in a post-absorptive state either in the follicular (F) [2-6 days post-menses] or luteal (L) [22-26 days post-menses] phases after having their VO2 max determined. Each subject cycled for thirty minutes at 60% or 80% of their VO2 max with blood obtained from a catheter at rest, immediately after exercise and at ten minutes into recovery. The order of the exercise was counter-balanced over two menstrual cycles. Plasma levels of protein, protein carbonyls, & estradiol were measured. Repeated measures ANOVA was used to analyze the data. Mean resting PC was 0.373 +/- 0.047 nM per mg protein & increased significantly by the exercise to 0.892 +/- 0.139 nM per mg protein (p = 0.001). The increase in PC at 60% VO2 max (2.4 fold) was similar to the increase in PC at 80% VO2 max (2.3 fold). The increase in PC were similar independent of menstrual cycle status despite the fact that blood estradiol was an average 146 pM for the F phase & 448 pM for the L phase. PC returned to normal at 10 min recovery at the 60% VO2 max intensity. In contrast, PC tended to be slightly higher after 10 min of recovery at the 80% VO2 max intensity. These data suggest that cycling at either 60% or 80% VO2 max elevates plasma PC independent of estradiol level. However, the recovery increase in plasma PC seems to stay elevated slightly longer for the higher intensity of exercise.

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SHORT-TERM HANDGRIP TRAINING AUGMENTS VASOREACTIVITY WITHOUT CHANGES IN AUTONOMIC MODULATION OR CENTRAL HEMODYNAMICS

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Recent studies report short-term exercise training improves vasoreactivity (VR). The mechanism for change is thought to involve the endothelium. Few studies have shown clear evidence in favor of this hypothesis or report the influence of training on other factors known to effect VR. We examined the influence of short-term handgrip training (HTr) on central hemodynamics, autonomic balance, and brachial artery flow-mediated dilation (BAFMD): Seven men (Age:24.86±5.58) participated in 4 wks of dynamic HTr using the non-dominant arm. HTr consisted of 5 sessions/wk, for 20min at 60% of MVC and 1 contraction/4sec. Assessments included BAFMD, blood pressure, heart rate, heart rate variability (HRV) and exercise performance (arm crank exercise time and handgrip MVC). Following HTr BAFMD improved in the trained arm only (see table). No significant changes were noted in resting hemodynamics, HRV (SDNN:Pre: 54.25±20.38, Post:52.13±19.47 ms), and exercise performance (Pre:5.60±1.67, Post:4.86±1.68 min).

O1

| | Trained | | Untrained | |
|------------|-------------|--------------|-------------|--------------|
| | Pre | Post | Pre | Post |
| BAFMD(%) | 7.70±1.59 | 12.27± 4.23* | 6.87±4.65 | 7.16± 4.58 |
| BAFMD(mm) | 0.24±0.06 | 0.41± 0.16* | 0.22±0.15 | 0.24± 0.16 |
| HR (bpm) | 70.21±6.77 | 71.71± 5.12 | 71.50±6.14 | 73.00± 7.53 |
| SBP (mmHg) | 115.07±6.38 | 112.57±12.95 | 114.43±9.02 | 110.29± 9.83 |
| DBP (mmHg) | 71.71±6.55 | 71.42± 6.29 | 73.29±6.87 | 74.29± 5.94 |
| MVC (kg) | 39.50±8.17 | 43.09± 8.63 | 41.39±7.09 | 44.67±10.69 |

*denotes p < .05

These data indicate 4 wks of HTr improves BAFMD without changes in resting HRV, blood pressure and heart rate. This suggests augmented VR due to HTr may be locally mediated.

VAGAL MODULATION AND CENTRAL HEMODYNAMIC RESPONSE TO COMMON DOSES OF ORALLY ADMINISTERED ASPIRIN DURING DYNAMIC HANDGRIP EXERCISE AND FOREARM OCCLUSION

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The purpose of this study was to examine the effect of a small to moderate single dose of aspirin on cardiovascular responses to low and high-intensity dynamic (0.5hz) handgrip exercise (20% (H20) and 60% (H60) of maximal voluntary contraction, respectively) & post-exercise forearm occlusion (FAO). Twelve participants reported to the laboratory on four occasions. One hour prior to each test, participants ingested 0 mg (ASA 0), 80 mg (ASA 80), 325 mg (ASA 325), or 650 mg (ASA 650) of aspirin. The testers were blinded to the dose administered, and the order was randomized. Each visit involved 5 minutes of H20 and H60 exercise, preceded by 5 min spontaneous breathing (SB1 and SB2, respectively). H60 was immediately followed by 5 minutes of FAO. ECG & continuous arterial blood pressure data were collected. Data were analyzed for mean R-R interval, standard deviation of normal R-R intervals (SDNN), normalized units of low-(0-0.15 Hz) frequency power (LFnu), mean arterial pressure (MAP), systolic blood pressure (SBP), and diastolic blood pressure (DBP). A two-way repeated measures ANOVA with Tukey's post hoc analysis was used to test for significance across visits and conditions. Alpha was set at p<0.05. During ASA 0, Mean R-R interval and SDNN increased in a dose dependent manner with exercise. SDNN returned to baseline, but Mean R-R remained elevated with FAO. MAP, SBP, DBP, and LFnu increased during H60, but returned to baseline during FAO. We found lower indices of sympathetic activity (LFnu) during FAO with ASA 80 (ASA 0: 54.3+14.0; ASA 80: 43.4+17.0; p<0.05). SBP was higher during FAO with ASA 325 (ASA 0: 126.6+24.6; ASA 325:144.3+20.7mmHg; p<0.05). However, mean R-R interval during SB1 was higher with ASA 650 compared to ASA 0 (ASA 0:1025+116; ASA 650: 1075+94 ms; p<0.05). These data suggest that aspirin effects cardiovascular response at all doses tested. The peculiar nature of the responses to the variety of doses is consistent with evidence suggesting that aspirin may influence cardiovascular behavior through more than one mechanism.

O2

ASSOCIATIONS BETWEEN INDICES OF AUTONOMIC BALANCE, CENTRAL HEMODYNAMICS, FOREARM VASCULAR FUNCTION AND UPPER EXTREMITY EXERCISE PERFORMANCE

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This study examined associations between indices of heart rate variability, blood pressure, forearm vascular function and upper extremity exercise in 18 healthy individuals (age=22+1). Following a 10-min rest period, standard ECG's were collected in a supine position for 5-min & evaluated for the standard deviation of normal RR intervals (SDNN) and normalized units of low- (0-0.15 Hz) and high-frequency (0.15-0.40 Hz) power (LFnu and HFnu, respectively). Non-dominant forearm blood flow (FBF), venous capacitance (FVCap) and venous outflow (FVO) were evaluated at rest and following 5-min upper arm occlusion (OCC), using plethysmography. Exercise performance was measured using a graded arm ergometer test (ExDur) and handgrip dynamometer (MVC). Univariate analysis revealed significant associations between MVC and ExDur (r=0.80, p=0.0008), FBRest (r=0.50, p=0.037), pulse pressure (r=0.50, p=0.03), and SDNN (r=0.46, p=0.06); FBF following OCC & LFnu (r=0.517, p=0.04), HFnu(r=-0.517, p=0.04), LF/HF (r=0.510, p=0.05) & HR (r=-0.517, p=0.03); FVOrest & LFnu (r=0.587, p=0.02), HFnu (r=-0.587, p=0.02) and LF/HF (r=0.635, p=0.008); pulse pressure and SDNN (r=0.614, p=0.009), LFnu (r=0.575, p=0.02), HFnu (r=-0.575, p=0.02), and LF/HF (r=0.633, p=0.006). These data reveal a strong relationship between handgrip strength and maximal exercise duration on an arm ergometer test. Furthermore, these data confirm previous literature regarding independent influences of autonomic modulation (SDNN and LF/HF) and indices of arterial and venous function of the forearm on exercise performance. The multiple associations between indices of autonomic balance, vascular function and exercise performance suggests important interactions between these systems. Recognizing the plasticity of these physiological systems in health and disease, clinicians should carefully consider each of these measures in clinical trials.

O3

EVALUATION OF VASOREACTIVITY IN HEART FAILURE PATIENTS ON LONG-TERM ANGIOTENSIN CONVERTING ENZYME INHIBITION & BETA-BLOCKING THERAPY

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This study examined hemodynamics, VR, and exercise (EX) performance in 16 HF patients (Age=59±11 yrs; EF=37±8%) on long-term ACEI or B1B (>3mon). High-resolution ultrasound was used to measure brachial artery VR after forearm occlusion and sublingual Nitro. Images were obtained after withholding medications for 18hrs and 15min of supine rest. EX tests were done on a separate day. Hemodynamics, flow mediated dilation (FMD) and EX times were similar between patients on ACEI or B1B vs. those not on such agents (see table). NTG mediated dilation was less in patients on B1B (p<0.05).

| | Hemodynamics | | Vasoreactivity | | | Ex.Time | |
|-----------------------------|--------------|--------|----------------|--------|-----------|------------|-----------|
| | EF% | SBP | DBP | HR | FMD | NTG | (min) |
| 04 HF+ACE(n=10) Rest | 36+9 | 136+23 | 73+10 | 82+19 | 3.36+5.08 | 10.52+7.32 | 9.68+3.82 |
| Peak Ex | NA | 185+22 | 74+15 | 148+24 | NA | NA | |
| HF-ACE(n=6) Rest | 39+5 | 129+21 | 67+9 | 75+19 | 4.46+2.39 | 13.74+4.84 | 7.02+1.89 |
| Peak Ex | NA | 183+26 | 65+8 | 133+23 | NA | NA | |
| HF+B1B(n=10) Rest | 38+5 | 132+20 | 72+8 | 82+19 | 2.64+2.93 | 8.87+5.67* | 8.01+3.74 |
| Peak Ex | NA | 184+26 | 69+15 | 144+24 | NA | NA | |
| IF-B1B(n=6) Rest | 36+11 | 137+27 | 69+12 | 74+18 | 5.65+5.54 | 15.94+5.13 | 9.79+2.76 |
| Peak Ex | NA | 185+19 | 73+12 | 141+25 | NA | NA | |

Long-term ACEI & B1B did not result in different hemodynamics, FMD or EX time. NTG mediated dilation was less in HF+B1B suggesting a change in this VR mechanism. Withholding meds prior to imaging may have influenced the findings.

CORRELATION BETWEEN ANKLE-BRACHIAL INDEX, RECOVERY OF OXYGEN SATURATION AND FUNCTION IN PEOPLE AT RISK FOR VASCULAR DISEASE

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05 The prevalence of cardiovascular disease (CVD) highlights the importance of screening older subjects for peripheral artery disease (PAD). The standard clinical Ankle-brachial index (ABI) and a newly developed muscle oxidative capacity test using near-infra-red spectroscopy (NIRS) were compared in 57 elderly subjects (71 + 9 yrs). These subjects either responded to a local newspaper advertisement (n = 39), or were tested at the Athens Senior Center (n = 18). A subset of the sample (n=15) performed the Continuous Scale Physical Functional Performance test (CS-PFP). We hypothesized that NIRS would be more sensitive to increased CVD risk, and would better predict physical function capacity as measured by CS-PFP. The ABI and CS-PFP tests are valid and reliable instruments. NIRS measurements were taken in the tibialis anterior muscle following a 10second maximal isokinetic contraction. The half-time of re-oxygenation of the tibialis muscle after exercise was used as an index of oxidative metabolism. There was weak agreement between the standard ABI method and new NIRS method (R2 = - 0.11). There are two possibilities for explaining the weak relationship between the ABI and NIRS method. 1) ABI may not be sensitive enough to give a true indication of PAD, especially in those with mild PAD. 2) The 10second MVC for the NIRS test may not have been sufficient to evoke a big enough decline in muscle oxygenation in some elderly subjects. The CS-PFP was weakly related to both ABI (R2 = -0.017) and NIRS (R2 = -0.07). The subset of elders used for the CS-PFP test were those who responded to the local paper advertisements, and did not demonstrate a wide variability in either ABI or NIRS values. It is expected that the relationships would be strengthened if those with impaired function were tested on the CS-PFP. NIRS testing has potential, but the exercise protocol employed for this study may need to be adapted to older subjects.

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THE INFLUENCE OF CONTRACTION VELOCITY AND CONTRACTION TYPE ON ANTAGONIST MUSCLE COACTIVITY DURING ISOKINETIC KNEE EXTENSION

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06 As a muscle contracts in concentric, eccentric or isometric mode, the role of opposing muscles changes according to the demands of the task. Therefore, it is conceivable that the neural command to an agonist-antagonist muscle pair may be scaled differently by the nervous system according to the type and velocity of contraction. Subjects (N=23) performed maximal tests of knee extensor strength on a KinCom dynamometer at 5 velocities, concentric(C) and eccentric (E) 60 and 180 deg/s, and isometric (ISO) (60° of flexion). EMG data were collected with a telemetric system (Noraxon, USA). Electrodes were placed on the vastus lateralis, vastus medialis, biceps femoris, and the semimembranosus of the dominant leg and summed to form an agonist and an antagonist activation value. Hamstring coactivity was expressed as a percent of maximal hamstring EMG activity. Table 1 shows coactivity was significantly different between contraction velocities and modes (One-way ANOVA F= 9.9, p=0.0000). The magnitude of coactivity increased with velocity, but the increase was greater under concentric conditions (Tukey, s post hoc). These data suggest that the distribution of neural command to agonist and antagonist muscle pairs may be scaled according to contraction type and velocity.

Table 1: Mean percent coactivity across contraction velocity and modes

| | E180 | E60 | ISO | C60 | C180 |
|-------------------|-------------|------------------|-----------|----------------------|------------|
| Mean (SD) | 25.5(21.5)* | 15.3(10.6) | 18.9(9.8) | 23.3(11.8) | 35.5(17.1) |
| * p<0.05 vs. C180 | | ∫ p<0.05 vs. C60 | | Ω p<0.05 all but E60 | |

THE INFLUENCES OF MODE AND SPEED OF LOCOMOTION ON THE SPEED OF TREADMILL BELT

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07 The purpose of this study was to examine the differences between the displayed treadmill speeds and the actual measured belt speeds and their relation to the increase of speed during walking and running on the treadmill. Six subjects were tested while walk or run on a Kistler Gateway treadmill. The targeted walking speeds were 44.7, 67.0, 89.4, 111.7, 134.1, and 156.4 cm/s. The targeted running speeds were 134.1, 156.4, 178.8, 201.1, 223.5, and 245.8 cm/s. Results: The variation of measured speeds increased with both the walking and running speeds. The displayed speed over estimates the actual walking or running speed and the magnitude of over estimation increased with the walking and running speeds. The ratio of (over estimation) / (displayed speed) for walking remains approximately the same but increased with running speed. The differences between walking and running were compared at both 134.1 and 156.4 cm/s. There was no difference observed between walking and running regarding the comparing the displayed speeds to the measured speeds at 134.1 cm/s, but measured speeds produced greater variability with running comparing to walking at 156.4 cm/s. Conclusion: The speed of treadmill belt is less than the speed indicated by the display board with subject walking or running on the treadmill and the belt speed varies as locomotion progresses. The amount of deviation and variability are related to the mode and speed of locomotion.

FREQUENCY AND LOAD EFFECTS ON LOWER EXTREMITY CYCLING KINEMATICS

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08

The purpose of this study was to examine the influence of the alteration of the lower extremity inertial property and change of pedaling frequency on the lower extremity cycling kinematics. Fourteen healthy college students participated in the study with their age mean (SD), 24 (5) years old, height 1.84 (0.09) m, and body mass 85 (10) kg. The subjects were cycling at 60, 80, and 100 rpm with weights attached to their knee. The weights amounted to 0, 0.5, 1, 1.5, 2 kg, respectively. Hip, knee, and ankle joint angle and angular velocity were calculated from collected kinematic data. Significant influence of both cadence and load were observed from one third of the 24 measured kinematic parameters. For example, the crank angle at which the minimum hip joint angle observed decreased with both increased cadence and load linearly. All but one of the rest of the calculated parameters were affected by the cadence rather than load significantly. For example, the maximum hip joint angular velocity increased from 166 to 249 degree per second where the maximum knee joint angular velocity increased from 274 to 423 degree per second with increased cadence. This investigation provides additional information for cycling study literature regarding the influence of cadence and inertial property as well as the interaction between them on the lower extremity kinematics with systematic manipulation of the independent variables.

RELIABILITY TESTS FOR LOCOMOTION STABILITY AND VARIABILITY

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09

In human locomotion, researchers have attempted to determine the states of stability and variability. Variability of the locomotion system is often used as an indication of stability while the theoretical relation between the two remains unclear. Furthermore, there is not yet an empirically effective definition of stability and variability. The purpose of the study was to design a method based on dynamical systems theory to test stability and variability during walking at different velocities. Five female healthy participants of 20.2 (mean) (0.7, SD) years of age, mass 63 (11) kg; and height 1.67 (0.08) m, from the University community were recruited. The participants were instructed to walk on a treadmill at 6 different speeds (1.5, 1.8, 2.1, 2.4, 2.7 and 3.0 miles per hour) for five minutes each condition. Lower extremity kinematics was collected using a Qualisys Motion Capture System (Glastonbury, CT). A triggered visual perturbation was introduced to the participants during treadmill walking. The perturbations were introduced with a mean absolute latency of .059 s after the heel contact, which accounts for a relative latency of 6% of the gait cycle. The intraclass coefficient correlations across trials were 83% and 80% for stability and variability, respectively. The results indicate that the method employed in the current study can be reliably applied to locomotion stability and variability tests.

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STRENGTH TRAINING EXERCISE DID NOT ALTER LOWER EXTREMITY JOINT TORQUES DURING STAIR ASCENT IN PEOPLE WITH KNEE OSTEOARTHRITIS.

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010

The purpose of the study was to identify the effects of quadriceps strength training on lower limb joint torques during stair ascent in people with knee OA. Fourteen x-ray diagnosed, grade 2 knee OA subjects (mean age: 54 yr) were assigned to strength-training or control groups and tested twice, 12 weeks apart. Seven aged matched healthy subjects were also tested. Subjects performed 5 trials of stair ascent on a four-step stairway while floor reactions and sagittal plane video were recorded on the 2nd step. Inverse dynamics were used to calculate joint torques during the stance phase. Strength-trained subjects exercised in an 11-week resistance-training program. Leg press strength increased 25% after training ($p < .05$, t-test). No group by time interactions were found between OA training and control groups and pre-post tests for average torque at any joint (ANOVA, $p > 0.05$). OA subjects compared to healthy had larger hip extensor and lower knee extensor torques ($p > 0.05$). Thus OA subjects ascended stairs differently than healthy subjects, their strength was increased and self reported pain was decreased ($p < .05$) with strength training but they did not change their joint torques during stair ascent as a result of training.

Average (sd) torque during stance phase (Nm/kg; positive values represent extension)

| | Hip | Knee | Ankle |
|---|--------------|--------------|---------------|
| All OA Pre | 0.05 (0.25) | 0.26 (0.10) | 0.51 (0.13) |
| All OA Post | 0.11 (0.25)* | 0.26 (0.11)* | 0.55 (0.11) * |
| All OA pre + post Healthy vs. Healthy, $p < 0.05$ | -0.09 (0.16) | 0.42 (0.14) | 0.60 (0.13) |

EFFECTS OF OAT BETA-GLUCAN ON SUSCEPTIBILITY TO INFECTION AND MACROPHAGE ANTI-VIRAL RESISTANCE FOLLOWING STRENUOUS EXERCISE

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011

Intense exercise is associated with increased risk for URTI. Consumption of oat beta-glucan (Obg), a soluble fiber, is a mild immune system enhancer that may offset immune suppression with intense training. We studied the effects of Obg on susceptibility to infection following short-term exhaustive exercise training using our mouse model of respiratory infection (Davis et al. J. Appl. Physiol. 83 (5): 1461-6 1997). Macrophage (Mo) anti-viral resistance was also determined as a potential mechanism of this effect. Male CD-1 mice ($n=96$) were randomly assigned to one of four groups. Exercise mice (EX-obg and EX-h2o) ran to volitional fatigue on a treadmill for 3 consecutive days at 36m/min, 8% grade. Control mice (C-obg and C-h2o) were exposed to the same environment, but remained in their cages throughout the exercise period. Obg was consumed in the drinking water (~3.6mg/day) (EX-obg and C-obg) for 10 consecutive days prior to virus inoculation. Following rest or exercise on the last day of training, mice were intra-nasally inoculated with herpes simplex virus-1 (HSV-1). They were monitored twice daily for morbidity and mortality for 21 days. Additional mice ($n=72$) were sacrificed following exercise; peritoneal macrophages were obtained via i.p. lavage & assayed for anti-viral resistance to HSV-1. EX increased morbidity by 25% & mortality by 17% ($P < 0.05$), & ingestion of Obg prevented this increase in morbidity and mortality ($P < 0.05$). EX also decreased Mo anti-viral resistance ($P < 0.05$) & Obg prevented this decrease ($P < 0.05$). These data suggest that consumption of Obg may offset the increased risk of infection during heavy training, & that this is mediated, at least in part, by an increase in Mo anti-viral function.

PRIMARY SKELETAL MUSCLE CELL CULTURES: ENDURANCE TRAINED VS. SEDENTARY HUMANS.

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The purpose of this study was to examine differences in insulin-stimulated glucose uptake in endurance trained and sedentary men and women in differentiated primary human skeletal muscle cells. Endurance trained (VO_{2max} , mean \pm SE = 57.8 ± 3.3 mL/kg/min, $n = 14$) and sedentary (VO_{2max} , 39.0 ± 2.8 mL/kg/min, $n = 14$) individuals had muscle biopsies taken of the vastus lateralis. All participants had a body mass index (BMI) less than 25 kg/m² and a mean age of 22.6 ± 1.6 years. Twelve hour fasted blood samples were used to determine plasma insulin and glucose concentrations for an estimate of in-vivo insulin action. No differences in fasting blood values were observed. Myoblasts were isolated from skeletal muscle samples and maintained in a growth media until proliferation was complete (3-5 weeks). Following proliferation, serum and growth factors were reduced for 8-days to allow fusion and differentiation into myotubes. Glucose uptake was measured at varying insulin concentrations (basal, 0.1 hM, 1.0 hM, 10 hM, 100 hM and 1000 hM). Insulin exposure significantly ($P < 0.05$) increased glucose uptake over basal at the 10 hM, 100 hM, and 1000 hM concentrations. The trained group demonstrated approximately 45% higher ($P < 0.05$) basal glucose uptake (18.0 ± 2.1 vs. 12.4 ± 1.3 pmol/mg/min) compared to the sedentary group. Insulin mediated glucose uptake was approximately 45% higher ($P < 0.05$) at each insulin concentration compared to the sedentary group. Based on these findings it appears that training induced adaptations that increase insulin responsiveness and possibly basal glucose uptake may be retained in culture. Supported by NIH Grant Dk 52999

012

RHOA INDUCTION BY FUNCTIONAL OVERLOAD AND NANDROLONE DECANOATE IN RAT SKELETAL MUSCLE.

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The purpose of this study was to determine what effect functional overload with & without nandrolone decanoate (ND) administration had on RhoA expression in rat plantaris muscle. Male Sprague Dawley (125g) rats were randomly assigned to Con ($n=9$), 3 day ($n=5$), or 21 day ($n=5$) overload groups. Compensatory overload (OV) was induced by the synergist ablation of the distal 1/3rd of the medial and lateral gastrocnemius muscles of the hindlimb. Animals were randomly assigned to intramuscular injections of Sesame Oil ($n=12$) or ND ($n=12$, 6mg/kg). At the appropriate time animals were anesthetized & the fast twitch plantaris muscle was excised & frozen for analysis of muscle mass, protein concentration, RNA concentration, & RhoA expression. Muscle mass (mg) significantly increased ($P < 0.05$) from Con (109 ± 4) with 3 days of OV (143 ± 3) & OV+ND (144 ± 4) administration. Muscle mass also significantly ($P < 0.05$) from Con (257 ± 7) with 21 days of OV (309 ± 3) & OV+ND (333 ± 5) administration. RNA concentration (ug/mg) significantly increased ($P < 0.05$) from Con (1.77 ± 1) with 3 days of OV ($2.64 \pm .44$) & OV+ND ($2.57 \pm .12$). Similarly with 21 days of OV+ND, RNA concentration increased ($P < 0.05$, $1.68 \pm .16$) from Con ($1.19 \pm .13$). Western Blot analysis revealed an increase ($P < 0.05$) in RhoA expression at 3 days from Con ($1.06 \pm .13$) with OV ($2.15 \pm .21$), ND ($1.76 \pm .11$) & OV+ND ($3.85 \pm .62$). RhoA expression remained elevated from Con ($1.00 \pm .34$) at 21 days with ND ($3.80 \pm .35$). In conclusion, RhoA expression is induced by OV & ND administration alone. However, there is a synergistic effect of OV+ND to increase RhoA expression in rat plantaris muscle. The results of this study suggest that increases in RhoA expression with OV and/or OV+ND mirror increases in mass in the fast twitch plantaris muscle of adult rats, and that the effects of functional overload & testosterone administration may act through separate, synergistic pathways to increase RhoA expression.

013

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A COMPARISON OF STRENGTH IN 20, 30, 40, AND 50 YR OLD TRAINED WEIGHT LIFTERS.

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It has been reported that strength losses can occur in untrained individuals as early as the third decade in life. The purpose of this study was to determine if and when significant differences in strength levels occur across four decades of life. 20 male and 19 female, trained weight lifters, between the ages of 20 and 59 were maximally tested & assigned to one of four age groups: 20-29yr ($n=10$), 30-39yr ($n=10$), 40-49yr ($n=10$), and 50-59yr ($n=9$). Each subject was tested for upper & lower body strength using a one-repetition maximum (1RM) protocol on the Smith & hack squat sled machines, respectively. Relative & absolute strength values were determined with relative values based upon total body mass. A multivariate general linear model was used to determine if there was a significant difference in strength when comparing age groups & a Tukey post hoc test was used to determine where the significant differences occurred. A level of $p < .05$ was set as the criteria for determining significance. There were no significant gender or body weight interactions. There were no significant differences in upper body strength between the age groups until the sixth decade in both absolute & relative values (means \pm standard deviations for absolute values in kg: 20-29: 88 ± 41 ; 30-39: 92 ± 43 ; 40-49: 79 ± 36 ; 50-59: 68 ± 25). The 40 yr old age group, however was not significantly different from the 50 yr old group. There were no significant differences found in lower body strength across all four decades when analyzing absolute lifts (means \pm standard deviations for absolute values in kg: 20-29: 167 ± 82 ; 30-39: 162 ± 64 ; 40-49: 158 ± 68 ; 50-59: 115 ± 39). When evaluating relative strength there was a significant decrease in strength in the sixth decade compared to the third & fourth decade. In conclusion upper & lower body strength was maintained through the fifth decade. The change in strength seen in the sixth decade may be age related or may reflect a difference in the quality of training.

014

BIORHYTHMIC VARIATION DURING RESISTANCE EXERCISE IN AGED MEN

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Biorhythmicity refers to the daily patterns of oscillation followed by the many systems of the body. Biorhythmicity of resting parameters is disturbed in the aged. In a previous study, young adult males showed evidence of biorhythmicity in physiological response to exercise, as well as exercise performance. The purpose of this study was to determine whether or not biorhythmicity is maintained in response to exercise in the aged. Ten male subjects (76 ± 1.7 yrs, mean \pm SE) were tested at four times of day: 0800, 1200, 1600, and 2000 h. At each session, maximal effort knee extensions and flexions were performed on an isokinetic dynamometer, and physiological responses (heart rate, blood pressure, core temperature, and blood borne parameters) were measured. During the testing sessions, peak torque, total work, and work fatigue were noted. Statistical significance ($P < 0.05$) appeared only in one of 36 muscle performance variables studied. Yet, several others displayed a trend ($0.10 > P > 0.05$) towards significant time of day variability. As for physiological responses, heart rate, blood pressure, and core temperature failed to demonstrate significant biorhythmicity. Again, however, time of day fluctuation of certain physiological variables (core temperature, blood pressure) approached statistical significance. Blood borne hormones (cortisol, and testosterone) did show statistically significant variance, with highest levels appearing at 0800 h and lowest levels at 2000 h. These data indicate that aged subjects continue to have distinguishable biorhythmicity in response to exercise, though it is diminished with age.

015

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OLDER ADULTS USE GREATER RELATIVE EFFORT FOR STAIR ASCENT COMPARED TO YOUNG ADULTS

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016

Older adults have reduced neuromuscular function including less strength and power compared to young adults. Thus we hypothesized that compared to young adults, older adults perform daily activities at higher levels of effort relative to their maximum level of effort. The purpose of the study was to identify the effect of age on knee torque during stair ascent relative to maximum torque capability. We used stair ascent because it places a high demand on a single muscle group, the knee extensors. Ten young and 10 older adults (ages: 22 & 73 yr) were tested in stair ascent and maximal isometric leg press. Sagittal plane kinematics and floor reactions via a force plate were recorded during ascent and leg press. Knee angular position during leg press was set to the angular position at which the maximum knee torque was observed during ascent (54% of flexion) to equate quadriceps length between the tasks. Inverse dynamics were used to calculate knee joint torques in both tasks. Relative effort was calculated as the ratio of maximum knee torque in ascent to maximum knee torque in leg press and expressed in %. Knee torques in ascent and leg press were 36% and 63% lower and relative effort was 70% higher ($p < .05$) in older compared to young subjects. Difficulty in ascending stairs in older adults may be due less to the task demand and more to the fact that older adults perform this task with much less reserve capability than do young adults.

Maximum (sd) torques in ascent and leg press (Nm/kg) & relative effort (%)

| | Ascent | Leg press | Relative effort | |
|-------|---------------|---------------|-----------------|------------------------------|
| Young | 1.55 (0.29) * | 3.12 (1.14) * | 49.7 (16.0) * | * Young vs. Old $p < .05$ |
| Old | 0.99 (0.25) | 1.17 (0.29) | 84.6 (20.0) | |

MAGNITUDE OF STRENGTH LOSS THROUGHOUT THE VELOCITY RANGE IN YOUNG AND OLD ADULTS.

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017

Understanding of age-related loss of strength throughout the velocity range is important in the development of appropriate counter measures. Reportedly the loss of strength is greater at higher velocities of muscle contraction in older individuals, possibly due to alterations in recruitment patterns or secondary to changes in training intensities or speed of movement. Few studies have examined these issues using a wide range of movement speeds. This study examined the torque-velocity curve of the knee extensors in younger (20-22 years) and older (61-77 years) adults at angular velocities of 0, 60, 120, 180, 240, and 300 deg/sec. Knee extensor torque production was measured at a position of 30 degrees. In addition, absolute torque-velocity curves and standardized torque-velocity curves (i.e., adjusted to isometric strength) were derived. One-way analysis of variance indicated young adults were stronger at all velocities. The absolute torque drop off from 0 to 300 deg/sec was significant in men (Young: 100 Nm; Older: 54 Nm, $p < .05$) for young and older, respectively). However, there were no group differences in relative torque drop (Young: 49%; Older: 45%). No significant age group differences in absolute (Young: 37 Nm; Older: 34 Nm) or relative (Young: 36%; Older: 31%) torque drop off were found for the women. However, older women were unable to perform at the highest velocities (240 and 300 deg/sec) which narrowed the available spectrum of data. These data confirm an age-related loss of strength, but did not reveal a greater decline with increasing angular velocities. While the lower absolute strength values across the velocity spectrum are consistent with an age-related loss in quadriceps strength, the lack of age-related differences in the standardized torque-velocity curves suggests that the muscle fiber composition of the young and older groups may not have been appreciably different.

COMPARISON OF HYDRODENSITOMETRY, DUAL-ENERGY X-RAY ABSORPTIOMETRY, AND A FOUR-COMPONENT MODEL FOR THE ESTIMATION OF PERCENT BODY FAT IN FEMALE MASTERS SWIMMERS.

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018

The relationship of age with percent body fat in 35 adult female competitive swimmers was compared using hydrodensitometry (HD), dual-energy X-ray absorptiometry (DXA), and a four-component model (4-Comp). In addition, percent mineral and water in the fat-free mass was compared to subject age. Participants were healthy volunteers 21 to 73 years old. The four-component (4-Comp) model incorporated body density determined from HD, bone mineral mass measured by DXA, and body water estimated by multi-frequency bioelectrical impedance analysis (BIA). Mean percent body fat levels estimated by HD, DXA, and the 4-Comp model were 29.7%, 28.2%, and 29.1% respectively. The observed relationship between age and percent body fat was strongest using HD ($Rsq = .26$, $p = .01$) while dual-energy X-ray absorptiometry and the 4-Comp model demonstrated smaller associations ($Rsq = .18$, $p = .04$; $Rsq = .19$, $p = .03$ respectively). Examination of method agreement using the technique of Bland and Altman revealed no difference in precision ($r = -.13$, $p = .45$) between HD and DXA but large amounts of error ($SD = 4.01\%$). The 4-Comp model compared to HD and DXA showed smaller errors ($SD = 2.53$ for 4-Comp to HD; 2.94 for 4-Comp to DXA) but revealed differences in precision ($r = -.43$, $p = .01$; $r = -.55$, $p = .00$ respectively). Examination of percent mineral and water in the fat-free tissue revealed significantly greater hydration in older individuals. Information regarding the association of body mineral with age could not be determined due to small sample size. The underlying assumption that body water remains constant appeared not to be valid for this group of adult female swimmers and may have contributed to differences observed between methods.

COLLEGE-AGED MALE BODY COMPOSITION IS NOT DIFFERENT BETWEEN AIR DISPLACEMENT PLETHYSMOGRAPHY VS. HYDROSTATIC WEIGHING.

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019

Recent studies focusing on the accuracy of air displacement plethysmography (ADP) with male subjects have resulted in inconsistent findings. Therefore, we investigated the accuracy with ADP when compared to hydrostatic weighing (HW), and skinfold measurements (SM) in a large group of male subjects. Body composition was determined by ADP, SM, and HW with 47 men (22 ± 2 years; mean \pm SD). Initially, each subject's body composition was determined by ADP and SM. Skinfold measurements were performed by a technician with more than 250 experiences. Afterward, the participant's body composition was determined by HW. The body composition values of college-aged men, when determined by ADP ($15.8 \pm 7.1\%$) and HW ($15.0 \pm 6.8\%$), were found to be similar ($P > .05$). Body fatness determined by SM ($14.8 \pm 7.6\%$) was also found to be similar to ADP and HW with college-aged men. Our findings suggest ADP accurately estimates the body fatness of college-aged men. Also, skinfold measurements performed by an experienced technician accurately estimates body composition in college-aged male participants.

DIFFERENCES IN BODY COMPOSITION OF COLLEGE-AGED WOMEN ASSESSED WITH AIR DISPLACEMENT PLETHYSMOGRAPHY.

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Inconsistent information has been provided in previous research focusing on the accuracy of body composition assessment with air displacement plethysmography (ADP) in college-aged women. We wanted to determine the accuracy of ADP when compared to hydrostatic weighing (HW), and skinfold measurements (SM) in a group of 45 female participants. Body composition was determined by ADP, SM, and HW with 45 women (21 ± 2 years; mean \pm SD). Initially, each subject's body composition was determined by ADP and SM. Skinfold measurements were performed by two individuals, a technician with more than 250 experiences (SME) and a technician with less than 100 experiences (SMI). Afterward, the participant's body composition was determined by HW. We found ADP ($28.7 \pm 5.7\%$) to overestimate body composition by approximately 3% in women ($P < 0.001$) in comparison to HW ($25.5 \pm 6.0\%$). Body fatness determined by SMI ($21.6 \pm 4.7\%$) was significantly lower than all other methods of body composition assessment with women participants. Body fatness values were not different when comparing HW with SME ($25.2 \pm 6.2\%$). Our findings suggest ADP overestimates the body fatness of college-aged women by approximately 3%. Also, skinfold measurements performed by an inexperienced technician underestimates body composition. Lastly, there was no difference in the body composition values determined by HW and SME with college-aged women.

O20

CARBOHYDRATE-ELECTROLYTE INGESTION MINIMIZES THE DETRIMENTAL EFFECT OF HEAT ON PROLONGED CYCLING PERFORMANCE.

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High ambient temperature decreases prolonged exercise performance. Febbraio et al. found that, in addition to decreasing endurance performance, hot ambient conditions negated the ergogenic effect of carbohydrate ingestion found in cool conditions. We compared the effects of ingesting an 8% carbohydrate-electrolyte beverage (Powerade®, The Coca-Cola Company - CE) or an artificially-sweetened placebo (PL) during exercise on prolonged cycling performance & physiological function in hot (30 degrees C, 50% RH) & cool (20 degrees C, 50% RH) environmental conditions. Under each of the four conditions, eight endurance-trained, competitive cyclists, 7 males and 1 female, cycled for 120 min at $\sim 66\%$ VO_{2peak} (SS) followed by a 45-min performance trial (PT). Subjects consumed 6 ml/kg body weight of CE or PL immediately before, & 3 ml/kg body weight at 15-min intervals during the cycling bouts. In the heat, total work completed in PT was significantly greater ($p < .05$) with CE 604 ± 33 kJ than with PL 487 ± 48 kJ. In the cool condition, there was no significant difference between work done in PT with CE 680 ± 57 kJ and PL 664 ± 53 kJ. The reduction in mean cycling performance in the heat was significantly less with CE (76 kJ) than with PL (177 kJ). Compared to PL, CE was associated with increased CHO oxidation & lactate levels in the last hour of SS in both hot and cool conditions. No significant differences in core body temperature, VO_2 , or heart rate were observed between treatments in either condition. During the last hour of SS in the heat, CE resulted in significantly lower ratings of perceived exertion, higher blood glucose concentration, & less loss of plasma volume. In cool conditions, none of these measures was significantly different in CE and PL. In contrast to the findings of Febbraio et al., these results suggest that carbohydrate-electrolyte ingestion reduces the effect of heat on prolonged exercise performance.

O21

THE EFFECT OF DIETARY RESTRICTION AND EXERCISE ON HOMOCYSTEINE IN MILD TO MODERATELY OBESE ADULTS.

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The purposes of this pilot study were: 1) determine if mild to moderately obese adults have elevated resting homocysteine (Hcy) levels due to potential nutritional deficiencies from chronic dieting and, 2) determine if diet plus exercise would decrease their resting Hcy levels. METHODS: Fourteen subjects (12 females, 2 males) completed an 8-wk intervention consisting of a control group (C, n=2, no intervention), diet only (DO, n=5, -600 kcal/d) and diet + exercise (DE, n=7, -600 kcal plus aerobic exercise 3x/wk, 30-45 min/session, 70-85% HRmax). Aerobic fitness was estimated from a cycle ergometer submax test. Percent body fat (%BF) was estimated with bioelectrical impedance. All blood work was drawn in the morning prior to exercise following an overnight (12 h) fast. RESULTS: One-way ANOVAs showed no significant differences between groups ($p > 0.05$) on any variable (age = 27.7 yr; weight = 89.9 kg; %BF = 43.8; predicted VO_{2max} = 19.9 ml/kg/min; Hcy = 9.1 mM/L; RBC folate = 530 nM/L; daily dietary folate intake = 201.7 ug; daily caloric intake = 2263.5 kcal). Although both DE and DO lost weight (-1.9 to 2.9 kg) and improved aerobic fitness (+ 3.8 to 7.2 ml/kg/min), the intervention did not significantly reduce Hcy levels. CONCLUSIONS: Obesity per se did not predispose these subjects to elevated resting Hcy levels. Furthermore, an 8-wk moderate diet and/or exercise program did not significantly reduce Hcy levels. Longitudinal studies on those with greater degrees of obesity and elevated Hcy levels are needed to determine if diet-exercise interventions will impact Hcy levels.

O22

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CAFFEINE EFFECTS ON MOTOR CORTICAL EXCITABILITY AS MEASURED BY TRANSCRANIAL MAGNETIC STIMULATION

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Caffeine is known to improve cognitive function and to delay fatigue. The mechanisms of this effect on fatigue are not well understood but may involve central nervous system (CNS) as well as peripheral factors. Transcranial magnetic stimulation (TMS) has recently been used to directly assess CNS fatigue in humans by measuring decreases in motor cortical excitability. This is indicated by a decrease in the amplitude of motor evoked potentials (MEP) and prolongation of the silent period (SP) in muscle following stimulation of the motor cortex. The effect of caffeine on these parameters is not known. The aim of the present study was to examine the excitability of the motor cortex before and after a single moderate dose (6mg/kg) of caffeine. Motor cortical excitability was examined in six subjects immediately before and 30-min after caffeine ingestion via TMS. The MEP amplitude and the duration of the SP were recorded from the right extensor carpi radialis muscle using Ag-AgCl electrodes. A resting control group was not included because our experience is that these parameters are relatively stable over the time frame of this study. MEPs were significantly increased ($P < 0.05$) by 37% following caffeine ingestion. There was no significant change in SP duration. The results demonstrate that caffeine increases motor cortical excitability as measured by changes in MEP amplitude. This may be a possible mechanism of the delay in fatigue that often occurs with caffeine ingestion but a test of this hypothesis awaits further research.

O23

ACUTE EFFECTS OF MASSAGE ON RECOVERY AND JUMPING PERFORMANCE
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Twelve male volunteers served as subjects (mean \pm SEM physical characteristics: age=24.2 \pm 1.2y, body mass=78.32 \pm 4.98kg, body height=175.75 \pm 1.62cm) to investigate the acute effects of massage on recovery and vertical jump performance. After a "general" warm-up of 120s (pedaling at 60 rpm against a resistance of 9.81N on a stationary, Monarch cycle ergometer), subjects performed one practice jump followed by two maximal vertical jumps (counter movement with hands on hips). Next, the subjects performed a maximal cycle ergometer ride to exhaustion at a relative resistance of 0.736N/kg body mass. This ride served as a fatigue task where subjects were instructed to "ride as hard and fast as possible, for as long as possible". Following the fatigue task, subjects were given 5-min of either passive rest, or a standardized sport massage. Immediately following this treatment, the subjects performed two maximal vertical jumps. A 60s rest period occurred between successive jumps. The performance parameters were determined from vertical ground reaction forces (GRF) obtained with an AMTI forceplate sampling at a frequency of 500Hz. Subjects served as their own controls, with different treatment sessions, 48hrs apart. Means were obtained for the two pre and two post treatment jumps. Data were analyzed and treatment affects were determined using paired t-tests on the pre-post jump differences. Massage had no significant affect ($p > .05$) on peak rate of force development (PRFD), peak force (PF), peak velocity (PV), time-to-PRFD, time-to-PF, time-to-PV and time-to-peak power [eccentric & concentric phases]. Massage produced a significantly smaller fatigue decrement ($p < .05$) in estimated vertical displacement and peak power with a significantly more favorable peak impact force (59.6%). Massage appears to improve recovery as evident in the improved jump parameters and may help reduce the chances of injury from fatigue induced biomechanical alterations upon landing.

024

MEDICAL COVERAGE OF HIGH SCHOOL ATHLETICS IN NORTH CAROLINA
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Each year, over 5 million American adolescents participate in high school athletics. Additionally, there are 1.3 million sports-related injuries among high school athletes reported annually. It has been speculated that medical coverage, particularly physician and certified athletic trainer coverage, of high school athletic events is inadequate. Therefore, the purpose of this study was to assess the quality and extent of medical coverage at high school athletic events among North Carolina high schools. A questionnaire was mailed to the athletic average of 1095 students (+626). Seventy-one percent of schools had physician coverage at some athletic events, and of those, 47% were orthopedic surgeons. Fifty-six percent of the schools had coverage by either nationally or state certified athletic trainers. There was a significant correlation between school size and coverage by physicians ($r = 0.361$, $p = 0.001$) and coverage by certified athletic trainers ($r = 0.278$, $p = 0.009$). Additionally, less than 10% of physician coverage included monitoring of practices. Small schools seemed to have coaches certified in CPR providing medical coverage for athletic events ($r = 0.288$, $p = 0.006$). Only 12% of women, sports receive physician coverage, whereas 73% of men, sports are physician-covered, irrespective of school size. On the other hand, physician coverage of men, sports was related to school size ($r = 0.394$, $p < 0.001$). Finally, only 27% of the schools surveyed felt that medical coverage of athletic events could be considered adequate. These preliminary findings suggest that medical coverage of high school athletics in North Carolina, as in other states, is lacking and inconsistent. Additionally, there appears to be a disparity between quality of coverage of men and women, sports.

025

EFFECTS OF PASSIVE STRETCHING ON VOLLEYBALL BLOCK JUMPING
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The effect of passive stretching on maximal volleyball block jumping was investigated in a sample of 18 female, NCAA Div. I volleyball players (mean \pm SEM physical characteristics: age=20 \pm 0.28y, body height=68.21 \pm 0.74cm, body mass=72.54 \pm 1.82kg, body fat=24 \pm 1.1%, reach height=228.1 \pm 2.4cm, vertical touch height=257.8 \pm 2.8cm and competitive volleyball experience=6.72 \pm 0.32y). A Vertec with a computer-integrated forceplate was used to measure the touch heights and ground reaction forces during block jumping (a counter movement vertical jump from a slightly crouched "ready" position, knees bent approximately 45°, both arms overhead). A maximal block jump was performed following 140s of "general warm-up". Immediately after 140s of passive stretching including statically held front and side lunges and PNF stretching on the hamstrings, another maximal block jump was performed. Additional maximal block jumps were performed at 30s, 60s, 90s, and 120s post passive stretching. There were no significant changes in pre-post stretching peak force ($p = .792$), peak rate of force development ($p = .741$), peak impact force ($p = .218$), displacement ($p = .111$), or any of the time components for these variables. There was a significant difference found in peak power ($p = .003$) and peak velocity ($p = .022$). Even though there was a demonstrated difference in peak power and peak velocity, paired sample t-tests revealed the effect only lasted for 60s and 30s, respectively. Because of the small number of parameters affected and the short time the effect lasted, passive stretching may not compromise volleyball block jumping performance if used in pre-event warm-up routines.

026

PREVALENCE OF EXERCISE INDUCED MUSCLE CRAMPS DURING ULTRADISTANCE RUNNING EVENTS

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Little is known about exercise induced muscle cramps (EIMC), however the prevalence of EIMC has been estimated to be as high as 50-60% in athletes competing in events longer than 3 hours. The purpose of this study was to determine the prevalence of EIMC during an ultraendurance event, & to evaluate the preventative strategies employed by ultradistance runners. A questionnaire was given to the participants in two different ultradistance running races; the Umstead Ultramarathon (UU) in Raleigh, NC ($n = 41$ men and $n = 6$ women), & the LC 50 (LC) in Lake City, CO ($n = 30$ men and $n = 5$ women). Participants were not significantly different with a mean age of 45.0 \pm 1.10 years and a BMI of 23.9 \pm 0.28 kg/m² ($n = 82$). The prevalence of EIMC was not significantly different between the two races despite drastic environmental & race course conditions. 15 of 35 respondents (42.8%) on the high altitude single track course of LC, & 20 of 47 respondents (42.5%) in the hot, humid, relatively flat UU race experienced EIMC during or following the race. Participants in the UU race consumed 11.23 \pm 1.03 L of mostly (75%) sports drink & 3005 \pm 330 kilocalories of semi- or solid food; in the LC race respondents consumed 7.06 \pm 0.52 L of mostly (75%) sports drink & 2144 \pm 395 kilocalories of semi- or solid food. Despite this intake of food & drink, participants lost an average of 3.24 \pm 0.55 pounds in the LC race, & 4.09 \pm 0.47 pounds in the UU race. Of the ad libitum respondents in the two races, 70.2% consumed something that was solely meant to eliminate the possibility of developing cramps. The (Ecramp aid' of choice was electrolyte tablets (70%), followed by cola or sports drink (40%) & aluminum hydroxide (30%). These data suggest that participants in ultradistance running events engage in EIMC preventative strategies, & these may be justified since over 40% of ultradistance runners appear to suffer EIMC that negatively affected their performance. Supported by Appalachian State University Research Council Grant

027

AEROBIC BENEFITS OF ANAEROBIC TRAINING IN FEMALE COLLEGIATE VOLLEYBALL PLAYERS

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028

Aerobic fitness has long been advocated for cardiovascular health in the general population and as one of the components for success in team sports. Training for aerobic fitness often includes distance running as the primary activity. This may not be the optimal way to train for aerobic fitness. In regard to sport specific training, high intensity training that mimics the metabolic demands of the game situation may be optimal. In volleyball, typical rallies are 9-15 seconds, with various breaks or discontinuity of 9-25 seconds. An NCAA Division II female basketball squad (n=10) was tested prior to a 12 week anaerobic training for aerobic fitness (VO₂max) via bicycle ergometer utilizing the Astrand Maximal Test Protocol. Pretreatment results were a mean of 36.3 mlO₂/kg/min with a standard deviation of 4.9. Treatment consisted of six weeks of circuit resistance training utilizing 45-65% 1RM for 30-20 seconds with full ROM respectively 3 days per week. Treatment also utilized sprints of 9-12 seconds with 9-12 seconds relief for 55-65 reps engaged in 3 days per week. After six weeks, for an additional six weeks, 5 days per week, drills matching game situations were added. All this training would traditionally be considered anaerobic. Posttreatment retest with the Astrand protocol yielded a mean 42.2 mlO₂/kg/min VO₂max with a standard deviation of 5.6. A dependent t test yielded a p of .0018 rejecting the null hypothesis between pretest and posttest. The results suggested significant concomitant improvement in aerobic fitness with a sport specific anaerobic training regimen for female collegiate volleyball players.

THE IMPACT OF PHYSICAL ACTIVITY DIFFERENCES ON SEX HORMONE VALUES BETWEEN TWO COLLEGE FEMALE POPULATIONS

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029

The purpose of this study was to examine how activity levels differ between classes & between two college female populations, The Citadel (Cit) & College of Charleston (CofC), & how activity differences impact laboratory values including follicle stimulating hormone (FSH), luteinizing hormone (LH), 17 β -estradiol, & sex hormone binding globulin (SHBG). Sixty-three females volunteered to participate in the study (42 at Cit & 21 from CofC). Both groups provided data on the number of times they ran/week & the number of times they lifted weights/week. Our hypotheses were that females at Cit would have higher activity levels than CofC females over the 18 months & that there would be differences between freshman & sophomore years for Cit females due to the regimentation required during the first year in a military college environment. There were statistically significant differences (p<0.05) between schools in the amount of running during freshman (Cit=3.05 days/wk vs CofC=1.72 days/wk) & sophomore years (Cit=2.94 days/wk vs CofC=1.5 days/wk). There were also statistical differences (p<0.05) in the amount of weight training between schools during the sophomore year (Cit=1.75 days/wk vs CofC 0.79 days/wk). Despite differences in activity levels there were no statistically significant differences between schools with respect to change in the laboratory values from baseline. There were statistical differences (p<0.05) in SHBG among Cit females from baseline at each six month time point when compared with baseline. There were also noted differences in CofC female values, although the only significant difference (p<0.05) was at 12 months. The clinical value of these findings, when combined with other variables in our study, we anticipate will provide useful longitudinal data of the effects of moderate activity on the metabolic characteristics that impact repetitive stress bony injury.

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SEROTONERGIC MEDIATION OF THE HYPOTHALAMIC-PITUITARY-ADRENAL RESPONSE TO PROLONGED EXERCISE

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030

PURPOSE: To elucidate the proposed connection between central and peripheral fatigue mechanisms by examining the relationship between 5-HT and the HPA axis in response to prolonged exercise. **METHODS:** Ten endurance-trained males (20-28 yr old) ran to volitional fatigue at an intensity corresponding to their ventilatory threshold. Blood C, ACTH, and 5-HT levels were analyzed following a 30-min rest (T1), at fatigue (end of run; T2), and 30-min (T3) and 60-min (T4) into recovery. The area under the curve was calculated for T1 to T2 (AUC1), T2 to T3 (AUC2), and T3 to T4 (AUC3). Correlation analysis was used to evaluate the relationship between 5-HT and C or ACTH. **RESULTS:** All subjects' C, ACTH, and 5-HT levels increased from T1 to T2 (p<0.01), yet variable responses occurred in recovery (i.e., T3, T4). Three subjects' C levels continued to increase during recovery; all subjects' ACTH levels decreased; 5 subjects' 5-HT levels continued to increase. C and ACTH were correlated (p<0.05) at T1 (r=.790), T2 (r=.656), and T4 (r=.749). 5-HT was not (p>0.05) correlated with C or ACTH at T1 or T2, yet was correlated with ACTH at T3 (r=.641, p<0.05). 5-HT was not correlated (p>0.05) with the HPA measures for AUC1, yet AUC3 for C and 5-HT was correlated (r=.641, p<0.05). C and ACTH for AUC1 and AUC2 were not related, but these two hormones were correlated for AUC3 (r=.633, p<0.05). **CONCLUSION:** The C findings at T2 are not consistent with the variable C responses observed by Viru et al., yet a variable response of the HPA axis was manifest in the recovery responses. The hormonal variability in recovery may be indicative of an inter-individual recovery time requirement. The relationships between 5-HT and the HPA axis measures in recovery support both a central and peripheral interaction. Why these interactions do not appear until recovery from fatiguing exercise is unclear.

THE INSULIN RESPONSE TO A MODERATE INTENSITY 30-MINUTE SWIM IN HEALTHY ADULTS.

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031

The acute insulin response to exercise has been assessed during walking, cycling and running; however the response to swimming has not been thoroughly described. This project studied the acute response of insulin and blood glucose to a 30- min swim at ~65 % of peak oxygen uptake. Ten healthy active (27 \pm 5 years old) volunteers conducted a protocol to estimate the swim velocity at ~65% of their peak oxygen uptake. On a separate day, having neither exercised for 48 h nor eaten for 12 h, the subjects consumed a standardized meal and 3 h later swam for 30 min. During the trial, blood samples were taken 10 min before, and after 10, 20 and 30 min of swimming. One way repeated measures ANOVAs were used to determine significant differences on the insulin and the blood glucose concentrations. Blood glucose concentrations increased slightly during the trial, but the increase was not statistically significant. Conversely, insulin concentrations decreased over time. Insulin concentrations after 20 min (25.1 \pm 6.4 pmol/L) and after 30 min of swimming (24.3 \pm 4.8 pmol/L) were significantly lower than at rest (35.7 \pm 9.5 pmol/L) (p=0.035 & p=0.019, respectively). It was concluded that a minimum of 20 minutes of continuous moderate intensity swimming was needed to cause an acute decrease in circulating insulin concentrations. Blood glucose concentrations were unchanged throughout the trial, reinforcing that the decline in insulin concentrations was caused by the exercise. These results suggest that swimming could be beneficial for borderline insulin resistant patients because of the potential to lower insulin concentration without disturbing blood glucose homeostasis.

INFLUENCE OF ESTROGEN REPLACEMENT ON SUBSTRATE METABOLISM IN EXERCISING POSTMENOPAUSAL WOMEN

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032

Previous research indicates exercise substrate metabolism of young eumenorrheic women is influenced by endogenous estrogen (E) status; particularly, that increased E augments lipid metabolism (Wenz et al. J Physiol Pharm, 44, 1999). **PURPOSE:** To examine whether a similar phenomenon occurs in postmenopausal women using exogenous E in the form of hormone replacement therapy (HRT). **METHODS:** 9 postmenopausal women performed two 30-min exercise bouts at 70% of their age predicted maximal heart rate on HRT & without HRT (28-64 day washout). Steady-state respiratory gases were examined 20 min into exercise. Physiologic variables directly assessed or calculated from gas measurements in each bout were; VO₂ (L/min), VCO₂ (L/min), RER, energy expended (kcal/min), CHO utilized (%), CHO oxidized (g/min), lipid utilized (%) and lipid oxidized (g/min). **RESULTS:** No significant differences (p>0.10) were noted in variables between bouts except for kcal/min derived from lipid (p<0.05) and g/min lipid oxidized (p<0.05) with both being higher during exercise with HRT. Circulating E levels (estradiol, estrone: measured via RIA procedure) were not related to the lipid differences observed. However, there was a significant relationship between the degree of lipid metabolized and the E dosage used in the HRT (Spearman rho = +0.68; p<0.05). **CONCLUSIONS:** These results support that postmenopausal women receiving E in the form of HRT can experience enhanced lipid metabolism during exercise as well as verify that E is likely the cause for the increased lipid metabolism seen in earlier studies with young eumenorrheic women. These results are limited by their sample size and variability, which may account for the change in lipid metabolism noted without a subsequent concurrent change in carbohydrate metabolism.

INFLUENCE OF EXERCISE INDUCED HYPERCORTISOLISM ON TESTOSTERONE

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033

Research (Cumming et al. J. Clin. Endocrinol. Metab. 57:671-673, 1983) has demonstrated that pharmacologically induced (exogenous) hypercortisolism suppresses serum testosterone levels in men by steroidogenesis and hypothalamic-pituitary-gonadal (HPA) axis inhibition. Prolonged exercise is known to induce physiological (endogenous) hypercortisolism in some individuals (Davies & Few. J. Appl. Physiol. 35:887-891, 1973); however, the question remains, if endogenous hypercortisolism (exercise induced) can suppress serum testosterone levels. Therefore, the purpose of this study was to determine if endogenous hypercortisolism induced by prolonged exhaustive exercise is related to concurrent reductions in testosterone. Ten trained male subjects, 20-28 years of age, ran to volitional fatigue at a speed corresponding to their ventilatory threshold. Blood samples were taken at rest, fatigue, and at 30 and 60-min into recovery. Serum concentrations of cortisol and testosterone (total and free) were determined using RIA. ANOVA indicated significant (p<0.05) increases in cortisol from rest with levels peaking at 30-min post-exercise; 203.2 ± 25.2%, mean ± SE. Total testosterone declined by 33.2%, 60-min into recovery (vs. fatigue value) while free testosterone was 42.1 - 73.5% of resting values (fatigue to 60-min recovery). No correlation relationships (r=0.53 to +0.49, p>0.05) existed between the cortisol and testosterone measures. While these results are limited by sample size and sampling times, they still suggest that acute exercise induced hypercortisolism is insufficient to suppress serum testosterone.

VO₂MAX COMPARISON BETWEEN SEATED AND STANDING CYCLE ERGOMETRY

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Because previous studies have been equivocal, the current study compared VO₂max between seated and standing cycle ergometry protocols in male (n=14) and female (n=22) volunteers of average cardiovascular fitness. All subjects completed maximal exertion seated (SIT) and standing (STD) cycle ergometry protocols at 60 rev/min (rpm), with resistance increased 30 Watts/min. SIT required individuals to remain seated throughout the test until achieving volitional exhaustion. For STD, subjects performed seated cycling until they felt it was necessary to stand to continue. Subjects were then required to stand and perform "standing cycling" (resistance increased 30 Watts/min) to volitional exhaustion. VO₂max (ml/kg/min), peak HR (b/min), peak RER, and peak VE (L/min) were compared between SIT and STD using a Multivariate ANOVA. Results were considered significant at p<0.05. VO₂maxSTD (37.9 + 8.0) was significantly greater than VO₂maxSIT (36.8 + 6.6), while HRSTD (190 + 9.5) was significantly greater than HRSIT (187 + 9.6). VO₂maxSTD was, on average 1.95% greater than VO₂maxSIT, with a range of -16.93 to +17.43%, while HRSTD was, on average 1.23% greater than HRSIT, with values ranging from -5.59 to +7.43%. VESTD (86.0 + 31.6) was not significantly different than VESIT (82.6 + 26.8), while RERSTD (1.21 + 0.096) was significantly lower than RERSIT (1.23 + 0.065). Results suggest the utilization of a standing protocol should be considered when cycle ergometry is the selected testing mode. Future research should seek to determine characteristics of subjects who do and do not benefit from a standing cycle ergometry protocol.

PHYSIOLOGICAL AND PERCEPTUAL RESPONSES BETWEEN TREADMILL AND ELLIPTICAL EXERCISE

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035

Research comparing elliptical exercise training with conventional modes is sparse. Therefore the current study compared heart rate (HR), RPE-overall, RPE-legs, and RPE-chest between treadmill and elliptical exercise training in moderately fit volunteers (n=15). During a graded treadmill test (TM) HR and VO₂ were measured while RPE-O, RPE-L, and RPE-C were estimated each minute. Two elliptical exercise sessions followed; EL1: individualized steady state HR from TM stage 3 was prescribed and achieved during elliptical exercise, with subjects estimating corresponding RPE-O, RPE-L, and RPE-C. EL2: individualized RPE-O (estimated RPE-O from TM stage 3) was prescribed and produced during elliptical exercise, with steady state HR response being recorded. For RPE estimations, repeated measures ANOVA showed RPE-O was not significantly different (p>0.05) (TM: 11.1±2.1 vs. EL1: 12.5±3.5). However, significant differences (p<0.05) were found for RPE-L (TM: 11.2±2.1 vs. EL1: 13.1±3.3) and RPE-C (TM: 10.7±2.3 vs. EL1: 12.3±3.4). Analyses also showed steady state HR was not significantly different (p>0.05) between TM (162±16.7) and EL2 (157±22.6). Results of the current study suggest a) at a similar steady state HR, elliptical exercise is perceived as more intense than treadmill exercise with respect to leg (RPE-L) and breathing (RPE-C) exertion, with similar overall (RPE-O) feelings of exertion, and b) the RPE estimation-production paradigm permits individuals to achieve a prescribed HR during elliptical exercise training based on RPE estimations from treadmill exercise. While differentiated RPE estimations may differ between modes, RPE-O appears effective in regulating exercise intensity (HR) during elliptical exercise training.

RELIABILITY OF THE 30-SECOND CYCLE WINGATE ANAEROBIC TEST IN UNTRAINED, COLLEGE-AGED WOMEN

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The 30-sec cycle Wingate Anaerobic Test (WAnT) is a popular laboratory assessment of peak power (PP) (1st 5-sec), mean power (MP) (30-sec duration) and fatigability (F) (PP-minimum)/PP of the lower body. The purpose of this investigation was to establish the reliability of the WAnT utilizing three trials separated by 48hrs each and conducted at the same time of day in 15 untrained, college-aged females (22.4 ± 2.5 yrs). Since it is possible that alterations in leg volume may contribute to changes in power output, total leg volume (TLV) was determined prior to each trial. Subjects performed a warm-up for 6-min at 20% of their assigned resistance and at min 4 and 5 of the warm-up a maximal sprint was performed for 10-sec. Immediately following warm-up, the subjects remained seated for 5-min. The WAnT was performed following seated rest where the subject pedaled against a resistance of 0.85 kg/kg BW beginning from a 4-sec sprint against the cycle's inertial resistance only. The mean of right and left TLV were not different ($p > 0.05$) between trials and the Intra-Class Correlation within each leg and trial ranged from 0.98-0.99. PP, MP and F were not different between trials. The mean values for trials 1, 2, and 3, respectively, were PP (664 ± 88, 670 ± 99, 677 ± 99 watts), MP (435 ± 64, 440 ± 66, 439 ± 69 watts) and F (55.9 ± 6.1, 56.1 ± 7.2, 56.4 ± 6.7 %). To assess the reliability of PP, MP and F, Intra-Class Correlation was used for the three trials and yielded values of 0.97 for PP, 0.98 for MP, and 0.91 for F. These data suggest that in untrained, college-aged females where TLV remains constant, the WAnT is a reliable tool for the assessment of power output.

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THE EFFECTS OF LONG DURATION CONCENTRIC OR ECCENTRIC CONTRACTIONS ON MAXIMAL STRENGTH, MUSCULAR ENDURANCE, AND OXYGEN CONSUMPTION

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Even though mechanical loading is a key stimulus for muscle strength and hypertrophy, anecdotal observations suggest that contraction duration may also play a role in strength gains. We thus compared the physiological adaptations to long-duration concentric and eccentric contractions. Previously resistance trained males were randomly assigned to a long-duration concentric (2-1-8 s, N=6) or eccentric group (8-1-2 s, N=6) and performed 2 sets of 8 reps with 70% of 1-RM for 16 training sessions. Controls did not train (N=5). All subjects were tested for 1RM (pounds), muscular endurance (i.e., number of repetitions at an absolute load) and for oxygen consumption (VO₂, L/min) in one session of each contraction type, using a horizontal Cybex leg press machine. The Group by Time interactions were not significant ($p > 0.05$) but Table 1 shows the significant time main effects. These preliminary results suggest that both training modes produce similar gains in muscular strength and endurance at similar metabolic cost in previously trained subjects. Contraction duration could be used as a supplemental loading to elicit strength adaptations in previously trained males.

037

Table 1: Time Main Effect (*, $p < 0.05$)

| | Pre | Post | Pre | Post | PreVO ₂ | PostVO ₂ | PostVO ₂ | PostVO ₂ |
|------|--------|--------|-------|-------|--------------------|---------------------|---------------------|---------------------|
| | 1-RM | 1-RM | END | END | CON | CON | ECC | ECC |
| Mean | 396.5 | 416.2* | 14.8 | 23.4* | 13.9 | 11.3* | 12.6 | 10.8* |
| (SD) | (74.7) | (71.7) | (4.5) | (5.2) | (3.2) | (2.6) | (2.6) | (2.1) |

OBESITY AS A MAJOR DETERMINANT OF AEROBIC FITNESS IN CHILDREN WITH ASTHMA

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The purpose of this study was to determine if reduced aerobic fitness was related to obesity in children with asthma. Thirty-seven children (M 22, F 15) with asthma between the ages of 8 and 17 years participated in the study. Aerobic fitness was assessed by measuring peak oxygen uptake (VO₂peak) during progressive maximal exercise testing on a cycle ergometer. Body mass index (BMI) was calculated from measurement of height and weight and was reported as a percent of predicted (50th percentile). 85th and 95th percentiles were used as cut points for overweight and obesity, respectively. Inactivity and vigorous physical activity were assessed via questionnaire. Baseline pulmonary function, specifically FEV₁ % predicted, was assessed using standard spirometry. 20 children had BMI values below the 85th percentile, 5 children were classified as overweight, & 12 children were obese. Given the small number of overweight children, the overweight and obese categories were collapsed into one group referred to as obese. VO₂peak was significantly reduced in the obese children compared to the nonobese children (30.8 + 8.0 v. 43.8 + 7.8 ml/kg/min). Average vigorous activity for the past year did not differ between the obese (4.0 + 4.5 hr/wk) and nonobese (5.6 + 5.0 hrs/wk) groups. Stepwise multiple regression revealed that BMI % predicted, sex, & inactivity were significant independent predictors of VO₂peak while controlling for vigorous activity and FEV₁. BMI % predicted accounted for 73% of the variance in VO₂peak, with sex and inactivity explaining an additional 5 and 2% of the variance, respectively. These findings suggest that obesity plays a substantial role in determining aerobic fitness in children with asthma independent of physical activity. Weight loss interventions may be helpful in improving aerobic fitness, which may enable these children to reduce the degree of disability associated with childhood asthma. Supported in part by the Wake Forest Univ. Cross-Campus Research Fund.

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BODY SHAPE AND FITNESS LEVELS OF MIDDLE SCHOOL STUDENTS

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Youth fitness levels have become a compelling issue since the 1996 Surgeon General report indicated that 50% of American youth are not regular exercisers. Using a modified figure scale (Stunkard et al 1983; Fallon & Rozin 1985), & a questionnaire concerning fitness, a sample of 994 middle school students between ages 11 and 16 were analyzed. The sample was 56% Caucasian and 51% female. Overall, 67% indicated that they enjoyed P.E. class, while 17% wished that they did not have to take P.E. Interestingly, of the 334 respondents who did not indicate that they enjoyed P.E., 79% of them met the criteria for a regular exerciser. Respondents identified their current body shape & picked their ideal body shape using a figure scale of 1 (very thin) to 9 (very round). For current body shape, the average female response was 4.9 (+/-1.6), while the male response was 5.6 (+/-1.1). Overall, this was a non-significant difference, as were the gender differences for Caucasians and Blacks. However, the Hispanics (F=3.5, M=5.5) and Asians (F=3.7, M=5.4) had significant gender differences. There was no significant interaction between body shape and enjoyment of P.E. class; however, greater variability was found for those who wished they didn't have to take P.E. In comparisons of actual vs. desired body shapes, the older females had larger differences between the two, than did the younger females. This age effect was reversed for the males, and is similar to results reported by Rosenblum & Lewis (1999). With criteria just slightly different from that of the Surgeon General report, only 12% of our respondents were not regular exercisers. Reasons for not exercising were significantly different between genders, with the males, explanations being too lazy% and other, % while the females, explanations were too tired% and didn't like it. % Since 80% of our sample was 11-13 years old, our findings suggest that the teenage years of 14-16, may be the pivotal time-frame in which many youth become non-exercisers.

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UPPER BODY STRENGTH IN 11-13 YEAR OLD STUDENTS IS INCREASED WITH 12 WEEKS OF GRAVITRON TRAINING

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O40

The purpose of this study was to determine if one or three sets of assisted pull-ups using a 12-week training protocol on the Gravitron 2000AT unit by StairMaster would increase the number of individuals (11-13 year old students) meeting the minimum score on the PCPFS standards for muscular strength. Fifty-four students (age 11.5 +/- 0.6) in grades 6-8 at A.D. Henderson University School in Boca Raton, FL were consented to participate in this study. All subjects took part in a pretest and a posttest consisting of three upper body strength tests: pull-ups, flexed-arm hang, and push-ups. Forty-two of the fifty-four subjects engaged in a 12-week training protocol (2-3 d/wk) on the Gravitron 2000AT unit by StairMaster performing either one set (T1; N=21) or three sets (T3; N=21) of 8 to 15 reps. The remaining subjects were in the control group (C; N=12). Statistical analysis supported a significant ($p < 0.05$) improvement for three sets of training for pullups. All other results were nonsignificant. These results support the performing of three sets of assisted pullups for 12 weeks with the Gravitron 2000AT unit by StairMaster will increase muscular strength, but it did not statistically increase the number of individuals meeting the minimum muscular strength criteria for the PCPFS testing.

NUTRITION AND PHYSICAL ACTIVITY NEEDS ASSESSMENT IN ELEMENTARY SCHOOLS - PUTTING LESSONS LEARNED INTO PRACTICE

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O41

According to the 1999 National Health and Nutrition Examination Survey (NHANES), an estimated 13% of children ages 6-11 are "95th percentile for body mass index (BMI). The primary goal of obesity prevention and therapy should be healthy eating and physical activity. The DeKalb County Board of Health (BOH) designed a pilot program to increase physical activity and nutrition awareness in the schools. METHODS: Three DeKalb County elementary schools participated in a pilot program to promote healthy eating and physical activity. The schools, with assistance from BOH staff and students from Georgia State University, completed the Centers for Disease Control and Prevention 'School Health Index For Physical Activity and Healthy Eating (Index)'. The Index is a self-assessment that helps schools identify strengths and weaknesses in their policies and programs and prioritize plans for improvement. RESULTS: Weaknesses included no recess, lack of standardized nutrition or physical activity curriculum and no health promotion for staff. The schools applied for and received a "School Nutrition and Physical Activity" grant from the BOH to fund a school policy or environmental barrier. Funded projects include the addition of tennis and golf to the PE curriculum, allotting time for recess, adding fitness stations to a walking trail and starting a walking club for school staff, students, and parents. The program is currently being expanded to sixteen schools in DeKalb County.

EFFECTS OF UNLOADING ON SYNAPTIC STRUCTURE IN AGED AND YOUNG ADULT MUSCLE

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O42

The purpose of this study was to determine the effects of an extended period of muscle unloading on the morphology of neuromuscular junctions (NMJs) in young adult, and aged rats. Eight of sixteen aged (22 mo) and eight of sixteen young adult (8 mo) male Fischer 344 rats were subjected to unloading via hindlimb suspension (HS) for 4 weeks, while the remaining eight in each age group served as control animals. To visualize NMJs, 50 micrometer thick longitudinal muscle sections of soleus muscles were stained with rhodamine conjugated bungarotoxin, and Alexa Fluor 488 labeled anti-synapsin I antibody. Bungarotoxin and anti-synapsin I binding are specific to post-synaptic acetylcholine receptors and pre-synaptic acetylcholine vesicles, respectively. Morphological characteristics investigated included perimeter length, total area, stained area, and dispersion. Our results indicate that HS evoked significant ($P < 0.05$) expansion of post-synaptic perimeter length, total post-synaptic area and stained area of acetylcholine receptor clusters in aged, but not young adult rats. Similarly, pre-synaptic unloading induced alterations were detected only among aged muscle. Specifically, HS induced enhancements ($P < 0.05$) of perimeter length, total area, stained area of acetylcholine vesicle clusters were restricted to aged rats. Neither aged, nor young adult synapses displayed modification in synaptic dispersion. The data presented here suggest that prolonged muscle unloading stimulates remodeling of NMJs in aged, but not young adult skeletal muscle.

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INFLUENCE OF GENDER ON RESISTANCE TRAINING-INDUCED MYOSIN ISOFORM SHIFTS AND MYOFIBER HYPERTROPHY IN OLDER ADULTS

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O43

The purpose of this study was to test the influence of gender on resistance training (RT)-induced changes in myosin heavy chain (MHC) isoform (I, IIa, IIx) distribution and myofiber size in older adults. 11 men (69±2 yr, 178±2 cm, 79±4 kg) & 7 women (64±2 yr, 167±1 cm, 75±5 kg) completed 16-26 wk of 3 d per wk RT. Leg RT included 2-3 sets per exercise with loads 65-80% of (1RM) (i.e. 8-12 repetitions) for 3 of 4 exercises (knee extension, leg curl, leg press, squat). Vastus lateralis muscle biopsies were analyzed for MHC isoform distribution & cross-sectional areas of type I & type II myofibers. Maximum voluntary strength was determined by knee extension (1RM). Serum total testosterone (TT) & insulin-like growth factor I (IGF-I) were determined by radioimmunoassay. Data were analyzed using 2(gender) x 2(time) ANOVA. Variables with a significant gender x time interaction were also analyzed by 2(gender) x 2(time) ANCOVA using IGF-I or TT as covariate. MHCIIx distribution decreased ($p < 0.05$) after RT similarly in both genders (19.1% to 14.4%). Significant gender x time interactions ($p < 0.05$) indicate greater myofiber hypertrophy in men than in women for both mean fiber area (40% vs. 13%) & type II fiber area (48% vs. 15%). There was a strong trend toward an interaction for type I myofiber hypertrophy ($p = .057$) with increases of 31% & 11% for men and women, respectively. A gender x time interaction was found ($p < 0.05$) for 1RM strength, with men (67%) showing greater gains in 1RM than women (52%). All significant gender x time interactions remained after using average TT or average IGF-I as covariate. In summary, downregulation of MHCIIx expression with RT occurred similarly in both older men and older women; however, there were significant gender differences in RT-induced myofiber hypertrophy and strength gain. These gender differences could not be explained by varying levels of circulating anabolic hormones.

VALIDATION OF AN IN VIVO RAT MODEL FOR DETERMINATION OF MUSCLE FUNCTION

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O44

The purpose of this study was to determine the reliability of an in vivo model of skeletal muscle function in rats. Animals were placed in a customized restraint and stimulated transcutaneously to elicit muscular contraction of one hindlimb under three conditions: control (CON), partial paralysis (PAR), and ischemia (ISC). A force transducer connected to the foot recorded force production from the triceps surae muscle group. Mean force production in CON animals over 7 consecutive days was 78.17g, \pm 0.41 (mean \pm SE), with a coefficient of variation of 1.3%. Within a representative animal over the same time period, mean force was 79.61g \pm 3.87. A representative animal exposed to repeated stimulations at a lower intensity produced a mean force of 61.64g, \pm 0.15, with a coefficient of variation of 1.52%, over a 10 minute period. These findings show the consistency over a given duration and over consecutive days. The model is also sensitive to changes in muscle function and to innervation of the muscle group. Mean force production of CON and PAR animals pre-PAR was the same (CON 77.46 g, \pm 6.02; PAR 76.42 g, \pm 5.99). However, immediately post-injection, mean force in PAR animals was significantly lower (27.88g, \pm 3.3), while CON animals maintained force (77.61g, \pm 4.4). Repeated stimulation over 30 minutes produced a 15% reduction in force in the CON group, while ISC limbs were reduced by 72%. The decrease in force in both treatment groups provides evidence that this model measures function from the triceps surae muscle group. In addition, the data indicate this to be a reliable model for determining in vivo muscle function in the rat. The model may also be useful as a training tool, where known stimulation intensity can be administered consistently.

CONTRACTILE PROPERTIES OF BOTULINUM NEUROTOXIN A-TREATED SKELETAL MUSCLE.

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O45

The purpose of this study was to characterize the functional properties of skeletal muscle treated with botulinum neurotoxin A. An in vivo model was used to determine contractile properties of the triceps surae muscle group in five groups of rats (Control (Con), 3 units toxin (3U), 6U, 12U, and 18U) immediately before and regularly for 70 d after injection of the triceps surae. All toxin-injected hind-limbs decreased force production 24 h post-injection ($p < 0.05$), reaching a maximum decrement by 3 d post-injection (3U decreased 52.49%; 6U-66.62%; 12U- 68.36%; 18U-80.71%). Contralateral hind-limbs from treated groups also produced less force, indicating systemic spread of the toxin. All contralateral legs decreased force production by 3 d ($p < 0.05$), reaching a maximum decrement by 7 d (3U-37.92%; 6U- 44.55%; 12U- 64.04%; 18U- 66.34%). In the injected hind-limb, recovery was incomplete in all groups except the 3U. The 6U, 12U, and 18U groups recovered to 72.38%, 63.45%, and 49.02% of initial levels, respectively, all significantly lower than their baselines ($p < 0.05$). Contralateral legs in all groups recovered to baseline force production. Muscle weights of all toxin injected hind-limbs were significantly reduced from Con, and in contralateral legs, loss of muscle mass was variable. These data indicate that botulinum neurotoxin A can have significant effects on skeletal muscle, even at very low doses.

Funding for this study provided by Ipsen Pharmaceuticals.

EFFECTS OF GENDER AND FATIGUING EXERCISE ON SUSCEPTIBILITY TO RESPIRATORY INFECTION

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O46

Fatiguing exercise increases susceptibility to respiratory infection following intranasal inoculation with herpes simplex virus-1 (HSV-1) in male mice (Davis et al, 1997). Although there may be gender differences in susceptibility to certain pathogens, it is unknown whether female mice will respond differently than males in response to strenuous exercise and HSV-1 infection. Therefore, we tested the effects of gender and repeated exhaustive exercise on susceptibility to HSV-1 infection. Male (n = 34) and female (n = 36) CD-1 mice (~ 60 d old) were randomly assigned to exercise (Ex) or control (C) groups. Exercise consisted of 3 days of running at 36 m/min until volitional fatigue (143 \pm 32min). Fifteen min following the last bout of exercise, Ex and C mice were inoculated intranasally with a standard dose (LD30) of HSV-1. Mice were monitored for 21 days for morbidity (time to sickness and symptom severity) and mortality. There was no difference in time to fatigue between male and female Ex mice. No differences in susceptibility to infection were found between C groups. Ex was associated with increased morbidity in both male ($p = 0.016$) and female ($p = 0.008$) mice as indicated by time to sickness, but mortality was not different in either group. There was a trend toward increased symptom severity in Ex-female vs. Ex-male mice ($p = 0.09$), however, the small sample size for this comparison yielded relatively low power (0.4). Results indicate that 3 days of fatiguing exercise increases susceptibility to infection in both males and females. While no statistically significant gender differences were found in this experiment, further research with a larger sample size is needed before firm conclusions can be made.

EFFECT OF SAMPLING TECHNIQUE ON PLASMA ENDOTHELIN-1 CONCENTRATION

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O47

Due to disturbance of the vascular endothelium, venipuncture may acutely alter the secretion of various endothelium-derived substances. Exercise publications in the past have expressed concern regarding the effect of venipuncture or catheter placement on plasma concentration of endothelin-1 (ET-1), an endothelium-derived vasoconstrictor and smooth muscle mitogen. However, little research has been performed to address this concern. PURPOSE: To examine the effects of repeated venipuncture and indwelling catheter placement on serial plasma ET-1 measurements. Results shall provide essential procedural information for researchers wishing to examine the effect of exercise on plasma ET-1 concentration. METHODS: Five healthy male subjects (age: 28 \pm 8, mean \pm SD) provided serial antecubital venous blood samples on two occasions separated by at least 1 week. On one occasion samples were collected every 30 minutes via a Teflon catheter for 240 minutes. On another occasion samples were collected every 30 minutes via separate venipunctures for 150 minutes. RESULTS: Baseline ET-1 concentrations were not different between the two trials (catheter: 1.19 \pm 0.19 pg/mL; venipuncture: 1.20 \pm 0.18 pg/mL; mean \pm SE; $p > 0.05$). Repeated measures ANOVA demonstrated no significant differences in plasma ET-1 concentrations across time with either collection technique. ET-1 concentrations ranged between 1.08 \pm 0.16 pg/mL at 30 minutes and 1.33 \pm 0.15 pg/mL at 240 minutes during the catheter treatment and between 1.20 \pm 0.18 pg/mL at baseline and 1.43 \pm 0.13 pg/mL at 120 minutes during the venipuncture trial. CONCLUSION: The above results suggest that both an indwelling catheter and repeated venipuncture are acceptable methods for obtaining blood samples for measurement of exercise-induced alteration of plasma ET-1 concentration. Supported by a New Faculty Grant, Office of Research Services, UNCG.

INFLUENCE OF VITAMIN C SUPPLEMENTATION ON OXIDATIVE AND SALIVARY IGA CHANGES FOLLOWING AN ULTRAMARATHON

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048

This randomized study measured the influence of vitamin C (N=15) compared to placebo (N=13) supplementation on oxidative and salivary IgA (sIgA) changes in runners competing in an ultramarathon race. Seven days prior to the race, subjects ingested in randomized, double-blind fashion three 500-mg tablets of vitamin C or placebo each day. On race day, blood and saliva samples were collected 1 h pre-race, after 32 km of running, and then again immediately post-race. During the race, runners received 1 l/h carbohydrate beverages (60 g/l) with vitamin C (150 mg/l) or without in a double-blinded fashion. The runners also ingested 2-3 carbohydrate gel packs per hour (25 g each). Subjects in both groups ran a mean of 69 km (range 48 to 80 km) in 9.8 hours (range 5 to 12 hours) & maintained an intensity of approximately 75% HRmax throughout the ultramarathon race. Plasma ascorbic acid was higher in the vitamin C compared to placebo group pre-race, & increased significantly in the vitamin C group during the race (post-race, 3.21 ± 0.29 & 1.28 ± 0.12 $\mu\text{g}/100$ μl , respectively, $P < 0.001$). No significant group or interaction effects were measured for lipid hydroperoxide & F2-isoprostane, but both oxidative measures rose significantly during the ultramarathon race. Saliva volume, sIgA concentration, sIgA secretion & sIgA: saliva protein ratio all decreased significantly ($P < 0.001$) during the race, but the pattern of change in all saliva measures did not differ significantly between groups. No significant correlations were found between post-race plasma vitamin C, oxidative, & saliva measures, except for a positive correlation between post-race serum cortisol & serum vitamin C ($r = 0.50$, $P = 0.006$). These data indicate that vitamin C supplementation in carbohydrate-fed runners does not serve as a countermeasure to oxidative and sIgA changes during or following a competitive ultramarathon race.

THE EFFECTS OF ACUTE EXERCISE ON NEUTROPHIL-INDUCED OXIDATIVE STRESS

C Quindry, W Stone, J King, & C E Broeder, East Tennessee State Univ., Johnson City, TN. The purpose of this study was 1) to document PMN-generated oxidative stress within blood following acute exercise, & 2) to account for fitness/activity levels & diet in relation to basal & post exercise oxidative stress (OS). 9 males (18 -30 yrs.) were recruited for 1 maximal & 3 sub-maximal exercise sessions. Blood was drawn before and immediately after, 1hr & 2hr after exercise for measures of PMN, myeloperoxidase (MPO), superoxide (O₂⁻), vitamin C (C), uric acid (UA), malondyaldehyde (MDA) & lipid hydroperoxides (LPO). The 3 sub-max trials were: 1) 45 min. at 10% above lactate threshold (LT), 2) 45 min. at 10% below LT, & 3) 10% below LT until caloric expenditure equaled (about 60 min) the 10%+ trial. The results indicated all trials elicited a significant intensity-dependent PMN increase ($p \leq 0.05$). Post exercise elevations in MPO were significant ($p \leq 0.05$) & similar for all trials except 10%+ (NS). Alternately, O₂⁻ was significantly elevated following both supra-LT intensity sessions, while O₂⁻/PMN were not. These data indicate total PMN number best represents PMN-generated reactive species within blood. Post max, C ($p = 0.092$) and UA ($p = 0.034$) were significantly depleted, & %LPO increased above baseline. Resting and post-exercise C was inversely related to O₂⁻ but not PMN levels. Resting UA and O₂⁻ levels demonstrated a similar response. Subjects were separated according to High ($n = 5$) and Low ($n = 4$) fitness (VO₂ max & physical activity history questionnaires), Low fit subjects had significantly higher PMN & O₂⁻ following maximal exercise. Pre exercise Low ^ High group differences neared significant for PMN ($p = 0.068$) & O₂⁻ ($p = 0.09$). High fit subjects had significantly higher C levels before & after exercise. Covariate analysis of dietary C intake demonstrated between group significance at rest only. LPO was positively correlated with dietary fat & cholesterol ($p = 0.002$), post exercise LPO levels were primarily a function of baseline LPO. In conclusion, these results indicate that PMN do impose an OS on the blood plasma following exercise. This study clearly shows that exercise intensity, plays a major role in post exercise OS. Finally, these results emphasize regular physical activity and proper diet in the prevention of acute OS during and following exercise.

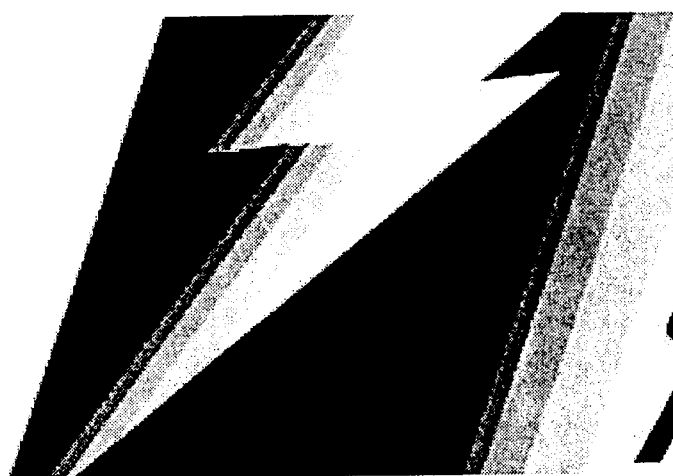
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