

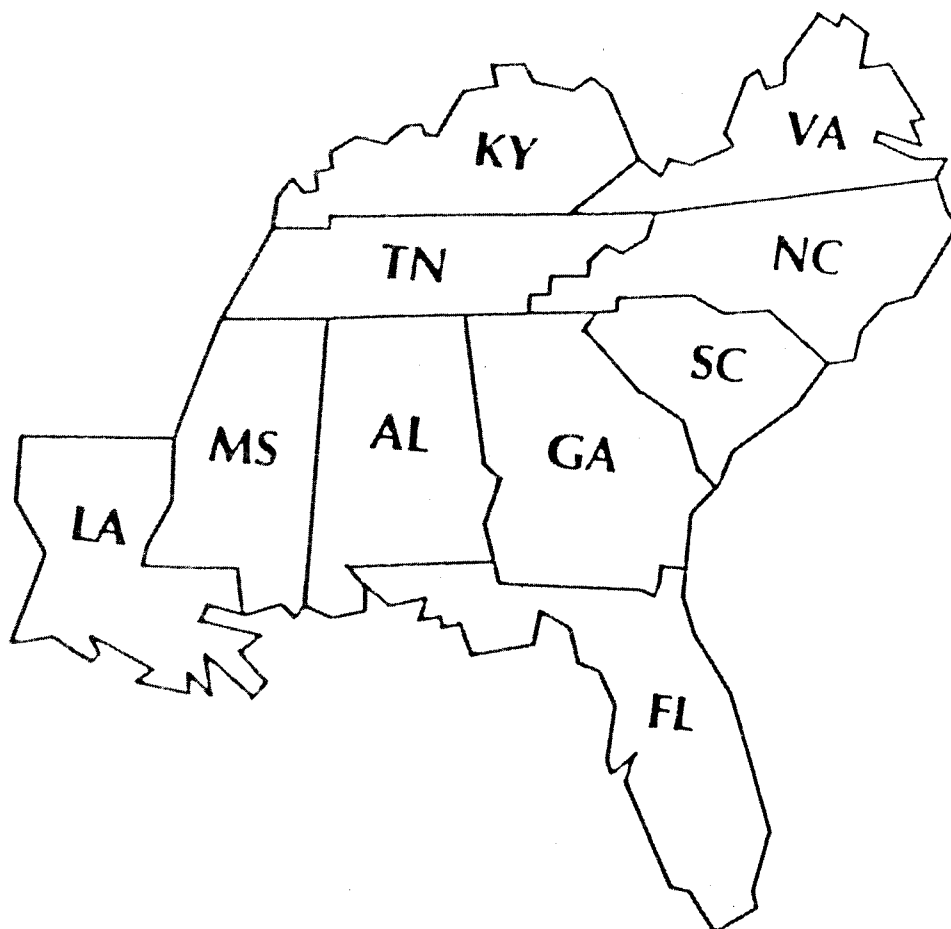
**AMERICAN COLLEGE
of SPORTS MEDICINE**

Southeast Regional Chapter

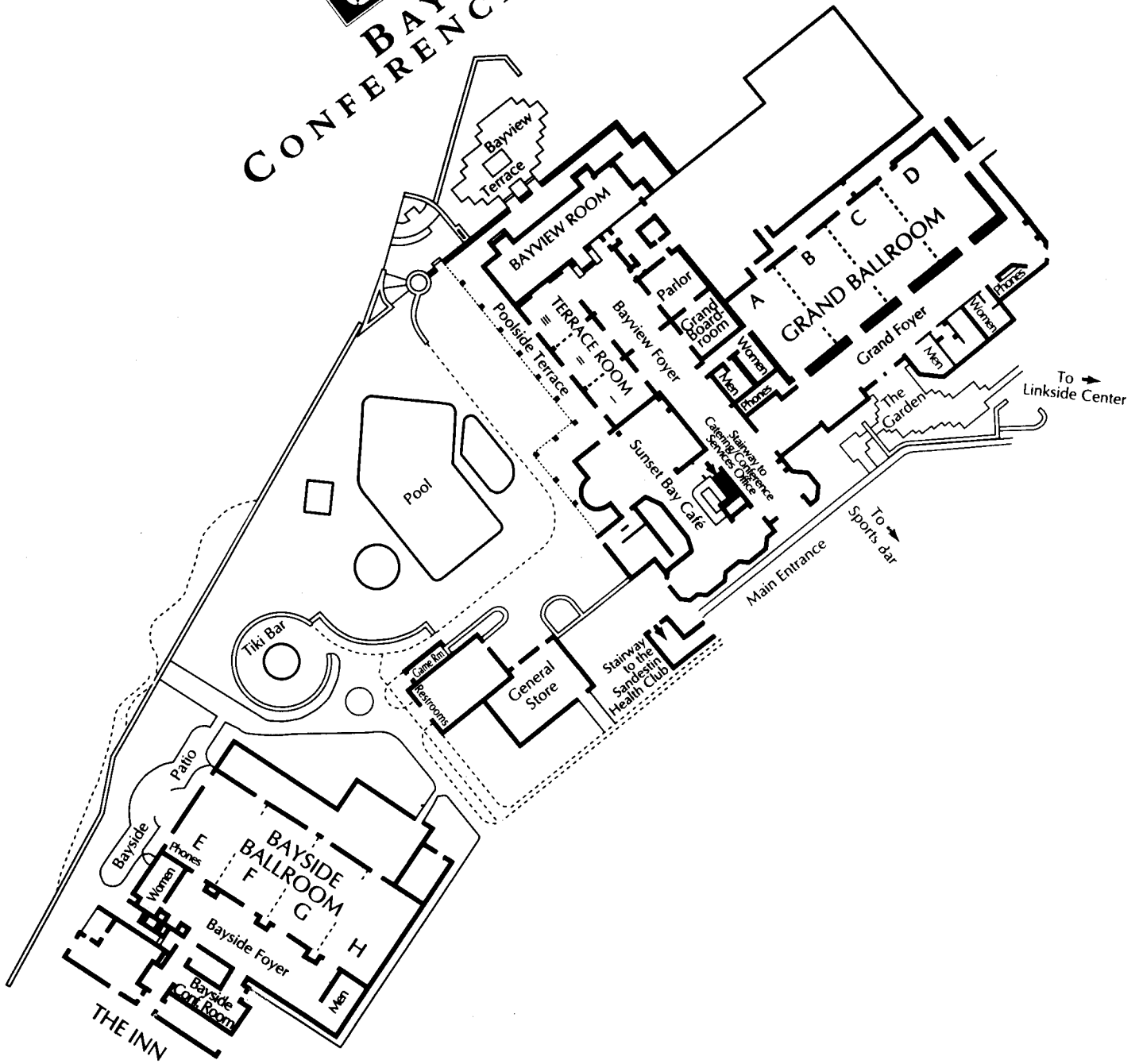


January 29-31, 1998
26th Annual Meeting
Sandestin Resorts, Destin, Florida

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Sandestin
BAYSIDE CENTER
CONFERENCE CENTER



Twenty-Sixth Annual Meeting

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

**Sandestin Resorts
Destin, Florida**

January 29-31, 1998

Officers

President:

Bob Moffatt, Florida State University

Past President:

Bruce Gladden, Auburn University

President-Elect:

Dianne Ward, University of South Carolina

Executive Board:

Dave Bassett, University of Tennessee

Mark Davis, University of South Carolina (National Rep.)

Bonita Marks, University of North Carolina, Chapel Hill

Mike Overton, Florida State University

Ann Swank, University of Louisville

Melicia Whitt, University of South Carolina (Student Rep.)

George Wortley, Lynchburg Family Practice Residency (Clinical Rep.)

Executive Secretary:

Vaughn Christian, Appalachian State University

Meeting Host:

Florida State University

Bob Moffatt and Mike Overton

Publisher and Editor:

Kent Johnson, David Lipscomb University

Meeting Objective

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.

Planning Committee

Dianne Ward, Program Chair
Bob Moffatt, Host
Mike Overton, Host
Mark Davis
Ann Swank
George Wortley

Bruce Gladden
Vaughn Christian
Dave Bassett
Bonita Marks
Melicia Whitt

SEACSM List of Reviewers

Jerry Brandon	Carolyn Berry
Tony Cronan	Kurt Cureton
Beth Meyer Davis	Larry Durstine
Judith Flohr	Don Franks
Greg Hand	Emily Haymes
Bonita Marks	Steve Messier
Bob McMurray	Diane Spitler
Walter Thompson	Amanda Timberlake
Janet Walberg-Rankin	Jay Williams
George Wortley	

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	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

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
11th	Feb. 4-5, 1983 Gainesville, FL	Russ Pate Bill Herbert Kirk Cureton	Jon MacBeth (ES) Earl Allen David Cundiff Scott Powers
12th	Feb. 3-4, 1984 Auburn University	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)

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

	<u>Date/Place</u>	<u>Pres./PastPres./PresElect</u>	<u>Executive Board</u>
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	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)
ES = Executive Secretary N = National Representative	S = Student Representative MD = Physician Representative	CC = Clinical Consultant

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	Edward Howley	Kent Johnson	Heather Vincent



HEALTHSOUTH.

SEACSM's Women's Breakfast Meeting

sponsored by

HEALTHSOUTH

Invited Speakers

CHARLOTTE TATE, PhD

President, American College of Sports Medicine
University of Houston

JOAN CRONAN, MEd

Director of Women's Athletics
University of Tennessee

DIANNE WARD, EdD

Interim Dean, School of Public Health
President-Elect, SEACSM
University of South Carolina

Friday, January 30, 1998

6:30 - 8:00 am

Bayside Room

SanDestin Resort, SanDestin, Florida

All participants are cordially invited to attend.

Please check at Registration Desk for details and seating availability.



HEALTHSOUTH.



Merck Sponsored Seminar

**“Exercise-Induced Asthma: Prevalence,
Etiology and Exercise Training”**

presented by

Andrew Murphy, MD
University of Virginia
and
Carl King, PhD
NC Heart Institute

Friday, January 30, 1998
10:45 - 12 Noon
Grand Ballroom C

SEACSM Annual Meeting, January 29-31, 1998

SanDestin Resort, SanDestin, Florida

**1998 SEACSM Meeting Schedule
SanDestine Resort, SanDestin, Florida**

THURSDAY, JANUARY 29, 1998

12:00 - 6:00 PM
Grand Foyer

Registration

12:00 - 7:30 PM
Bayside Meeting Room

Speaker Ready Room

4:00 - 6:00 PM
Terrace Room

Poster Presentations
Cardiovascular/Environmental/Occupational Physiology
Nutrition and Sports Science
Hematology/Immunology
Psychology, Psychiatry and Education
Body Composition

4:00 - 5:30 PM
Grand Ballroom C
Bayside G

Symposium
Recent Advances in Body Composition Assessment: An Update
Role of Endorphins in Glucose Regulation During Exercise

4:00 - 5:30 PM
Grand Ballroom B
Bayside E
Grand Ballroom D

Tutorials
Skeletal Muscle Biopsy - Limitations and Contributions To Exercise Science
The Zone Diet and Athletic Performance: A Critical Evaluation
Development of References and Citations Using Commercially Available Software Programs

4:00 - 6:00 PM
Grand Ballroom A
Bayside F
Bayside F

Free Communications
Motor Control and Rehabilitation
Psychology/Psychiatry
Exercise Evaluation

7:30 - 9:00 PM
Grand Ballroom

Business Meeting and Keynote Address
New Insights in Exercise Physiology from Transgenic Mouse Models
Sanders Williams, MD
University of Texas Southwestern Medical Center in Dallas

9:00 - 11:00 PM
Bayside Ballroom

SEACSM Social

FRIDAY, JANUARY 30, 1998

8:00 AM - 6:00 PM Grand Foyer	Registration
8:00 AM - 6:00 PM Bayside Meeting Room	Speaker Ready Room
8:00 AM - 6:00 PM Grand Foyer and Bayview Foyer	Exhibits
6:30 - 8:00 AM Bayview Room	Women's Breakfast, sponsored by HealthSouth Invited Speakers: Charlotte, Tate, PhD Joan Cronan, MEd Dianne Ward, EdD
7:30 - 9:00 AM Terrace Room	Poster Presentations Fitness Exercise Evaluations Energy Balance and Weight Control Respiratory Physiology
7:45 - 9:00 AM Bayside F Bayside E	Free Communications Skeletal Muscle Cardiovascular / Connective Tissue / Endocrinology
7:45 - 9:00 AM Bayside G Grand Ballroom A	Symposia Growth Hormone, Body Composition, and Exercise Inversion Ankle Sprains - Return to Play
7:45 - 9:00 AM Grand Ballroom B Grand Ballroom C Grand Ballroom D	Tutorials The Importance of Physical Activity and Nutrition in Promoting A High Quality of Life as We Age Human Subjects Research-Ethics and Institutional Approval Putting Technology to Work for You
9:15 - 10:15 AM Grand Ballroom	Special Topics Lecture Neural Mechanisms Underlying the Decline of Steadiness with Age Roger Enoka, PhD, Univ. of Colorado
10:15 - 10:45 AM	Break
10:30 AM - 12:00 Noon Grand Ballroom A Bayside G Bayside F	Free Communications Epidemiology Body Composition Chronic Disease & Disability
10:45 AM - 12:00 Noon Grand Ballroom C	Merck Sponsored Seminar Exercise-induced Asthma: Prevalence, Etiology, and Exercise Training Carl King, PhD, NC Heart Inst. Andrew Murphy, MD, Univ. of Virginia
10:45 - 12 Noon Grand Ballroom B Grand Ballroom D Bayside E	Symposium What Can the Mouse Tell Us about Nutrition and Exercise? Exercise, Nutrition, and Protection Against Myocardial ischemia-Reperfusion Injury Athletes At Risk: A Psychological Perspective
12 Noon - 1:00PM	Lunch

1:00 - 1:55 PM
Grand Ballroom

Henry J. Montoye Scholar Lecture
Catecholamines: Index of Exercise Stress
Edward Howley, PhD, Univ. of Tennessee

2:00 - 4:00 PM
Bayside E
Ballroom C

Free Communications
Biomechanics
Sports Nutrition

2:15 - 3:30 PM
Grand Ballroom A
Grand Ballroom B
Grand Ballroom D
Bayside G

Tutorials
Physical Fitness and Vegetarian Diets: Is There A Relationship?
Understanding Epidemiological Research in Exercise Science: A Tutorial
Comprehensive Risk Stratification for Patients Entering Cardiac Rehabilitation
The Science of Training for Speed, Agility, and Quickness

2:00 - 3:15 PM
Bayside F

Symposia
The Performance Team: A System for Promoting The Well-being of Athletes

2:00 - 4:00 PM
Terrace Room

Poster Presentations
Competitive Athletes
Growth, Development, Aging

3:15 - 3:45 PM

Break

3:45 - 4:55 PM
Grand Ballroom

Basic Science Lecture
Cardiovascular Aging and Exercise: Whole Body to the Gene
Charlotte Tate, PhD, Univ. of Houston

5:00 - 6:00 PM
Grand Ballroom

Student Symposium
Future Trends in Exercise Research and Clinical Practice
Larry Golding, PhD, Univ. of Nevada, Las Vegas

5:00 - 6:00 PM
Terrace Room

Case and Clinical Abstracts
Scapula Pain - Football
Syncope - Baseball
Lower Leg/Ankle Pain - Swimming
Active Isolated Stretching: A New Tool for Rehabilitation

6:00 - 7:00 PM
Bayside Ballroom

Graduate Student Fair

SATURDAY, JANUARY 31, 1998

7:00 - 8:00 AM Bayview Room	Past Presidents Breakfast
7:30 - 11:00 AM Bayside Meeting Room	Speaker Ready Room
7:45 - 9:00 AM Grand Ballroom B	Clinical Symposium The Prevention of Traumatic and Overuse Injuries: Science or Myth?
7:45 - 9:00 AM Grand Ballroom C Bayside F	Symposiums Student Biomechanics Symposium: Biomechanics and Exercise Associated with Aging, Illness, and Injury Recent Advances in Exercise Physiology for Heart and Lung Transplant Recipients
7:45 - 9:00 AM Grand Ballroom A Grand Ballroom D Bayside E Bayside G	Tutorials Creatine Supplementation Changing Health Behavior: A User-Friendly Theoretical Approach The Effects of Acute Radiation Exposure on Physiological Function and Blood Lipid Profiles Exercise Science: Career Opportunities
9:15 - 10:15 AM Bayside Room	Special Topics Lecture Benefits of Exercise Training: A 20 Year Longitudinal Study Larry Golding, PhD, Univ. of Nevada, Las Vegas
10:15 - 10:45 AM	Break
10:45 - 12 Noon Bayside E Bayside F	Symposiums Assumptions and Accuracy of Models for Predicting VO ₂ Max Control of Autonomic Nervous System Function During Physical Activity
10:45 - 12 Noon Terrace I	Tutorial The Role of Exercise During Childhood in Prevention of Adult Diseases: Recent Findings
10:30 - 12 Noon Terrace II & III	Clinical Tutorial Alternative Approaches to Back Pain
10:45 - 12 Noon Bayside G	Student Award Winners Presentations
12 Noon - 2:00 PM Grand Ballroom	Luncheon and Guest Speaker Nutritional and Pharmacological Agents for Weight Loss: The Real Story Priscilla Clarkson, PhD, Gatorade
2:30 PM Grand Board Room	Business Meeting Executive Committee

Florida Chiropractic Association

sponsor of the

SEACSM Graduate Student Fair

Friday, January 30, 1998

6:00 - 7:00 PM

Bayside Ballroom

and

Alternative Approaches to Back Pain

a Clinical Tutorial presented by

Dr. Tom Hyde and Dr. James Walaski

Florida Chiropractic Association

Saturday, January 31, 1998

10:45 - 12 Noon

Terrace Room II & III

Florida Chiropractic Association

**SOUTHEAST AMERICAN COLLEGE OF SPORTS MEDICINE
26TH ANNUAL MEETING**

THURSDAY, JANUARY 29

12:00 - 6:00 REGISTRATION
(Grand Foyer)

12:00 - 7:30 SPEAKER READY ROOM
(Bayside Meeting and Grand Parlor)

4:00 - 6:00 POSTER SESSIONS
(Terrace Room)
Authors Present from 5:00 - 6:00
Chair: Lisa Colvin, Southern Arkansas University

Cardiovascular, Environmental, and Occupational Physiology

- [1] Spinal Administration of a Cholinergic Receptor Agonist Attenuates the Cardiovascular Responses to Muscle Activity. W.D. Shealy, G.A. Hand. University of South Carolina
- [2] Relationship of Body Surface Area and Body Composition to Left Ventricular Dimensions in Elite Female Weightlifters. M.C. Washam and L.E. Thomas. Northeast Louisiana University. B.J. Talton, J. Pujol, D.G. Burkett. Louisiana Tech University
- [3] Hemodynamic Responses to Submaximal Supine Cycling in Obese 7 to 11 Year Old Children: Gender and Ethnicity Differences. M.C. Humphries, B. Gutin, S. Owens, M. Litaker, M.A. Ferguson, S. Vemulapalli. Medical College of Georgia
- [4] Impact of Time of Day on Hot Weather Responses to Running. C.A. Ashley, J.D. Reneau, J.P. Roy, P.A. Bishop. University of Alabama
- [5] Association of All-Cause Absenteeism to Age, Race, and Diabetes in a Southern Louisiana Blue-Collar Workforce. B. Picou, G. Church, R. Wood, M. Welsch. Louisiana State University
- [6] Effects of Gender in Exercise and Non-Exercise Post-Meal Metabolic Rate and Substrate Utilization. M.R. Sharp, C.M. DeWitt. University of South Carolina-Aiken
- [7] A Comparison of Eversion Ankle Function Between Normal and Chronically-Sprained Ankles. K.D. Browder, K.C. Lake. Georgia Southern University

Nutrition and Sports Science

- [8] The Effect of Creatine Supplementation at Commercially Recommended Intakes on Anaerobic Power and Capacity. J.H. Driggers, R.M. Timmons, V.A. Tomsons, D.E. Kremer. Lander University

Hematology/Immunology

- [9] Influence of Obesity on Immune Function. J.M.A. Hjertman, D.C. Nieman, D.A. Henson, S.L. Nehlsen-Cannarella, A.C. Utter, D.E. Butterworth, O.R. Fagoaga. Appalachian State University

- [10] Influence of Mode and Carbohydrate on the Cytokine Response to Heavy Exertion. D.C. Nieman, S.L. Nehlsen-Cannarella, O.R. Fagoaga, D.A. Henson, A. Utter, J.M. Davis, F. Williams, D.E. Butterworth. Appalachian State University
- [11] Effects of Mode and Carbohydrate on the Granulocyte and Monocyte Response to Intensive, Prolonged Exercise. E.B. Garner, D.C. Nieman, S.L. Nehlsen-Cannarella, O.R. Fagoaga, D.A. Henson, A.C. Utter, J.M. Davis, F. Williams, D.E. Butterworth. Appalachian State University
- [12] Immune Response To Exercise Training and/or Energy Restriction in Obese Women. M.D. Austin, D.C. Nieman, S.L. Nehlsen-Cannarella, D.A. Henson, D.E. Butterworth, O.R. Fagoaga, A.C. Utter. Appalachian State University

Psychology, Psychiatry, and Education

- [13] Body Shape Perception Among Physically Active College Students. J.L.P. Roy, M. Richardson. University of Alabama
- [14] A Comparison of the Initial Curriculum Recommendations of the Southeastern American College of Sports Medicine among Georgia Colleges and Universities. B.L. Carter, R. Scoby. J.D. Archbold Memorial Hospital

Body Composition

- [15] Criterion-Referenced Reliability Evidence for the Prudential Fitnessgram Body Composition Standards. R.E. Nixon, D.A. Rowe, T.J. Michael. Middle Tennessee State University. M.T. Mahar. East Carolina University
- [16] Relationship of Simple and State-of-the-Art Body Composition Measurements with Cardiovascular Risk Factors in Obese Children. S. Owens, M.A. Ferguson, S. Riggs, S. Vemulapalli, B. Gutin. Medical College of Georgia
- [17] The Reliability and Validity of a Home-Model Body Fat Monitor/Scale. J.G. Webb, B.L. Marks, R.G. McMurray. University of North Carolina-Chapel Hill
- [18] Correlation of Anthropometric Measurements and Visceral Adipose Tissue in Obese Children. M. Litaker, S. Owens, S. Riggs, B. Gutin. Medical College of Georgia
- [19] Reliability of Trunk and Abdominal Fat Measurements by Dual-Energy X-Ray Absorptiometry. J.L. Clasey, A. Weltman, FACSM, C. Bouchard, FACSM, C.D. Teates, M.O. Thorner, M.L. Hartman. University of Virginia

4:00 - 5:30

SYMPOSIUM

- [TS 1] Recent Advances in Body Composition: An Update
Mindy Millard-Stafford, Phillip B. Sparling, Mitchell A. Collins, Kirk J. Cureton.
Georgia Institute of Technology; Kennesaw State University; University of Georgia
Chair: Craig Broeder, East Tennessee University
(Grand Ballroom C)
- [TS 2] Role of Endorphins in Glucose Regulation During Exercise
Theodore J Angelopoulos; University of Southern Mississippi
Chair: Mark Davis, University of South Carolina
(Bayside G)

4:00 - 5:30

TUTORIALS

[TS 3]

Skeletal Muscle Biopsy-Limitations and Contributions to Exercise Science
 Gary A. Dudley; University of Georgia
 Chair: Tibor Hortobagyi, East Carolina University
(Grand Ballroom B)

[TS 4]

The Zone Diet and Athletic Performance: A Critical Evaluation
 Samuel N. Cheuvront and Jacqueline L. Dupont; Florida State University
 Chair: Janet Walberg-Rankin, Virginia Tech
(Bayside E)

[TS 5]

Development of References and Citations using Commercially Available Software Programs
 Michael Berry; Wake Forest University
 Chair: Richard Godsen, College of Charleston
(Grand Ballroom D)

4:00 - 6:00

FREE COMMUNICATIONS

Motor Control and Rehabilitation
 Chair: Tibor Hortobagyi, East Carolina University
(Grand Ballroom A)

[20]

(4:00 - 4:15) Comparison Between Bilateral and Unilateral Strength During the Supine Leg Press. R. Kandle, J. Stockett, B. Forbis, M. Spencer, J. Barrier, J. Money, J. Connors, J. Lambert, J. Tracy, P. DeVita, T. Hortobagyi. East Carolina University

[21]

(4:15 - 4:30) Myosin Heavy Chain Expression in Elite Power Lifters. M.P. Harber, A.C. Fry, J.M. Webber, N.A. Pattison, C.A. Lessman, L.W. Weiss. University of Memphis

[22]

(4:30 - 4:45) Impact of Smoking Low Nicotine Cigarettes on Steady State Exercise Responses. K.D. Biggerstaff, R.J. Moffatt, S. Bearden, S.N. Cheuvront, P. McDouough. Florida State University

[23]

(4:45 - 5:00) Older Adults' Evaluation of the Physical Exercise Profile-Revised (PEP-R) Questionnaire - An Exercise Assessment Tool. E.L. Wyse, L.W. Boyette, J.E. Boyette, W.R. De l'Aune. Atlanta Veterans Affairs Medical Center

[24]

(5:00 - 5:15) Greater Power Production in Elite Sprinters During Jump Squat Compared to Conventional Squat Exercise. J. Stockett, R. Kandle, J. Barrier, J. Money, B. Forbis, M. Spencer, J. Tracy, J. Lambert, J. Connors, P. DeVita, T. Hortobagyi. East Carolina University

[25]

(5:15 - 5:30) Regression of VO_2 on Heart Rate During Unsupported (US) and Supported (S) Deep Water Running. S.P. Brown, D. O'Donnell, L. Kravitz, K. Beason, J. Alvarez. University of Mississippi

[26]

(5:30 - 5:45) Electromyographic Study of VMO & RF Muscle Activity During Straight Leg Raise Exercises in 4 Different Hip & Ankle Positions. K.S. Thomas, T.J. Michael, D.A. Rowe. Middle Tennessee State University

Psychology/Psychiatry

Chair: Diane Spitler, Roanoke-Chawan Hospital, Asheville, NC
(Bayside F)

- [27] (4:00 - 4:15) Reasons for Joining a Fitness Facility. J.L. Drummond, H.S. Lenes. University of Southern Mississippi
- [28] (4:15 - 4:30) Physical Activity, Physical Self-Worth and Calcium Intake of Young Adult Females. J.A. Flohr, A.M. Dwyer. James Madison University
- [29] (4:30 - 4:45) Effect of Class Exercise Participation on Body Image of College Females. D.J. The, D.A. Rowe. Middle Tennessee State University.
- [30] (4:45 - 5:00) Internal Consistency of the Body Self-Image Questionnaire in Women Participating in Aerobic Dance and Weightlifting. C.A. White, D.A. Rowe. Middle Tennessee State University

Exercise Evaluation

Chair: Walter Thompson, Georgia State University
(Bayside F)

- [31] (5:00 - 5:15) A Comparison of the Caloric Cost of Step Aerobic Dance Utilizing Arm and Leg Weights, Resistive Bands or Muscular Contractions. P.E. Mosher, M.A. Ferguson, R.O. Arnold, R.A. Belva. University of Tennessee-Chattanooga
- [32] (5:15 - 5:30) The Flywheel Effect and Its Impact Upon Cycle Ergometry. P. McDonough, K.D. Biggerstaff, S. Bearden, J. Bergen, T.S. Moerland, R.J. Moffatt. Florida State University
- [33] (5:30 - 5:45) Should the Eight-Repetition Max Dumbbell Bench Press Replace the Pull-Up Test When Measuring Strength in Fourth Grade Students? A.C. Huffman, J.A. Flohr. James Madison University
- [34] (5:45 - 6:00) The Effect of Different Warm-Up Intensities on Performance in a 2000 Meter Rowing Test. A. Fuller, P.E. Mosher, B.E. Oglesby, Jr. University of Tennessee-Chattanooga

7:30 - 9:00

BUSINESS MEETING AND KEYNOTE ADDRESS**(Grand Ballroom)**

Presiding: Robert Moffatt, Florida State University
 Introduction of Speaker: Greg Hand, University of South Carolina

"New Insights in Exercise Physiology from Transgenic Mouse Models"
 Sanders Williams, MD
 University of Texas Southwest Medical Center, Dallas

9:00 - 11:00

SEACSM SOCIAL**(Bayside Ballroom)**

FRIDAY, JANUARY 30

8:00 - 6:00

REGISTRATION
(Grand Foyer)

EXHIBITS
(Grand Foyer and Bayview Foyer)

SPEAKER READY ROOM
(Bayside Meeting Room)

6:30 - 8:00

WOMEN'S BREAKFAST
Sponsored by HealthSouth
(Bayview Room)

Invited Speakers:

Charlotte Tate, PhD, President ACSM
Joan Cronan, MEd, Women's Athletic Director, University of Tennessee
Dianne Ward, EdD, Interim Dean, University of South Carolina, School of Public Health
Chair: Sue Graves, Florida Atlantic University, Davis, Florida

7:45 - 9:00

POSTER SESSIONS
(Terrace Room)

Authors Present from 8:00 - 9:00

Chair: Lisa Colvin, Southern Arkansas University

Fitness

- [35] The Effects of Simulated Tennis Tournament Play on Selected Physical Performance Measures. A.C. Fry, M.L. Wilson, M.D. Fry, Y. Li. University of Memphis
- [36] Internal Consistency of the Health Style: A Self Test Questionnaire. M.A. Tener, R.E. Nixon, C. Bland, D.A. Rowe. Middle Tennessee State University
- [37] Metabolic Response of Men to Lower vs. Upper and Lower Body Rowing. J.J. Mayo, L. Kravitz, J. Alvarez, K. Honea. University of Mississippi
- [38] A Comparison of the Physiological Responses to Lower Body and Combined Upper and Lower Body Exercise. J. Alvare, L. Kravitz, J. Mayo, K.P. Honea. University of Mississippi
- [39] Physiological and Perceived Exertion Responses of Deep-Water Exercise and Treadmill Exercise. M.M. Key, K.L. Blair, L.J. Rosenberg, D.E. Kremer. Lander University

Exercise Evaluation

- [40] The Effects of Race on Exercise Trainability in Females. P.L. Lloyd, C.M. DeWitt. University of South Carolina-Aiken
- [41] Temperature and Heart Rate Responses to Varying Exercise Intensities. L.K. Poor, M.R. McCammon, E.J. Heininger, N.W. Pollock, A.Z. Wade, M.T. Mahar. East Carolina University

- [42] Predicting Stairmaster 4000PT VO_{2max} Based on Submaximal Stairmaster 4000PT Exercise. T.W. Stout, B.R. Abadie, M. Black, J. Edmonson, P. Conn, B. Malone, M.R. Coggins, C.J. Brown. Mississippi State University
- [43] Dissimilar Hamstring/Quadriceps (H/Q) Ratios According to Mode of Muscle Contraction and Training Status. J. Barrier, J. Money, J. Stockett, R. Kandle, M. Specer, B. Forbis, J. Lambert, J. Tracy, J. Connors, P. DeVita, T. Hortobagyi. East Carolina University
- [44] An Evaluation of the Jugs Radar Gun. R. Godsen, B. Barfield, G. Ross. College of Charleston
- Energy, Balance and Weight Control
- [45] Metabolic Changes Following a 3 Month Diet and/or Exercise Intervention. B.E. Oglesby, Jr., B.S. Brown, FACSM, J.S. Dollahite, C.J. Flocks, C.E. Riggs, FACSM. University of Tennessee-Chattanooga
- [46] Substrate Use During and Following Moderate and Low Intensity Exercise: Implications for Weight Control. K.M. Townsend, D.R. Bassett, Jr., R. Boughey, K. Patterson, D.L. Thompson. University of Tennessee
- [47] Acute Exercise Reduces Leptin Expression in Retroperitoneal but Not Epididymal Fat. S.B. Bramlett, S.L. Hendry, J. Zhou, R.B.S. Harris, . Zachwieja. Louisiana State University
- [48] Effect of Chromium Picolinate (CP) and L-Carnitine (LC) on Oxygen Consumption and Respiratory Exchange Ratio During Rest, Exercise and Recovery. L. Chitwood, L. Weathers, J. Alvarez, S. Brown, L. Kravitz. University of Mississippi
- [49] Changes in Serum Leptin Levels in Response to Acute Cycle Ergometry Exercise in Non-Obese, Obese, and Post-Obese Women. D.M. Dorsey, A. Anderson, P.J. Geiselman, S.B. Bramlet, J.J. Zachwiega. Louisiana State University
- Respiratory Physiology
- [50] Effects of Passive Cycle Pedaling Movement on Minute Ventilation. T. Blanton, R. Carlile, M. Fletcher, B. Moore, E. Ropp, B. Strobel, B. Tooke, H. Welch, R. Johnson. Appalachian State University
- [51] Effects of Simple Movement on Ventilation by Use of the Hand Ergometer. J. Burlew, S. Harmon, C. Kester, H. McAlexander, D. Osborne, J. Truitt, J. Welty, H. Welch, R. Johnson. Appalachian State University
- 7:45 - 9:00 FREE COMMUNICATIONS
- Skeletal Muscle
Chair: David Essig, University of South Carolina
(Bayside F)
- [52] (7:45 - 8:00) Inhibition of Maximal Torque Production by Acute Stretching is Joint-Angle Specific. A.G. Nelson, J.D. Allen, A. Cornwell, J. Kokkonen. Louisiana State University and Brigham Young University-Hawaii Campus

- [53] (8:00 - 8:15) Exercise Training Reduces Myocardial Lipid Peroxidation Following Short-Term Ischemia-Reperfusion. H.A. Demirel, S.K. Powers, J.S. Coombes, H. Naito. University of Florida
- [54] (8:15 - 8:30) Immobilization Induced Atrophy is Associated with Increased Oxidative Stress. J.S. Coombes, S.K. Powers, K.H. Ward, H.A. Demirel, H.K. Vincent, A. Shanley. University of Florida
- [55] (8:30 - 8:45) Biorythmicity of Maximal Muscle Performance and Selected Physiological Variables. M.R. Deschenes, C. Coddling, M. McMillan, B. Tonks. College of William & Mary
- [56] (8:45 - 9:00) The Relationship Between the Rate of Tension Development (RTD) of the Quadriceps Muscle Groups and the Sprint Start. B. Forbis, J. Money, J. Barrier, J. Stockett, R. Kandle, M. Spencer, J. Lambert, J. Tracy, J. Connors, P. DeVita, T. Hortobagyi. East Carolina University
- Cardiovascular / Connective Tissue / Endocrinology
Chair: Greg Hand, University of South Carolina
(Bayside E)
- [57] (7:45 - 8:00) Neck Afferents and Muscle Sympathetic Nerve Activity: Implications for the Vestibul sympathetic Reflex. K.M. Hume, C.A. Ray. University of Georgia
- [58] (8:00 - 8:15) Muscle Sympathetic Nerve Activity Increases with Graded Neck Exercise. S.L. Steele, K.M. Hume, E.T. Mahoney, C.A. Ray. University of Georgia
- [59] (8:15 - 8:30) Femoral Neck, Lumbar Spine and Whole Body Bone Mineral Density Changes in Collegiate Female Athletes. T.L. Robinson. University of South Alabama
- [60] (8:30 - 8:45) Influence of Carbohydrate on the Hormonal Response to 2.5 Hours of Running and Cycling in Triathletes. F. Williams, D.C. Nieman, D.A. Henson, A.C. Utter, J.M. Davis, D.E. Butterworth. Appalachian State University

7:45 - 9:00

SYMPOSIA

[TS 6]

Growth Hormone, Body Composition, and Exercise
Arthur Weltman, Jody Clasey
University of Virginia; University of Kentucky
Chair: Emily Haymes, Florida State University
(Bayside G)

[TS 7]

Inversion Ankle Sprains - Return To Play
Kathy Simpson, Sean Cravens, Beth Higbie
University of Georgia; Georgia State University
Chair: Jeff Chandler, Lexington Clinic Sports Medicine Center, KY
(Grand Ballroom A)

7:45 - 9:00

TUTORIALS

[TS 8]

The Importance of Physical Activity and Nutrition in Promoting A High Quality of Life as We Age
Craig E. Broeder, Lynn Panton
East Tennessee State University

Chair: David Nieman, Appalachian State University
(Grand Ballroom B)

[TS 9]

Human Subjects Research - Ethics and Institutional Approval
Neal W. Pollock
East Carolina University
Chair: Don Franks, Louisiana State University
(Grand Ballroom C)

[TS 10]

Putting Technology to Work for You
Don Torok
Florida Atlantic University
Chair: Jerry Brandon, Georgia State University
(Grand Ballroom D)

9:15 - 10:15

SPECIAL TOPICS LECTURE
Neural Mechanisms Underlying the Decline of Steadiness with Age
Roger Enoka, PhD
University of Colorado
Chair: Michael Overton, Florida State University, Tallahassee, Florida
(GRAND BALLROOM)

10:15 - 10:45

BREAK

10:30 - 12 Noon

FREE COMMUNICATIONS

Epidemiology
Chair: Stewart Trost, University of South Carolina
(Grand Ballroom A)

[61]

(10:30 - 10:45) Influence of Physical Activity and Aerobic Power on Cardiovascular Disease Risk Factors. R.G. McMurray, J.S. Harrell, L. Johnston, E. Sprow. University of North Carolina

[62]

(10:45 - 11:00) Comparison of the Accuracy of Automated Commercial Blood Pressure Monitors to a Mercury Manometer. K.M. Corrigan, D.J. Torok, J.A. O'Kroy, R.L. Welsh. Florida Atlantic University

[63]

(11:00 - 11:15) Exercise Mode is Related to Activity Level and Stage of Exercise Adoption. J. Rodean, FACSM. Clark Atlanta University

[64]

(11:15 - 11:30) A Cross-Sectional Study of CHD Risk Factors as Determined During Corporate Health Screenings in Middle Tennessee. B.W. VanderLoop, T.J. Michael. Middle Tennessee State University and Baptist Hospital, Nashville

[65]

(11:30 - 11:45) Relationship Between Parents' and Children's Perceptions of Physical Activity Behavior. M.T. Mahar, C.R. Parker. East Carolina University and Wahl-Coates School, Greenville, NC

Body Composition and Fitness
Chair: Kirk Cureton, University of Georgia
(Bayside G)

- [66] (10:30 - 10:45) Evaluation of the BODPOD® for Assessing Body Composition in Black and White Football Athletes. M.L. Millard-Stafford, M.A. Collins, P.B. Sparling, L.B. Rosskopf, T.K. Snow, S. Webb. Georgia Institute of Technology; Kennesaw State University
- [67] (10:45 - 11:00) Comparison Between Air Displacement Plethysmography, Hydrostatic Weighing, Dual-Energy X-Ray Absorptiometry, and a Three-Component Model for Determining Body Fat in Athletic Men. M.A. Collins, M.L. Millard-Stafford, P.B. Sparling, T.K. Snow, L.B. Rosskopf, S.A. Webb, J. Omer. Georgia Institute of Technology; Kennesaw State University
- [68] (11:00 - 11:15) Body Composition Using a Four-Component Model: Accuracy and Influence of Body Water Estimates. E.M. Evans, M.L. Mallard-Stafford, C.M. Modlesky, M. Collins, K.J. Cureton. University of Georgia
- [69] (11:15 - 11:30) Use of the Leg-to-Leg Bioelectrical Impedance Method in Assessing Body Composition Changes in Obese Women. A.C. Utter, D.C. Nieman, B.J. Warren, A. Ward. Appalachian State University.
- [70] (11:30 - 11:45) Body Composition of Obese Women Assessed Using a Four-Component Model. M.J. Saunders, E.M. Evans, K.J. Cureton. University of Georgia
- [71] (11:45 - 12:00) A Cardiovascular Fitness and Risk Factor Profile of Registered and Licensed Practical Nurses Within a Region. B.L. Carter, J.L. Weiner, C.C. Bentley. John D. Archbold Memorial Hospital, GA
- Chronic Disease and Disability
Chair: Bonnie Marks, University of North Carolina-Chapel Hill
(Bayside F)
- [72] (10:30 - 10:45) Exercise and Its Impact on Quality of Life in African American Women. R.E. Tanner, T.A. Jacobson, J.A. Doyle. Grady Health System-Atlanta
- [73] (10:45 - 11:00) Improvements in Reaction Time of Parkinson's Patients Following Aerobic Exercise Intervention. J.L. Bergen, T. Toole, R.G. Elliott II, S. Park, C.G. Maitland. Florida State University
- [74] (11:00 - 11:15) Exercise and Tumor Development in a Mutant Mouse Predisposed to Multiple Intestinal Adenomas. L.H. Colbert, J.M. Davis, D.A. Essig. University of South Carolina
- [75] (11:15 - 11:30) Fuel Oxidation and Substrate Responses in Non-Obese Black and White Females During Exercise. D. Myers, L. Chitwood, J. Cole, S. Brown, J. Matthews, and J. Alvarez. University of Mississippi
- [76] (11:30 - 11:45) Short-Term Training Without Weight Loss Improves Glucose Tolerance in Obese Males with Abnormal Glucose Tolerance. J.C. Denton, M.R. Lewis, A.Z. Jamurtas, A.H. Goldfarb, FACSM, M. Akram, W. Forsythe III, T.J. Angelopoulos, FACSM. University of Southern Mississippi
- [77] (11:45 - 12:00) Changes in Mean Arterial Pressure Following Resistance Training in Phase III and IV Cardiac Rehabilitation Patients. M. Alomari, K. Ecker, S. Boehler, J. Schluck, M. Welsch. Mankato State University and Louisiana State University

- 10:45 - 12 Noon **MERCK SPONSORED SEMINAR**
 Exercise-Induced Asthma: Prevalence, Etiology and Exercise Training
 Carl King, PhD, NC Heart Institute and
 Andrew Murphy, MD, University of Virginia
 Chair: Larry Durstine, University of South Carolina
(Grand Ballroom C)
- 10:45 - 12 Noon SYMPOSIA
- [TS 11] What Can the Mouse Tell Us About Nutrition and Exercise?
 David Essig, University of South Carolina
 Jacob Friedman, Case Western Reserve University
 Sanders Williams, University of Texas Southwestern Medical School
 Richard Tsika, University of Illinois
 Chair: Alan Goldfarb, University of North Carolina-Greensboro
(Grand Ballroom B)
- [TS 12] Exercise, Nutrition, and Protection Against Myocardial Ischemia-Reperfusion Injury
 Scott K. Powers
 University of Florida
 Chair: Bruce Gladden, Auburn University
(Grand Ballroom D)
- [TS 13] Athletes at Risk: A Psychological Perspective
 David Pargman, Amy J. White, Jack Watson
 Florida State University
 Chair: Paul Ribosl, Wake Forest University
(Bayside E)
- 12 Noon - 1:00 **LUNCH**
- 1:00 - 1:55 **HENRY J. MONTOYE SCHOLAR LECTURE**
 Catecholamines: Index of Exercise Stress
 Edward Howley, PhD
 University of Tennessee
 Chair: Bruce Gladden, Auburn University and Scott Powers, Florida State University
(Grand Ballroom)
- 2:00 - 4:00 FREE COMMUNICATIONS
- Biomechanics
 Chair: Steve Messier, Wake Forest University
(Bayside E)
- [78] (2:00 - 2:15) Effects of a High Intensity Warm-Up on Vertical Jump Performance. R.L. Boros, H.S. O'Bryant. Appalachian State University
- [79] (2:15 - 2:30) The Effects of Orthotics on Running Economy and Gait Mechanics in Symptomatic Recreational Runners. W. Harper, P. DeVita, W. Jenkins, J. Houmard, M. Mahar. East Carolina University
- [80] (2:30 - 2:45) Lower Hamstring Coactivation During Knee Extension in Olympic Sprinters and Distance Runners Than in Sedentary Subjects. D. Tunnell, R. Kandle, J.

Stockett, B. Forbis, M. Spencer, J. Barrier, J. Money, J. Connors, J. Tracy, J. Lambert, P. DeVita, T. Hortobagyi. East Carolina University

- [81] (2:45 - 3:00) The Reliability of the Double-Legged Stabilogram Diffusion Analysis Protocol When Applied to Single-Legged Stance. S.J. Kinzey, C.W. Armstrong, D.G. Clark. University of Mississippi; University of Toledo
- [82] (3:00 - 3:15) Synchronization and Symmetry in Joint Motions in the Lower Extremities During Treadmill Running. M. Spencer, J. Barrier, R. Kandle, J. Money, J. Stockett, B. Forbis, J. Lambert, J. Tracy, J. Connors, P. DeVita, T. Hortobagyi. East Carolina University
- [83] (3:15 - 3:30) The Temporal Patterning of Muscle Activity Associated with a Soccer Instep Kick. A.G. Jameson, C.W. Armstrong, S.J. Kinzey. University of Mississippi; University of Toledo
- [84] (3:30 - 3:45) Stretching the Adductor Longus Muscle Does Not Change Average EMG Values Measured During Maximal Voluntary Contractions. D.G. Clark, S.J. Kinzey. University of Mississippi
- [85] (3:45 - 4:00) Effects of Four Different Warm-up Protocols on Subsequent Standing Long Jump. M.H. Stone, H.S. O'Bryant, M.E. Stone, A. Koch, K. Sanborn, J. Hrubby, R. Boros, L. Shannonhouse, P. Vasseur, C. Proulx. Appalachian State University
- Sports Nutrition
Chair: Richard Kreider, University of Memphis
(Ballroom C)
- [86] (2:00 - 2:15) The Effect of Medium-Chain Triglyceride, Carbohydrate, L-Carnitine Supplementation on the Performance and Metabolic Responses of Marathon Athletes. I. Swart, M.C. Kruger. University of Pretoria, South Africa
- [87] (2:15 - 2:30) Nutritional Status and Eating Habits of Female High School Cheerleaders and Their Non-Athletic Counterparts. R.E. Keith, N.E. Weaver. Auburn University
- [88] (2:30 - 2:45) Hematological & Metabolic Effects of Calcium B-HMB Supplementation During Resistance-Training. R. Kreider, M. Ferreira, M. Wilson, A. Almada. University of Memphis
- [89] (2:45 - 3:00) Dietary Supplements Following Eccentric Resistance Exercise: Glycogen Resynthesis, Protein Breakdown, and Hormonal Responses. J.R. Wojcik, J. Walberg-Rankin, F.C. Gwazdauskas. Virginia Tech University
- [90] (3:00 - 3:15) The Effect of Creatine Supplementation on Muscular Performance and Body Composition of Female Athletes. J. Walberg-Rankin, M. Brenner, D. Sebolt. Virginia Tech University
- [91] (3:15 - 3:30) Physiological and Performance Responses to Supplementation with Thiamin and Pantothenic Acid Derivatives. M.J. Webster, M. Branz. University of Southern Mississippi

2:15 - 3:30

TUTORIALS

[TS 14]

Physical Fitness and Vegetarian Diets: Is There A Relationship?
David Nieman
Appalachian State University
Chair: Amanda Timberlake, Life College
(Grand Ballroom A)

[TS 15]

Understanding Epidemiological Research in Exercise Science: A Tutorial
Steve Hannigan-Downs, Timothy Michael
Middle Tennessee State University
Chair: Barbara Ainsworth, University of South Carolina
(Grand Ballroom B)

[TS 16]

Comprehensive Risk Stratification for Patients Entering Cardiac Rehabilitation
Carl King, Mark Senn
N.C. Heart Institute; S.C. Heart Center
Chair: Timothy Lightfoot, University of North Carolina
(Grand Ballroom D)

[TS 17]

The Science of Training for Speed, Agility, and Quickness
Jeff Chandler, Brian L. Zeller
Lexington Clinic Sports Medicine Center (KY)
Chair: Neal Pollock, East Carolina University
(Bayside G)

2:00 - 3:15

SYMPOSIA

[TS 18]

The Performance Team: A System for Promoting the Well-Being of Athletes
Dixie L. Thompson
University of Tennessee
Chair: Pat Mosher, University of Tennessee-Chattanooga
(Bayside F)

2:00 - 4:00

POSTER SESSIONS

Authors Present from 2:00-3:00
Chair: Lisa Colvin, Southern Arkansas University
(Terrace Room)

Competitive Athletes

[92]

Comparison of Men and Women Cross Country Runners on a One Minute Wingate Test.
S. Bearden, K.D. Biggerstaff, P. McDonough, R.J. Moffatt. Florida State University

[93]

Eighteen Month Changes in Cardiovascular Variables Associated with Performance in
Female Master Athletes. A. Dirks, J. Nichols. San Diego State University

[94]

The Effect of Music on Heart Rate, Perceived Exertion, and Exercise Duration During
High Intensity Steady State Exercise. J.S. Steinberg, G.M. Dominick, S.L. Nimmons,
D.E. Kremer. Lander University

Growth, Development, Aging

- [95] Effects of Training and Detraining on Strength and Balance in Older Men and Women. S. Murphy, A. Lloyd, D.A. Gaasch, B.F. Sharon, L.W. Boyette, L.J. Brandon. Atlanta Veterans Affairs Medical Center, Decatur, GA, Georgia State University
- [96] The Effect of Two Years of Resistance Training on Strength Changes in Elderly Men and Women. L.B. Panton, D.S. King, C.E. Broeder, J. Gammon, S. Stettler. East Tennessee State University; Iowa State University
- [97] Resistance Training's Effects on the Health-Risk Profile of Elderly Individuals. C.E. Broeder, L. Panton, D.S. King, J. Gammon, S. Stettler. East Tennessee State University; Iowa State University
- [98] Physical Function, Perceived Quality of Life, and Presence of Comorbidity in Senior Citizens. H. Kluess, R. Wood, N. Aucoin, E. Hirschey, A. Labruzzo, M. Lee, K. Metoyer, R. Reyes, A. Sebastien, M. Welsch. Louisiana State University; St. James Place Retirement Community
- [99] The St. James Place Project: Age Physical Fitness and Cognitive Performance in Elderly Women. K. Metoyer, E. Hirschey, N. Aucoin, A. Labruzzo, M. Lee, R. Reyes, A. Sebastien, M. Welsch, R. Wood. Louisiana State University; St. James Place Retirement Community
- [100] The St. James Project: Physical Functional Ability, Physical Activity, and Self-Efficacy for Exercise in Elderly Women. A. LaBruzzo, K. Metoyer, N. Aucoin, E. Hirschey, M. Lee, R. Reyes, A. Sebastien, M. Welsch, R. Wood. Louisiana State University; St. James Place Retirement Community
- [101] The Relationship Among Strength, Balance, and Function in Older Adults. C. Pritzlaff, L. Wideman, D. Perrin (FASCM), J. Clasey, M. Hartman, A. Weltman (FASCM). University of Virginia
- [102] The St. James Project: Physical Functional Ability of Older Women in Louisiana. R. Reyes, M. Welsch, N. Aucoin, E. Hirschey, A. Labruzzo, M. Lee, K. Metoyer, A. Sebastien, R. Wood. Louisiana State University; St. James Place Retirement Community
- [103] The St. James Project: Reaction Time Measures in Functional Behavioral Assessment. B. Maraj, L. Hemard, J. Holmes, M. Lee, R. Reyes, R. Wood. Louisiana State University; St. James Place Retirement Community
- [104] The St. James Place Project: Physical Functional Ability and Vagal Modulation of Heart Rate in the Elderly. M. Lee, N. Aucoin, L. Hemard, J. Holmes, B. Maraj, R. Reyes, M. Welsch, R. Wood. Louisiana State University; St. James Place Retirement Community
- [105] The St. James Project: Cognitive Performance and Quality of Life in Elderly Women. E. Hirschey, A. Sebastien, N. Aucoin, A. Labruzzo, M. Lee, K. Metoyer, R. Reyes, M. Welsch, R. Wood. Louisiana State University; St. James Place Retirement Community
- [106] Effects of Training and Detraining on Strength and Functional Independence in Older Adults. D.A. Gaasch, S. Murphy, A. Lloyd, L.W. Boyette, B.F. Sharon, L.J. Brandon. Veteran Affairs Medical Center; Georgia State University

- [107] Methodological Comparison for the Effects of Strength Training in Older Adults. A. Lloyd, D. Gaasch, S. Murphy, L.W. Boyette, B.F. Sharon, L.J. Brandon. Veteran Affairs Medical Center-Decatur, GA; Georgia State University
- [108] Patterns and Correlates of School-Time Activity in 3rd, 4th, and 5th Graders. W.K. Guion, E. Thoresen, M. Smith. Georgia Southern University
- 3:15 - 3:45 **BREAK**
- 3:45 - 4:55 SEACSM BASIC SCIENCE LECTURE
Cardiovascular Aging and Exercise: Whole Body to the Gene
Charlotte Tate, PhD
University of Houston
Chair: Russ Pate, University of South Carolina
(Grand Ballroom)
- 5:00 - 6:00 SEACSM STUDENT SYMPOSIUM
Future Trends in Exercise Research and Clinical Practice
Larry Golding, PhD
University of Nevada, Las Vegas
Chair: Melicia Whitt, University of South Carolina
(Grand Ballroom)
- 5:00 - 6:00 CASE AND CLINICAL ABSTRACTS
Chair: Jeff Chandler, Lexington Clinic Sports Medicine Center, KY
(Terrace II)
- [TS 19a] (5:00 - 5:15) Scapula Pain - Football.
Kim Arnstine, University of Tennessee
- [TS 19b] (5:15 - 5:30) Syncope - Baseball
George Wortley, Lynchburg Family Practice, VA
- [TS 19c] (5:30 - 5:45) Lower Leg/Ankle Pain - Swimming
Brian Zeller, Lexington Clinic Sports Medicine, KY
- [TS 19d] (5:45 - 6:00) Active Isolated Stretching: A New Tool for Rehabilitation
B.H. Reuter, Auburn University
- 6:00 - 7:00 SEACSM STUDENT FAIR
(Bayside Ballroom)

SATURDAY, JANUARY 31

- 7:00 - 8:00 PAST PRESIDENTS' BREAKFAST
Chair: Bruce Gladden, Auburn University
(Bayview Room)
- 7:45 - 9:00
[TS 20] CLINICAL SYMPOSIUM
The Prevention of Traumatic and Overuse Injuries: Science or Myth?
Jeff Chandler, Brian Zeller, David Richards
Lexington Clinic Sports Medicine Center (KY)
Chair: Kim Arnstine, University of Tennessee
(Grand Ballroom B)
- 7:45 - 9:00 SYMPOSIA
- [TS 21] Student Biomechanics Symposium: Biomechanics and Exercise Associated with Aging, Illness, and Injury
Paul DeVita, Jason Barrier, Sean Cravens, Dino Vrongistinos
East Carolina University; Wake Forest University; Appalachian State University
Chair: Kathy Simpson, University of Georgia
(Grand Ballroom C)
- [TS 22] Recent Advances in Exercise Physiology for Heart and Lung Transplant Recipients
Randy W. Braith, Danny Martin
University of Florida
Chair: Mark Senn, Heart Center, Columbia, SC
(Bayside F)
- 7:45 - 9:00 TUTORIALS
- [TS 23] Creatine Supplementation
Richard B. Kreider
University of Memphis
Chair: Linda Chitwood, University of Mississippi
(Grand Ballroom A)
- [TS 24] Changing Health Behavior: A User-Friendly Theoretical Approach
Doris A. Abood
Florida State University
Chair: Judy Flohr, James Madison University
(Grand Ballroom D)
- [TS 25] The Effects of Acute Radiation Exposure on Physiological Function and Blood Lipid Profiles
Daniel L. Blessing, Oleg Gergel
Auburn University; Kiev Radiation Clinic, Ukraine
Chair: Michael Berry, Wake Forest University
(Bayside E)
- [TS 26] Exercise Science: Career Opportunities
Len Kravitz
University of Mississippi
Chair: Carolyn Berry, Winston-Salem State University
(Bayside G)

- 9:15 - 10:15 **SPECIAL TOPICS LECTURE**
Benefits of Exercise Training: A 20 Year Longitudinal Study
 Larry Golding, PhD
 University of Nevada, Las Vegas
 Chair: Robert McMurray, University of North Carolina-Chapel Hill
(Bayside Room)
- 10:15 - 10:45 **BREAK**
- 10:45 - 12 Noon **SYMPOSIA**
- [TS 27] **Assumptions and Accuracy of Models for Predicting VO_{2max}**
 Michael McCammon, M.T. Mahar, D.A. Rowe
 East Carolina University; Middle Tennessee State University
 Chair: David Bassett, University of Tennessee
(Bayside E)
- [TS 28] **Control of Autonomic Nervous System Function During Physical Activity**
 Gregory Hand, L. Britt Wilson, Michael Overton, Chester Ray
 University of South Carolina; University of South Alabama College of Medicine; Florida
 State University; University of Georgia
 Chair: Phil Sparling, Georgia Tech
(Bayside F)
- 10:45 - 12 Noon **TUTORIAL**
- [TS 29] **The Role of Exercise During Childhood in Prevention of Adult Diseases: Recent
 Findings and Unanswered Questions**
 Bernard Gutin
 Medical College of Georgia
 Chair: Bill Riner, University of South Carolina-Lancaster
(Terrace I)
- 10:30 - 12 Noon
 [TS 30] **CLINICAL TUTORIAL**
 Chair: George Wortley, Lynchburg Family Practice, VA
 Alternative Approach to Back Pain in Athletes
 James Waslaski, Florida Massage Therapy Association
 Thomas E. Hyde, Florida Chiropractic Association, N. Miami Beach, FL
(Terrace III)
- 10:45 - 12 Noon **STUDENT AWARD WINNERS - PRESENTATIONS**
 Chair: Bruce Gladden, Auburn University
(Bayside G)
- [109] (10:45 - 11:00) - Third Place (Edward T. Mahoney, University of Georgia) **Reactive
 Hyperemia is Attenuated Following Exercise - Induced Muscle Damage.** E.T. Mahoney,
 K.M. Hume, C.A. Ray, University of Georgia
- [110] (11:00 - 11:15) - Second Place (Michael A. Ferguson, Medical College of Georgia) **Fat
 Distribution and Hemostatic Measures in Obese Children..** M.A. Ferguson, B. Gutin, S.
 Owens, M. Litaker, R.P. Tracy, J. Allison. Medical College of Georgia; University of
 Vermont

[111] (11:15 - 11:30) - First Place (Heather Ketelaar Vincent, University of Florida)
Protection Against Oxidative Stress and Fatigue in the Diaphragm Occurs With Short
Term Endurance Training. HK. Vincent, S.K. Powers, D.J. Stewart, H. Demirel, H.
Naito, R.A. Shanely. University of Florida

12 Noon - 2:00 SEACSM LUNCHEON LECTURE
(Guest Speaker Sponsored by **Gatorade**)
Chair: Robert Moffatt, Florida State University
(**Grand Ballroom**)

Nutritional and Pharmacological Agents for Weight Loss: The Real Story
Priscilla Clarkson, PhD
University of Massachusetts

2:30 SEACSM BUSINESS MEETING
Executive Committee
(**Grand Board Room**)



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**Florida State University
Dept. of Nutrition, Food and Movement Sciences**

Free Communication

Abstracts

SPINAL ADMINISTRATION OF A CHOLINERGIC RECEPTOR AGONIST ATTENUATES THE CARDIOVASCULAR RESPONSES TO MUSCLE ACTIVITY.

Wendi D. Shealy and Gregory A. Hand. Dept. of Exercise Science, The University of South Carolina. Columbia, SC 29208

Static contraction of skeletal muscle elicits reflex increases in mean arterial blood pressure (MAP) and heart rate (HR). These adjustments are mediated by activation of group III and IV afferent nerve fibers that originate in skeletal muscle and project to the spinal cord. The majority of these fibers synapse in the dorsal horn. The purpose of this study was to determine if the inhibitory cholinergic system located in the dorsal horn modulates this transmission of information. In a group of anesthetized cats, a dose response curve was determined for spinal administration of the cholinergic receptor agonist, bethanechol. The lower lumbar/upper sacral region of the spinal cord was surgically exposed and the dorsal and ventral roots were cut. The L7 dorsal root was left intact so that all sensory input from the hindlimb entered the spinal cord at the L7 level. Contractions of the ipsilateral triceps surae muscles were electrically evoked by stimulation of the L7 ventral root. Control cardiovascular responses were determined during 1-min contractions. MAP was increased by 41 ± 7 mmHg and HR by 10 ± 3 bpm. Following a 45-min period of microdialyzing $10 \mu\text{M}$ bethanechol into the dorsal horn, MAP and HR changes during contraction were 30 ± 7 mmHg and 8 ± 1 bpm. After a 45-min perfusion with $100 \mu\text{M}$ bethanechol, the MAP and HR responses to contraction were reduced (24 ± 9 mmHg and 8 ± 9 bpm). Microdialysis of 1mM bethanechol further blunted the cardiovascular adjustments (MAP 16 ± 3 mmHg; HR 6 ± 1 bpm). These results demonstrate that activation of cholinergic receptors in the dorsal horn blunts the arterial blood pressure and heart rate responses to static muscle contraction. Further, these data suggest that the spinal cholinergic system plays an inhibitory role in modulating afferent input arising from muscle activation.

Supported by RPSC Award #11530-E120.

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RELATIONSHIP OF BODY SURFACE AREA AND BODY COMPOSITION TO LEFT VENTRICULAR DIMENSIONS IN ELITE FEMALE WEIGHTLIFTERS

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This study examined the relationship between body surface area (BSA) and lean body mass (LBM) on left ventricular (LV) posterior wall thickness (PWT) and septal thickness (ST) in university national championship level college female powerlifters. Eleven (11) female powerlifters were the subjects for this study. Non-invasive M-mode echocardiographic studies were performed for ventricular dimensional measurement. Anthropometric and body composition measurements for the determination of BSA, body fat percentage, and LBM were also collected. Statistical analysis utilizing SPSS revealed no significant relationship ($p > .05$) between the anthropometric parameters of BSA and LBM and the ventricular dimensional parameters of LVPWT and ST. These data indicate that anthropometric variables may not be reliable indicators of myocardial dimensions in female weightlifters due to a large variance in BSA and LBM in this population. Therefore, standardization of echocardiographic data by body surface area in this population without considering variances in body composition may be inappropriate.

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HEMODYNAMIC RESPONSES TO SUBMAXIMAL SUPINE CYCLING IN OBESE 7 TO 11 YR OLD CHILDREN: GENDER AND ETHNICITY DIFFERENCES

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The influence of gender and ethnicity on hemodynamic responses to exercise was studied in obese boys and girls (n = 79). Hemodynamic measurements were made after 10 min of supine rest and during submaximal cycling at a work rate of 49 W on a supine ergometer for 8 min, with measurements made during the last 5 min. The rest to exercise difference in heart rate was greater in blacks and females than in whites and males, respectively ($p < .05$). The rest to exercise difference in cardiac output was greater in blacks than in whites ($p < .05$). The rest to exercise difference in systolic blood pressure was greater in white females than in black females ($p < .05$). The rest to exercise difference in total peripheral resistance was greater in females than in males ($p < .05$). No significant differences were found for stroke volume, diastolic blood pressure, or mean arterial pressure. These results indicate that gender and ethnicity need to be taken into account in studies of hemodynamic responses to exercise in obese children.

Supported by the National Heart, Lung, and Blood Institute (HL 49549)

IMPACT OF TIME OF DAY ON HOT WEATHER RESPONSES TO RUNNING

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Well-trained males (n=15) performed three 3-mile runs at a comfortable pace. Runs were performed at approximately 6:00 am, noon, and 6:00 pm CST (counterbalanced order) during the summer months. Pace was monitored so that duration of the runs were equivalent. Runs were completed within two weeks and were separated by at least 48 hours. Heart rate (HR) and rectal temperature (Tre) were assessed pre- and post-exercise as well as at 2 and 5 min of recovery. Wet bulb (WBT), dry bulb (DT) and globe temperatures (GT) were assessed. Results are shown below:

	WBT*	DBT*	GT*	PreTre	PostTre	dTre*	PreHR	PostHR
6AM	22.93 (2.32)	23.79 (3.44)	24.69 (5.22)	36.27 (.44)	38.43 (.97)	2.14 (.72)	70.20 (12.43)	174.20 (15.69)
12N	26.52 (2.00)	33.09 (4.19)	39.13 (8.89)	36.71 (.32)	38.43 (1.23)	1.71 (1.11)	74.89 (11.30)	178.27 (14.56)
6PM	24.13 (2.13)	29.09 (4.17)	30.46 (7.47)	36.73 (.43)	38.20 (1.09)	2.09 (1.04)	77.93 (11.07)	175.73 (15.21)

(* Significantly different, $p < .05$)

Repeated measures analysis of variance procedures revealed a significant difference in WBT, DBT, and GT between the runs as well as a significant difference in dTre between the runs ($p < .05$). However, differences in heart rate and core temperature measurements were not significant ($p > .05$). In conclusion, it appears that in our subjects, differing environmental conditions did not induce differences in physiological function. It seems logical to assume that our subjects were probably acclimatized to the experimental conditions, resulting in physiological adjustments to minimize heat strain.

ASSOCIATION OF ALL-CAUSE ABSENTEEISM TO AGE, RACE, AND DIABETES IN A SOUTHERN LOUISIANA BLUE-COLLAR WORKFORCE

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This study examined all-cause absenteeism (ACA) within a population of 755 male blue-collar workers. Blood lipids, body mass index, blood pressures, activity levels, and smoking status were assessed. ACA was defined as the total number of days/worker missed six months prior to testing. Associations between ACA and the aforementioned variables were analyzed using Chi-square and Wilcoxon 2-Sample tests. Workers missed an average of 9.5 days/6 months - an estimated \$1.2 million/year loss to the company. Despite a progressive increase in cardiovascular risk with advancing age, the increased risk did not translate into higher rates of absenteeism which is inconsistent with previous research. In contrast, significant differences for ACA were found ($p < 0.05$) between (1) age groups, 12.5 days, 8.0 days, and 7.0 days for age 18-29 yrs (n=173), 40-49 yrs (n=238), and 50-63 yrs (n=135), respectively; (2) race, 11.3 days vs 8.6 days for African-Americans (n=264) and Caucasians (n=491), respectively; and (3) diabetes, 12.4 days vs 9.2 days for diabetics (n=70) and non-diabetics (n=685), respectively. Various psychosocial factors may have influenced the greater number of absences by these population subgroups. Data from the present study suggests the need for a multi-faceted health promotion program, not solely focused on traditional cardiovascular risk factors, to ultimately decrease rates of ACA, as well as the accompanying financial burden.

EFFECTS OF GENDER IN EXERCISE AND NON-EXERCISE POST-MEAL METABOLIC RATE AND SUBSTRATE UTILIZATION

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Metabolic rate and substrate utilization were examined to determine a potential gender difference in utilization of carbohydrates and lipids. During a cross over design, seven female and seven male highly fit subjects, ages 18 to 50, were studied by indirect calorimetry utilizing a canopy technique. For the non-exercise (NEx) phase, subjects were studied immediately after consuming a high fat/sugar meal (92 grams of fat, 40 grams of refined sugar) following a 12 hour fasting period. In the exercise (Ex) phase, subjects were exercised aerobically for 60 minutes maintaining a heart rate between 60-75% of the subject's heart rate reserve, immediately preceding the meal. While not statistically different ($p < 0.05$), the results indicate female subjects in both phases had lower metabolic rates (NEx-3.65; Ex-4.08) and higher Respiratory Exchange Ratio (RER) (NEx-0.91; Ex-0.80) than their male counterparts (NEx-3.76; Ex-4.26) and RER (NEx-0.83; Ex-0.74). Females showed less expenditure of energy and lower rate of fat oxidation. The results suggest that metabolic rate and substrate expenditure may have a slight, albeit non-significant, impact on the differences in body fat composition between the genders.

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Funded by The University of South Carolina Research and Productive Scholarships.

A COMPARISON OF EVERSION ANKLE FUNCTION BETWEEN NORMAL AND CHRONICALLY-SPRAINED ANKLES

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Few studies have examined whether chronically-sprained ankles are weaker muscularly than the contralateral non-injured ankle, although this assumption provides the underlying basis for many ankle rehabilitative and preventive programs designed to treat recurrent inversion ankle sprains. The purpose of this study was to compare the peak evertor torque (PT), average evertor torque (AT), and peak evertor torque location (PTL) of chronically-sprained (CP) ankles and their contralateral non-injured (NI) ankle. Ten males (Age=21±2 yr; Height=182±8 cm; Weight=80±7 kg) with one CP ankle and one NI ankle volunteered to participate in this study. A CP ankle was defined as one that had received a first degree sprain three times in any one year period. Prior to testing, each participant completed a five minute lower extremity stretching program. Each participant then performed three practice trials at 60°/s and 180°/s on a Kin-Com 125AP isokinetic dynamometer (Chattanooga, TN). Finally, three maximal efforts of concentric eversion and three maximal efforts of eccentric eversion were completed at each speed for each ankle. The testing was performed with the knee in 10° of flexion and the ankle in 10° of plantar flexion so that range of motion could be maximized. Testing order was randomized for each subject. An ANOVA with appropriate *post hoc* tests revealed no significant differences for PT, AT, or PTL between CP ankles and NI ankles (PT_{CP}=25±10 Nm; PT_{NI}=25±10 Nm; AT_{CP}=18±6 Nm; AT_{NI}=19±7 Nm; PTL_{CP}=11°±8° of inversion; PTL_{NI}=9°±10° of inversion). These results suggest that muscle weakness may not be the primary reason for recurrent inversion ankle sprains, and that rehabilitative and preventive programs may need to be modified to improve their effectiveness in treating and/or preventing this injury.

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THE EFFECT OF CREATINE SUPPLEMENTATION AT COMMERCIALY RECOMMENDED INTAKES ON ANAEROBIC POWER AND CAPACITY

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The purpose of this study was to assess the effect of creatine supplementation of a commercial product on anaerobic power and capacity. Six college aged recreationally active subjects participated in the study. Using a double blind randomized design, subjects ingested either creatine (CRE) or a placebo (PLA) for 4 consecutive days prior to testing. Total CRE ingestion was 20 g/day, as recommended by the manufacturer for "creatine loading" (Challenge™ Creatine Monohydrate, General Nutrition Corp., Pittsburg, PA). Anaerobic tests included the Wingate Bike Test assessing anaerobic power (W-AP) and anaerobic capacity (W-AC), the flying 40 yard sprint (FF), the vertical jump (VJ), and the modified bicep curl to fatigue (BC). Supervised supplementation and subsequent testing were separated by 14 days between trials. The data were analyzed using dependent t-tests for each anaerobic test ($p < 0.05$). There were no significant differences between CRE and PLA for W-AP (CRE: 9.45 ± 0.50, PLA: 9.76 ± 0.88 W/kg) or W-AC (CRE: 7.70 ± 0.64, PLA: 7.78 ± 0.55 W/kg). There were also no significant differences between treatments for FF (CRE: 4.75 ± 0.16, PLA: 4.74 ± 0.23 s), VJ (CRE: 53.8 ± 5.3, PLA: 54.0 ± 4.6 cm), or BC (CRE: 38.0 ± 21.8, PLA: 30.9 ± 12.4 s). These results suggest that CRE supplementation at doses recommended by the manufacturer does not enhance anaerobic power or capacity.

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INFLUENCE OF OBESITY ON IMMUNE FUNCTION

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9 The influence of obesity on innate and adaptive immunity was studied by comparing 116 obese (age, 44.3 ± 0.9 y, body mass index, 33.2 ± 0.6 kg/m²) and 41 nonobese women (age, 42.2 ± 1.7 y, body mass index, 21.2 ± 0.3 kg/m²). Other factors known to have an influence on immunity were measured, including aerobic fitness, psychological well-being, and serum levels of glucose, triglycerides, and cholesterol; these variables were included in multiple regression models to determine the comparative influence of obesity on immunity. Blood counts for total white blood cells (WBC) (31%), neutrophils (43%), lymphocytes (17%), and monocytes (24%) were significantly elevated in obese compared to nonobese subjects. Total T and B lymphocytes, T helper lymphocytes, but not T cytotoxic/suppressor and natural killer lymphocytes, were also elevated in obese subjects. For all subjects combined, body mass index was significantly correlated with WBC ($r=0.44$, $P<0.001$). Obesity was also related to suppressed mitogen-induced lymphocyte proliferation (19-32%) (an index of T and B cell function), higher monocyte and granulocyte phagocytosis and oxidative burst activity (13-16%), and normal natural killer cell activity. These data support the contention that mild-to-moderate obesity is associated with alterations in immune function.

Supported by the Cybex Grant from the American College of Sports Medicine

INFLUENCE OF MODE AND CARBOHYDRATE ON THE CYTOKINE RESPONSE TO HEAVY EXERTION

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10 This randomized, double-blind, placebo-controlled study was designed to determine the influence of exercise mode, and 6% carbohydrate (C) versus placebo (P) beverage ingestion, on blood cell counts, plasma glucose, hormone, and inflammatory cytokine responses (5 total samples over 9 hours) to 2.5 h of high-intensity running and cycling ($\sim 75\%$ VO_{2max}) by 10 triathletes who acted as their own controls. C relative to P ingestion (but not exercise mode) was associated with higher plasma levels of glucose and insulin, lower plasma cortisol and growth hormone, and diminished perturbation in blood immune cell counts. The pattern of change over time for interleukin (IL)-6 was significantly different between C and P conditions ($P=0.021$) and between running and cycling modes ($P<0.001$), with the lowest post-exercise values seen in the C-cycling sessions (10.7 ± 1.8 pg/ml), and the highest in the P-running sessions (51.6 ± 14.2 pg/ml). The pattern of change over time between C and P conditions (but not modes) was significantly different for IL-1 receptor antagonist ($P=0.003$), with values once again lowest for the C-cycling sessions (1.5-h post-exercise, 301 ± 114 pg/ml) and highest for the P-running sessions (1171 ± 439 pg/ml). These data indicate that carbohydrate ingestion is associated with higher plasma glucose levels, an attenuated cortisol response, and a diminished pro- and anti-inflammatory cytokine response.

Supported by a grant from the Gatorade Sports Science Institute

EFFECTS OF MODE AND CARBOHYDRATE ON THE GRANULOCYTE AND MONOCYTE RESPONSE TO INTENSIVE, PROLONGED EXERCISE

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11 The influence of exercise mode, and 6% carbohydrate (C) versus placebo (P) beverage ingestion (double-blinded, random order), on granulocyte and monocyte phagocytosis and oxidative burst activity, plasma glucose, and hormonal responses (5 total blood samples over 9 hours) to 2.5 h of high-intensity running and cycling ($\sim 75\%$ VO_{2max}) was measured in 10 triathletes who acted as their own controls. Both granulocyte and monocyte phagocytosis increased strongly following the exercise bouts, but was attenuated in the C trials (condition x time interactions, $P=0.05$ and $P=0.01$, respectively), with the largest contrasts seen between the C-cycling and P-cycling trials. Exercise mode had a slight effect on granulocyte (mode x time interaction, $P=0.04$) and monocyte ($P=0.12$) phagocytosis, but no change in pre- to post-exercise values was measured. The pattern of change over time for granulocyte ($P=0.04$) and monocyte ($P=0.01$) oxidative burst activity was significantly different between P and C conditions, but not between running and cycling modes ($P=0.30$, $P=0.74$, respectively), with the lowest 1.5-h post-exercise values seen in the C sessions. C relative to P ingestion (but not exercise mode) was associated with higher plasma levels of glucose and insulin, lower plasma cortisol and growth hormone, and lower blood neutrophil and monocyte cell counts. These data indicate that carbohydrate ingestion is associated with higher plasma glucose levels, an attenuated cortisol response, and diminished granulocyte and monocyte phagocytosis and oxidative burst activity.

Supported by a grant from the Gatorade Sports Science Institute

IMMUNE RESPONSE TO EXERCISE TRAINING AND/OR ENERGY RESTRICTION
IN OBESE WOMEN

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The effect of exercise training (five 45 minute walking sessions/wk at 60-75% maximum heart rate) and/or moderate energy restriction (4.19-5.44 MJ or 1,200-1,300 kcal per day) on innate and adaptive immunity (including mitogen-stimulated lymphocyte proliferation (MSLP), natural killer cell activity (NKCA), and monocyte and granulocyte phagocytosis and oxidative burst (MGPOB) was studied in obese women (N=91, age 45.6±1.1 y, body mass index 33.1±0.6 kg/m²) randomized to one of four groups: control (C), exercise (E), diet (D), exercise and diet (ED). Aerobic power, body composition, and immune function were measured in all subjects before and after a 12-week diet intervention period, with data analyzed using a 4 x 2 repeated measures design. All subjects self-reported symptoms of sickness in health logs using a precoded checklist. Data from this study indicate that although exercise training was unrelated to any significant changes in resting immune function, the number of days with symptoms of upper respiratory tract infection (URTI) was reduced relative to subjects in the nonexercise groups (5.6±0.9 and 9.4±1.1 sickness days, respectively, P<0.05). Energy restriction and weight loss (7.9±0.7 kg) was associated with a significant decrease in MSLP, but no change in NKCA, MGPOB, or URTI. The data are consistent the viewpoint that weight loss, even at a moderate rate, is associated with a decrease in adaptive, but not innate, immunity.

Supported by the Cybex Grant from the American College of Sports Medicine

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BODY SHAPE PERCEPTION AMONG PHYSICALLY ACTIVE COLLEGE
STUDENTS

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The purpose of this study was to examine the relationship between gender and body shape perception among physically active college students, using a set of nine silhouette drawings developed by Stunkard et al. (1983). Subjects chose the figure that approximated their current shape (CURRENT), their ideal shape (IDEAL), the shape that they believed was the most attractive (ATTRACTIVE), and the shape that they believed the opposite sex found the most attractive (OTHER ATTRACTIVE). The means and standard deviations were calculated, and t-tests within gender were performed. The results were as follows:

	MALE (N=84)	FEMALE (N=137)
(*p<0.05)	Mean Difference ± SD	Mean Difference ± SD
IDEAL - CURRENT	-0.18 ± 1.08	-0.68* ± 0.78
OTHER ATTRACTIVE - ATTRACTIVE	0.68* ± 0.61	-0.89* ± 0.84
IDEAL - OTHER ATTRACTIVE	0.17* ± 0.46	-0.04 ± 0.69
CURRENT - OTHER ATTRACTIVE	0.35* ± 1.17	0.63* ± 1.04
CURRENT - ATTRACTIVE	1.03* ± 1.09	-0.26* ± 1.00
IDEAL - ATTRACTIVE	0.85* ± 0.65	-0.93* ± 0.73

These data indicated that females were more dissatisfied with their body shape than males, possibly due to what they believed males found attractive. These results may have implications for interventions designed to lower the risk of eating disorders in females.

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A COMPARISON OF THE INITIAL CURRICULUM RECOMMENDATIONS
OF THE SOUTHEASTERN AMERICAN COLLEGE OF SPORTS MEDICINE
AMONG GEORGIA COLLEGES AND UNIVERSITIES

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The purpose of this study was to evaluate undergraduate curriculums emphasizing clinical and/or preventive exercise tracks within the state of Georgia. Each institution's courses were compared to those initially recommended by the Southeastern American College of Sports Medicine. Undergraduate programs were reviewed via the internet, microfiche, or from course catalogs which were faxed or mailed upon request. A total of forty-nine institutions were reviewed. It was determined that a total of eight colleges/universities offered curriculums emphasizing clinical and/or preventive tracks. However, one university could not provide the required course content and therefore was omitted from the study. Upon evaluation of each of seven university programs, it was concluded that each institution essentially met the initial recommendations set forth by the Southeastern American College of Sports Medicine.

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CRITERION-REFERENCED RELIABILITY EVIDENCE FOR THE PRUDENTIAL FITNESSGRAM® BODY COMPOSITION STANDARDS

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Physical activity leaders who adopt the Prudential FITNESSGRAM® youth fitness testing program can choose between percent fat and body mass index (BMI) to assess body composition. Participants are categorized as either passing or failing standards provided in the program materials. The purpose of this study was to determine criterion-referenced equivalence reliability for the FITNESSGRAM® body composition standards for BMI and percent fat for fifth grade boys and girls. That is, we investigated whether students who passed the BMI standards also passed the percent fat standards. Ss were students attending a local public school. Data were collected for bioelectrical impedance analysis (BIA), BMI, and triceps and calf skinfolds. BIA-predicted percent fat (BIA-PF) and skinfold-predicted percent fat (SF-PF) were averaged to create mean percent fat values. Equivalence reliability of FITNESSGRAM® healthy fitness zone standards for BMI and PF was estimated using modified κ and percent agreement (PA). Results are presented below:

	Boys (n=29)	Girls (n=34)	All (n=63)
κ_q	.66	.82	.75
PA	.83	.91	.87

83% of boys and 91% of girls were categorized similarly by both standards (i.e., either passed both, or failed both). Modified κ was also much lower for boys than girls. In conclusion, the criterion-referenced equivalence reliability between the FITNESSGRAM® BMI and PF standards is acceptable for fifth grade girls, but low for fifth grade boys.

RELATIONSHIP OF SIMPLE AND STATE-OF-THE-ART BODY COMPOSITION MEASUREMENTS WITH CARDIOVASCULAR RISK FACTORS IN OBESE CHILDREN

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In a sample of 37 7-to-11 yr-old obese children we obtained (1) simple measures of body composition (BC), including BMI, skinfolds, waist circumference (WC), waist-to-hip ratio (WHR), and sagittal diameter, and (2) state-of-the-art measures of BC (total body fat mass (TFM) and total body percent fat via DXA; visceral adipose tissue (VAT) and subcutaneous abdominal adipose tissue via MRI). We then examined relationships between these measures of BC and various cardiovascular (CV) risk factors (HDL-C, TC/HDLC, LDL-C, insulin, plasminogen activator inhibitor-1 (PAI-1), left ventricular mass/Ht^{2.7} (LVM), systolic blood pressure (SBP). Among the state-of-the-art BC measurements, only VAT explained significant proportions of the variance in HDL-C, TC/HDLC, LDL-C, insulin, PAI-1, and LVM. TFM explained significant proportions of the variance in SBP ($R^2=0.32$). For the simple BC measurements, the WHR explained significant proportions of the variance in HDL-C ($R^2=0.25$), LVM ($R^2=0.19$), and TC/HDLC ($R^2=0.35$); WC explained significant proportions of the variance in insulin ($R^2=0.11$) and PAI-1 ($R^2=0.14$); sagittal diameter explained significant proportions of the variance in SBP ($R^2=0.38$). Thus, when investigating relationships between CV risk factors and BC in obese children and MRI measurement of VAT is not available, several simple measures of BC may prove useful in explaining the variance in CV risk factors.

Supported by grants from the NHLBI and the American Heart Association-Parke Davis

THE RELIABILITY AND VALIDITY OF A HOME-MODEL BODY FAT MONITOR/SCALE

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The reliability and validity of a home body fat monitor/ weight scale was investigated with 54 volunteers (M: n = 15, F: n = 39) between 25 and 55 years of age. Following an overnight fast, subjects were tested in the morning in a euhydrated state prior to any physical activity. Percent body fat (%BF) was estimated with Lange skinfold calipers (7 skinfold sites, Jackson & Pollock, Phys Sportsmed, 1985) and the Tanita TBF-511 Body Fat Monitor/Scale. The TBF-511 measures body weight and estimates %BF based upon bioelectrical impedance methodology (Nunez et al, MSSE, 1997). A subsample (n = 11, 1M, 10F) also had their %BF estimated using hydrostatic weighing technique. The results were analyzed using Pearson correlations and paired t-tests. The TBF-511 Monitor/Scale demonstrated high test-retest reliability within a five-minute period ($r = 1.000$, $p = .322$) as well as between two different test days ($r = .993$, $p = .635$). The %BF estimations from the TBF-511 Monitor/Scale, skinfolds, and hydrostatic weighing methods were highly correlated ($r = .896$ to $.966$, $p = .001$). The hydrostatic weighing and skinfold %BF estimations were within acceptable tester error range (2.37%, Katch & Katch, Res. Q. Exerc. Sport, 1980). The TBF-511 consistently overpredicted %BF when compared to skinfold %BF estimation (+4.95, $p = .001$) and hydrostatic weighing (+4.32, $p = .001$). There were no significant differences between %BF methods for age or gender. These results suggest that the Tanita TBF-511 Body Fat Monitor/Scale can be used reliably for tracking %BF, however the validity of the %BF estimation is questionable since it consistently overpredicted %BF by 4 - 5%.

CORRELATION OF ANTHROPOMETRIC MEASUREMENTS AND VISCERAL ADIPOSE TISSUE IN OBESE CHILDREN.

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Visceral adipose tissue (VAT), a risk factor for cardiovascular disease in adults, can be reliably measured using magnetic resonance imaging (MRI), an expensive technique not generally available outside large clinical settings. Correlates of VAT based on readily-available and inexpensive anthropometric measurements are needed. VAT was measured by MRI in 36 obese children, aged 7 to 11 years. Height, weight, calf and tricep skinfolds, midthigh, hip and waist circumferences and sagittal diameter were measured, and waist/hip, waist/thigh, sagittal/thigh, and body mass index were calculated. All of the anthropometric measurements were significantly correlated with VAT, with estimated correlation coefficients ranging from $r = 0.44$ ($p = .007$) to $r = 0.75$ ($p < .001$). The measurement showing the highest correlation with VAT was waist circumference, $r = 0.75$ ($p < .001$). Stepwise regression was used to investigate multivariable associations between the anthropometric measurements and VAT, and gender and ethnicity effects. Ethnicity, waist circumference and their interaction explained 75% of the observed variance in VAT ($p < .001$). For a given level of waist circumference, white children in this sample tended to have higher VAT measurements than did black children ($p = .054$). This study provides preliminary evidence that easily-obtained anthropometric measurements may help identify children with elevated VAT levels so that appropriate preventive measures might be prescribed.

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Supported by grants from NIH (HL55564) and the American Heart Association-Parke Davis

RELIABILITY OF TRUNK AND ABDOMINAL FAT MEASUREMENTS BY DUAL-ENERGY X-RAY ABSORPTIOMETRY

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Regional measures of dual-energy X-ray absorptiometry (DXA) scans have been used to estimate abdominal adiposity but few studies have reported the reliability of these measures. The purpose of this study was to determine the reliability of DXA trunk fat (TFat) and abdominal fat (AFat) mass estimated from total body DXA scans. Total body DXA scans (Hologic QDR 2000; software version 5.64; pencil beam mode) were performed twice (same day) on 12 older individuals (10 postmenopausal women and 2 men). TFat area extended from the shoulders to the top of the iliac crest with the arms excluded and was analyzed using the traditional bone and body composition analysis procedures. AFat was determined by creating a region bound superiorly by horizontal lines placed at the top of L2 and inferiorly at the top of the iliac crest using an operator defined region of interest with non-traditional utility regional analysis procedure. All analyses were performed by a single trained investigator (J.L.C.). Linear regression analysis revealed that scan 1 and scan 2 were highly correlated for TFat ($r = 0.999$, $SEE = 0.357$) and for AFat ($r = 0.992$, $SEE = 0.203$). There were no significant differences between the scan of the same regional analysis; mean differences were -0.068 kg ($p = 0.52$) for TFat and -0.024 kg for AFAT ($p = 0.67$). The technical errors (standard error about the line of identity) for TFat and AFat were 0.35 kg and 0.19 kg, respectively. When the differences between scans were plotted against the mean of the two scans for each subject (Bland-Altman plots), all values fell within the 95% confidence intervals. Therefore, TFat and AFat estimated by DXA are reliable and may be useful in the prediction of abdominal adiposity.

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Supported in part by NIH grants AGO5673, RO1AG10997, and RO1DK32632

COMPARISON BETWEEN BILATERAL AND UNILATERAL STRENGTH DURING THE SUPINE LEG PRESS

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The horizontal leg press is a useful exercise for developing lower body strength. Whether the largest strength benefit comes from the unilateral or bilateral exercise is unknown. A bilateral deficit has been observed in isometric contractions meaning the bilateral force is decreased compared to the sum of the individual unilateral forces (Ohtsuki 1981). The purpose of this study was to determine if a bilateral deficit exists in isotonic contractions. Elite athletes ($n=18$, mean age: 19.8 ± 3.9 yr.) were tested on the horizontal leg press for concentric and eccentric one repetition maximum. Concentric and eccentric phases were independently loaded with the aid of a newly developed dynamometer, the Negator (Myonics Corp., Metairie, LA). Each subject was tested on each individual lower extremity and both extremities simultaneously in random order. A bilateral index (BI) was then calculated by the following equation:

$$BI (\%) = [100 \times \text{bilateral} / (\text{right unilateral} + \text{left unilateral})] - 100 \text{ (Enoka, 1991)}$$

Sum of concentric and eccentric unilateral loads were 433 (± 118) and 584 (± 154) Lb. Concentric and eccentric bilateral loads were 371 (± 85) and 481 (± 70) Lb. Results showed BI ratios of -14.5% and -17.7% in concentric and eccentric phases, respectively ($t = .22$). The results indicated that a bilateral deficit exists in the isotonic, horizontal leg press and the muscles were therefore underloaded in the bilateral version of the exercise. Thus, exercising one leg at a time would maximize the benefit of strength gain at a faster rate.

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Supported by the LeRoy T. Walker International Human Performance Center, the Division of Academic Affairs of East Carolina University and the State of North Carolina

MYOSIN HEAVY CHAIN EXPRESSION IN ELITE POWER LIFTERS

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This investigation compared the percent myosin heavy chain (MHC) expression in elite level, actively competing power lifters (PL) to sedentary control subjects (CON). Subjects were male power lifters ($n=5$, $\bar{X}\pm\text{SE}$, age= 31.0 ± 1.5 yrs, BW= 101.8 ± 11.7 kg) and sedentary controls ($n=7$; age= 27.3 ± 3.3 , BW= 85.9 ± 6.1 kg). All PL had qualified for national level competitions, while one PL had previously won the world championship in his weight class. Current 1 RM performances for the PL were squat= 287.1 ± 15.6 kg, bench press= 199.1 ± 21.5 kg, and deadlift= 283.6 ± 7.5 kg, indicating their high level of achievement. Muscle biopsies were obtained from the vastus lateralis muscle of all subjects, and were analyzed for MHC isoform expression using SDS-PAGE and optical densitometry. Additional tests included the vertical jump and isokinetic parallel squats at three different bar velocities (0.20, 0.82, and $1.43\text{ m}\cdot\text{s}^{-1}$). Significant differences ($p<0.5$) were found for vertical jump height (PL= 58.9 ± 2.3 cm, CON= 47.5 ± 3.3 cm) and vertical jump peak power (PL= 5437.9 ± 337.8 W, CON= 4186.4 ± 313.8 W). Force and power on the isokinetic parallel squat was greater for the PL at all velocities. A significant difference was also found for percent MHC IIA expression (PL= $60.0\pm 6.1\%$, CON= $46.5\pm 2.5\%$). The greater jump and isokinetic squat performances, as well as the self reported recent competitive lifts, suggest that the power lifters were highly trained. It appears that power lifters express a higher percentage MHC IIA than sedentary individuals. Although it has been previously suggested that MHC IIB expression would be desirable for strength/power athletes, this does not appear to be the case. These data are similar to previously reported data on competitive Olympic-style weightlifters. Such a MHC profile be due to a fiber type shift (IIB to IIA), as well as hypertrophy of type IIA fibers.

This project was funded by a University of Memphis Faculty Research Grant

IMPACT OF SMOKING LOW NICOTINE CIGARETTES ON STEADY STATE EXERCISE RESPONSES

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Alterations in metabolic responses to exercise have been produced by cigarette smoking. The influence of nicotine was minimized in this study by using low nicotine cigarettes (0.168 mg) with a normal carbon monoxide production. Nine male smokers (22.2 ± 2.9 yrs) reported to the laboratory on two occasions following a 12 hr smoking abstinence. Subjects rested in a seated position and smoked three cigarettes or continued abstinence. During the smoking trial, subjects smoked one cigarette at 10, 30, and 50 min of rest. Cycle ergometry was performed at 50 W for 10 min at approximately 30±6% of $\dot{V}O_2\text{max}$. Respiratory carbon monoxide was significantly ($p<0.05$) elevated (15.5 ± 5.6 vs. 7.1 ± 3.4 ppm) prior to exercise on the smoking trial. Steady state $\dot{V}O_2$, defined as a change in $\dot{V}O_2$ of less than 150 mL/min, was significantly lower on the smoking trial (0.99 ± 0.13 vs. 1.06 ± 0.13 mL/min), however it took significantly longer to reach steady state $\dot{V}O_2$ on the smoking trial (274 ± 104 vs. 220 ± 90 sec). Blood lactate concentration was significantly higher on the smoking trial (1.05 ± 0.19 vs. 0.96 ± 0.23 mmol/L). Steady state heart rate, systolic blood pressure, and rating of perceived exertion did not differ between trials. Cigarette smoking impairs the ability of smokers to attain a steady state $\dot{V}O_2$ during low intensity exercise, and anaerobic metabolism may produce a greater percentage of the energy to meet those demands.

Supported by a Grant from the College of Human Sciences, Florida State University

OLDER ADULTS' EVALUATION OF THE PHYSICAL EXERCISE PROFILE-REVISED (PEP-R) QUESTIONNAIRE - AN EXERCISE ASSESSMENT TOOL

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The purpose of this study was to evaluate an exercise assessment tool, the Physical Exercise Profile - Revised (PEP-R), by pre-testing using 53 older adults. The PEP-R is a questionnaire that gathers information on exercise factors, or determinants, that influence exercise initiation and adherence by older adults. The PEP-R was previously validated by 24 local and national experts in the fields of exercise, wellness, and geriatrics. The participants included both males and females who were at least 60 years old, representing different socioeconomic, health, and fitness levels. Thirty-six of the participants were exercisers and 17 were non-exercisers, as defined by whether or not they had an exercise routine during the month prior to completing the questionnaire. Each participant independently completed the PEP-R questionnaire, then completed a written evaluation that screened for potential problems such as low discriminability, ambiguous or poorly worded questions, questions that people might object to answering, and length of time required to complete the questionnaire. The results of this evaluation showed that 87% of the participants responded that the PEP-R gathered all the information necessary to fully describe their exercise habits. Seventy percent responded that no additional questions were needed to find out more information about their exercise habits. Sixty-six percent of the subjects said that all of the multiple choice responses were appropriate for each question. The average amount of time needed to complete the questionnaire was 35 minutes with 52% of the participants responding that it was too long. The longest amount of time that they felt the PEP-R should take to fully describe their exercise habits was a mean of 26 minutes. The evaluation revealed that 71% of the participants did not think that any of the questions were poorly worded. The data gained from this pre-testing is being used to produce the final PEP-R questionnaire.

Supported by Department of Veterans Affairs, Grant #E825-RA

GREATER POWER PRODUCTION IN ELITE SPRINTERS DURING JUMP SQUAT COMPARED TO CONVENTIONAL SQUAT EXERCISE

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Basic weight training has been incorporated into elite sprinters' training. This training produces strength gains but gains in power, the key element in sprinting, are not documented. To train for power, strength and speed must be simultaneously trained, and this may require a different training technique than conventional squats. The purpose of the study was to compare mechanical power during conventional and jump squats to determine which method would produce the greatest amount of power in elite sprinters. It was hypothesized that jump squats with loads would produce a greater amount of power than conventional squats. Thirteen, elite 100 m and 200 m sprinters (3 females; age: 17.3 ± 3.3 yr.; 10 males; age: 20.7 ± 5.3 yr.) performed a series of vertical jump squats with weight increments from zero load to the maximum load, with 1-4 trials per load. Subjects also performed 1-4 repetitions of conventional squats with weights starting with a load about half their maximum to their maximum load. All jumps and squats were done on a force plate. Average velocity was computed from air time for the jump squats and from the bar velocity captured from video data for the squats. Average power was calculated as the product of force (bar weight) and velocity. Average power was about 33% ($t=11.2$; $P=0.001$) and 34% ($t=9.9$; $P=0.0001$, body mass normalized), greater during jump squats than conventional squats. The load at which the highest average power occurred during jumping was $28\% \pm 17.6$ of the maximum load and $77\% \pm 21.9$ for squatting ($t=16.6$; $P=0.0002$). These results showed that a sprinter can generate more power by jumping with weights than by squatting with weights.

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Supported by the LeRoy T. Walker International Human Performance Center, the Division of Academic Affairs of East Carolina University and the State of North Carolina

REGRESSION OF VO_2 ON HEART RATE DURING UNSUPPORTED (US) AND SUPPORTED (S) DEEP WATER RUNNING

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The purpose of this study was twofold: (1) to investigate the relationship between heart rate and VO_2 during the performance of US and S deep water running (DWR), and (2) to compare regression equations predicting VO_2 from heart rate between the two methods of support. Thirty-three students (15 males and 18 females), aged 19 to 28 years, completed practice sessions until satisfactory DWR performance was attained, and returned for a $VO_{2\text{ peak}}$ test in the water on a subsequent day. The $VO_{2\text{ peak}}$ test involved the performance of a DWR graded exercise at a metronome cadence of 72 strides \cdot min $^{-1}$ with a cadence increase of 12 strides \cdot min $^{-1}$ in each subsequent 3 minute stage. Heart rate and VO_2 were monitored continuously throughout the test. Statistical analysis of the difference in physiological stimulus between US and S DWR in female and male subjects was made using simple linear regression. F-ratios were developed from the residual sum of squares of a restricted and unrestricted model to test the hypotheses. It was shown that US DWR is a mode of exercise that does not produce a graded physiologic response. This study demonstrated that during US DWR heart rate predicts VO_2 in ml \cdot min $^{-1}\cdot$ kg $^{-1}$ with the highest correlation coefficient and the lowest standard error in both gender groups. The male equation, $VO_2 = 4487(\text{HR}) - 42,2241$, has an r of .69 and a SEE of 6.9. The female equation, $VO_2 = 1852(\text{HR}) - 5917$, has an r of .65 and a SEE of 5.3. All developed regression equations were statistically different between gender and between the two methods of support.

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ELECTROMYOGRAPHIC STUDY OF VMO & RF MUSCLE ACTIVITY DURING STRAIGHT LEG RAISE EXERCISES IN 4 DIFFERENT HIP & ANKLE POSITIONS

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The purpose of this study was to investigate the effect of hip angle and ankle position on the amount of muscular activity in the vastus medialis oblique (VMO) and rectus femoris (RF) while performing a straight leg raise exercise. Ss were 31 college students from a private university in TN. An electromyograph (EMG) machine was used to record the electrical activity from the VMO and the RF muscles. All Ss performed the following conditions in random order: (a) hip flexion 10 degrees/ankle relaxed (HF10/R); (b) hip flexion 10 degrees/ankle dorsiflexed (HF10/DF); (c) hip flexion 90 degrees/ankle relaxed (HF90/R); and (d) hip flexion 90 degrees/ankle dorsiflexed (HF90/DF). Three trials were given for each condition. One minute rest was given between each trial and 3 minutes rest given between each condition. Mean integrated EMG (IEMG) was analyzed using totally repeated measures 2×2 factorial ANOVA for the VMO and for the RF. There was no significant ($p > .05$) interaction for the VMO. Significant ($p < .05$) main effects were found for hip angle and ankle position for the VMO. Tukey post hoc results indicated that the mean IEMG for VMO was greater at HF10/DF than at HF90/R but not compared to the other 2 conditions. There was a significant ($p < .05$) interaction for RF. Tukey post hoc analysis revealed mean IEMG was greater at HF90/DF than the other 3 conditions. In conclusion, the hip angle/ankle position that elicits the greatest amount of muscular activity in the VMO is HF10/DF when compared to HF90/R and the position that elicits the greatest amount of muscular activity in the RF is HF90/DF.

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REASONS FOR JOINING A FITNESS FACILITY

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This study describes the development of the Fitness Facility Membership Questionnaire of 43 items, designed to identify reasons for joining a fitness facility. Items were generated from responses to an open-ended questionnaire. A 50-item version of the questionnaire was completed by 152 members of five community-based fitness facilities. Principal components analysis with varimax rotation yielded 8 factors, accounting for 63.8% of the variance. The factors were labeled and are presented in the order of most important to least important as Intrinsic Motivation, Resistance Equipment, Extrinsic Motivation, Socialization, Aerobic Equipment, Aquatic-related Facilities, Amenities, and Recreational Facilities. Cronbach alpha coefficients ranged from .72 to .89. Women and men differed significantly with respect to their reasons for joining a fitness facility. Structure coefficients indicated that women scored higher on Socialization, Extrinsic Motivation, Intrinsic Motivation, and Aerobic Equipment. Men scored higher on Aquatic-related Facilities and Resistance Equipment. There was no difference between women and men in scores on Recreational Facilities or Amenities. These results have possible implications for promotion and marketing of fitness facilities. Facility directors who are aware of members' reasons for joining may be able to develop and implement strategies to attract new and retain current members.

PHYSICAL ACTIVITY, PHYSICAL SELF-WORTH AND CALCIUM INTAKE OF YOUNG ADULT FEMALES.

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Important factors in the prevention of osteoporosis include adequate calcium intake (CI) as well as weight bearing physical activity (PA). PA contributes to the development of physical self worth (PSW). It has also been suggested that PSW plays a role in dietary behavior. The purpose of the current study was to determine if there was a relationship among PA, PSW, and CI of females. Forty-one females ($x = 19.1$ yr.) completed a food frequency questionnaire (FFQ), Physical Self-Perception Profile (PSPP), and the Seven Day Physical Activity Recall Questionnaire (PAR). Subjects were divided into four groups dependent on activity level (inactive (IA), light (LA), moderate (MA), and heavy (HA)) as determined from the PAR. PSW is one of the five sub-scales of the PSPP. Correlation analysis indicated a significant relationship between activity level and PSW ($r = 0.49$, $p = 0.01$). ANOVA indicated significant differences between PSW and activity level ($F = 4.096$, $p = 0.013$). PSW was significantly higher in the HA group as compared to all other groups. There were no significant differences between groups for CI, however CI was highest (1244.5 mgs \pm 331.0) in the IA group and lowest in the HA group (972.0 ± 401 mgs). A Kendall's Coefficient of Concordance test indicated no significant relationship among PA, PSW and CI. Previous reports have indicated that individuals who exercise on a regular basis will often adopt healthy eating behaviors. The results of the current study underscore the need to deliver exercise and nutritional messages to young females that emphasize the importance of weight bearing physical activity and low calorie calcium sources.

EFFECT OF CLASS EXERCISE PARTICIPATION ON BODY IMAGE OF COLLEGE FEMALES

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The purpose of this study was to investigate the effect of class exercise participation on body image. Students attending a Southeastern university were enrolled in undergraduate health courses, some of which included an exercise component. The Body Self-Image Questionnaire (BSIQ; Rowe, 1996) was administered to 23 females from exercise classes (E) and 31 females from non-exercise classes (NE). Group mean subscale scores were analyzed using ANCOVA (adjusted for pre-class values). Results ($* p < .05$) are presented below.

	AE	FE	AG	HFE	HFI	SD	HD	NA	II
NE	14.23	17.05	11.74	18.51	11.69	9.66	7.22	9.33	19.75
E	14.21	15.68	11.14	20.53*	12.28	9.29	7.35	9.08	19.98

note: AE = Appearance Evaluation; FE = Fatness Evaluation; AG = Attention to Grooming; HFE = Health/Fitness Evaluation; HFI = Health/Fitness Influence; SD = Social Dependence; HD = Height Dissatisfaction; NA = Negative Affect; II = Investment in Ideals

The exercise group scored significantly ($p < .05$) higher on the HFE subscale. However, there were no group differences ($p > .05$) in adjusted posttest mean scores for all other subscales. Participation in class exercise appears to have a greater effect on evaluations of health and fitness than participation in a non-exercise class. Effects on other aspects of body image are not dependent upon whether an exercise component is included.

Supported by a Faculty Research Grant from Middle Tennessee State
University

INTERNAL CONSISTENCY OF THE *BODY SELF-IMAGE QUESTIONNAIRE* IN WOMEN PARTICIPATING IN AEROBIC DANCE AND WEIGHTLIFTING

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Internal consistency of the *Body Self-Image Questionnaire* (Rowe, 1996) was investigated in female aerobic dance and weightlifting participants ($n=60$, mean age= 39 ± 19 yrs). Aerobic dance participants ($n=28$) were recruited during an exercise session, and completed the questionnaire immediately following. The weightlifting participants ($n=32$) completed the questionnaire immediately after their workout session. The 39-item BSIQ contains 9 subscales (Overall Appearance Evaluation; Fatness Evaluation; Attention to Grooming; Health/Fitness Evaluation; Health/Fitness Influence; Social Dependence; Height Dissatisfaction; Negative Affect; and Investment in Ideals). Cronbach's alpha was calculated for each subscale for the entire sample ($n=60$). Internal consistency was acceptable for five out of the nine subscales, using a criterion of $\alpha \geq .70$ (Overall Appearance, .85; Fatness Evaluation, .82; Health/Fitness Evaluation, .84; Height Dissatisfaction, .93; and Negative Affect, .88). Subscales with an unsatisfactory alpha coefficient were Attention to Grooming (.59); Health/Fitness Influence (.47); Social Dependence (.61); and Investment in Ideals (.69). Three of these four subscales contain only 3 items which may explain their lower internal consistency. A comparison was made to the results of the original developmental study which obtained satisfactory internal consistency for 7 of the 9 subscales. Health/Fitness Influence and Social Dependence subscales obtained unsatisfactory alphas in both studies. The mean age difference between the original study and the present study could be a plausible explanation for the difference in internal consistency results. Further investigation of internal consistency of the BSIQ in different age groups is recommended along with possible item additions to the subscales with lower internal consistency.

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A COMPARISON OF THE CALORIC COST OF STEP AEROBIC DANCE UTILIZING ARM LEG WEIGHTS, RESISTIVE BANDS OR MUSCULAR CONTRACTIONS.

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Within the last decade, traditional aerobic dance has been modified to include the use of a step bench ranging from 4-12 inches in height. Using various dance step combinations the individual performs movements up, down and laterally on the bench. The energy cost for step aerobic dance has been shown to be approximately 10 kcal per minute. In an effort to increase caloric expenditure the use of rubber resistive bands and/or hand and ankle weights has been added to the step routine. The individual performs various arm, leg and abdominal exercises using the bands or the weights. The purpose of this investigation was to compare the caloric cost of three, 30 minute aerobic step bench routines using either resistive bands (RB), hand-ankle weights (HW) or muscle contractions (MC) without bands or weights. A total of 32 female subjects volunteered to participate in the study. All subjects completed a VO_2 max treadmill test and then performed the 3 routines on 3 separate days in random order. Three routines were videotaped and each routine included a 4 minute warm up followed by 3 minutes of stepping alternated with equal periods of arm, leg and abdominal exercises and a 4 minute cool down. All routines were identical with the exception of the type of resistance utilized. Oxygen consumption (VO_2) and heart rate were measured continuously during each routine. The results indicated there were no significant differences in caloric expenditure among the 3 routines. The mean energy cost for the RB was 183.5 ± 13.6 , HW 182.4 ± 16 and MC 178 ± 12.1 kcal. Heart rate means were 155 bpm (RB), 154 bpm (HW) and 151 bpm (MC) which were 78%, 77% and 75% of HR max respectively. These results suggest that total caloric expenditure was similar, regardless of the resistance utilized at an intensity range of 75 - 77% of HR max.

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Funded by a UT Chattanooga Student Provost Grant

THE FLYWHEEL EFFECT AND ITS IMPACT UPON CYCLE ERGOMETRY

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The purpose of this study was to determine the impact of added lower limb weight during brief maximal cycle ergometer exercise. A total of eighteen male (age= 26.2 ± 1.4 yrs) subjects took part in this investigation. Seven subjects performed three, 30s Wingate tests (separated by four minutes of passive rest), against a resistance of $0.75 N\cdot kg^{-1}$ bodyweight and a second group of 11 subjects performed four 15s bouts of maximal cycling with one minute of rest interspersed, against the same resistance. Both groups completed three randomly assigned maximal cycling conditions, 1) with 0.68 kg of weight attached to each thigh (TW), 2) with 0.68 kg of weight attached to each leg at the ankle (AW) and 3) without weight added to the legs (CTL). Mean values for bodyweight (81.5 ± 2.4 kg), body fat (11.6 ± 2.2 %) and $VO_{2\text{ peak}}$ (49.1 ± 2.4 ml $\cdot kg^{-1}\cdot min^{-1}$) were representative of healthy college-aged males and did not differ between groups. Baseline total work (Wtot), (30s; 56.1 ± 2.4 kJ vs. 15s; 43.45 ± 2.1 kJ), was significantly ($p<0.05$) different. Repeat measures ANOVA revealed significant differences in Wtot during the 15s tests between CTL (43.4 ± 2.1 kJ) and both TW (46.8 ± 1.95 kJ) and AW (47.0 ± 2.1 kJ). However, for the 30s test, no significant differences were noted for Wtot with the addition of TW or AW. Peak post-exercise blood lactate for the 15s (9.2 ± 1.3 , 9.4 ± 1.3 , 9.7 ± 0.6 mM, for CTL, TW and AW) and the 30s (11.4 ± 0.5 , 10.7 ± 0.4 and 11.8 ± 0.6 mM, for CTL, TW and AW) tests were not significantly different between conditions or tests. These results indicate that for short (15s) maximal cycle ergometer tests, the addition of weight to the lower limbs can positively (~8.0 %) influence leg ergometer work performance. This performance increment is most likely due to a weight dependent increase in pedal crank torque, which allows the cyclist to better overcome flywheel inertia. In addition, it seems that this "flywheel effect" is dampened when the length of the bout increases.

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SHOULD THE EIGHT-REPETITION MAX DUMBBELL BENCH PRESS REPLACE THE PULL-UP TEST WHEN MEASURING STRENGTH IN FOURTH GRADE STUDENTS?

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The Presidential Physical Fitness Tests (PPFT) has always utilized the pull-up (PU) to determine muscular strength in children. In view of the high failure rates of most children performing the pull-up test and the American College of Sports Medicine guidelines for resistance training in young children, an alternative test seems warranted. The purpose of this study was to investigate the relationship between the bench press and PU tests. Fifty-four fourth graders (26 females, 28 males) participated in the PPFT pull-up test and performed an eight-repetition max dumbbell bench press (8RMBP). A Pearson Product Correlation (PPC) was used to determine the relationship between the number of PU and the 8RMBP. Correlation results indicated a significant ($r = 0.42$, $p = 0.03$) relationship between the PU and 8RMBP for girls. A PPC was used to examine the relationship between work volume of the PU test (bodyweight x repetitions) and the work volume of the 8RMBP (max resistance x repetitions). Results indicated a significant ($r = 0.45$, $p = 0.02$) relationship between the work volume of the PU and 8RMBP for girls. The results of this study suggest that the bench press test appears to be a viable test for measuring upper body strength of fourth grade girls. It is difficult to draw conclusions on the viability of the bench press test for boys until additional studies are performed.

THE EFFECT OF DIFFERENT WARM-UP INTENSITIES ON PERFORMANCE IN A 2000 METER ROWING TEST

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This study examined the effects of a low-intensity warm-up (LWU) versus a high intensity intermittent warm-up (HWU) on the performance of a 2000 meter maximal effort rowing ergometer test (ME). The subjects were eight collegiate male rowers with at least three years of rowing experience. Each rower had to complete a GXT on the rowing ergometer in order to determine max $\dot{V}O_2$ (58.75 ± 2.46 ml/min/kg). The following week, the subjects performed a pretest to re-verify the workload required to reach 50% and 75% of $\dot{V}O_2$ max. During the next two weeks, each subject completed two ME tests with different warm-ups (WU) in randomized order. The low intensity warm-up (LWU), consisted of nine minutes and fifty seconds at an intensity of 50% of $\dot{V}O_2$. The high intensity intermittent warm-up (HWU), consisted of 5 minutes of the LWU followed by a power stroke pyramid designed to elicit an average $\dot{V}O_2$ of 75% of max $\dot{V}O_2$ (20 s on, 30 s off, 30 s on, 30 s off, 40 s on, 60 s off, 30 s on, 30 s off, 20 s on). Each WU concluded with one minute of low intensity rowing and two minutes of rest before beginning the ME. The HWUME and LWUME resulted in a statistically similar max $\dot{V}O_2$ ($t = -0.007$, $p = .995$ and max HR ($t = 2.072$, $p = .077$). There was a significant difference ($t = -3.564$, $p = .009$) between tests in the time it took to complete the first 500 meters (HWUME = $1.73 \pm .05$ min, LWUME = $1.76 \pm .06$ min), however, no significant differences between tests were found for the last three 500 meter segments. The total time to finish the ME was 4 seconds shorter for the HWUME ($\mu = 7.05 \pm .19$ min) (LWUME $\mu = 7.09 \pm .21$ min). However, the dependent t-test on the four second difference failed to reach statistical significance ($t = -2.230$, $p = .061$). The HWU did result in rowers reaching their peak max $\dot{V}O_2$ earlier in the test (HWUME 4.50 ± 1.36 min, LWUME $6.21 \pm .83$ min; $t = -3.608$, $p = .009$). These results suggest that the high intensity intermittent warm-up may be beneficial for achieving a higher level of performance sooner on a ME test. Although a statistically significant performance improvement was not seen, the four second mean difference between the two tests indicates that further study concerning the effects of WU might be warranted.

Supported by a UTC Student Provost Grant

THE EFFECTS OF SIMULATED TENNIS TOURNAMENT PLAY ON SELECTED PHYSICAL PERFORMANCE MEASURES

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This project studied the effects of multiple tennis matches on selected measures of physical performance related to tennis play. Typical recreational level tennis tournaments often involve numerous matches in one day. To determine the effects of such a format, physical performance tests were administered during the course of a simulated tournament. Tests included: hexagon agility, 20 yard sprint times, service velocity, dominant hand grip strength, vertical jump height (VJH), vertical jump peak power (VJPP), vertical jump mean power (VJMP), and performance on a 10 sec modified-Wingate test which resulted in determination of peak power (WinPP) and mean power (WinMP). Eleven, amateur male adult tennis players participated in five 70 min (3 singles and 2 doubles) matches with approximately 30 min of rest between matches. All subjects had been previously rated as 3.5-4.0 players by U.S.T.A. professionals using the U.S.T.A. player rating system. Tests were administered before the 1st match (test 1), and immediately after each of the singles and doubles matches (tests 2-6). Results of repeated measures ANOVA ($p < 0.05$) indicated that ($\bar{X} \pm SE$) VJH (test 1 = 46.0 ± 2.6 cm, test 6 = 44.9 ± 2.2 cm), VJPP (test 1 = 7608.5 ± 43.9 W, test 6 = 7531.5 ± 119.8 W), VJMP (test 1 = 1460.8 ± 48.8 W, test 6 = 1430.7 ± 48.8 W), WinPP (test 1 = 949.6 ± 30.9 W, test 6 = 783.3 ± 28.0 W), and WinMP (test 1 = 823.6 ± 27.8 W, test 6 = 783.3 ± 30.4 W) all significantly decreased by the end of the simulated tournament. Only measures of muscular power were attenuated by the conclusion of the simulated tournament. It was concluded that tennis is a high power sport that makes significant demands on short-term anaerobic power and capacity after multiple matches. Training considerations need to be adopted by adult amateur male tennis players to meet these demands.

This project was funded by the United States Tennis Association.

The purpose of conducting this study was to investigate the internal consistency of the *Health Style: A Self Test* questionnaire (U.S. Health and Human Services, 1981). The questionnaire consists of six subscales to measure health beliefs and behaviors, including physical (PHYS), social (SOC), emotional (EMOT), environmental (ENV), spiritual (SPIR), and mental (MENT). Each subscale contains 10 questions, answered using a 4-point Likert scale. Subjects ($n=90$) were students in undergraduate physical activity and health classes at a large regional university. Cronbach's alpha (α), inter-item correlations, and alpha if item deleted were calculated for each subscale using SPSS version 6.1.2. Internal consistency results were as follows:

	PHYS	SOC	EMOT	ENV	SPIR	MENT
α	0.72	0.73	0.73	0.81	0.64	0.70

Internal consistency was unacceptable (criterion $\alpha < 0.70$) for the SPIR subscale. However, internal consistency was only marginally acceptable for other subscales, especially considering each subscale contained 10 items. In conclusion, it appears from the statistical results and inspection of the item wording that within at least some of the subscales, items may not be consistently measuring the same construct.

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METABOLIC RESPONSE OF MEN TO LOWER VS. UPPER AND LOWER BODY ROWING

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Rowing is currently experiencing a resurgence of popularity as a recreational physical activity. One manufacturer (Bowflex®) has introduced an exercise device that allows for lower body only (LB) as well as upper and lower body rowing (U+LB). The metabolic response to these variations is unclear. Therefore, the purpose of this investigation was to compare the physiological responses of LB to U+LB at two different workout cadences (66 b/min and 75 b/min). Fifteen healthy male subjects (age = 26.7 ± 7.1 yrs; wt = 82.5 ± 11.0 kg) completed four randomized submaximal rowing trials (5 min each for U+LB75, U+LB66, LB75, LB66). Oxygen consumption (VO_2), ventilation (VE), respiratory exchange ratio (RER), and heart rate (HR) were monitored continuously. Ratings of perceived exertion (RPE) were recorded after each trial. MANOVA with repeated measures revealed a significant ($p < .0001$) within group effect for all dependent variables as shown in table below:

PARAMETER	U+LB75	U+LB66	LB75	LB66	
VO_2 (ml/kg/min)	17.6±1.9	15.4±2.2	14.1±2.0	12.0±1.6	*
VE (l/min)	30.8±5.5	27.8±6.1	26.2±6.3	23.2±4.2	*
HR (b/min)	128.2±16.6	120.5±18.0	116.0±14.0	109.4±14.1	*
RER	.91±.04	.91±.03	.94±.07	.96±.05	†
RPE	12.9±1.3	12.0±1.4	12.1±2.4	10.8±1.4	∅

* $p < .01$, U+LB75 > U+LB66 > LB75 > LB66; † $p < .05$, U+LB75 = U+LB66 > LB75 = LB66
 ∅ $p < .01$, U+LB75 = U+LB66 = LB75 > LB66

These results suggest that greater physiological responses to submaximal rowing are the result of increased rowing cadences and the amount of active muscle mass involved (U+LB vs LB) during the exercise.

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A COMPARISON OF THE PHYSIOLOGICAL RESPONSES TO LOWER BODY AND COMBINED UPPER AND LOWER BODY EXERCISE

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The purpose of this study was to determine if physiological differences exist between lower body (LB) and combined upper and lower body rowing (U+LB). Fifteen females (age= 21.8 ± 3.7 yrs; wt= 59.4 ± 8.8 kg) completed four 5-min randomized trials incorporating different rowing cadences (75 b/min, 66 b/min) with rowing styles (U+LB75, U+LB66, LB75, LB66). Subjects were familiarized with rowing technique and self-selected a resistance (mean= 7.7 ± 1.5 kg) for testing (Bowflex®). Oxygen consumption (VO_2), heart rate (HR), respiratory exchange ratio (RER), expiratory volume (VE), and rate of perceived exertion (RPE) were measured. A one-factor MANOVA with repeated measures revealed a significant ($p < .0001$) within group effect for all dependent variables as shown below:

Parameter	U+LB75	U+LB66	LB75	LB66	
VO_2 (ml/kg/min)	18.1±2.6	15.3±1.8	12.6±1.8	10.7±1.5	$p < .01^*$
VE (l/min)	25.9±4.6	22.4±3.5	19.1±3.5	16.6±2.2	$p < .01^*$
HR (bpm)	135.2±14.4	126.8±16.1	115.9±15.8	108.4±14.9	$p < .01^*$
RER	.92±.05	.94±.07	.93±.06	.92±.06	
RPE	12.8±1.6	11.9±1.8	10.9±1.9	9.3±1.7	$p < .05^*$

*U+LB75 > U+LB66 > LB75 > LB66

It was concluded that U+LB significantly increases the physiological responses when compared to LB rowing. Furthermore, rowing speed independent of rowing style contributes to the elevation of VO_2 , VE, HR, and RPE.

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PHYSIOLOGICAL AND PERCEIVED EXERTION RESPONSES OF DEEP-WATER EXERCISE AND TREADMILL EXERCISE

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The purpose of this study was to compare heart rate (HR), blood pressure (BP), and perceived exertion (RPE: Borg 6-20 Scale) responses of deep water exercise (DW) to treadmill exercise (TM) at absolute workloads. Six 40 to 65 year old moderately active females participated in two 20 minute submaximal steady state exercise bouts. Subjects were familiarized to both TM and DW exercise, regardless of previous experience with the two exercise modes. TM and DW exercise were conducted in random order on two separate occasions, separated by one week between tests. During TM, subjects walked at a self-selected rate ($78 - 94 \text{ mmin}^{-1}$) determined during familiarization to treadmill exercise. During DW, subjects were supported by a jog belt and walked to a metronome pace at the same absolute rate determined during treadmill familiarization. Exercise bouts were preceded and followed by three minutes of walking at a rate 13.5 mmin^{-1} less than exercising rate. HR and RPE were recorded every five minutes during the submaximal exercise bouts. BP was recorded prior to, immediately after cool down, and three minutes post-cool down. Data were analyzed using a series of repeated measures ANOVAs ($p < 0.05$). HR and RPE responses were significantly greater during DW compared to TM (HR-DW: 118.0 ± 10.0 , HR-TM: 104.8 ± 5.4 bpm; RPE-DW: 12.8 ± 1.7 , RPE-TM: 10.6 ± 1.5 units). There were no significant differences in BP for the two modes of exercise. These results suggest that exercise at absolute submaximal workloads produces higher heart rate and perceived exertion responses when performed in deep water compared to a treadmill, which may be a consideration when recommending water exercise for a middle aged female population.

THE EFFECT OF RACE ON EXERCISE TRAINABILITY IN FEMALES

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The objective of this investigation was to determine the effect of race on the exercise trainability of sedentary females. Eight females (4 African-American and 4 Caucasian), ages 18-24 served as subjects. To establish homogeneity among the subjects, participants were required to have a body fat composition between 15-30 percent. It was also required that participants be absent of cardiovascular diseases and other exercise limiting conditions. Subjects underwent pre-training exercise testing to determine initial cardiovascular fitness level. Subsequently, each subject participated in a 5 week exercise training period. This period consisted of performing 30 minutes of treadmill exercise at 65-75% of subjects age predicted maximal heart rates 3 days per week. Then, each subject underwent post-training exercise testing to determine the difference in magnitude of aerobic capacity gains between the two groups. While not statistically different ($p > 0.05$), the initial level of cardiorespiratory fitness (measured as $\dot{V}O_{2\text{max}}$) in Caucasian females (mean: $49.25 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) was higher than that of African-American females (mean: $45.75 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$). After training, average maximal aerobic capacity remained higher in white females (mean: $53.5 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) compared to their black counterparts (mean: $52.4 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$). African-American subjects had a higher net gain in maximal $\dot{V}O_2$ ($+6.6 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) as compared to their Caucasian counterparts ($+4.3 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$); the net gain was not significantly different ($p > 0.05$) between groups. Although not found to be significantly different, a trend did exist toward a higher level of exercise trainability in African-American females versus Caucasian females.

TEMPERATURE AND HEART RATE RESPONSES TO VARYING EXERCISE INTENSITIES

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The importance of regular exercise on health enhancement has been well documented. However, for certain medical conditions, including multiple sclerosis and late stage pregnancy, intense exercise may be contraindicated to avoid complications related to increased core temperature. The purpose of this study was to evaluate the relationship between submaximal exercise and heart rate (HR) and core temperature (T_{re}) responses. Twenty-one healthy, college-aged subjects (12 women, 9 men) exercised at 50, 60 and 70% $VO_{2\text{max}}$ for 20 minutes on a cycle ergometer. $VO_{2\text{max}}$ was determined on an electronically braked cycle ergometer ($44.8 \pm 6.7 \text{ ml} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$). Exercise sessions were conducted on successive days. The order of exercise intensities was counterbalanced. T_{re} and HR data were obtained via a portable data logger throughout exercise and 10 minutes of recovery. Data were analyzed with a two-way repeated measures ANOVA. No T_{re} differences ($p > 0.05$) were observed between exercise intensities at 50 and 60% of $VO_{2\text{max}}$. During the last 10 min of exercise and throughout recovery, T_{re} was significantly greater ($p < 0.05$) for the 70% condition when compared to the 50% and 60% conditions. Average HR responses were 123 bpm at 50%, 144 bpm at 60% and 155 bpm at 70% of $VO_{2\text{max}}$ ($p < 0.05$). Our results indicate that a 70% exercise intensity might have a greater effect on core temperature response than lower workloads. For exercise prescription, workloads not exceeding 60% of $VO_{2\text{max}}$ might be more appropriate for individuals who are temperature intolerant.

Funded by Research/Creative Activity Grants #97-31, East Carolina University, Greenville, NC.

PREDICTING STAIRMASTER 4000PT VO_{2max} BASED ON SUBMAXIMAL STAIRMASTER 4000PT EXERCISE

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Several studies have demonstrated the ability to accurately predict VO_{2max} from submaximal leg ergometer (Astrand & Ryhming, 1954; Fox, 1973; Golding, Myers, & Sinning, 1989) and treadmill exercise (Foster et al., 1984; Mahar et al., 1985). Since VO_{2max} is mode specific, a specific regression equation for the StairMaster 4000PT must be developed. The purpose of this study was to develop a regression equation to accurately predict StairMaster 4000PT VO_{2max} from submaximal StairMaster exercise. Fourteen healthy females (18-28) participated in a maximal GXT on the StairMaster 4000PT to measure VO_{2max} . Subjects also completed a 5 minute exercise bout, performed at an exercise intensity which elicited a heart rate between 130 to 150 bpm. Multiple regression analysis to estimate StairMaster 4000PT VO_{2max} yielded the following predictor variables: submaximal exercise heart rate (SMHR), and estimated submaximal VO_2 (SM VO_2). Submaximal StairMaster 4000PT exercise VO_2 values were based on norm values reported by the manufacturer. The following regression equation was produced:

$$VO_{2max} \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1} = 53.97 + (.57 \text{ SM}VO_2) - (.22 \text{ SMHR}).$$

The correlation between measured and predicted StairMaster 4000PT VO_{2max} using Pearson's equation was $r=0.73$. The standard error of the estimate, which is a good indicator of predictive accuracy, was $2.36 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$ or 7.02% of measured VO_{2max} . A paired sample t-test between the measured VO_{2max} ($33.60 \pm 3.45 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) and the predicted VO_{2max} ($33.60 \pm 3.27 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) produced a t value of 0.0002, $\geq .05$. The findings of this preliminary investigation suggest that the regression equation generated in this study, can predict StairMaster 4000PT VO_{2max} from submaximal StairMaster 4000PT exercise with an acceptable degree of accuracy.

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DISSIMILAR HAMSTRING/QUADRICEPS (H/Q) RATIOS ACCORDING TO MODE OF MUSCLE CONTRACTION AND TRAINING STATUS

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An H/Q ratio of less than 0.6 has been associated with a potential for muscle injury during athletic performance. The mode of muscle contraction for finding this ratio has primarily been concentric, while the majority of muscle injury may occur during eccentric contractions. The purpose of this study was to compare H/Q ratios during concentric (con), eccentric (ecc) and isometric muscle contractions at different speeds and to compare the ratio between highly trained athletes and untrained subjects. The subjects were 15 male and 5 female elite 100-to-400 meter sprinters and 12 untrained females. All subjects performed maximum voluntary isometric, and con. and ecc. isokinetic contractions during knee extension and flexion at $90^\circ/\text{sec}$ and $180^\circ/\text{sec}$ on a Kin-Com dynamometer. The results in the table indicate that the H/Q ratios during dynamic muscle action were significantly lower in the untrained subjects than in trained subjects.

	Ecc $90^\circ/\text{sec}$	Con $90^\circ/\text{sec}$	Isometric	Ecc $180^\circ/\text{sec}$	Con $180^\circ/\text{sec}$
Untrained	0.39 ± 0.08^a	0.48 ± 0.09	0.53 ± 0.16	0.43 ± 0.10^c	0.63 ± 0.21
Trained	0.54 ± 0.10^b	0.62 ± 0.11^b	0.54 ± 0.19	0.57 ± 0.08^{bc}	0.81 ± 0.12^b

(a = different from isometric in same group; b = different from untrained; c = different from con in same group. $p < 0.05$)

Additionally, there are significant differences in H/Q ratios between ecc and con contractions independent of training status. In conclusion, it may be necessary to establish and validate a new criterion for a significant H/Q ratio in detecting injury potential. This new criterion should be sensitive to contraction mode and training history.

Supported by the LeRoy T. Walker International Human Performance Center, the Division of Academic Affairs of East Carolina University, and the State of North Carolina

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AN EVALUATION OF THE JUGS RADAR GUN.

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Sports radar guns have been used for years to provide quick and supposedly accurate speed information in a variety of sport settings. The problem is that these speed estimations may be apocryphal. We had shown previously that one such device, the Sports Radar 3200, did not meet the accuracy claims of its manufacturer. This study was conducted to evaluate the JUGS radar gun. The manufacturer, JUGS, Inc., claims an accuracy (validity) of ± 1 MPH. We decided to evaluate this claim indirectly since our motion analysis data of the JUGS gun were inconsistent. We collected simultaneous projectile data using two JUGS guns placed side-by-side. Since validity cannot exceed reliability, we could refute the manufacturer's claim if the two JUGS units did not yield speed values which were consistently within ± 1 MPH. We decided that if 95% of the throws were within ± 1 MPH, then we would have to proceed with more detailed motion analysis; otherwise, we could refute the manufacturer's claims on the basis of inadequate reliability. In all, one-hundred-seventy duplicate estimations (all baseballs) were made during six separate data-collection occasions. Overall, there was concordance (values within ± 1 MPH) between the two units in only 40% of the trials, and the average absolute difference was 3.6 MPH. Although there were two "runs" of ten consecutive throws with 90% concordance, the 95% criterion was never challenged. We conclude that the JUGS gun does not meet the manufacturer's ± 1 MPH accuracy claim.

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METABOLIC CHANGES FOLLOWING A 3 MONTH DIET AND/OR EXERCISE INTERVENTION
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This study investigated the interactive effects of a three month dietary weight reduction and exercise program on resting metabolic rate (RMR) and respiratory exchange ratio (RER) at rest and during a graded exercise test. Twenty-six females (18-50 year, between 20 to 50% > desirable body weight) completed the study. Randomly assigned groups were: (1) fat restriction (F, 20-40 g of fat/d), (2) caloric restriction (D, estimated maintenance - 2092 kJ/d), (3) exercise (E, 3 d/wk, 1255 kJ/session, self-monitored aerobic program), (4) D plus E (DE), and (5) control (C). The F group was dropped from the study due to low compliance. The D and DE groups achieved their dietary goals. Both DE and E significantly increased treadmill time to exhaustion ($p=0.0148$) and relative peak oxygen consumption (ml/kg/min , $p=0.0056$) but not absolute peak oxygen consumption (l/min , $p=0.0611$). Both the D and DE groups consistently showed greater declines than E and C on almost all anthropometric variables including body weight and percent body fat. No significant pre to post or among group differences were seen in RMR (kJ/d , $p=.9054$; kJ/kg bw/d , $p=.7985$; kJ/kg lbw/d , $p=.8684$). No significant differences were seen for RER. In this study, diet seemed to have a greater effect on weight loss than self-monitored exercise. However, neither intervention resulted in significant changes in RMR or RER.

Supported by funding from UAF College of Education. Mini-grant, Human Performance Lab of UAF, and Washington Regional Medical Center, Fayetteville, AR 72701

SUBSTRATE USE DURING AND FOLLOWING MODERATE AND LOW INTENSITY EXERCISE: IMPLICATIONS FOR WEIGHT CONTROL

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We compared substrate utilization during and after low and moderate intensity exercise of similar caloric expenditure. Ten active males (age: 26.9 ± 4.8 years, ht: 181.1 ± 4.8 cm, wt: 75.7 ± 8.8 kg, VO_2max : 51.2 ± 4.8 $\text{ml kg}^{-1}\text{min}^{-1}$) cycled at 33% and 66% VO_2max on separate days for 90 and 45 min, respectively. After exercise, subjects rested in a recumbent position for 6 h. Two h post-exercise, subjects ate a standard meal of 66% carbohydrate (CHO), 11% protein, and 23% fat. Near-continuous indirect calorimetry and measurement of urinary nitrogen excretion were used to determine substrate utilization. Total caloric expenditure was similar for the 2 trials; however, significantly ($P<0.05$) more fat (42.4 ± 13.6 g vs. 24.0 ± 12.2 g) and less CHO (142.5 ± 28.5 g vs. 188.8 ± 45.2 g) was utilized as a substrate during the low compared to the moderate intensity trial, respectively. Protein utilization was similar for the 2 trials. The difference in substrate use can be attributed to the exercise period because over twice as much fat was utilized during low (30.0 ± 11.0 g) compared to moderate intensity exercise (13.6 ± 6.6 g). Significantly more CHO was utilized during the moderate (106.0 ± 27.8 g) compared to the low intensity bout (68.7 ± 20.0 g). Substrate use during the recovery period was not significantly different. We conclude that low intensity, long duration exercise results in a greater total fat oxidation than does moderate intensity exercise of similar caloric expenditure. Dietary-induced thermogenesis was not different for the 2 trials.

Funded by the UTK Scholarly Activities Research Incentive Fund.

ACUTE EXERCISE REDUCES LEPTIN EXPRESSION IN RETROPERITONEAL BUT NOT EPIDIDYMAL FAT.

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In this study we investigated the effect of a single bout of exercise on leptin mRNA expression in rat white adipose tissue. Male Sprague-Dawley (SD) rats were randomly assigned to either an exercise ($n = 9$) or a control ($n = 8$) group. Acute exercise was performed on a rodent treadmill and was carried out to exhaustion, lasting an average of 85.5 ± 1.5 minutes. By the end of exercise, soleus muscle and liver glycogen were reduced by 88% ($p < 0.001$) but serum leptin levels were similar between the exercise (3.01 ± 0.33 ng/ml) and control (2.67 ± 0.41 ng/ml) animals. However, in comparison to controls, acutely exercised animals had lower ($p < 0.05$) leptin mRNA expression in retroperitoneal fat and this was independent of fat pad weight. Leptin mRNA expression in epididymal fat was not affected by exercise. Previous studies have indicated that the retroperitoneal fat depot receives more blood flow than epididymal fat, and that peripheral noradrenergic and β_3 -adrenergic receptor stimulation are involved in the regulation of leptin gene expression. The site specific reduction in leptin mRNA expression may be related to greater blood flow and thus, enhanced catecholamine delivery to retroperitoneal fat during acute exercise. In conclusion, these data indicate that an acute bout of exercise in male SD rats is sufficient to reduce leptin mRNA expression in white adipose tissue, but this response is not uniform among the various fat depots.

EFFECT OF CHROMIUM PICOLINATE (CP) AND L-CARNITINE (LC) ON OXYGEN CONSUMPTION AND RESPIRATORY EXCHANGE RATIO DURING REST, EXERCISE AND RECOVERY.

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The purpose was to determine the effects of CP (200 µg/day) and LC (500 mg/day) on $\dot{V}O_2$ and RER during rest, exercise, and recovery. Subjects included 7 healthy, sedentary, over-fat (>17% BF), males between the ages of 18-30. The double-blind, crossover design included 10-days of supplementation (CP-LC), an experimental session, 10-days of wash out, 10-days of CP-LC, and a second experimental session. Subjects were randomly assigned to CP-LC/placebo or placebo/CP-LC groups. Each session, conducted at 5:00 a.m. following a 12-hr overnight fast, consisted of 30 min of rest, 30 min of treadmill walking, and 30 min of recovery. Respiratory gases were measured continuously by open circuit spirometry. Data for $\dot{V}O_2$ and RER were analyzed by two-way ANOVA. No significant effects of supplementation ($p > .05$) for $\dot{V}O_2$ or RER during rest, exercise, or recovery were observed. A paired sample T-test also revealed no significant difference in EPOC for supplementation ($4.5 \pm 2.0 \text{ LO}_2$) and placebo trials ($4.9 \pm 1.8 \text{ LO}_2$). Results indicate that 10-days of CP and LC supplementation does not significantly effect $\dot{V}O_2$ and RER during rest, exercise, and recovery. The usefulness of such supplementation in weight reduction regimens should be questioned.

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CHANGES IN SERUM LEPTIN LEVELS IN RESPONSE TO ACUTE CYCLE ERGOMETRY EXERCISE IN NON-OBESE, OBESE, AND POST-OBESE WOMEN.

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The purpose of this study was to determine whether an acute bout of cycle ergometry exercise typical of progressive fat oxidation would decrease serum leptin levels in healthy, but sedentary women of different fat morphologies and obesity histories. Five non-obese (NO) (mean age = 25.6 ± 3.5 (SE) yrs, mean body fat = 25 ± 2.78 (SE)%), 5 obese (O) (26.2 ± 2.81 yrs, 44.4 ± 1.75 %), and 5 post-obese (PO) (22.6 ± 1.03 yrs, 32.16 ± 3.04 %) women cycled for 60 minutes at ~60% peak $\dot{V}O_2$. PO women were weight stable for at least 8 weeks prior to experimentation. Dual energy x-ray absorptiometry (DEXA) was used to determine body composition. To identify the specific effects of exercise, a control trial consisting of 60 minutes of seated rest was also conducted. Exercise and control trials were counterbalanced one month apart in the follicular phase and conducted following a three day normalized, eucaloric diet. During both trials, two 10 minute breath by breath measurements of $\dot{V}O_2$ and RER were used to determine substrate oxidation. Blood samples were collected before and every 15 minutes during exercise. No significant differences in exercise fat oxidation were found between groups (NO, 9.12 ± 2.10 (SE) grams, O, 6.73 ± 2.56 grams, and PO 9.59 ± 1.48 grams). As expected, obese subjects had significantly higher serum leptin levels when compared to NO and PO subjects ($p < 0.0001$); however, no change over time in response to exercise was observed between the three groups ($p = 0.8755$). The results of this study suggest: 1) no differences in fat oxidation occur during an acute bout of exercise in women varying in fat morphologies and obesity histories, and 2) serum leptin levels in NO, O, and PO women are unaffected by an acute bout of exercise.

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EFFECTS OF PASSIVE CYCLE PEDALING MOVEMENT ON MINUTE VENTILATION

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Previous studies have demonstrated the relationship between passive movement and increases in certain ventilatory parameters. These studies focused on peripheral stretch receptors in the muscles. The purpose of this study was to examine the effects of a passive cycling movement on minute ventilation. Six college aged individuals, 3 males and 3 females, served as subjects. The mean weights of the males and females were 77.4 ± 5.9 kg and 60.8 ± 3.9 kg, respectively. Frequency (f) and minute ventilation (\dot{V}_E) were measured at rest (R), during passive cycling (P) and during no load cycling (NL) using a Monark cycle ergometer. Tidal volume (V_T) was calculated from \dot{V}_E and f . Passive cycling consisted of experimenters turning the pedals of the cycle while the subjects, with their feet attached to the pedals, provided no effort. No load cycling was accomplished with the cycle set at 0 KP. Subjects pedaled at 50 rpm for both conditions. Each subject was fitted with a mouthpiece, which was connected by tubing, to a Parkinson-Cowan CD4 dry gas meter. Following seat height adjustment, subjects were allowed 3-4 minutes to become accustomed to the condition prior to data collection. The order of P and NL conditions were counterbalanced. Data were collected at 1 min, 3 min, 5 min, 7 min, and 9 min. \dot{V}_E data were analyzed using repeated measures ANOVA and t-tests. There were no significant time or interaction effects ($p > .05$). There was a significant difference across conditions ($p < .05$). T-tests revealed significant differences between all pairs of treatment means with the $\bar{x} \pm \text{SE}$ of R, P, and NL being $8.0 \pm 0.9 \text{ L} \cdot \text{min}^{-1}$, $10.2 \pm 0.3 \text{ L} \cdot \text{min}^{-1}$ and $12.1 \pm 0.4 \text{ L} \cdot \text{min}^{-1}$, respectively. It was concluded that passive movement affects \dot{V}_E and this effect may be due to stimulation of the stretch receptors in the muscles.

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EFFECTS OF SIMPLE MOVEMENT ON VENTILATION BY USE OF THE HAND ERGOMETER

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It has been suggested that simply the movement of muscles will elicit an increase in ventilation. The purpose of this study was to examine the effects of passive arm movement on minute ventilation (V_E). Five college aged individuals, 3 males and 2 females, served as subjects. The mean weights of the males and females were 70.4 ± 8.4 kg and 53.9 ± 5.2 kg respectively. Frequency (f) and V_E were measured at rest (R), during passive arm movement (P), and during a no load arm movement (NL) using a Monark hand ergometer. Tidal Volume (V_T) was calculated from V_E and f . Passive arm movement consisted of having the testers turning the hand ergometer while the subjects, with their hands on the crank, provided no effort. No load arm movement was accomplished with the hand ergometer set at 0 KP. Subjects cranked at 50 rpm for both conditions. Each subject was fitted with a mouth piece, which was connected by tubing to a Parkinson-Cowen CD4 dry gas meter. Subjects were allowed 3-4 mins. to become acclimatized to each condition prior to data collection. The order of P and NL conditions were counter balanced. Data was collected at 1 min, 3 min, 5 min, 7 min, and 9 min, V_E data were analyzed using repeated measures analysis of variance and the paired t-test. There was no significant time or interaction effects ($p > .05$). There was a significant difference across conditions ($p < .05$). Paired t-tests revealed significant difference between all pairs of treatments with the $\bar{x} \pm SE$ of R, P, and NL being 5.9 ± 0.3 L \cdot min $^{-1}$, 7.7 ± 0.4 L \cdot min $^{-1}$, and 2.3 ± 0.5 L \cdot min $^{-1}$, respectively. It was concluded that passive movement affects V_E and this effect may be due to the stimulation of proprioceptors in the muscles.

INHIBITION OF MAXIMAL TORQUE PRODUCTION BY ACUTE STRETCHING IS JOINT-ANGLE SPECIFIC.

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Regimens of acute stretching inhibit maximal force production by the stretched muscle group (Kokkonen & Nelson, *MSSE* 28:S190; Fowles & Sale, *MSSE* 29:S26). To investigate one of the possible inhibitory mechanisms involved, the effects of an acute stretching regimen upon maximal dynamic (1.05 rad \cdot sec $^{-1}$) knee-extension torque, and maximal isometric knee-extension torque at 5 specific knee joint-angles (90°, 108°, 126°, 144° & 162°) were examined in thirty female and twenty-five male (19-25 y) volunteers. Each person's dominant leg maximal dynamic and isometric (five angles) knee-extension torques were measured on a Cybex-II dynamometer in a balanced random order at baseline and again immediately following 10 minutes of acute static stretching of the dominant leg quadriceps. Maximal dynamic torque was significantly reduced ($p < 0.05$) from 36.1 J to 33.8 J following stretching. Post-stretch maximal isometric torque at 162° was also significantly ($p < 0.05$) less (16.5 J vs. 15.2 J). All other angles remained unchanged ($p > 0.05$). The loss of isometric torque only at near full extension suggests that stretching altered initial sarcomere length, resulting in the muscle beginning work further down the ascending limb of the length:tension curve. Hence, part of the stretch induced inhibition might be due to stretching inducing a slackened condition in the muscle and tendon. This consequently causes the sarcomere to shorten more than normal in order for it to apply force to the bone.

EXERCISE TRAINING REDUCES MYOCARDIAL LIPID PEROXIDATION FOLLOWING SHORT-TERM ISCHEMIA-REPERFUSION

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These experiments tested the hypothesis that endurance exercise training will reduce myocardial lipid peroxidation following short-term ischemia and reperfusion (I-R). Female Sprague-Dawley rats (4 months old) were randomly assigned to either a sedentary control group (N=13) or to an exercise training group (N=13). The exercise trained animals ran 4 days/week (90 min/day) at ~75% of VO_2 max. Following a 10-wk training program, animals were anesthetized, mechanically ventilated, and the chest was opened by thoracotomy. Coronary occlusion was achieved by a ligature around the left coronary artery; occlusion was maintained for 5 min followed by a 10 min period of reperfusion. Myocardial antioxidant enzyme activities, heat shock protein 72 (HSP 72) relative content, and thiobarbituric acid-reactive substances (TBARS) were measured. Although training did not alter ($P > 0.05$) myocardial activities of antioxidant enzymes (superoxide dismutase and glutathione peroxidase), training was associated with four fold increases ($P < 0.05$) in HSP 72 in the left ventricle. Compared to control, trained animals exhibited significantly lower levels of myocardial lipid peroxidation ($P < 0.05$) following I-R. These data support the hypothesis that exercise training provides protection against myocardial lipid peroxidation induced by short-term I-R *in vivo*.

Supported by the American Heart Association-Florida Affiliate (AHA 9401243)

IMMOBILIZATION INDUCED ATROPHY IS ASSOCIATED WITH INCREASED OXIDATIVE STRESS

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The aim of this study was to investigate whether oxidative stress contributes to the development of atrophy in immobilized muscles. The hindlimbs of female Sprague Dawley (120 days old) rats were immobilized using hindlimb suspension for 14 days (n=6) and compared to active control animals (n=6). At the completion of the immobilization period all animals were euthanized and the soleus, plantaris and gastrocnemius muscles were removed, weighed and frozen for subsequent biochemical analysis. Hindlimb suspension resulted in significant ($p < 0.05$) decreases in the muscle mass to body mass ratio in the soleus (-49%) and gastrocnemius (-17%) but not in the plantaris. To determine the amount of radical-mediated oxidative damage lipid peroxidation was determined by measuring malandialdehyde levels using the TBARS spectrophotometric assay. Hindlimb suspension resulted in significant ($p < 0.05$) increases in TBARS in the soleus (+70%) but no significant changes in the plantaris and gastrocnemius muscles were found. These data suggest that immobilization induced atrophy of the soleus is associated with increased oxidative stress.

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BIORHYTHMICITY OF MAXIMAL MUSCLE PERFORMANCE AND SELECTED PHYSIOLOGICAL VARIABLES

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We have previously established that chronobiological influences can significantly alter physiological responses to maximal aerobic exercise, but not exercise performance itself. The purpose of the present study was to investigate whether maximal muscle performance, and selected physiological parameters displayed significant biorhythmicity during the segment of the day when exercise typically occurs. Ten healthy, but untrained males (21.1 ± 0.6 yrs, 181.7 ± 2.0 cm, 81.6 ± 3.3 kg; mean \pm SE) volunteered for this investigation. In a randomized sequence, each subject performed a protocol of maximal alternating concentric muscle actions of the knee extensors/flexors at 0800 h, 1200 h, 1600 h, and 2000 h on an isokinetic dynamometer. Each leg completed 5 repetition sets at 1.05, 1.57, and 2.09 rads/sec, and a set of 50 repetitions at 3.14 rads/sec. Performance variables measured were peak torque, total work, maximal work for 1 repetition, average power, and fatigue. Pre- and post-exercise rectal temperature, heart rate, blood pressure, and plasma lactate data were collected. Comparisons for each variable across the 4 time points were executed with 1 way repeated measures ANOVA, and when indicated, Fisher's PLSD post-hoc analysis. With the exception of fatigue, maximal muscle performance demonstrated time of day variation whereby performance improved from 0800 h to 2000 h. However, significant ($p < 0.05$) chronobiological effects were detected only at the greatest velocities of movement. Among physiological variables, pre- and post-exercise rectal temperature, and post-exercise blood pressure fluctuated significantly ($p < 0.05$) during the segment of the day studied. In conclusion, these data indicate that like rectal temperature and blood pressure, maximal muscle performance is sensitive to biorhythmic influences, but only at faster velocities of movement.

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THE RELATIONSHIP BETWEEN THE RATE OF TENSION DEVELOPMENT (RTD) OF THE QUADRICEPS MUSCLE GROUPS AND THE SPRINT START

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The sprint start requires that athletes produce large amounts of force and torque in a short time to propel themselves rapidly out of the starting blocks. High RTD in the lower extremities may be crucial for successful sprint starts. The purpose of the study was to identify the relationship between RTD and sprint start performance. It was hypothesized that a significant relationship would exist between these variables. Fifteen, elite 100 to 400 m sprinters (11 male, 4 female; mean age: 19.9 yr.) were tested. Reflective markers were placed on 11 joint centers and their positions were recorded by an infrared camera system (Qualisys Inc., Glastonbury, CT) for the first two strides. The kinematic data were used to calculate the center of mass velocity at the first and second steps out of the blocks. Each subject performed six sprint start trials and their 5 and 10 m times were also recorded electronically. RTD was acquired during two 5 s maximal isometric contractions on a Kin-Com dynamometer (Chattecx Corp., Hixson, TN). RTD was the ratio of maximum knee extensor torque to the time from the start of contraction to the maximum torque. Results of four Pearson Product Moment Correlations were: RTD of the front limb in the blocks versus the velocity of the center of mass at the first step ($r = -0.528$), mean RTD of the left and right limbs versus the velocity of the center of mass at the second step ($r = -0.153$), mean RTD of both limbs and the 5 m ($r = -0.067$), and 10 m ($r = -0.326$) times. No significant correlations were obtained between RTD of the quadriceps during an isometric contraction and the selected aspects of the sprint start.

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Supported by the LeRoy T. Walker International Human Performance Center, the Division of Academic Affairs of East Carolina University and the State of North Carolina

NECK AFFERENTS AND MUSCLE SYMPATHETIC NERVE ACTIVITY: IMPLICATIONS FOR THE VESTIBULOSYMPATHETIC REFELEX

We have recently shown that head-down neck flexion (HDNF) elicits an increase in muscle sympathetic nerve activity (MSNA) and calf vascular resistance (CVR) in humans. We believe these responses are mediated by the activation of the vestibular system, in particular the otolith organs. To further test our hypothesis we addressed the following questions: 1) Do head positions which do not engage the otolith organs result in increased MSNA and CVR?; and 2) Do neck afferents play a role in the increase in MSNA and CVR observed during HDNF? To test these questions we measured MSNA in the leg before and during 3 min of head rotation to the side (~90° horizontal plane) and during neck flexion in the lateral decubitus position. Head rotation in the horizontal plane allows the head to be moved without stimulating the otolith organs but does allow for the study of neck muscle afferents. Neck flexion in the lateral decubitus position allows neck muscle afferents to be studied in a position that mimics HDNF but unlike HDNF does not change head orientation with respect to gravity. Head rotation (n = 11) did not elicit changes in MSNA. MSNA, expressed as burst frequency and total activity, was 13 ± 1 and 13 ± 1 burst/min and 146 ± 34 and $132 \pm$ units/min during baseline and head rotation, respectively. There was no significant change in CVR (39 ± 4 to 41 ± 4 units; n = 8). MSNA was unchanged during neck flexion in the lateral decubitus position (n = 5). HDNF was tested in 9 of the subjects. MSNA increased by $79 \pm 12\%$ (p < 0.001) during HDNF. These findings indicate that: 1) head positions which do not stimulate the otolith organs do not increase MSNA; and 2) neck afferents in normal positions do not elicit changes in MSNA. These results further support the concept that HDNF increase MSNA and CVR by activation of the vestibular system.

Supported by N. I. H. Award AR44571

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MUSCLE SYMPATHETIC NERVE ACTIVITY INCREASES WITH GRADED NECK EXERCISE

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The purpose of the present study was to examine muscle sympathetic nerve activity (MSNA) during graded neck exercise. MSNA was measured in seven healthy subjects while performing isometric neck extension in the prone position. After a 3 min baseline period, subjects performed three intensities of isometric neck extension for 2.5 min: 1) unloaded, 2) 10% maximal voluntary contraction (MVC), and 3) 30% MVC. MSNA was recorded from either the tibial or popliteal nerve using the microneurographic technique. Mean arterial pressure (MAP) and heart rate were measured continuously using a Finapres blood pressure monitoring unit. There was a significant interaction for all variables across intensities. The results are as follows (*p < 0.05 vs. unloaded; †p < 0.05 vs. 10%):

Variable	Intensity	Time				
		Baseline	60 s	90 s	120 s	150 s
MAP (mmHg)	unloaded	101±5	102±5	102±6	101±6	101±6
	10%	101±5	106±5	109±5*	109±5*	112±5*
	30%	103±5	115±5**	122±6**	127±5**	132±4**
Heart rate (bpm)	unloaded	64±4	67±4	65±4	64±4	66±4
	10%	64±4	67±4	68±4	70±4*	70±4*
	30%	65±5	75±3**	78±3**	82±3**	84±4**
MSNA (units)	unloaded	69±19	101±31	114±26	77±18	78±26
	10%	71±19	112±21*	112±23	149±29*	133±27*
	30%	68±16	180±38**	177±40**	244±26**	236±21**

The data indicate that neck muscles can significantly augment MAP, HR, and MSNA. These results are the first to demonstrate that neck muscles can elicit marked increases in MSNA in humans.

Supported by N. I. H. Award AR44571

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FEMORAL NECK, LUMBAR SPINE AND WHOLE BODY BONE MINERAL DENSITY CHANGES IN COLLEGIATE FEMALE ATHLETES

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Regular physical activity may help prevent osteoporosis by maximizing peak bone mass and reducing the loss of bone mineral with age. To examine the role of various exercise training regimens on bone mineral density (BMD), longitudinal changes in femoral neck (FN), lumbar spine (LS), and whole body (WB) BMD were monitored (by DXA) in collegiate female athletes whose skeletons were exposed to differential loading patterns. Three groups of athletes (track, n=10; volleyball, n=4; soccer, n=7) and a control group (n=6), from an original subject pool of 50, completed a 17.0±0.9 month observation period. Mean age of all subjects at baseline was 20.0±1.4 years. Athletes had been training specifically for their sport at least 3 years (mean=7.4±3.1 yr), and averaged 18.6±6.5 hr/wk of training. The % change in BMD at the FN and WB were not significantly different among groups (p>0.05). The % change in LS BMD was significantly different among groups (p<0.05); the soccer players were significantly different compared to track, volleyball and controls, and when compared to zero (i.e., no change). The % change in FN BMD was significantly different compared to zero for track and control subjects. The % change in WB BMD did not differ compared to zero in any group.

	Track	Soccer	Volleyball	Controls
% change FN BMD	-4.1±3.8#	-3.0±3.6	-3.2±3.6	-4.1±2.6#
% change LS BMD*	0.6±2.2	3.2±3.2#	-0.8±1.5	0.2±1.5
% change WB BMD	0.2±1.1	1.3±2.1	0.2±1.8	-0.1±1.2

* significant differences among groups (p<0.05); # significant differences compared to zero. There were no significant group differences for changes in body composition, although control subjects gained significant weight and fat mass when compared to zero; no group had a significant change in lean body mass. The % change in WB BMD was related to change in weight (R²=0.15, p<0.05) and change in lean mass (R²=0.26, p<0.01). The % change in FN BMD was related to change in lean mass (R²=0.16, p<0.05) and total training hr/wk (R²=0.30, p=0.01). The % change in LS BMD was related to total training hr/wk (R²=0.26, p<0.05). These results indicate that changes in bone mass appear to be site-specific, and vary depending on specific training and mechanical loading characteristics of the different athletic groups.

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INFLUENCE OF CARBOHYDRATE ON THE HORMONAL RESPONSE TO 2.5 HOURS OF RUNNING AND CYCLING IN TRIATHLETES

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The purpose of this study was to investigate the influence of exercise mode and 6% carbohydrate (C) versus placebo (P) beverage ingestion on the plasma glucose and hormonal responses to 2.5 h of running and cycling at $\sim 75\% \text{VO}_{2\text{max}}$. Ten triathletes acting as their own controls participated in the double-blind, random-order study (4 sessions over 4-6 wks). The triathletes consumed 12 ml/kg body mass of C or P beverage 15 min prior to exercise, and 4 ml/kg carbohydrate or placebo every 15 min of the 2.5 h exercise bout. Percent $\text{VO}_{2\text{max}}$, $\% \text{HR}_{\text{max}}$, respiratory rate, and ending lactate values did not differ significantly between any of the 4 test sessions indicating similar relative workloads. Plasma glucose [$F(2,18)=11.29$, $P<0.001$] and insulin concentrations [$F(2,18)=4.32$, $P=0.029$] were lower in P versus C conditions immediately post-exercise, but did not vary between test modes. The pattern of change in plasma cortisol was significantly different between P and C conditions [$F(4,36)=4.74$, $P=0.004$] (but not modes), with values higher in P during most of recovery. The pattern of change in plasma growth hormone was significantly different between P and C conditions [$F(4,36)=6.61$, $P<0.001$] (but not modes), highlighted by significantly higher values in P immediately post-exercise. The pattern of change in plasma catecholamines did not differ between P and C. In summary, C relative to P ingestion before, during, and after 2.5 h of intensive exercise was associated with higher plasma levels of glucose and insulin, lower plasma cortisol and growth hormone, and no difference in epinephrine levels.

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Supported by a grant from the Gatorade Sports Science Institute

INFLUENCE OF PHYSICAL ACTIVITY AND AEROBIC POWER ON CARDIOVASCULAR DISEASE RISK FACTORS

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The purpose of this study was to determine the relationship between aerobic power ($\text{VO}_{2\text{max}}$), physical activity (PA) and cardiovascular disease (CVD) risk factors. The study also determined how improvements in $\text{VO}_{2\text{max}}$ and increased PA levels influence CVD risk factors of 576 low-fit adults ($\text{VO}_{2\text{max}} < 30 \text{ ml/kg/min}$). PA (Baeke questionnaire) and $\text{VO}_{2\text{max}}$ (submaximal cycle test) of 1664 law enforcement trainees were evaluated with respect to the CVD risk factors of total cholesterol, blood pressure [BP], smoking and obesity using separate logistic regression, adjusting for age, gender and the other major CVD risk factors. Compared to the lowest tertile of $\text{VO}_{2\text{max}}$, the highest tertile was found to have a reduction in relative risk (RR) for elevated cholesterol (RR 0.56; 95% CI 0.36-0.43), BP (RR 0.32; 95% CI 0.15-0.62) and obesity (RR 0.09; 95% CI 0.06-0.12). The middle tertile of $\text{VO}_{2\text{max}}$ compared to the lowest had reduced in RR for elevated diastolic BP (RR 0.44; 95% CI 0.23-0.66) and obesity (RR 0.38; 95% CI 0.28-0.50). Moving from the low to high levels of PA caused significantly lower RR for high systolic BP (RR 0.48; 95% CI 0.23-0.95). Moving from either the low PA to moderate or moderate to high resulted in no significant change in any of the RRs ($p>0.05$). Participation in a 9-week aerobic exercise program by low-fit individuals resulted in a significant 9% increase in PA levels; however, only those subjects who improved $\text{VO}_{2\text{max}}$ had a significant reduction in RR for high cholesterol (RR 0.62; 95% CI 0.42-0.92) and systolic BP (RR 0.57; 95% CI 0.40-0.80). No significant change in RRs were noted for diastolic BP or obesity. The results of these studies indicate that aerobic power has more of an effect on CVD risk factors than PA levels. Furthermore, in low-fit persons, it appears that only PA that increases aerobic power is associated with a reduction in CVD risk factors of cholesterol and blood pressure.

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Supported by grant #R48/CCR402177 from the Center for Disease Control and Prevention

COMPARISON OF THE ACCURACY OF AUTOMATED COMMERCIAL BLOOD PRESSURE MONITORS TO A MERCURY MANOMETER.

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The objective of this study was to compare the accuracy of automated commercial blood pressure monitors to a mercury manometer measured by two trained technicians. The automated commercial blood pressure monitors described here are routinely found in the pharmacy sections of grocery stores and drug stores. All subjects were seated during blood pressure measurement. Thirty-five subjects were recruited and screened prior to participate in this study, with each subject visiting six randomly selected stores outfitted with similar blood pressure monitors. After the subjects rested quietly, blood pressure was taken simultaneously by the machine (left arm) and by two trained technicians (right arm). The technicians used a dual-headed stethoscope with a mercury manometer. There was no significant difference for systolic blood pressure between the machines and investigators (machine; mean \pm SD, mmHg; 117.0 ± 12.7 , investigator 1; 117.8 ± 12.9 , investigator 2; 114.7 ± 12.4). There was a significant difference for diastolic blood pressure between the machines and investigators (machine; mean \pm SD, mmHg; 68.7 ± 29.4 , investigator 1; 74.6 ± 9.9 , investigator 2; 73.9 ± 9.6 , $p<0.05$). These results suggest that automated commercial blood pressure monitors tend to significantly underestimate diastolic blood pressure and correctly assess systolic blood pressure.

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EXERCISE MODE IS RELATED TO ACTIVITY LEVEL AND STAGE OF EXERCISE ADOPTION

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Activity patterns, including activity level (AL), exercise frequency (FQ), exercise duration (DR), exercise mode (MO), and stage of exercise adoption (STAGE) were investigated in 100 students (n = 74 females) at one historically African American university. Exercise intensity (IN) was estimated by classifying MO by METS. Although mean FQ and DR did not differ significantly by gender, mean IN was significantly higher for males ($t = -2.48, p < .05$). IN was significantly related to AL, FQ, STAGE, and DR ($r = .72, .66, .63, \text{ and } .5; p < .05$). Subjects reporting participation at the pre-contemplation, contemplation, preparation, action, and maintenance stages of exercise adoption were as follows: 1, 14, 22, 40, and 23 respectively. Although 51 subjects reported exercising vigorously three or more times weekly, 29 subjects reported no vigorous exercise. Subjects were asked to rank reasons they exercised. Weight control was indicated most frequently as the most important reason for exercising, followed by muscle tone, muscle strength, and enjoyment (n=29, 17, 11, 10). Subjects were also asked to indicate in which activities they participate and which activities they would like to try or to work on from a list of 20 activities. Fitness/exercise walking and free weights were reported most frequently as activities in which subjects participated (n=46, 41). Further study is suggested to explore population-specific strategies, including distinctive MO, to attract and retain individuals at each STAGE in university and other settings.

A CROSS-SECTIONAL STUDY OF CHD RISK FACTORS AS DETERMINED DURING CORPORATE HEALTH SCREENINGS IN MIDDLE TENNESSEE

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This study examined the prevalence of CHD risk factors in 3,646 individuals in middle Tennessee from January 1995 to December 1995. The contributing factors to CHD that were examined included: smoking status, blood pressure, blood lipids, fitness status, nutrition status, blood glucose, and obesity. Males were found to be at greater risk than females based upon results for total cholesterol, LDL, HDL, total cholesterol/HDL Ratio, Triglycerides, glucose, systolic and diastolic blood pressure. A higher percentage of ex- and current smokers were seen in the male group. Men and women exhibited similar fitness profiles, as well as, nutritional profiles. The results indicate that the males in this study are at a greater risk for the development of CHD. The total sample was compared to national standards with these results indicating that Middle Tennesseans do not meet the standards in the following risk factors: total cholesterol, TC/HDL, %fat for males, %fat for females, BMI for males, smoking and inactivity.

RELATIONSHIP BETWEEN PARENTS' AND CHILDREN'S PERCEPTIONS OF PHYSICAL ACTIVITY BEHAVIOR

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Parents' level of activity may be one determinant of physical activity in children. The purposes of this study were to examine (a) the relationship between children's and parents' perceptions of parents' level of activity and (b) whether children's perceptions of their parents' activity habits were related to physical activity levels in children. Children (N = 201) were administered a questionnaire that consisted of several measures of physical activity, including the Godin-Shephard (1985) scale and selected questions from the Youth Risk Behavior Survey. A questionnaire designed to measure the parents' activity levels and their perceptions of their child's activity level was sent to parents. Seventy-seven percent (N = 154) of parental questionnaires were returned. Perceptions of the parents' level of activity were categorized as "more active," "the same," or "less active" than someone their same age and gender. Only 50% of children had ratings similar to their parent's ratings. Thirty-one percent of children overestimated their parent's rating of activity and 19% underestimated their parent's rating of activity. Analysis of variance was used to test differences in exercise habits of children among the following categories of perceived parental exercise: (a) both parents perceived as "more active," (b) either father or mother perceived as "more active," and (c) both parents perceived as "less active." A meaningful difference was observed between the both parents more active and both parents less active groups (Cohen's $d = .61$), with the children of two active parents displaying higher physical activity levels (mean = 80.5 ± 24.6 units) than children of two inactive parents (mean = 64.5 ± 29.6 units). Although children's perceptions of their parents' physical activity levels are not highly accurate, these perceptions nonetheless appear to influence children's physical activity behavior.

Supported by Research/Creative Activity Grant #96-RD-43, East Carolina University

EVALUATION OF THE BODPOD® FOR ASSESSING BODY COMPOSITION IN BLACK AND WHITE FOOTBALL ATHLETES

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The purpose of the study was to determine how race affects the accuracy of an air displacement plethysmograph (BODPOD® Body Composition System- BP) compared to hydrostatic weighing (HW) to assess body composition in 69 Division IA collegiate football players. Thirty-two subjects were Caucasian (C) and 37 were African American (AA). Subjects (mean \pm SD age = 19.5 ± 1.1 y; ht = 186.3 ± 5.7 cm; wt = 102.8 ± 18.6 kg) completed the HW with simultaneous assessment of residual lung volume and BP on the same day. Percentage body fat was calculated using the Siri equation for both C and AA and the Schutte equation in AA. In C, mean (\pm SE) body fatness determined via BP ($17.5 \pm 1.2\%$) was significantly lower ($p < 0.05$) than for HW ($20.1 \pm 1.0\%$). In AA, mean % fat via BP ($12.9 \pm 1.0\%$) was lower than for HW ($14.4 \pm 1.0\%$) when using the Siri equation. However, there was a significant race \times test interaction when the Schutte equation was used in the AA. Using Schutte, the mean differential between BP and HW for AA was $1.3 \pm 0.3\%$ compared to $2.5 \pm 0.4\%$ for C (when using Siri). These results suggest that the use of the Schutte equation in AA football athletes improves the agreement between BP and HW in that population. Further studies on BP are needed with other criterion references in various populations before additional conclusions regarding accuracy can be made.

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COMPARISON BETWEEN AIR DISPLACEMENT PLETHYSMOGRAPHY, HYDROSTATIC WEIGHING, DUAL-ENERGY X-RAY ABSORPTIOMETRY, AND A THREE-COMPONENT MODEL FOR DETERMINING BODY FAT IN ATHLETIC MEN

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The purpose of this investigation was to compare air displacement plethysmography, BOD POD® Body Composition System, to hydrostatic weighing (HW), dual-energy X-ray absorptiometry (DXA), and a 3-Component model for determining body composition. Twenty Division IA football players (mean \pm SD age = 19.6 ± 1.1 yrs; height = 182.6 ± 5.4 cm; mass = 90.8 ± 13.0 kg) gave written consent to participate in the study. Body fatness was assessed on the same day using the BOD POD and HW with simultaneous measurement of residual lung volume. In addition, whole body scans were performed using a Lunar DPX-L DXA (software version 1.3Z, medium mode, $3000\mu\text{A}$) to assess total body bone mineral content and % fat. Bone mineral content and HW determined body density were used to compute body fatness based on a 3-Component model (fat, mineral, residual). The data were analyzed using a single factor ANOVA with repeated measures and Tukey *post hoc* tests. Mean (\pm SEM) body fatness scores determined with the BOD POD ($10.9 \pm 1.0\%$) were significantly lower ($p < .05$) than those found for HW ($13.3 \pm 0.9\%$), DXA ($12.9 \pm 1.2\%$), and the 3-Component model ($12.7 \pm 0.8\%$). The respective linear regression equations were as follows: % FAT_{HW} = $4.80 + \% \text{ FAT}_{\text{BOD POD}}(0.783)$, $r^2 = .80$, SEE = 1.9%; % FAT_{DXA} = $1.77 + \% \text{ FAT}_{\text{BOD POD}}(1.024)$, $r^2 = .80$, SEE = 2.4%; % FAT_{3-Component} = $5.61 + \% \text{ FAT}_{\text{BOD POD}}(0.653)$, $r^2 = .64$, SEE = 2.4%. For $\approx 50\%$ of the subjects, %fat values from the BOD POD were within ± 2 percentage points of those values from the three criterion methods. In conclusion, body fatness assessed using the BOD POD yielded scores that were lower than HW, DXA, and the 3-Component model determined values.

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BODY COMPOSITION USING A FOUR-COMPONENT MODEL: ACCURACY AND INFLUENCE OF BODY WATER ESTIMATES

Estimation of body composition using a four-component model (fat, water, protein or mineral) is more accurate than estimation from densitometry because variation in the water and mineral fractions of the fat-free mass (FFM) are measured and not assumed to be constant. However, the use of isotope dilution to assess body water requires expensive tracers and assays, and inconveniences the subject. The purpose of this study was to determine if estimation of total body water (TBW) from bioelectrical impedance analysis (BIA) was an acceptable alternative to measurement by deuterium (D_2O) dilution when utilizing a four-component model for body composition assessment (%Fat_{4c-BIA} vs %Fat_{4c-D2O}). Measures of body density by hydrostatic weighing, TBW by BIA and D_2O dilution, and bone mineral by dual-energy x-ray absorptiometry (DXA) were obtained in 21 adults. TBW was estimated from BIA resistance (RJL analyzer) using the equation of Kushner and Schoeller (1986). Body fat was estimated using the four-component model modified from Lohman (1986). There was a strong relation between TBW estimated by BIA and D_2O ($r = 0.93$, SEE = 4.6 L) with no significant difference between estimates ($\bar{x}_{\text{diff}} = 0.70 \pm 4.8$ L, $P > 0.05$). Likewise, there was a strong relation between %Fat_{4c-BIA} and %Fat_{4c-D2O} ($r = 0.91$, SEE = 4.5%), with no significant difference between %Fat estimates ($\bar{x}_{\text{diff}} = 1.0 \pm 4.4\%$, $P > 0.05$). Individual differences between %Fat_{4c-BIA} and %Fat_{4c-D2O} were large, however, ranging -7.9 to 9.1%. We conclude that the mean %Fat_{4c-BIA} for a group is accurate; however, measurement of TBW using D_2O dilution is needed for accurate individual body fat estimates using a four-component model.

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USE OF THE LEG-TO-LEG BIOELECTRICAL IMPEDANCE METHOD IN ASSESSING BODY COMPOSITION CHANGES IN OBESE WOMEN

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69 The purpose of this study was to determine the validity of the leg-to-leg bioelectrical impedance (BIA) system (TANITA Body Fat Analyzer-Model TBF 105, TANITA Corporation of America, Inc.; Skokie, Illinois) as a method of estimating body composition (BC) changes when compared to hydrostatic weighing (HW) in an obese population. Subjects included 102 moderately obese females (43.2±0.6% fat, 44.9±1.1 yr.) and 31 age matched non-obese controls (24.0±1.5% fat, 43.3±2.2 yr.). The obese subjects were randomly divided into 1 of 4 groups, with BC measurements made pre- and post-12 week intervention: diet (D) (1,200-1,300 Kcal/day), exercise (E) (five 45 min sessions/wk at 78.5±0.5% max HR), both exercise and diet (ED) and controls (C) (no diet or exercise). Fat-free mass (FFM) and percent body fat (%BF) were estimated from BIA and HW. For all subjects combined, the estimation of %BF from BIA and HW were highly correlated ($r=0.88$, $p<0.001$). Mean values of estimated %BF for all obese subjects were significantly different between HW and BIA (43.2±0.6% and 49.9±0.9%, $p<0.001$), respectively. When comparing the reduction in %BF across time between HW and BIA in the D group, a significant difference was reported ($p<0.004$). In summary, cross-sectionally a high correlation was found between the leg-to-leg BIA system and HW in estimating %BF; however, BIA tended to overestimate %BF in obese women by 6.7±1.3%. In addition, the leg-to-leg BIA system tended to overestimate the changes in %BF and FM and underestimate changes in FFM across time in a dieting obese female population.

Supported by the Cybex Research Grant from the ACSM Foundation

70 BODY COMPOSITION OF OBESE WOMEN ASSESSED USING A FOUR-COMPONENT MODEL

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Densitometry, long considered the most valid laboratory body composition assessment method based on a two-component model, assumes that the density of the FFM is 1.100 g/ml, which, in turn, is based on the assumption that the relative proportions and densities of its water, mineral, and protein constituents are uniform across individuals. The purpose of this study was to determine whether the assumed density and composition of the fat-free mass (FFM), and estimates of percent fat (%Fat) from body density using the Siri equation (%Fat_s), are valid in obese women. Measures of body density by underwater weighing (D_w), body water by bioelectrical impedance, and bone mineral by whole body dual-energy X-ray absorptiometry were obtained in 70 obese women (BMI; M±SD = 33.8± 6.0 kg/m²). %Fat_s was significantly lower ($P < 0.05$) than %Fat estimated from body density, water and mineral (%Fat_{d,w,m}) by use of a four-component model in obese women (43.1± 6.2 vs. 43.9 ± 5.0%), but the mean difference was too small to be meaningful. The discrepancy between %Fat_s and %Fat_{d,w,m} was explained by slightly higher density of the FFM (D_{ffm}) (1.102 ± 0.011 g/ml) than 1.10 g/ml assumed and lower water fraction of the FFM (72.1 ± 3.6%) than the 73.8% assumed by the Siri equation. There was a strong relation between %Fat_s and %Fat_{d,w,m} ($r = 0.92$, SEE = 1.9%). We conclude that in obese women, the density and composition of the FFM are similar to values assumed, and estimates of %Fat from body density are quite accurate.

Supported by a Grant from Life Fitness Academy.

71 A CARDIOVASCULAR FITNESS AND RISK FACTOR PROFILE OF REGISTERED AND LICENSED PRACTICAL NURSES WITHIN A REGION

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The subjects consisted of forty-nine registered (10 male[M], 39 female [F]) and eight licensed practical nurses (7F & 1M) in southwest Georgia. Each subject (mean age 33 ± 10) was briefed on the research parameters and submitted their written consent. An independent survey instrument was constructed to assess each subject's health history. Seven individuals were excluded from the stress testing for medical reasons. Resting blood pressure was recorded via left arm auscultation in the standing position. Heart rate was monitored by cardiac telemetry. Fifty subjects (9M & 41F) performed a treadmill test utilizing the Bruce protocol. The stress test was terminated at 85% of the subject's age predicted maximal heart rate. Functional capacity with handrail support was calculated using a validated equation ($VO_2 = 2.282 \times \text{time in minutes} + 8.545$). Each subject's peak oxygen consumption was then extrapolated by increasing the peak MET level (77% VO_{2max}) by an additional twenty-three percent (± 8% margin of error). Mean body mass index was 29.9 (± 9.1) kg/m². Mean systolic blood pressure was 122 (±14) mmHg and the diastolic was 81 (± 9) mmHg. The mean peak oxygen consumption was 28.4 (± 8.1) ml/kg/min⁻¹. Forty-two (74%) of the subjects did not engage in aerobic exercise (≥3 d/wk); eleven (19%) currently smoke and twenty (35%) have a family history of coronary heart disease. The data seems to support the need for preventative lifestyle modifications regarding coronary heart disease.

In Conjunction with Valdosta State University

EXERCISE AND ITS IMPACT ON QUALITY OF LIFE IN AFRICAN AMERICAN WOMEN

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Physical inactivity contributes to many of the chronic diseases seen in African American patients and is particularly prevalent in those of low socioeconomic status. Little research has focused on the benefits of physical activity in this high risk population. To address this research gap, we conducted a twelve week randomized, controlled trial to assess the impact of moderate physical activity training on sedentary African American patients in a primary care setting. The exercise intervention group (n=23) received low impact aerobic exercise and behavior modification training once a week in a group setting while the control group (n=21) received a weekly general health education class. Physical activity was measured by a self report questionnaire that assessed stage of readiness. The preliminary results at an alpha level = to 0.10 show, that when compared to the control group 80% more people in the exercise group moved forward in their self reported physical activity stage compared to only 50% in the control group (p=.09). Individuals in the exercise group did show a small trend in improvements in self reported "Quality of Life" - general and mental health scores as measured on the validated Medical Outcomes Study Short Form-36™ Health Survey. Change in stage of readiness for physical activity and quality of life scores were in a positive direction. This intervention may hold promise with an adequately powered sample.

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IMPROVEMENTS IN REACTION TIME OF PARKINSON'S PATIENTS FOLLOWING AEROBIC EXERCISE INTERVENTION.

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Aerobic exercise has been shown to play a significant role in the prevention and reversibility of chronic diseases such as coronary heart disease, diabetes, and osteoporosis; however, there is very little evidence on the effects of aerobic exercise on Parkinson's disease (PD). Since the nigrostriatal dopaminergic system has been associated with the pathology of PD, and a number of studies have documented that brain levels of monoamine neurotransmitters are influenced by exercise, the purpose of this study was to determine if aerobic exercise might affect a measurable component of muscle coordination for PD patients. Thus 4 PD subjects, ages 47-74 (Stage II - Hoehn & Yahr scale) were pre-tested for reaction time (RT) of elbow flexion and extension under both simple and choice paradigms. The 4 subjects then participated in a 16 week aerobic exercise intervention consisting of cycling and walking, and then were post-tested on RT to analyze for effect of intervention. The results showed a significant change, as the 4 PD subjects improved their choice RT scores from 532 ms to 415 ms, and increased the speed of simple RT scores from 285 ms to 261 ms. The pre-test scores were similar to 4 other random PD subjects that scored 307 ms for simple RT and 527 ms for choice RT. The post-test scores for the treatment group were comparable to 6 age matched normal healthy non-exercising adults, who averaged 222 ms for simple RT and 409 ms for choice RT. The results indicate that aerobic exercise may reduce the detrimental effects of neuromuscular slowing within PD patients, by improving the subjects ability to initiate and perform appropriate movement patterns. The physiological mechanisms involved in facilitation of the appropriate neuromotor pathway for RT may be related to enhanced levels of cerebral blood flow, brain metabolism, and neurotransmitters, as a result of the exercise.

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EXERCISE AND TUMOR DEVELOPMENT IN A MUTANT MOUSE PREDISPOSED TO MULTIPLE INTESTINAL ADENOMAS.

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Substantial epidemiological evidence suggests that physical activity may have a protective effect against the development of colon cancer. Potential mechanisms remain largely unexplored due to the paucity of appropriate experimental models. The purpose of this study was to examine exercise effects on polyp development in an induced mutant mouse which is predisposed to multiple intestinal neoplasia (Min mouse). Three wk old male and female heterozygotes were randomly assigned to control (CON, n=16) or exercise (EX, n=22) groups. During week one, EX mice were acclimated to treadmill running from 15-60 min/day at 10-18 m/min. From 4-10 wks of age, mice ran at 18-21 m/min for 60 min. CON mice sat in plexiglass lanes suspended above the treadmill for the same time periods. At 10 wks of age, mice were sacrificed, the intestines removed, opened, and counted for polyps. There were no significant differences in total intestinal polyps between groups (CON, 37.2 ± 3.7; EX, 32.9 ± 3.9, x ± SE, p=0.44). A training effect was demonstrated in EX mice as assessed by increased citrate synthase in the gastroc/soleus (CON, 25.1 ± 3.2; EX, 41.2 ± 3.5 mmol/g/min, x ± SE, N=10, p=0.009). These preliminary results suggest that seven weeks of exercise training does not affect the development of intestinal polyps in the Min mouse. Further studies are required to determine if longer training periods could affect other tumor outcomes including regression of the polyps.

Supported by an ACSM Foundation award and the Manning Foundation.

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FUEL OXIDATION AND SUBSTRATE RESPONSES IN NON-OBESE BLACK AND WHITE FEMALES DURING EXERCISE

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Seven black and ten white females exercised after a 12-hour fast to compare fuel oxidation and substrate responses during 45 minutes of exercise. Black females averaged 25.8 yrs old, and 25.3 % body fat. White females were 26.9 yrs. old and 26.8 % body fat. T-tests revealed no significant biometric differences ($p > 0.05$) between groups. VO_{2max} for the black females (30.7 ± 5.4 ml/kg/min) was significantly lower than for white females (36.1 ± 3.5 ml/kg/min). VO_2 and RER were determined by indirect calorimetry. Venous blood specimens were drawn at rest and exercise mins 15, 30, and 45 from an indwelling cannula. Data for RER, glucose, FFA, glycerol and FFA/glycerol ratios were analyzed using ANCOVA with VO_{2max} as a covariant. No significant group differences were observed for RER, FFA, or FFA/glycerol ratios. A significant covariant effect of VO_{2max} ($F=6.09, p=.03$) and a significant group effect ($F= 5.93, p=.03$) was observed for blood glucose levels. Controlling for the effect of VO_{2max} , corrected glucose values were 93.7 ± 3.4 mg/dL vs 106 ± 2.9 mg/dL, respectively. The black and white females of this study displayed similar patterns of response for substrate oxidation throughout exercise.

SHORT-TERM TRAINING WITHOUT WEIGHT LOSS IMPROVES GLUCOSE TOLERANCE IN OBESE MALES WITH ABNORMAL GLUCOSE TOLERANCE.

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The purpose of this study was to determine the effects of short-term exercise on responses to an oral glucose challenge (OGTT) in males with android obesity and abnormal glucose tolerance. Six centrally obese men (experimental group; E) with abnormal glucose tolerance participated in a 10 d exercise training period. Their characteristics were as follows: [mean (SE): Mass 111.3 (4.7) kg; BMI 36.0 (1.4) $kg.m^{-2}$; WHR 1.01 (0.02); age 36.2 (3.8) years]. Six other volunteers with android obesity but normal glucose tolerance also participated in the 10 d exercise program (control group; C). Their characteristics were as follows: [mean (SE): Mass 109.6 (6.2) kg; BMI 34.3 (2.0) $kg.m^{-2}$; WHR 0.99 (0.02); age 36.3 (3.8) years]. Subjects in the E and C groups were matched according to their ages. We measured glucose tolerance and insulin response to a glucose load before and after 10 d of exercise in both groups using the traditional 2 h OGTT. Exercise bouts were 40 min. in duration and consisted of treadmill walking at $\sim 75\%$ AP HR_{max} . Three day dietary recalls were used to evaluate the subjects' diets during the exercise period. Average daily caloric intake was as follows [E: 2898 kcal.d⁻¹ (41% CHO, 43% fat, 16% protein); C: 2982 kcal.d⁻¹ (43% CHO, 39% fat, 18% protein)]. No significant change in weight was observed ($p > 0.05$) in either group as a result of 10 d of exercise [E: 111.2 kg (4.3) vs. 111.3 kg (3.94); C: 109.2 kg (6.0) vs. 109.1 kg (6.0)]. No significant change ($p > 0.05$) in fasting glucose was observed in the E group following 10 d of exercise training as compared to pre-exercise values [Glucose: (163 (32.2) $mg.dl^{-1}$ vs. 167.2 (37.2) $mg.dl^{-1}$]. A significant change in fasting plasma glucose, however, was observed following training in the C group when comparing pre-training to post-training values [Glucose: (103.8 (4.3) $mg.dl^{-1}$ vs. 95.7 (3.2) $mg.dl^{-1}$]. The area under the glucose curve during the OGTT was not significantly changed ($p > 0.05$) in the C group following 10 d of exercise as compared to pre-exercise [Glucose area: (17,307.5 (772.1) $mg.dl^{-1}.120$ min.⁻¹ vs. 16,587.5(865.4) $mg.dl^{-1}.120$ min.⁻¹)]. The area under the glucose curve during the OGTT, however, decreased significantly ($p < 0.05$) following the 10 d of training as compared to pre-participation in the E group. [Glucose area: (32,540 (5,370.4) $mg.dl^{-1}.120$ min.⁻¹ vs. 31,247.5 (5,571.6) $mg.dl^{-1}.120$ min.⁻¹)]. The data suggests that short-term exercise without concomitant weight-loss was effective in improving glucose responses to an oral glucose challenge in obese male subjects with abnormal glucose tolerance.

CHANGES IN MEAN ARTERIAL PRESSURE FOLLOWING RESISTANCE TRAINING IN PHASE III AND IV CARDIAC REHABILITATION PATIENTS

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The purpose was to determine the effect of resistance training (RTr) on mean arterial pressure at rest (MAP_{rest}). Four men and three women (age: 54 ± 2 yrs) enrolled in phase iii/iv cardiac rehab, participated in a 12-week RTr program of 12 exercise stations to include all major muscle groups. Participants exercised 2d/wk, performing 2 sets of 12-20 reps, at a moderate intensity. Prior to and following RTr, strength was assessed on each exercise station and blood pressures obtained using standard procedures. Strength on all exercise stations increased significantly ranging from 23.3% on leg extension to 75.8% on the low back extension ($p=0.05$). Furthermore, MAP_{rest} dropped from 88 ± 11 mmHg to 81 ± 8 mmHg after Rtr ($p=0.05$). No significant correlation was noted between changes in MAP_{rest} and the change in strength on each individual exercise station. In contrast, when changes in strength on all exercise stations were combined, a significant correlation was found with the changes in MAP_{rest} (see Table). In conclusion, the magnitude of the reduction in MAP_{rest} is inversely related to whole-body strength gains, rather than to gains in individual muscle groups. Furthermore, these data indicate the efficacy of a well-rounded Rtr program in reducing MAP_{rest} in cardiac rehab patients.

Ss	$\Delta \Sigma 12$ stations	ΔMAP
1	155 lbs	+2.0 mmHg
2	245 lbs	- 1.3 mmHg
3	265 lbs	- 5.9 mmHg
4	278 lbs	- 5.4 mmHg
5	393 lbs	- 4.0 mmHg
6	410 lbs	- 8.6 mmHg
7	450 lbs	-19.3 mmHg
$R^2=0.83;$		$p=0.05$

EFFECTS OF A HIGH INTENSITY WARM-UP ON VERTICAL JUMP PERFORMANCE

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To examine the effects of high intensity warm-up on jumping performance, 30 colleged age males. (age = 22.7 ± 0.6 y; body height = 1.77 ± 0.01 m; body mass = 82.3 ± 3.0 kg; isometric pull force = 2332.8 ± 126.5 N; mean \pm SE), were recruited as subjects for the study. To ensure subjects entered the test session in similar physiological condition, each performed a 2 min hop-jump-lunge immediately prior to entering the test site. Subjects performed 2 sets, (PRE and POST), consisting of 2 static and 2 countermovement vertical jumps performed on the forceplate, separated by a maximal effort isometric pull. Static and countermovement jump order was counterbalanced to account for any order affect. Forceplate data were sampled at 500 Hz, and conditioned at a frequency of 1050 Hz with a low pass digital filter. The vertical jump parameters of peak force (PEAK), rate of force development (RFD) and power for both static and countermovement jumps were determined from forceplate ground reaction forces, and mean and maximal PRE and POST values were calculated. Dependent t-tests and Pearson product moment correlations were used to analyze all mean and maximal parameter data. The alpha level was set at $p \leq 0.05$. Mean, ($T=4.26$, $p=0.0002$), and maximal, ($T=2.71$, $p=0.0113$), PEAK forces observed during the static jumps increased significantly from PRE to POST. Average PEAK, (in static jumps), increased from 158.9 ± 28.7 N PRE to 194.4 ± 30.0 N POST. Maximal PEAK, (in static jumps), increased from 191.4 ± 30.2 N PRE to 225.2 ± 32.1 N POST. Correlations revealed a significant moderate relationship, between the average RFD and PEAK values, ($r=0.71$, $p \leq 0.05$), observed during the countermovement jumps. These data indicate that an isometric pull, or similar near-maximal effort warm-up exercise, may lead to higher force outputs and improved performance in high-power events such as the vertical jump.

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THE EFFECTS OF ORTHOTICS ON RUNNING ECONOMY AND GAIT MECHANICS IN SYMPTOMATIC RECREATIONAL RUNNERS.

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The objective of this study was to investigate the effects of orthotics on gait mechanics and running economy in symptomatic recreational runners. Subjects consisted of 10 recreational middle distance runners who were symptomatic of lower extremity pain thought to be caused by excessive pronation. All subjects were prescribed semi-rigid orthotic devices. Subjects participated in three 10 minute submaximal runs at 70% of their predetermined $\dot{V}O_{2max}$. Four conditions were analyzed including 1) the pre-orthotic shoes only condition; 2) shoes plus additional weights; 3) shoes plus orthotics; and 4) post accommodation shoes only condition. There was a 2 week accommodation period between the second and third conditions to allow subjects to gradually become accustomed to wearing the orthotic devices. Rear foot movement in the frontal plane was video taped during the seventh minute of each submaximal run. Dependent t-tests were applied to each of the following factors: (1) pronation angle at heel contact, (2) maximum pronation angle, (3) time to maximum pronation angle, and (4) submaximal oxygen consumption. The statistical analyses compared shoes only versus the shoes and weights conditions, the shoes only versus the shoes with orthotics conditions, and the shoes with orthotics versus the postaccommodation shoes only condition. Dependent t-tests were also performed on the pre and post $\dot{V}O_{2max}$ data ($p < 0.05$).

Results of the biomechanical analyses demonstrated a 273% ($p < 0.04$) increase in pronation angle at heel strike while running in shoes and orthotics compared to shoes only. Maximum pronation angle was reduced 19% ($p < 0.05$) in shoes and orthotics compared to shoes only. No significant differences were noted when comparing the time it took to reach maximum pronation. After removing the orthotics in the final test, pronation angle at heel strike decreased 243% ($p < 0.01$), maximum pronation angle increased 12% ($p < 0.05$) and time to maximum pronation increased 17% ($p < 0.04$) compared to running with the devices. When an average of 58.7 g were added to each foot, there was a 43% decrease ($p < 0.05$) in pronation angle at heel strike. Results of the submaximal $\dot{V}O_{2max}$ data indicated no significant differences between any of the three conditions. There were also no differences between the pre and post $\dot{V}O_{2max}$ data. In conclusion, prescribed orthotic devices produced meaningful biomechanical changes but these changes did not result in improved economy. Improved mechanics through orthotic intervention may aid in the prevention of pain associated with these lower extremity deformities and prevent further injury in symptomatic runners. If, in fact, orthotics do improve running efficiency over time, it is suggested that future research involve a greater accommodation period to allow neuromuscular adaptations to develop.

Partially Supported by Solo Laboratories, Inc.

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LOWER HAMSTRING COACTIVATION DURING KNEE EXTENSION IN OLYMPIC SPRINTERS AND DISTANCE RUNNERS THAN IN SEDENTARY SUBJECTS

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In a prior study (Osternig et al., MSSE, 18:431, 1986), athletes revealed large hamstring coactivation during the late phase of knee extension. However, the athletes' data were not compared to a reference and only concentric contractions were used. Indeed, one would expect athletes to produce lower coactivation compared to sedentary subjects due to improved neuromuscular coordination ensuing long-term training. To test this hypothesis, we compared the hamstring to quadriceps EMG ratio of Olympic caliber power ($n=7$) and endurance ($n=4$) athletes to the ham/quad EMG ratio of sedentary subjects ($n=12$) during isometric and isokinetic 90 and 180°/s concentric and eccentric knee extension on a Kin-Com dynamometer. The group by contraction mode interaction was not significant. The table shows the percent hamstring coactivation data pooled across eccentric (ECC) and concentric (CON) contraction modes of each speed.

Group	n	ECC and CON 90°/s		Isometric		ECC and CON 180°/s	
		Mean	+SD	Mean	+SD	Mean	+SD
Sprinters	7	15	6	10	4	18	8
Runners	4	12	4	6	3	12	4
Sedentary	12	26*	16	21*	15	24*	13

* $P < 0.05$ compared to sprinters and runners.

There was a significant group main effect for the 90°/s ($F=3.6$, $p=0.04$), isometric ($F=5.9$, $p=0.01$), and for the 180°/s ($F=2.8$, $p=0.02$) conditions. These data suggest that intense training decreases antagonist muscle coactivation, thus increasing the effectiveness of the agonist muscle contraction in Olympic caliber athletes.

Supported by the LeRoy T. Walker International Human Performance Center, the Division of Academic Affairs of East Carolina University, and the state of North Carolina.

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THE RELIABILITY OF THE DOUBLE-LEGGED STABILOGRAM DIFFUSION ANALYSIS PROTOCOL WHEN APPLIED TO SINGLE-LEGGED STANCE

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Conventional stabilogram methods have traditionally been used to quantify the neurological control mechanisms responsible for the maintenance of posture. An alternative to traditional stabilometry, stabilogram-diffusion analysis (SDA), has been used to provide expanded insight into the control mechanisms of double-legged stance. The SDA provides three parameters that can be used to make judgements concerning the open and closed loop control phases of postural control. If applied to single-legged stance data, this technique may also provide for an increased understanding of the maintenance of single-legged stance. Previously, the SDA has been found to be a reliable method for the analysis of double-legged stance. Before using the SDA parameters for the description of single-legged stance, the reliability of these parameters must be estimated. Therefore, the purpose of the study was to estimate the reliability of SDA parameters during a single-legged stance. Ten subjects (18 to 25 years of age) participated in the study. Following an orientation, the testing session consisted of the subjects standing on the force plate for 30 single-legged trials and 10 double-legged trials. Each trial was 30 seconds in duration and the sampling rate was set at 100 Hz. The SDA was performed over 0.01 second time intervals. The time interval at which the transition from open-loop to closed-loop control was not reliable (ICC (2,1)= 0.15). Diffusion coefficients of the open and closed-loop phases were also not reliable (ICC (2,1)= 0.36 and 0.10). This lack of reliability might indicate that single-legged stance is chaotic rather than stochastic as double-legged stance has been classified.

SYNCHRONIZATION AND SYMMETRY IN JOINT MOTIONS IN THE LOWER EXTREMITIES DURING TREADMILL RUNNING

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Numerous mechanisms of running related injuries have been proposed. Hamill et al. (1992) suggested that a disruption in timing between the subtalar and knee joint motions may be a possible mechanism for knee injury. The purpose of this study was to identify the synchronization of knee and subtalar joint motions and the symmetry between right and left sides during treadmill running. Nineteen healthy, elite, runners were evaluated. High-speed video of the rear (200 Hz) and sagittal (60 Hz) planes of both lower extremities were recorded while subjects ran at an average of 3.0 m/s on the treadmill. Reflective markers on the posterior of the legs and shoes and on both lateral ankle, knee, and hip joints were processed through video analysis to determine the rearfoot and knee angular position during the stance phase. Rearfoot motion was used to assess pronation. Maximum pronation (R/L: 9.3°/9.0°), relative time to this event (R/L: 34.7%/34.9%), maximum knee flexion (R/L: 37.7°/37.9°) and relative time to this event (R/L: 43.5%/43.8%) were highly symmetrical between right (R) and left (L) sides. Maximum pronation did occur approximately 9% earlier in stance than maximum knee flexion. This asynchronization was approximately twice as large as those reported by Hamill et al. (1992) and Bates et al. (1979). These differences may be due to the running speed or sample characteristics used in the studies. The present results suggest that the synchronization between rearfoot and knee joint motions may not be as close as previously indicated and that asynchronous motions of greater than 9% between these joints may be a mechanism of running related injury.

Supported by the LeRoy T. Walker International Human Performance Center, the Division of Academic Affairs of East Carolina University and the State of North Carolina

THE TEMPORAL PATTERNING OF MUSCLE ACTIVITY ASSOCIATED WITH A SOCCER INSTEP KICK.

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Muscular strength has been previously cited as a direct influence on maximal kick performance. Actual muscle activity during a maximal effort / targeted kick (METK) is not fully understood. More importantly, muscle activation patterns during a METK have not yet been identified. The purpose of this study was to investigate the temporal patterning of muscle activity associated with a METK. Six muscles, rectus femoris (RF), gluteus maximus (GM), vastus lateralis (VL), biceps femoris (BF), tibialis anterior (TA) and gastrocnemius (GN) were identified as being active in the METK. Fifteen (15) healthy, female division one varsity soccer players performed five (5) METK of a FIFA approved soccer ball a distance of five (5) meters to a target area 1.5m². The METK was divided into three phases (loading [1], swing / contact [2], follow-through [3]). Muscle activity was quantified using Integrated Electromyography (IEMG) and Time to Peak (TP) values. Although all muscles were active across all phases, the VL, GN, RF, and BF were most active during 1; the VL, RF, and TA were most active during 2; and, the VL and RF were most active during 3. Surprisingly, GN was the first to fire, and RF fired before BF during 1. During phase 3 TA was the last to fire. These results indicate that both muscle coordination (TP) among all muscles, and the strength of contraction (IEMG) of individual muscles are large influences on the success of a METK.

STRETCHING THE ADDUCTOR LONGUS MUSCLE DOES NOT CHANGE
AVERAGE EMG VALUES MEASURED DURING MAXIMAL VOLUNTARY
CONTRACTIONS

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Muscle stretching prior to activity may be used to ready the muscle for forceful
contractions. Research provides evidence of a linear relationship between muscle
activity and force production. However, the effect of stretching on muscle activity
has not been addressed. The purpose of this experiment was to examine the effect of
an 18 second stretch on average muscle activity during a maximal voluntary
contraction of the adductor longus (MVC-AL). Twenty-one (21) subjects (11
females, 10 males) performed a 5 second MVC-AL while seated on a Universal™
Proflex and abducted at the hip to 30°. Each subject then performed a self-induced
maximal stretch (MS), indicated by a muscle spindle response, for a period of 18
seconds. Within a period of 20 seconds after MS, the subjects returned to 30° of hip
abduction and performed a 5 second MVC-AL. No difference was found between
pre-stretch and post-stretch average muscle activity ($t(20) = 0.81$; $p = 0.43$). Based
on the linear relationship between force production and muscle activity, the results of
this study indicate that a MS does not seem to alter muscle force production.

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EFFECTS OF FOUR DIFFERENT WARM-UP PROTOCOLS ON SUBSEQUENT
STANDING LONG JUMP.

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The purpose of this study was to examine the effects of four different warm-up
treatments on the standing long jump (SLJ) in male and female college sprinters ($n = 12$;
age = 19.6 ± 0.7 y; ht = 1.76 ± 0.08 m; body mass = 74.0 ± 10.4 kg; 1 RM squat = 131.4 ± 21.2
kg) and untrained subjects ($n = 21$; age = 20.6 ± 0.7 y; ht = 1.71 ± 0.08 m; body mass =
 74.1 ± 11.6 kg; 1RM squat = 73.4 ± 11.6 kg). All subjects were familiar with the standing
long jump. Subjects were randomly divided into four treatment groups; each group
performed a different warm-up separated by 3 days: 1) no activity; 2) 8 min of
stretching; 3) high force (1 x 3 squats at 50%, 75% and 87.5% of 1RM); 4) high power
(1 x 3 speed squats at 20%, 30% and 40% of 1 RM). The standing long jump was
measured with a metric tape measure immediately and 15 mins after warm-up. Data
were analyzed using a repeated measures ANOVA; the alpha level was set at 0.05.
Results indicate that males were stronger than females and trained subjects were
stronger than untrained subjects; after all warm-up conditions males jumped farther
than females and trained subjects jumped farther than untrained subjects ($p < 0.05$).
There were no significant differences in SLJ performance between treatment (warm-up)
groups for males, females, trained, untrained or combined groups. The relation between
the 1 RM squat and SLJ was $r = 0.82$ ($n = 33$). These data indicate that warm-up of any
type was ineffective in stimulating the SLJ and that maximum strength (1RM parallel
squat) is strongly related to jumping ability.

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THE EFFECT OF MEDIUM-CHAIN TRIGLYCERIDE, CARBOHYDRATE, L-CARNITINE
SUPPLEMENTATION ON THE PERFORMANCE AND METABOLIC RESPONSES OF
MARATHON ATHLETES

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Nine trained ($VO_{2max} = 60.3 \pm 3$ lml/kg/min) male marathon athletes served as subjects in this study.
Subjects were 25.1 ± 5.5 years of age, 165.8 ± 8.0 cm tall and weighed 56.2 ± 6.1 kg. Each subject
completed two, seven week supplementation periods where they received either medium-chain
triglycerides and carbohydrates (MCT+CHO) or MCT + CHO and L-carnitine (MCT+CHO+L-
carnitine). Supplementation periods were separated by a five week washout period. The supplement
was based on a commercially available product, ENERGO (PVM Products (Pty) Ltd, SA) modified to
include MCTs to the value of 31% of total energy value (protein 3%, carbohydrate 66%). Carnitine
supplement included 200mg L-carnitine per 20g supplement in the form of Carnesium (Omeara (Pty)
Ltd, SA). Athletes performed a progressive exercise test after an overnight fast, on day 1 (prior to the
start of the supplement period) and day 42 of each trial period. Respiratory gases were continuously
monitored for the purpose of determining VO_2 , VCO_2 , respiratory exchange ratio (RER) and VO_2 max.
Peak treadmill running speed was recorded. Venous blood samples were obtained immediately prior to,
at the completion of, and at 30min post test for the purpose of assessing free fatty acids, lactate and
plasma carnitine levels. Neither MCT+CHO, nor MCT+CHO+L-carnitine supplementation had
significant effects on peak treadmill running speed nor VO_{2max} . A shift towards lipid metabolism was
observed with L-carnitine supplementation, evident from RER and VCO_2 data, however, these
differences were not significant.

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NUTRITIONAL STATUS AND EATING HABITS OF FEMALE HIGH SCHOOL
CHEERLEADERS AND THEIR NON-ATHLETIC COUNTERPARTS

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The purpose of the present study was to compare female high school cheerleaders (n=40) with female non-athletic controls (n=39) as related to nutritional status and eating disorder symptoms. Cheerleaders and controls ranged in age from 14-18 yr (grades 9-12). Nutritional status was determined via a 24-hr diet recall and anthropometric measurements (ht, wt, body mass index, waist-to-hip ratio, triceps skinfold and midarm muscle area). The EAT-26 was used to screen for symptoms of eating disorders. Results indicated that the anthropometric measurements of the cheerleaders were generally less than the control group with body weight being significantly lower (p=0.04). There was a trend for nutrient intakes to be less in the cheerleaders with vitamin A intake significantly (p=0.04) lower. Nutrient Index scores were poorer for the cheerleaders (65±21% of the RDA) as compared with controls (74±20%, p=0.06). No significant differences were found in mean EAT-26 scores; however, 30% of the cheerleaders as compared with only 15% of the controls scored in the eating disorder range of the EAT-26 questionnaire. In summary, high school cheerleaders had somewhat smaller anthropometric measurements, lower nutrient intakes and a higher percentage of subjects scoring in the eating disorder range as compared with controls.

Supported by the Al. Agricultural Experiment Station

HEMATOLOGICAL & METABOLIC EFFECTS OF CALCIUM β -HMB SUPPLEMENTATION
DURING RESISTANCE-TRAINING

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Leucine and metabolites of leucine such as α -ketoisocaproate (KIC) have been reported to inhibit protein degradation, particularly during periods of increased proteolysis. The anticatabolic effects of leucine and KIC have been suggested to be regulated by the leucine metabolite β -hydroxy β -methylbutyrate (β -HMB). Nissen et al. (*J. Appl. Physiol.* 81:2093-2104, 1996) reported that calcium β -HMB supplementation (1.5 to 3 g/d) reduced markers of protein catabolism and promoted greater gains in fat free mass and strength in untrained and trained subjects undergoing resistance training. Consequently, β -HMB has become a popular nutritional supplement among resistance-trained athletes. However, little is known about the long-term effects of β -HMB supplementation on hematological and metabolic markers in humans. This study examined the effects of ingesting 0, 3, or 6 g/d of calcium β -HMB on urine and serum β -HMB concentrations and clinical chemistry profiles in experienced resistance-trained males. In a double-blind and randomized manner, 40 experienced resistance-trained athletes (7.3±1 hr/wk) were matched according to training volume and weight and assigned to supplement their diet for 28-d during training with a fortified carbohydrate/protein powder (84 g/d carbohydrate, 75 g/d protein, 3 g/d fat) containing either: 0, 3, or 6 g/d of calcium β -HMB. Subjects observed a non-red meat diet for 3-d prior to blood and urine assessment and did not train for 48 hours prior to testing. Fasting urine and venous blood samples were obtained on day 0 and 28 of supplementation. Serum and urinary β -HMB concentrations were determined. In addition, a comprehensive 31 panel clinical chemistry analysis was run on serum samples while whole blood samples were analyzed for cell blood counts. Data were analyzed by repeated measures ANOVA and are presented as mean±SEM changes for the 0, 3, and 6 g/d β -HMB groups, respectively. β -HMB supplementation resulted in significant increases in serum (0.7±0.4; 22.3±8; 37.4±15 μ M, p=0.03) and urinary (30±15; 783±292; 1301±437 μ M, p=0.009) β -HMB. Changes in creatine kinase levels in the 6 g/d group tended to be lower (p=0.07) than changes in the 0 g/d group (82±71; -24±28; -101±92 IU). However, no significant differences were observed among groups in lactate dehydrogenase, aspartate aminotransferase, alanine aminotransferase, gamma-glutamyl transferase, urea nitrogen, creatinine, the ratio of urea nitrogen to creatinine, uric acid, glucose, electrolytes, total protein, albumin, globulin, carbon dioxide, lipid profiles, total bilirubin, hemoglobin, hematocrit, red blood cells, white blood cells, or types of lymphocytes. Results indicate that β -HMB supplementation during resistance-training increases serum and urinary β -HMB but does not adversely affect hematological and metabolic profiles.

Supported by Experimental & Applied Sciences, Golden CO

DIETARY SUPPLEMENTS FOLLOWING ECCENTRIC RESISTANCE EXERCISE:
GLYCOGEN RESYNTHESIS, PROTEIN BREAKDOWN, AND HORMONAL RESPONSES

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We examined the influence of carbohydrate (CHO), carbohydrate-protein (CP), or placebo (P) supplements following eccentric resistance exercise on muscle glycogen, muscle protein breakdown by urinary 3-methylhistidine (3MH), serum growth hormone (GH), cortisol (C), and testosterone (T). Untrained males (N = 26) consumed a controlled meat-free diet for 9 d and performed 24 h urine collections d 3-9. To reduce glycogen, on d 4 evening subjects cycled for 40 min at 70% of $\dot{V}O_{2peak}$ followed by 5 maximal 1-min cycling sprints. On d 5 morning, fasted subjects performed 100 eccentric leg flexions at 120% of 1-RM. The subjects drank either CHO (1.25 g CHO kg⁻¹), CP (0.875 g CHO kg⁻¹, 0.375 g protein kg⁻¹), or P following exercise and 2 h later. Muscle biopsies were taken post-exercise on d 5 plus mornings of d 6 and d 8. Blood samples were obtained in the fasted state mornings d 4-10 plus immediate, 3 h, and 6 h post-exercise on d 5. Muscle glycogen was low across all groups on d 5 (33.3 ± 3.7 mmol kg⁻¹ ww), partially recovered on d 6 (74.5 ± 7.8 mmol kg⁻¹ ww), and normal by d 8 (105.6 ± 10.8 mmol kg⁻¹ ww, P < 0.01). No interaction was seen between supplements over time for glycogen. On d 5 lowest 3MH was seen for CP (193.0 ± 13.8 μ mol d⁻¹) versus CHO and P (251.1 ± 22.5 μ mol d⁻¹ and 235.2 ± 6.8 μ mol d⁻¹, P < 0.05). Similar trends (P < 0.07) were seen for d 5 3MH relative to body weight, lean body mass, and urinary creatinine. GH increased 200% after eccentric exercise on d 5 with no interaction. C fell 50% over d 5 with no interaction. Morning C fell 24% to 143.7 ng ml⁻¹ for all groups d 6-8 and rose to baseline d 9-10 (P < 0.01) with no interaction. T fell over d 5 for all groups (P < 0.01). T at 3 h on d 5 was lower for CHO (4.2 ± 0.3 ng ml⁻¹) and CP (4.3 ± 0.3 ng ml⁻¹) versus P (5.1 ± 0.2 ng ml⁻¹, P < 0.05). In summary, perturbations in glycogen, GH, and C were unaffected by supplement. However, a CP supplement may be beneficial for reducing muscle protein breakdown on the day of eccentric resistance exercise.

Supported by Dairy Management, Inc.

THE EFFECT OF CREATINE SUPPLEMENTATION ON MUSCULAR PERFORMANCE AND BODY COMPOSITION OF FEMALE ATHLETES

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The effect of 5 wks of daily creatine supplementation on muscle function and body composition were assessed in 16 female NCAA Division 1 lacrosse players. The athletes were tested during their pre-season training period that included 3 d/wk of a weight training program designed by the strength coach. Subjects were randomly assigned to placebo (P, n=9) and creatine (C, n=7) groups. C received 20 g/d of creatine monohydrate (Sportpharma) for the first 7 d and 2g/d for the remaining 4 wks. Body composition (skinfold and hydrostatic weighing), muscle strength (1RM for bench press and leg extension), isokinetic muscle endurance (5 sets of 30 repetitions at 180 degrees/s on Biodex machine), and blood lactate response to the muscle endurance test were measured prior to supplementation and after 5 wks. Resting blood GPT and BUN were measured prior to, after 2.3 wks and at the end of the supplementation period to assess kidney and liver function. Bench press strength increased for both groups; C ($+6.2 \pm 2.0$ kg) increasing significantly more than P ($+2.8 \pm 1.8$ kg). Both groups had a similar increase in leg extension 1RM ($+1.4 \pm 4.1$ kg). Percent body fat, as assessed using skinfold measurement, decreased significantly for C compared to P (-1.2 ± 0.9 and $+0.3 \pm 0.8\%$). Fat-free mass increased over the 5 wks (0.7 kg) but was not different by group. There was a trend ($p = .1$) for a decrease in body fat using hydrostatic weighing and a significant increase in total work done during the muscle endurance test for both groups over time but no difference between groups. Blood lactate after the muscle endurance test was unaffected by training or supplement. No changes were seen over the experiment for GPT but BUN increased for both groups over time with no difference by group. In summary, oral creatine supplementation for 5 wks in conjunction with a resistance training program increased upper body strength and reduced body fat (via skinfold) more than the resistance training program alone. However, lower body strength, lean tissue mass, body fat via hydrostatic weighing, and muscle endurance were not influenced by the creatine supplementation in female athletes.

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PHYSIOLOGICAL AND PERFORMANCE RESPONSES TO SUPPLEMENTATION WITH THIAMIN AND PANTOTHENIC ACID DERIVATIVES

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The purpose of this study was to investigate the physiological and performance responses to supplementation with allithiamin and pantethine. On two separate occasions, six highly trained cyclists (VO_{2max} 61.8 ± 2.1 ml \cdot kg $^{-1}\cdot$ min $^{-1}$) performed a 50-km steady-state ride on a cycle ergometer at a workload corresponding to ~60% of VO_{2max} followed by a 2000-m time trial. For seven days prior to each ride, subjects daily ingested either a placebo (PL) or a combination of 1 g of allithiamin and 1.8 g of a 55%/45% pantethine/pantothenic acid compound (AP), respectively. Treatments were administered using a randomized, double blind, counter-balanced design. During the 50-km ride, measures of heart rate, respiratory gas exchange and ratings of perceived exertion were recorded at 5, 15, 25, 35 and 45-km. Blood samples were collected at 10, 20, 30, 40 and 50-km and analyzed for lactate, glucose and free fatty acids. Blood samples for the analysis of lactate were also collected three and five min after the completion of the 2000-m time trial. There were no significant differences in any of the measured parameters between experimental conditions. Time to complete the 2000-m time trial was also not significantly different between experimental conditions (PL 178.2 ± 8.4 , AP 170.7 ± 10.2 s; $P = 0.58$). These results suggest that despite the reported enhanced absorption properties, supplementation with allithiamin and pantethine does not alter exercise metabolism or cycling exercise performance.

Allithiamin and Pantethine were provided by Ecological Formulas/Cardiovascular Research, Concord, CA

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COMPARISON OF MEN AND WOMEN CROSS COUNTRY RUNNERS ON A ONE MINUTE WINGATE TEST

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The purpose of this study was to compare the performances of competitive male and female cross country runners during 60 seconds of maximal cycling against a resistance of 0.75 N/kg. Ten male (age: 20.1 ± 1.7 yrs, height: 178.1 ± 7.3 cm, weight: 64.5 ± 3.7 kg) and ten female (age: 18.9 ± 1.6 yrs, height: 166.1 ± 5.9 cm, weight: 57.6 ± 6.6 kg) track athletes performed a 60s wingate test on a Monark (model 824) cycle ergometer with performance measures averaged every five seconds. Pre and Post-exercise blood was analyzed for Hb, Hct, lactate, glucose, and pH. Males significantly outperformed females on total work(kgm), peak power(W), and mean power(W/min) although minimum power was not different. The total percent decline in power (peak power-minimum power) was also greater for men. Post-exercise lactate values were significantly higher in males than females (9.2 ± 1.5 mmol vs. 7.4 ± 1.4 mmol). Body weight correction for power output comparisons revealed significant differences only for peak power output (males: 9.54 ± 8.1 W/kg, females: 8.17 ± 1.01 W/kg). These data suggest that competitive male runners may have a greater ability to generate force quickly when compared to their female counterparts. This high power output, however, was not sustainable and declined rapidly such that the mean power output (W/kg) for one minute was not different between the two groups.

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EIGHTEEN MONTH CHANGES IN CARDIOVASCULAR VARIABLES ASSOCIATED WITH PERFORMANCE IN FEMALE MASTER ATHLETES

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The purpose of this study was to document changes in cardiovascular variables associated with performance over an 18-month period in female master cyclists (n=10), runners (n=7), and non-athletic women (n=8). Maximal aerobic capacity (VO_{2max}), maximal heart rate (HR_{max}), lactate threshold (LT), and peak blood lactate ($Lact_{peak}$) were determined at baseline and at 18 months as the first segment of a progressing longitudinal study. Training remained consistent from 0-18 months in both athletic groups; however, the controls increased physical activity from 1.69 to 3.31 hours per week. Consistent with an increase in physical activity, the controls increased LT from 53% to 67% of VO_{2max} . At baseline, LT was 53%, 66%, and 81% of VO_{2max} for controls, cyclists, and runners, respectively, while at 18 months it was 67%, 69%, and 79%. The VO_{2max} was significantly greater in runners ($47.21 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) and cyclists ($51.44 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$) and did not change in any group (46.89, 50.50, and $27.19 \text{ ml}\cdot\text{kg}^{-1}\cdot\text{min}^{-1}$, respectively) from 0-18 months. The VO_{2max} of the cyclists is the highest reported to date for age-matched athletic women. This study indicates that maintaining the amount of training from year to year may attenuate a cardiovascular age related decline. More research on LT is needed in this population to help provide insight in order to maximize training and improve performance.

THE EFFECT OF MUSIC ON HEART RATE, PERCEIVED EXERTION, AND EXERCISE DURATION DURING HIGH INTENSITY STEADY STATE EXERCISE

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Music is often heard at sporting events, whether during practices and time-outs or between halves and innings. However, the effect of music on physical performance, especially by trained athletes, remains unclear. The purpose of this study was to assess heart rate (HR), perceived exertion (RPE, Borg 6-20 Scale), and exercise duration (ED) of trained subjects listening to music during high intensity steady state (HISS) exercise. Five male Division II college soccer players participated in three randomly assigned HISS exercise bouts while listening to headphone music. The three music conditions were fast tempo music (FM), slow tempo music (SM), and no music (NM). Each exercise bout consisted of a 3 minute warm-up followed by exercise at $200 \text{ m}\cdot\text{min}^{-1}$, 6% grade, until volitional exhaustion. HR and RPE were recorded every 2 minutes during exercise. ED was recorded when subjects reached volitional exhaustion. ED and final 4-minute exercising HR and RPE were analyzed using repeated measures ANOVAs ($p < 0.05$). There were no significant differences in HR (FM: 184.3 ± 8.7 , SM: 185.9 ± 6.3 , NM: 183.6 ± 9.8 bpm), RPE (FM: 12.4 ± 2.6 , SM: 13.8 ± 2.7 , NM: 12.6 ± 2.0 units), or ED (FM: 12.5 ± 3.9 , SM: 11.2 ± 2.0 , NM: 10.6 ± 2.9 min) between the three music conditions. These results suggest that exercise performance by trained athletes is unaffected by listening to music when the exercise involves high intensity steady state performance to exhaustion. This lack of effect might be due to the high level of intrinsic motivation and concomitant reduced level of extrinsic motivation in trained athletes.

EFFECTS OF TRAINING AND DETRAINING ON STRENGTH AND BALANCE IN OLDER MEN AND WOMEN

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The literature is not clear on the gender differences in balance between older adult males and females. Therefore, the purpose of this study was to evaluate the effects of a 4-month strength training intervention on strength (using one repetition maximum (1 RM)) and balance (latency and number of falls) using a Neurocom Equitest Dynamic Posturography device in older adults. Twelve males (age 72.3 yrs; Wt 84.3 kg) and 20 females (age 71.3 yrs; Wt 71.2 kg) strength trained 11 muscle groups for one hour, three days a week for 16 weeks. Three sets at 50%, 60% and 70% of their 1RM were completed. Strength and balance were evaluated initially, at the conclusion of the 4-month training intervention, and an average of 15 months after the intervention (follow-up). The males total body strength increased 40.2% ($p < 0.05$) from pre- to post-training, but decreased 11.9% ($p > 0.05$) from post-training to follow-up. The females increased 45.2% ($p < 0.05$) for total body strength from pre- to post-training and decreased 12.5% ($p < 0.05$) from post-training to follow-up. The latency periods from the pre- to post-testing were not significantly different, but there was a trend toward a reduction in the latency period for both genders. The decrease in latency periods from post-testing to follow-up was significant for both males and females. Falls in the older men did not change during any of the three test periods. There was no statistical difference in the number of falls from pre- to post-testing in the older females, but the follow-up falls were greater than the post-test falls. These results suggest that older men and women have similar strength and balance responses to strength training; however, balance in older women is more adversely affected by detraining than in older men.

THE EFFECT OF TWO YEARS OF RESISTANCE TRAINING ON STRENGTH CHANGES IN ELDERLY MEN AND WOMEN

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The purpose of the present study was to compare strength changes after two years of training in elderly men and women between the ages of 60 to 79 years (68 ± 6 yrs, Mean \pm SD). In a previous study twenty two subjects were randomly placed into a training (TR; n=13) or control (CON; n=9) group. The TR underwent 12 wks of resistance training on 10 Keiser™ isotonic machines, designed to isolate the major muscle groups of both the upper and lower body. Subjects performed 3 sets of 8-12 repetitions at 75 to 80% of 1-RM, 3x/wk. Changes in isotonic strength were measured before (T1) and after (T2) training by 1-RM on the leg extension and the chest press. Following training the TR significantly ($p \leq 0.05$) increased upper and lower body strength by 25 and 39%, respectively. After completion of the original study both groups were invited to continue or begin training. Four subjects from the TR declined to continue. The training protocol was similar to the original protocol, however, the number of sets was reduced to one set to fatigue. The CON significantly increased leg strength (T1: 45 ± 14 ; T2: 48 ± 14 ; T3: 58 ± 15 kg) by 29% over the two years while the TR group maintained but did not increase leg strength significantly (T1: 44 ± 16 ; T2: 61 ± 21 ; T3: 64 ± 20 kg). The CON also significantly increased arm strength (T1: 40 ± 11 ; T2: 41 ± 11 ; T3: 53 ± 13 kg) by 33% while the TR maintained but did not significantly increase arm strength (T1: 44 ± 20 ; T2: 55 ± 23 ; T3: 57 ± 18 kg). At the end of the two years strength values for the legs and arms were not significantly different between the groups. Despite a decrease in total workload the TR maintained strength over the two years. The CON showed similar improvements in strength as those observed after 12 wks of training in the TR. These results indicate that in elderly men and women, safe and effective improvements in strength can be gained with one set of resistance exercise to failure.

Funded in part by a grant from Iowa State University and Metabolic Technologies Inc.

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RESISTANCE TRAINING'S EFFECTS ON THE HEALTH-RISK PROFILE OF ELDERLY INDIVIDUALS

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This study's purpose was to determine how resistance training affected an elderly (age: 60 to 79 yr old) person's health-risk profile (i.e., cholesterol profile). Twenty-two subjects were randomly assigned to either a training (TR=13) or control (C=9) group. In the initial 12-weeks of the complete 2 yr study only the TR participated in the resistance training program on 10 Keiser™ isotonic machines, designed to isolate the major muscle groups of both the upper and lower body. Subjects performed 3 sets of 8-12 repetitions at 75 to 80% of 1-RM, 3x/wk. Changes in isotonic strength were measured before (T1) and after training by 1-RM on the leg extension and the chest press. Following the initial 12-weeks, the TR significantly ($p \leq 0.05$) increased upper and lower body strength by 25% and 39%, respectively. After completion of the initial 12-week comparison (Study period 1) both groups were invited to continue or begin training. Four subjects from the TR declined to continue. The training protocol was similar to the original protocol, however, the number of sets was reduced to one set to fatigue. At the end of two years, the TR group showed no significant strength declines while the C group significantly increased lower and upper body strength. There were no significant differences in body weight (BW), skinfolds by sum of seven (SUM7), and waist-to-hip ratios (W/H) in either the C or TR groups. However, the total cholesterol/high density lipoprotein ratio (TCHOL/HDL) significantly declined in the TR group by 16.9% despite the finding that TCHOL increased 14.7%. The improved TCHOL/HDL was due to a significant increase in [HDL] from 44 mg/dL in T1 to 56.9 mg/dL in the 2 yr follow-up measurement. In conclusion, long-term moderate intensity resistance training showed significant gains in strength in elderly individuals but had no significant effect on body weight, SUM7 skinfolds, or W/H ratio. There was however a significant improvement in the continuous training group's TCHOL/HDL ratio that was the direct result of a significant improvement in HDL concentration over-time.

Funded in part by a grant from Iowa State University and Metabolic Technologies Inc.

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PHYSICAL FUNCTION, PERCEIVED QUALITY OF LIFE, AND PRESENCE OF COMORBIDITY IN SENIOR CITIZENS

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The purpose was to determine physical function (PF), perceived quality of life (QOL), and presence of comorbidity in a group of senior citizens from a retirement community. Thirty four people (age: 81 ± 5 yrs; ht: 61.61 ± 3.26 in; wt: 137.80 ± 25.95 lb) were interviewed about presence of comorbidities. Physical function and quality of life were measured using the AAHPERD physical fitness test for individuals over the age of 65 and the Nottingham Health Profile. Participants were classified as above or below average according to National norms. A Mann-Whitney U test was used for group comparison. Results in the table indicate the below average group had consistently worse scores for QOL. However, there was only a significant association between measures of PF (endurance, coordination, agility) and QOL (Physical Mobility, Pain, $p < 0.03$).

	PM	Pain	Sleep	Social	Energy
\geq average	6.6 ± 11.6	3.8 ± 6.6	10.5 ± 17.9	3.3 ± 11.6	8.4 ± 21.9
$<$ average	27.4 ± 16.6	26.6 ± 27.7	25.4 ± 27.5	8.4 ± 16.6	26.4 ± 37.0

Presence of comorbidity was not associated with quality of life. However, poor physical function was associated with worsening scores of QOL and may be improved by a well rounded exercise training program.

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THE ST JAMES PLACE PROJECT: AGE PHYSICAL FITNESS AND COGNITIVE PERFORMANCE IN ELDERLY WOMEN

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Physical fitness is associated with fluid intelligence among the elderly. The purpose of this investigation was to determine which, if any, of the AAHPERD physical fitness test items for older adults would best relate to fluid intelligence among female residents of a retirement community. Therefore, 32 women (ages 72-93) were assessed for physical fitness using the AAHPERD test and for cognitive function using the Wechsler forward/backward digit span test, the subject performed tasks (SPTS) measure, and the mini-mental status exam. The very-old and oldest-old were compared for group differences in cognitive function using t-tests, and correlations were drawn between the AAHPERD test and cognitive function test scores. The t-tests revealed no age-related differences in cognitive function. However, there was a trend toward poorer performance on the SPTS among the oldest-old subjects ($p=0.13$). The scores for the AAHPERD coordination and agility/balance items correlated well with scores for the SPTS ($r=-0.42$, $p<0.05$, and $r=-0.52$, $p<0.01$, respectively). The results of this investigation suggest that there may be some age-related decline in secondary memory as measured by the SPTS, and that the AAHPERD coordination and agility/balance test items may be useful in relating physical functional ability to cognitive function in elderly women.

THE ST. JAMES PROJECT: PHYSICAL FUNCTIONAL ABILITY, PHYSICAL ACTIVITY, AND SELF-EFFICACY FOR EXERCISE IN ELDERLY WOMEN

Angela Labruzzo, Kristi Metoyer, Nikki Aucoin, Elke Hirsche, Matt Lee, Rafael Reyes, Anne Sebastien, Micheal Welsch, Robert Wood, Louisiana State University and the Center on Aging at St. James Place.

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Poor self-efficacy for exercise in older adults may be related to poor physical fitness and low levels of physical activity. It was the purpose of this investigation to compare self-report of physical activity and scores of the AAHPERD physical fitness test items for persons over 65 years of age to self-efficacy for exercise behavior. Therefore, 32 female residents of a retirement community (ages 72-93) were examined for physical fitness using the AAHPERD test, and answered questionnaires regarding physical activity level in older adults and self-efficacy for exercise behavior. Pearson interclass correlation was used to examine relationships among all variables. Alpha was set a-priori at 0.05. The results indicated no significant correlation between self-report of physical activity and self-efficacy for exercise, nor were there any significant correlations between the scores of any of the AAHPERD test items and self-efficacy for exercise behavior. However, there were trends towards relationships between self-efficacy and the scores for the endurance ($p=.10$) and coordination ($p=.17$) components of the AAHPERD test. These trends were in the direction to suggest that self-efficacy may be positively related to endurance and coordination. The lack of associations between fitness items and self-efficacy for exercise suggests that these individuals may not have an accurate perception of their ability to participate in exercise training programs. This information has implications for exercise counseling strategies for older adults.

THE RELATIONSHIP AMONG STRENGTH, BALANCE AND FUNCTION IN OLDER ADULTS

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Aging is associated with decreases in strength and muscle mass. In addition, reduced lower extremity strength has been associated with reductions in gait speed, balance and stair climbing ability. The present study examined the relationship among muscle, function and balance performance in older adults. Fifty adults over the age of 60 yrs. (n = 30 males, 20 females) participated in the present study. Leg strength was measured in six muscle groups (hip extensor, hip flexor, knee extensor, knee flexor, ankle plantar flexor, ankle dorsiflexor) of the dominant leg using isokinetic dynamometer (KinCom, Chattecx Inc.). A leg strength score was calculated as the sum of the six strength measurements. Functional performance measures were obtained by timed stair climbing (2 flights) and a 30-meter walk. Balance performance was measured using the sharpened Romberg and one-legged stance tests, as well as by the Chattecx Balance System. The relationship among functional activities, balance measurements and sum strength scores (expressed both in absolute and relative to fat free mass (hydrostatic weighing)) were determined using Pearson product moment correlations. For older men a weak relationship was observed between strength and balance measures ($-0.33 < r < 0.18$), whereas in older women several comparisons of strength and balance measures were more strongly related ($0.43 < r < 0.65$). A stronger relationship between stair climbing and strength was also observed in older women ($r = -0.44$) compared to older men ($r = -0.27$). Similar relationships were observed between stair climbing and sharpened Romberg in both men and women ($r = -0.50$). Evaluation of balance using the Chattecx Balance System showed inconsistent results. Results of the present study indicate that at best only moderate relationships exist among common measures of strength, balance and function in older adults with slightly stronger relationships observed in older women.

THE ST. JAMES PROJECT: PHYSICAL FUNCTIONAL ABILITY OF OLDER WOMEN IN LOUISIANA

Rafael Reyes, Michael Welsch, Nikki Aucoin, Elke Hirschev, Angela Labruzzo, Matt Lee, Kristi Metoyer, Anne Sebastien, Robert Wood, Louisiana State University and the Center on Aging at St. James Place Retirement Community

The number of elderly receiving dependent care in Louisiana exceeds the national average. In as much as poor levels of physical fitness are likely to contribute to need for dependent care, it is of interest to compare the physical fitness of Louisiana's elderly to national norms. Therefore, 32 women (ages 72-93) residing at St. James Place Retirement Community in Baton Rouge, Louisiana were assessed using the AAHPERD Physical Fitness Test for the Elderly. Independent-t tests were used to compare the oldest 11 subjects (ages 82-93) to the youngest 11 subjects (ages 72-78) with regard to AAHPERD test items scores. The results indicated group differences ($p < 0.05$) in the agility-balance and endurance items of the AAHPERD tests wherein the older subjects performed more poorly than their younger counterparts. There was also a trend ($p = .07$) for the younger subjects to perform better on the AAHPERD muscular strength and endurance test than the older subjects. The mean scores for the AAHPERD items compared favorably to national norms except in the cases of agility and coordination among 75-79 year olds and subjects over 84 years of age. These scores fell in the below average category according to national norms. In conclusion, the AAHPERD test detected age-related differences in agility and endurance. Furthermore, the age-related difference in agility may be exaggerated in this population as compared to that which is observed nationally.

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THE ST. JAMES PROJECT: REACTION TIMES MEASURES IN FUNCTIONAL BEHAVIORAL ASSESSMENT.

Brian Maraj, Leanne Hemard, Jamila Holmes, Matt Lee, Rafael Reyes, Robert Wood, Louisiana State University and the Center on Aging at St. James Place

Sensorimotor capabilities are important components in any assessment of the functional capacity of an elderly population. One measure used to examine sensorimotor function is reaction time. We investigated the relationship between this measure of neuromuscular function with measures of agility, coordination, and endurance. We measured simple reaction times in 28 elderly individuals (72 - 93 years). A reaction timer (Lafayette Instruments model 63014) using both auditory and visual stimuli was used. Participants were required to depress a switch by hand after the onset of the signal. The trials ($n=100$) were performed in blocks of 25 which were counterbalanced across subjects. The onset of the stimulus was preceded by a variable foreperiod. The results indicated that the median auditory reaction times were faster than the visual counterpart (281 vs 394 ms). Age significantly correlated with visual ($r = .480, p < .01$) and auditory reaction times ($r = .457, p < .05$) as the older subjects performed generally more slowly. Moreover agility ($r = .564, p < .01$), coordination ($r = .547, p < .01$) and endurance ($r = .623, p < .001$) all had significant correlations to the reaction time measures. The strong correlations between these variables suggests that performances in gross movements facilitate not only the functional aspects of daily living for the elderly, but that this facilitation can also be evidenced at the neuromuscular level as well.

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THE ST. JAMES PLACE PROJECT: PHYSICAL FUNCTIONAL ABILITY AND VAGAL MODULATION OF HEART RATE IN THE ELDERLY.

Matt Lee, Nikki Aucoin, Leanne Hemard, Jamila Holmes, Brian Maraj, Rafael Reyes, Michael Welsch, Robert Wood, Louisiana State University and the Center on Aging at St. James Place Retirement Community

Vagal modulation of cardiac function, as assessed by heart rate variability (HRV), is negatively associated with age and positively associated with cardiovascular fitness. The purpose of this investigation was to determine if any of the AAHPERD physical fitness test items for persons over 65 years of age would be associated with HRV in a group of older subjects. Therefore, HRV was assessed in the time domain and by spectral analysis for 18 independent-living residents of a retirement community (age= 72-93 years). Level of fitness according to AAHPERD norms: average (A), above average (AA), or below average (B), was used in applying one-way ANOVAs on measures of HRV. Interclass correlation was used to describe the relationship between age and measures of HRV for this population. Alpha was set a-priori at 0.05. There was a significant negative correlation between age and the standard deviation of normal RR intervals (SDNN). There was also a trend ($p=0.07$) toward an age-related increase in normalized low-frequency (LFnu) power and decrease in normalized high-frequency power (HFnu). The ANOVAs indicated between group differences in SDNN, HFnu, and LFnu with regard to scores on the AAHPERD endurance test. The differences were such that SDNN and HFnu were greater for the AA group than for the A and B groups, and LFnu was lower for the AA as compared to A and B groups. These results suggest an age-related decrement in HRV in later life and that HRV is related to cardiovascular endurance in the elderly.

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THE ST. JAMES PROJECT: COGNITIVE PERFORMANCE AND QUALITY OF LIFE IN ELDERLY WOMEN

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Cognitive function is thought to be associated with quality of life in older persons. The purpose of this study was to determine which of a battery of cognitive performance tests appear most sensitive to quality of life among older females. Therefore, cognitive function was assessed in 32 female residents of a retirement community (age= 72-93) using the Weschler Forward-Backward Digit Span (FDS, BDS, Total FBDS), the Subject Performed Tasks (SPTS) and the Mini-Mental State(MMS) exams. The Nottingham Health Profile was used to measure quality of life as defined by energy level, sleep patterns, pain level, physical mobility, emotional well-being, and social interaction. The Spearman rank order correlation test was used to examine relationships between variables. The results suggest several negative correlations ($p < 0.05$), for which the Rho values are indicated below. In each case, better performance on the cognitive task was related to a

	ENERGY	SLEEP	PAIN	P. MOBIL.	EMOTION	SOCIAL
MMS	-.38	-.42	ns	-.54	-.42	-.48
BDS	ns	-.49	-.44	-.52	ns	ns
TBDS	ns	-.38	-.36	-.42	ns	ns
SPTS	ns	ns	ns	ns	ns	-.51

higher quality of life. These results suggest that the MMS and the Weschler BDS may be particularly useful for relating cognitive function to quality of life among elderly women.

EFFECTS OF TRAINING AND DETRAINING ON STRENGTH AND FUNCTIONAL INDEPENDENCE IN OLDER ADULTS

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The research literature is essentially void of gender based studies evaluating the effects of training and detraining in older adults. Therefore, the purpose of this study was to evaluate the effects of a 4-month strength training program on strength and functional independence tasks in older adults. Twelve males (age 72.3 yrs; Wt 84.3 kg) and 20 females (age 71.3 yrs; Wt 71.2 kg) strength trained 11 muscle groups for one hour, three days a week for 16 weeks. Three sets at 50%, 60% and 70% of their one repetition maximum (1RM) were completed. The evaluation of strength and functional tasks were completed initially, at the conclusion of the 4-month training intervention, and an average of 15 months after the intervention (follow-up). The data were analyzed by ANOVA, Scheffe' HSD test and Pearson correlations. When all of the muscle groups were combined and evaluated for difference, the males increased in total strength 40.2% ($p < 0.05$) from pre- to post-training and experienced a 11.9% ($p > 0.05$) decrease from post- to follow-up. The females increased 45.2% ($p < 0.05$) for total strength from pre- to post-training and decreased 12.5% ($p < 0.05$) from post- to follow-up. For the mean of all 7 functional tasks, a significant improvement was observed from pre- to post-training for the males, but not for the females. Follow-up functional tasks results were not different than post-training for the males, but were significantly less than post-training results for the females. These data show that similar increases in strength and function occur in older men and women following a strength training intervention. However, older men retain functional benefits longer than older women after the training intervention.

Supported by Department of Veterans Affairs, Grant # E721-RA

METHODOLOGICAL COMPARISON FOR THE EFFECTS OF STRENGTH TRAINING IN OLDER ADULTS

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The purpose of this study was to determine the effects of a 4-month strength training program on balance and whether or not different methods of evaluating balance provide the same results. Eighty-five volunteers, 43 experimental subjects (ES), \bar{x} age 72 yrs and 42 comparison subjects (CS), \bar{x} age 72.6, served as subjects. The ES strength trained 6 muscle groups (3 trunk, 3 lower extremity), one hour, three days a week for 16 weeks. The CS did not participate in the strength training intervention. Both ES and CS were evaluated before and after the 16 week intervention period for strength, for the latency period (LP) of balance via a Neurocom Equitest Dynamic Posturography device, and for functional standing balance (FSB) under three conditions: standing on each foot, standing on both feet with heels up and with toes up (with eyes open and closed on each condition). A mean was computed for the latency time period and the average time of all conditions on FSB, before and after training. The data were evaluated for differences using paired t-tests and correlations. The results show that the ES increased 31.7% ($p < 0.05$) and 54.0% ($p < 0.05$) for trunk and lower extremity strength, respectively, and 29% ($p < 0.05$) and 4.7% ($p < 0.10$) for SB and LP respectively, following training. The CS increased 5% and 8.9% for trunk and lower extremity strength, respectively, and 1.0% and 0.0% for SB and LP, respectively. These data suggest that strength training improved functional balance and that the functional balance test measures a different aspects of balance than the Neurocom test in older adults.

Supported by Department of Veterans Affairs, Grant # E721-RA

PATTERNS AND CORRELATES OF SCHOOL-TIME ACTIVITY IN 3RD, 4TH AND 5TH GRADERS

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The present study examined the patterns of objectively measured school-time activity and the associated variables. One hundred and twenty-three children ranging from 8-11 years of age ($M = 9.54$ $SD = .92$) wore Caltrac activity monitors for one full school day to objectively measure activity. Weight, height and body fat using skinfold thickness were measured and VO_{2max} was estimated via submaximal cycle ergometry. The Self-Report of Activity (SRA) was completed to be used as a correlate of activity. All participants followed similar daily schedules that included a physical activity class. Descriptive results indicated a wide ranging, normally distributed activity pattern. Stepwise linear regression analysis using activity as the dependent variable indicated that activity increased for older males with lower body fat [$F(3,118) = 10.93$, $p < .000002$, R^2 Adj = 20.0%]. Independent T-test comparing lower and upper activity quartiles indicated significant differences in gender and body fat ($p < .01$) with a trend towards VO_{2max} ($p = .06$). The results suggest that within a uniform daily schedule leaner, male students accumulate significantly more activity which is not associated with subjectively reported activity.

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REACTIVE HYPEREMIA IS ATTENUATED FOLLOWING EXERCISE-INDUCED MUSCLE DAMAGE

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The purpose of the present investigation was to examine the effect of exercise-induced muscle damage on reactive hyperemia. Six subjects were tested in the supine position. Reactive hyperemic calf blood flow (CBF), elicited by 10 minutes of arterial occlusion, was measured via strain gauge plethysmography for 3 minutes before and 48 hours after exercise-induced muscle damage. Muscle damage was elicited by performing a total of 10 sets of unilateral calf raises to fatigue at 60% of maximum voluntary contraction. The first five sets were performed on a leg press machine and the remaining 5 sets were performed on a seated calf raise machine. One leg underwent the muscle damage protocol while the other leg served as control. Heart rate and mean arterial pressure, measured before and during the postocclusion period, were the same before and 48 hours after muscle damage. CBF and calf vascular conductance (CVC) following muscle damage were significantly attenuated during the first 90 s of the reactive hyperemia with no differences during the remaining 90 s. The data for the damaged leg are as follows (mean \pm S.E.; $\dagger p < 0.05$ vs. before):

		Reactive Hyperemia					
Trial		Baseline	5 s	15 s	30 s	60 s	90 s
CBF (ml/100ml/min)	Before	2.1 \pm 0.2	26.4 \pm 4.0	31.5 \pm 4.5	27.6 \pm 3.8	25.2 \pm 4.0	17.7 \pm 3.5
	After	1.8 \pm 0.4	23.0 \pm 3.0 \dagger	23.2 \pm 3.5 \dagger	21.5 \pm 3.7 \dagger	16.0 \pm 3.0 \dagger	13.1 \pm 3.1 \dagger
CVC ($\times 10$) (units)	Before	0.25 \pm 0.03	2.96 \pm 0.56	3.62 \pm 0.57	3.21 \pm 0.45	2.93 \pm 0.50	2.02 \pm 0.42
	After	0.22 \pm 0.05	2.70 \pm 0.46	2.68 \pm 0.44 \dagger	2.63 \pm 0.48 \dagger	1.86 \pm 0.41 \dagger	1.48 \pm 0.34 \dagger

There were no differences for any variable with the control leg. The data indicate that exercise-induced muscle damage impairs vascular vasodilation. This is the first demonstration that exercise-induced muscle damage affects local blood flow in humans.

Supported by N. I. H. Award AR44571

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FAT DISTRIBUTION AND HEMOSTATIC MEASURES IN OBESE CHILDREN

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Poor hemostatic function is a relatively newly identified risk factor for cardiovascular (CV) disease in adults. In many instances poor hemostatic function is one of a cluster of risk factors present, including obesity (abdominal obesity). However, less information is available about children. We examined the relationship of general (DXA) and visceral adiposity (MRI) to plasma hemostatic factors (fibrinogen, D-Dimer and plasminogen activator inhibitor-1 (PAI-1)) in obese boys and girls aged 7 to 11 years of age ($n = 41$). Univariate analyses revealed that fibrinogen was positively associated with % body fat (BF) ($r = 0.42$, $p < 0.01$), subcutaneous abdominal adipose tissue (SAAT) ($r = 0.40$, $p < 0.01$), total fat mass (TFM) ($r = 0.42$, $p < 0.01$), and body mass index (BMI) ($r = 0.41$, $p < 0.01$). PAI-1 was positively associated with visceral adipose tissue (VAT) ($r = 0.49$, $p < 0.01$), SAAT ($r = 0.32$, $p < 0.05$), fat free mass (FFM) ($r = 0.50$, $p < 0.01$), and insulin ($r = 0.61$, $p < 0.001$). D-Dimer was positively associated with % BF ($r = 0.40$, $p < 0.01$), SAAT ($r = 0.37$, $p < 0.05$), TFM ($r = 0.40$, $p < 0.01$), and BMI ($r = 0.43$, $p < 0.01$). Multiple regression analysis revealed that for fibrinogen, gender and higher % fat explained significant independent portions of the variance. For PAI-1, higher concentrations of VAT and FFM were significant predictors. For D-Dimer, ethnicity was a significant predictor. These results suggest that general adiposity and VAT may play a role in regulating plasma hemostatic factors in obese children. Even early in childhood, adiposity is associated with unfavorable concentrations of hemostatic factors that are in turn implicated in CV morbidity and mortality later in life.

Supported by grant HL 49549 from the National Heart, Lung and Blood Institute and grant 96014340 from the American Heart Association-Parke Davis Company

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PROTECTION AGAINST OXIDATIVE STRESS AND FATIGUE IN THE
DIAPHRAGM OCCURS WITH SHORT TERM ENDURANCE TRAINING

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Our purpose was to determine whether short term training (5 days) can increase the diaphragmatic antioxidant defense sufficiently to reduce oxidative stress and increase resistance to fatigue. Male Sprague-Dawley rats (60 days) were treadmill trained for 5 consecutive days at $\sim 70\% \text{VO}_2\text{max}$ (25 m/min, 0% grade, 60 min/day). Twenty-four hours after the last exercise session, costal diaphragm strips from control (CON, n=14) and trained (TR, n=13) animals were quickly excised and placed in an *in vitro* tissue bath. Peak twitch (PT) and tetanic tensions (TT) were measured, and the force-frequency curve was obtained. Strips were then subjected to a 60 min fatigue protocol (30Hz, 250 ms duration every 2 sec). No differences existed in the PT, TT or the force-frequency relationship. Forces were better maintained by the diaphragms of the TR at 5, 10 and 30, 40, 50 and 60 min during the 60 min fatigue protocol ($P < 0.05$). Following the fatigue protocol, strips from the TR animals showed 30% fewer lipid hydroperoxides compared to CON ($P < 0.05$). Exercise training also significantly increased the oxidative and antioxidant capacity (citrate synthase 11%, catalase 18%, glutathione 10%) of the costal diaphragm ($P < 0.05$). Western blotting analysis revealed that heat shock proteins (32kD, 72kD, 73kD) were not altered by exercise training. These data suggest that short-term exercise training: 1) can rapidly up-regulate enzymatic (catalase) and non-enzymatic antioxidant defenses (glutathione) in the diaphragm, and 2) this up-regulation is associated with a reduction in oxidative stress and improved fatigue resistance.

Supported by a Grant from the American College of Sports Medicine



Tutorial, Symposium and Clinical Case Abstracts



RECENT ADVANCES IN BODY COMPOSITION ASSESSMENT: AN UPDATE

Recent technological advances via dual-energy X-ray absorptiometry for measuring bone mineral, combined with the ability to measure body water with tracers have led to the development and use of multi-component models for determining body fatness. Therefore, the purpose of this symposium is to summarize recent advances in body composition assessment. This symposium will begin with a brief historical overview of the evolution of body composition assessment beginning with traditional indirect methods up to more modern technologies. This symposium will primarily focus on three recent applications of technology for determining body fat. First, there will be a discussion of the theoretical and practical bases of air displacement plethysmography for measuring body volume. Data will be presented on the reliability and validity of this new device compared to other criterion measures. Secondly, we will discuss the measurement of bone mineral content by whole body dual-energy X-ray absorptiometry and the resulting impact on body fat estimation. Issues such as the influence of different absorptiometer manufacturers and software versions on estimation of body fatness will be discussed. Lastly, there will be a discussion of various multi-component models based on the measurement of body density, bone mineral content, and/or body water. Differences between estimates of % fat from three- or four-component models and % fat from body density due to variation in body water and/or mineral among various populations will be discussed. Some general conclusions will be presented regarding the criterion measure for body composition assessment. The target audience will be students, practitioners, educators, and researchers in exercise science.

TS 1

TS 2

Purpose: This symposium will address the role of endogenous opioids and more specifically β -endorphins in the regulation of glucose metabolism during strenuous activity.

Content: Physical activity is known to stimulate the release of several endogenous opioid peptides one of which is β -endorphin. The significance of β -endorphin elevation during exercise as it pertains to glucose metabolism will be addressed in this symposium by presenting data from human and animal studies. Human studies will be presented to illustrate that opioids modulate the release of catecholamines and augment the release of glucagon during exercise. Animal data will be presented to illustrate that β -endorphin infusion during exercise influences plasma glucose by augmenting glucagon levels and attenuating insulin release.

Target Audience: This symposium is targeted toward both students and professionals in the area of exercise physiology and metabolism.

TS 3

SKELETAL MUSCLE BIOPSY - LIMITATIONS AND CONTRIBUTIONS TO EXERCISE SCIENCE

Gary A Dudley, PhD, FACSM, Department of Exercise Science, The University of Georgia, Athens, GA 30605

Purpose - Introduce the wealth of information that has been gained in studies where biopsies have been taken to assess human skeletal muscle as influenced by exercise. The idea is to introduce the important contribution that this technique has made to exercise science, and then present the salient features that must be appreciated to interpret results gained by its use.

Content - Since the 1960's hundreds of papers have been published where analysis of muscle biopsies were focal to the interests of the research. Few other techniques have made such a contribution to exercise science. At the same time, limitations of its application are seldom considered. Are the results representative of the muscle sampled, how fast does the sample need to be frozen? These and other issues will be addressed so that this technique will be carried on and receive increased use in the future.

Target Audience - Graduate students

THE ZONE DIET AND ATHLETIC PERFORMANCE: A CRITICAL EVALUATION
S.N. Cheuvront and J.L. Dupont. Department of Nutrition, Food, and Movement
Sciences, Florida State University, Tallahassee, FL 32306-2033

The Zone diet is the latest eating regimen marketed to improve athletic performance by opposing traditional high carbohydrate sports diets. It centers on protein intake and promises a change in the body's hormonal milieu through precise macronutrient alterations. These changes, in combination with the consumption of specific intermediates of lipid metabolism, are said to result in the production of more vasoactive eicosanoids, thus allowing greater oxygen delivery to exercising muscle.

TS 4

The purpose of this tutorial is to systematically examine and reveal the current evidence which objectively evaluates the Zone diet as an adjunct to improving performance. Research profoundly disputes any benefit to adopting such a diet although its popularity grows under a cloud of seemingly scientific "facts". For this reason, practitioners of exercise physiology, sports medicine, sports nutrition, and pre-professional students who work with athletes will benefit from this tutorial by understanding the diet's true ergolytic nature.

The purpose of this tutorial is to provide instructions on the use of software programs for the creation of citations and reference lists within manuscripts, papers and theses. Use of the programs Reference Manager, PubMed and Microsoft Word simplifies and quickens the creation and formatting of references and citations. Reference Manager and Microsoft Word are commercially available programs that reside on a personal computer. PubMed is a search engine that can be used to search Medline, a database with nine million citations maintained by the National Library of Medicine of the National Institutes of Health. PubMed is accessed using a commercially available network browser such as Netscape or Microsoft Internet Explorer. This tutorial will outline the use of these three programs. The sequence of steps outlined will take the audience through the steps of opening and accessing the programs, performing a Medline search, capturing and importing the findings of the search into a Reference Manager database, and finally composing a manuscript and developing citations and a reference list using Reference Manager and Microsoft Word.

TS 5

TS 6

Arthur Weltman - GH Overview - This section of the symposium will introduce GH, describe the physiologic role of GH, show the hypothalamic pituitary control pathways (GHRH, GHRP, somatostatin), and describe the effects of aging on GH release.

Jody Clasey - GH and Body Composition - Dr. Clasey will present data which indicates that GH is more strongly related to intraabdominal visceral fat than it is to total body fat. She will also present data which indicates that GH administration in GH deficient adults results in a preferential reduction in intraabdominal visceral fat. Dr. Clasey will examine age and gender differences in the GH/Body Composition relationship.

Arthur Weltman - GH and Exercise - Dr. Weltman will examine the relationship between acute and chronic exercise and GH release. He will present data that suggest that acute exercise stimulates GH release and that GH release during exercise is intensity dependent (with more GH release observed at exercise intensities above the lactate threshold). He will also show data which examine the potential mechanism of GH release during exercise (e.g. does exercise increase GHRH, GHRP, and/or result in somatostatin withdrawal). The effects of chronic training on 24 h levels of circulating GH will also be discussed.

The target audience includes exercise science students and faculty.

TS 7

The purpose of the symposium is to present the current research regarding inversion ankle sprain treatments, including the prevention of further sprains using ankle braces. The topics will include a brief overview of the etiology of the inversion ankle sprain, current treatment theories, research regarding the use of prophylactic bracing to prevent ankle sprains and research that has evaluated the efficacy of various braces to prevent excessive inversion without hindering performance. The expected audience would be physicians, physical therapists, athletic trainers and biomechanists.

This symposium will highlight current knowledge in aging research as it relates to physical activity and nutritional needs of the elderly. This symposium will be subdivided as follows:

1. An overview of the aging process from a physical and nutritional perspective
2. Exploring the benefits of physical activity as we age
 - a. How does an active versus a sedentary lifestyle affect our physiological aging processes?
 - b. How does specific types of exercise (resistance versus endurance) off-set the physiological signs of aging?
3. Exploring the nutritional needs of the elderly.
 - a. What are the nutritional needs of the elderly?
 - b. Can nutritional interventions improve our quality and quantity of life?
 - c. Are nutritional and hormonal interventions needed to improve our quality and quantity of life as we age?
4. Summary and question period

This symposium will be presented so that students, clinicians, and researchers are provided a concise yet up-to-date aging literature review in an effort to stimulate new areas of treatment interventions and/or research ideas.

TS 8

Conducting human research in the modern world requires careful attention to ethical considerations. Following exposure of the unethical and now infamous Tuskegee syphilis study, the U.S. Congress passed the National Research Act in 1974, requiring institutional review boards to approve all studies involving human subjects. For more than 20 years, research organizations have relied on these panels to ensure the ethical conduct of their investigators. While our students gain experience working on projects approved by such boards, they frequently have little schooling in the foundations or process of gaining approval. This tutorial will provide a brief history of human subjects research oversight, debate some of the common ethical dilemmas faced by researchers, and provide simple guidelines to demystify the "black box" of research approval.

TS 9

Putting Technology to Work for You

TS 10

The purpose of this tutorial is to provide the fitness professional, (educators, students, and practitioners), with some practical technological knowledge and skills (computer & Internet), and how these applications of modern technology can then be put to work for you. This tutorial will discuss some of the terminology dealing with computers and the Internet and provide an easy to follow outline of how to navigate with these applications. With this foundation in place, the focus will then shift to how to launch and integrate a variety of tools into your professional arsenal. Some of the topics to be discussed include: e-mail, search engines, building your website, understanding and using HTML, finding and creating information centers, job opportunities, classroom applications, and discussion groups. Each topic will provide an outline that the participant can take home and put into practice after the session. Emphasis will first target the novice, but also provide many upper level or advanced applications. Educators, students, and practitioners will walk away with the confidence of having an understanding of what is often viewed as a very technical environment.

TS 11

The mouse has become a valuable addition to the list of tools available to the exercise physiologist. This rodent species is especially suited to genetic analysis and provides unprecedented opportunity to investigate complex physiological processes and adaptations. This symposium will feature speakers who have used the mouse to investigate mechanisms underlying obesity, eating behavior, and changes in muscle performance due to training. Dr. Dewey will provide a mini-tutorial of mouse genetic models. Dr. Friedman will summarize how genes play a part in controlling body weight homeostasis and diabetes. Dr. Essig will describe a stress protein gene induced by exercise which confers protection against oxygen free radicals. Finally, Dr. Tsika will present studies on the regulation of the myosin gene which have provided insight into the regulation of muscle mass and fiber type characteristics. The symposium will hopefully target the graduate students in attendance who may be considering a career in exercise research.

EXERCISE, NUTRITION, AND PROTECTION AGAINST MYOCARDIAL ISCHEMIA-REPERFUSION INJURY

Scott K. Powers, Department of Exercise and Sport Sciences, Center for Exercise Science, University of Florida, Gainesville, Florida 32611

Coronary artery disease continues to be a major problem in the United States and other industrialized countries. Indeed, worldwide, millions of people die each year from myocardial infarctions. Therefore, developing a strategy to combat this problem is a major health priority. In this regard, it is commonly believed that regular exercise or dietary antioxidants are cardioprotective. Specifically, numerous human epidemiological studies have reported that the survival rate of heart attack victims is greater in active individuals compared to sedentary. Further, recent experimental studies have suggested that dietary antioxidants can reduce myocardial damage resulting from an ischemic-reperfusion insult. This tutorial lecture will provide an overview of recent experiments in our laboratory that have examined the role of both endurance exercise training and dietary antioxidants in protecting the heart against ischemia-reperfusion injury. Potential mechanisms to explain the link between endurance exercise, nutritional antioxidants, and myocardial protection against ischemia-reperfusion injury will be discussed.

TS 12

ATHLETES AT RISK: A PSYCHOLOGICAL PERSPECTIVE

Quintessential to the sport experience is the social process known as competition. Elite athletes in particular, are highly motivated to succeed (win, do well, master the environment, excel over others, etc.). To this end, many competitors are willing to place their physical safety in jeopardy (take risks). At professional or high ranking collegiate levels, incentives may be lucrative to the extent that prudence and discretion are subordinated to a dominant "will to win" or achieve at any cost. This Symposium provides an overview of the risk taking literature related to sport, and identifies associated issues and subissues. In particular, emphasis is placed upon the theoretical framework of Marvin Zuckerman, wherein stimulus seeking behavior (including risk taking tendencies) is viewed from a personological perspective. Data from 4 studies that have focused on risk taking tendencies vis-a-vis sport/motor behavior will be discussed. Finally, risk taking behavior among athletes as related to sport injury is addressed. This symposium should be of value to athletic trainers, orthopedic physicians, and others who may be professionally committed to clinical interventions aimed at causal and rehabilitative factors associated with sport injury.

TS 13

TS 14

The purpose of this tutorial is to summarize current scientific understanding regarding the relationship between physical fitness and vegetarian diets. The target audience includes all exercise scientists and graduate students who have an interest in this important area of sports nutrition. The available evidence does not support either a beneficial or detrimental effect of a vegetarian diet upon physical performance capacity, especially when carbohydrate intake is controlled. Concerns have been raised that an emphasis on plant foods to enhance carbohydrate intake to optimize body glycogen stores may increase dietary fiber and phytic acid intake to levels that reduce the bioavailability of several nutrients, including zinc, iron, and some trace minerals. There are no convincing data, however, that vegetarian athletes suffer impaired nutrient status from the interactive effect of their heavy exertion and plant-food based dietary practices, at least enough to impair performance and/or health. Although there has been some concern about protein intake for vegetarian athletes, data indicate that all essential and nonessential amino acids can be supplied by plant food sources alone as long as a variety of foods is consumed and the caloric intake is adequate to meet energy needs. Creatine, found in uncooked meat, has been urged as an ergogenic aid to athletes who perform repeated bouts of short-term high intensity exercise. However, further laboratory and field research is needed to help resolve the conflicting findings regarding the ergogenic efficacy of creatine. There has been some concern that vegetarian female athletes are at increased risk for oligo-amenorrhea, but evidence suggests that low energy intake, not dietary quality, is a major cause. In conclusion, the vegetarian diet per se is not associated with improved aerobic endurance performance. Although some concerns have been raised about the nutrient status of vegetarian athletes, a varied and well-planned vegetarian diet is compatible with successful athletic endeavor.

UNDERSTANDING EPIDEMIOLOGICAL RESEARCH IN EXERCISE SCIENCE: A TUTORIAL

S. Hannigan-Downs and T.J. Michael. Dept. of HPERS, Middle Tennessee State University, Murfreesboro, TN 37132

TS 15

In recent years there has been increasing attention to the relationship between chronic disease, lifestyle factors, and clinical outcomes. Epidemiological research has formed the basis for most of our understanding of these issues. The continuing need for epidemiological research is underscored by the fact that the annual cost of treating chronic diseases, such as Cardiovascular disease, has reached \$50 billion within the United States and is expected to increase as Americans live longer.

This presentation is designed to provide an introduction to the basic understanding of epidemiological methods and studies. Emphasis will be placed on different types of epidemiological research, including: measures of disease frequency; measures of effect; association and causation; and experimental and observational study designs used in the field of exercise science.

This sixty-minute tutorial will familiarize individuals with basic epidemiologic terminology, options in study design and concepts of data analysis while using examples from the current body of knowledge.

The American College of Sports Medicine (ACSM), the American Association of Cardiovascular and Pulmonary Rehabilitation (AACVPR), the American College of Cardiology (ACC), and the American College of Physicians (ACP), and the American Heart Association (AHA) have developed risk stratification models that classify patients entering cardiac rehabilitation into low, moderate, and high risk categories. All of these models primarily classify patients for untoward events based on left ventricular function, ischemic status of the myocardium, dysrhythmia, functional capacity, and history of prior serious untoward events such as cardiac arrest.

TS 16

A more comprehensive risk stratification model has been developed by the authors to include factors that not only contribute to an increased risk of untoward events but also takes into consideration the factors that may contribute to the progression of the underlying atherosclerotic process. This model includes personal cardiovascular history, blood pressure status, lipid status, cigarette smoking status and glycemic status. Data (N=243) from four cardiac rehabilitation programs comparing the level of risk associated with the two different models supports the concept that comprehensive risk stratification must take into account both the risk of untoward events and the risk associated with progression of the disease.

Title of Program: The Science of Training for Speed, Agility, and Quickness

Name of Organizer: T. Jeff Chandler, Ed.D., CSCS, FACSM

Speed, agility, and quickness training are commonly used to improve athletic performance. The extent to which these parameters can be improved with a conditioning program is a current topic of discussion. Empirical and scientific reports suggest that speed, agility, and quickness can be improved to some extent with training. The mechanisms by which these improvements occur are less clear. The purpose of this tutorial is to review both the empirical and scientific literature on speed, agility, and quickness training in athletic populations. Past and current research will be presented and discussed, and implications will be made for future research in this area. The target audience for this presentation is all attendees with an interest in athletic performance and athletic conditioning.

TS 17

The Performance Team: A System for Promoting the Well-Being of Athletes

TS 18

The Women's Athletics Department at the University of Tennessee, Knoxville has formed a multi-disciplinary group to enhance the health and well-being of female athletes. The Performance Team is coordinated by the head athletic trainer and the team physician and includes clinical and sports psychologists, nutritionists, physiologists, coaches, administrators, and others who work collaboratively to provide support to athletes. Primary foci of the Performance Team have been helping athletes avoid / overcome unhealthy eating patterns (eating disorders or disordered eating) and chemical dependency. The general purpose of this symposium is to share the structure and work of the Performance Team. The content will include details about the roles of the head athletic trainer and team physician in this structure, a description of the interface with treatment providers, and a discussion of intervention and treatment strategies. The target audience will be athletic trainers, team physicians, physiologists, strength and conditioning specialists, psychologists, and anyone else who works with athletes.

SCAPULA PAIN--FOOTBALL

Arnstine, K.S., M.D., University of Tennessee, Department of Family Medicine
Knoxville, Tennessee

HISTORY--17 year old high school football player presents with a chief complaint of "pain in the left shoulder blade." On the first play of the game, the preceding night, he was hit in the left upper torso. He then "caved in", fell backwards, and landed on his right side. He continued to play the rest of the game. He localizes his pain in the left upper back, from just left of the spine, across the left scapula. It is exacerbated with use of his left shoulder. Patient denies any neck pain or any numbness, tingling, or weakness down the left arm. There is no shortness of breath or chest pain.

TS 19a

PHYSICAL EXAM--The patient has normal ROM of the cervical spine without provocation of pain. His left clavicle appears slightly more prominent than the right. He has no other noticeable asymmetry on observation. There is no tenderness to palpation of the left clavicle, sternoclavicular joint, AC joint, acromial region, c-spine, nor t-spine. Patient has tenderness over the upper left scapula and over the left rhomboids. There is no point tenderness. Discomfort is elicited with protraction, retraction, elevation and depression of the scapula. There is normal ROM of the left shoulder and no detectable shoulder subluxation. His left upper extremity neurovascular exam is normal. Lungs are clear, with equal breath sounds bilaterally. Heart has a regular rate and rhythm, without murmur, rub, or gallop.

SYNCOPE -- BASEBALL

Wortley, G. C., M.D., Lynchburg Family Practice Residency
Lynchburg, VA

HISTORY -- 12-year-old black male with syncopal episode witnessed by coach while running wind sprints at Little League practice. Patient denies prodrome, chest pain or shortness of breath. No seizure activity seen. EMS arrived within 2 minutes and found patient awake, alert and oriented. Transported to ER where evaluation was "normal". EKG read as "normal for age". Five months later, while running he had a second syncopal episode. He was unresponsive for 3 minutes, awoke, and was confused for 15 minutes. No tonic/clonic activity seen. Driven to ER by mother.

FAMILY HISTORY -- Father died in helicopter crash. He had at least one syncope episode. Mother - alive and well. Had several syncope episodes as teenager. One sister - aged 10 years - no syncope.

PHYSICAL EXAM -- Athletic young man with heart rate of 52/min. Blood pressure 104/57. Height - 156 cms; weight 49 kg. There was no cyanosis or jugular venous distention. The lungs were clear. Normal heart sounds with no murmur, gallops or rales (one examiner noted a 1/6 systolic murmur). Neurologic examination normal.

TS 19b

LOWER LEG/ANKLE PAIN - SWIMMING

Zeller, R. L., M.S., ATC, Lexington Clinic Sports Medicine Center, Lexington, KY

HISTORY - 19 year-old, male swimmer who sustained a second degree lateral/syndamosis sprain to the right ankle seven weeks ago playing soccer. At three weeks post injury athlete was released to full activity with no complications exhibited. Currently, athlete complains of a burning pain in his anterior compartment of the lower leg during swimming workouts with symptoms persisting post activity. Mild numbness and weakness is also noted in right lower leg and foot. No new injury or possible mechanism of injury was reported.

PHYSICAL EXAM - The athlete exhibited palpable tenderness over the anterior compartment and decreased sensibility in the peroneal distribution as well in the plantar aspect of the foot. Active dorsiflexion is painful and weak (4/5) when compared bilaterally.

TS 19c

TS 19d

ACTIVE ISOLATED STRETCHING: A NEW TOOL
FOR REHABILITATION

B. H. Reuter, Dept. Of Health and Human Performance,
Auburn University, Al 36849

Rehabilitation specialists agree that returning range of motion (ROM) measures to preinjury values is an important part of rehabilitation. To achieve this goal stretching exercises are included in rehabilitation. Professionals do not agree on what is the best stretching technique. Active isolated stretching (AI) is a technique that utilizes contraction of antagonistic muscles to stretch the agonistic muscle, with assistance from a partner or rope in the extremes of the ROM. Unlike other techniques each stretch in AI is held for only 1.5-2 seconds and repeated for 8 or more repetitions. The theories behind this technique are a) contracting the antagonistic muscle to ensure that the muscle you are trying to stretch is relaxed and b) holding the stretch for 1.5-2 seconds to decrease the chances of activating the stretch reflex. At this time there is no research to confirm the success of AI stretching. However, the benefits seen in limited clinical usage justifies this attempt to expose the method to other rehabilitation professionals.

Title of Program: The Prevention of Traumatic and Overuse Injuries: Science or Myth?

Name of Organizer: T. Jeff Chandler, Ed.D., CSCS, FACSM

Prevention of injury is a proposed goal of many conditioning programs. The purpose of this tutorial is to present information to help determine the extent to which common sports-related injuries can be prevented, and to discuss the role of the physician, coach, athletic trainer, and conditioning specialist in the injury prevention program. Whether or not injuries can actually be prevented is largely unknown. Rather than preventing injury, properly designed and administered conditioning programs modify injury risk. Some of the factors that can be modified include strength, muscular endurance, cardiorespiratory endurance, and flexibility. Each factor may be related to both traumatic and overuse injuries by specific mechanisms that will be discussed. The interaction of the sports medicine team, generally consisting of a physician, therapist, coach, athletic trainer, conditioning specialist, and athlete will be discussed from the perspective of the physician, the athletic trainer, and the conditioning specialist. The target audience for this presentation is physical therapists, athletic trainers, conditioning specialists, and all attendees with an interest in modifying the risk of injury in athletes and other physically active persons.

TS 20

The mission of the Student Biomechanics Symposium is to provide a forum for young biomechanics researchers to present their current, scientific investigations. The symposium theme is biomechanical investigations of sports and exercise in aged, ill and injured populations. Historically, the symposium has provided professional training for many SEACSM members, many of whom have since presented at the national ACSM meeting. The Symposium will consist of six, 15 minute presentations, including 5 minutes of critical questions. The target audience is individuals working with aged, ill or injured populations along with biomechanics students and faculty.

The presentations are:

1. Aging alters the skeletal and muscular components of lower extremity stiffness during running.
2. EMG characteristics of young and elderly adults during running.
3. Generation of take-off velocity by amputee long jumpers.
4. A comparison of the inversion restraints provided by selected ankle orthoses.
5. Effects of a weight loss program on knee joint forces during walking in an obese, osteoarthritic population.
6. Gait characteristics after ACL-reconstruction and rehabilitation.

TS 21

The incidence of end-stage heart and/or pulmonary failure is increasing due to aging of the population and prolonged survival following acute cardiopulmonary insults. Organ transplantation is the recommended life extending treatment for many of these patients. The purpose of this symposium is to present recent advances in exercise physiology and exercise prescription for heart and lung transplant recipients. There is growing clinical consensus that exercise training is beneficial in transplant candidates before surgery and essential therapy for transplant recipients after surgery. Dr. Braith will summarize 10 years of experience at the University of Florida involving exercise challenges conferred by chronic cardiac denervation and glucocorticoid therapy after heart transplantation. Dr. Martin will present strategies used to prepare lung transplant patients for transplantation and the postoperative exercise rehabilitation. The state-of-the-art information presented in this clinical symposium will attract a broad SEACSM audience including both the Basic & Applied Science and Medicine interest areas. The information will have practical application for health care professionals and research application for basic and clinical scientists.

TS 22

TS 23

Over the last several years, significant research has been conducted to determine the effects of creatine supplementation on muscle bioenergetics, exercise performance, and body composition. Results of these studies suggest that short term (<7 days) and long-term (> 7-84 days) of creatine supplementation may be effective in increasing intramuscular creatine content, enhancing phosphocreatine resynthesis following intense exercise, improving repetitive sprint performance, enhancing the quality of training, and increasing lean body mass. Consequently, creatine supplementation has become one of the most popular nutritional supplements in recent history. Moreover, numerous athletic teams now provide creatine to their athletes. However, there have been several concerns recently described in the popular media regarding medical safety of creatine supplementation, recommendations of use, the ethics of recommending and/or using creatine for performance enhancement, and legal concerns of athletic teams providing supplements to athletes. This tutorial will provide an update regarding our current understanding of the effects of creatine supplementation on exercise and body composition as well as discuss the medical safety, ethics, and legal issues of creatine supplementation. This presentation will be of interest to a large number of attendees interested in nutrition and training/conditioning of athletes.

TS 24

Behavior change is required to meet most of the year 2000 health objectives for the nation. Lack of basic knowledge on the part of health professionals about factors that determine, stabilize or modify target behaviors contributes to the failure of many well-intentioned interventions. Therefore, attempts to change health behaviors through individual therapeutic interventions or through large-scale programs must include a theoretical rationale or empirical foundation in order to increase the likelihood of success. The purpose of this tutorial is to provide an understanding of some of the theories of behavior change that are in current use by researchers and practitioners. The Health Belief Model, Social Cognitive Theory, and the Transtheoretical Model will be presented with emphasis on application to behavior change efforts. Those who are working or are preparing to work with individuals on health-related lifestyle concerns would benefit from this tutorial.

Although a number of radiation accidents have been associated with the use of nuclear power and industrial applications of radioactive materials in recent years, limited data exists on the short-term and long-term health consequences when humans are exposed to these materials. During the past three years, I have had the opportunity to work as a visiting scientist at the Radiation Medicine Clinic in Kiev, Ukraine and to assist with data collection of 200 patients who were exposed to radiation during the Chernoble disaster. The purpose of this tutorial would be to examine the changes in VO₂ max, in blood lipid profiles and cardiac function that have resulted since exposure in this subject population.

TS 25

The content would include mean data presented in a longitudinal fashion to illustrate the physiological changes that have occurred following semi-annual examinations in the medical clinic. These would include GXT results (HR, BP, EKG, and VO₂ max) of men composing three exposure groups (low, moderate, and high) since the time of the accident.

The target audience would include exercise physiologists who are considering other research opportunities, exercise physiologists who see a variety of patients in a clinical setting (over 50,00 immigrants with low-level exposure have relocated in the US since the disaster, and medical doctors and others who have an interest in environmental issues and the health-related impact they may have.

EXERCISE SCIENCE: CAREER OPPORTUNITIES

L. Kravitz, Department of Exercise Science and Leisure Management,
University of Mississippi, University, MS 38677

Exercise science is an expanding multidisciplinary field that encompasses human movement, exercise performance, health, sport sciences, corporate and community fitness, rehabilitation and wellness. The traditional educational delivery system has prepared graduates for careers in teaching and human movement programs. Opportunities now exist in a number of related disciplines for the exercise science professional. The purpose of this tutorial is to present the growing community of exercise science professionals with some of the emerging career paths. Content will identify new and developing career tracks in health and fitness, sports sciences, exercise rehabilitation, fitness management, computer technology, lifestyle and exercise consulting, therapeutic sciences and human factors. The recent national ambitions to involve the mass population in low-intensity participation programs is opening up several new initiatives for the exercise scientist to become involved in the design, delivery and management of this process. With a solid grounding in the principles of exercise science, there are a number of professional pathways to explore.

TS 26

TS 27

The American College of Sports Medicine recommends the measurement of physical fitness for preventive and rehabilitative exercise programs. Physical fitness testing: (a) provides data used to develop exercise prescriptions, (b) allows cardiovascular disease risk stratification, (c) aids in the establishment of attainable fitness goals, and (d) can be used to educate participants about physical fitness concepts. Prediction of VO_2 max for risk stratification and exercise prescription is the cornerstone of fitness testing. As a result, many different models have been developed for predicting VO_2 max. In this symposium, we will examine: (a) underlying physiological principles for predicting VO_2 max, (b) statistical treatments used to evaluate prediction capabilities of various methods, and (c) different models for predicting VO_2 max. The target audience for this symposium includes exercise specialists who use VO_2 max prediction models in teaching, clinical, or fitness settings.

CONTROL OF AUTONOMIC NERVOUS SYSTEM FUNCTION DURING PHYSICAL ACTIVITY. G.A. Hand, Univ. of South Carolina (Chair); L.B. Wilson, Univ. of S. Alabama College of Medicine; J.M. Overton, Florida State Univ.; C.A. Ray, Univ. of Georgia.

The autonomic nervous system (ANS) is the major determinant of sympathoexcitation and blood flow delivery during physical activity. Autonomic output is controlled by descending neural activity originating in supramedullary brain regions (Central Command) and by ascending peripheral sensory input. The objectives of this symposium are to 1) discuss the mechanisms of ANS control during exercise, especially the effects on cardiovascular function; 2) present current experimental approaches to neuroscience research in exercise science; and 3) discuss the major questions that are likely to be addressed by future research. Topics will include: the role of excitatory amino acids in signal transmission at the spinal level, inhibition of sensory input from active muscle, the role of central command in controlling cardiovascular function, and vestibular sympathetic reflexes in humans. Information presented will be relevant to scientists and clinicians interested in the central and peripheral nervous system and in control of blood pressure and heart rate during exercise.

TS 28

The purposes and content of this tutorial are:

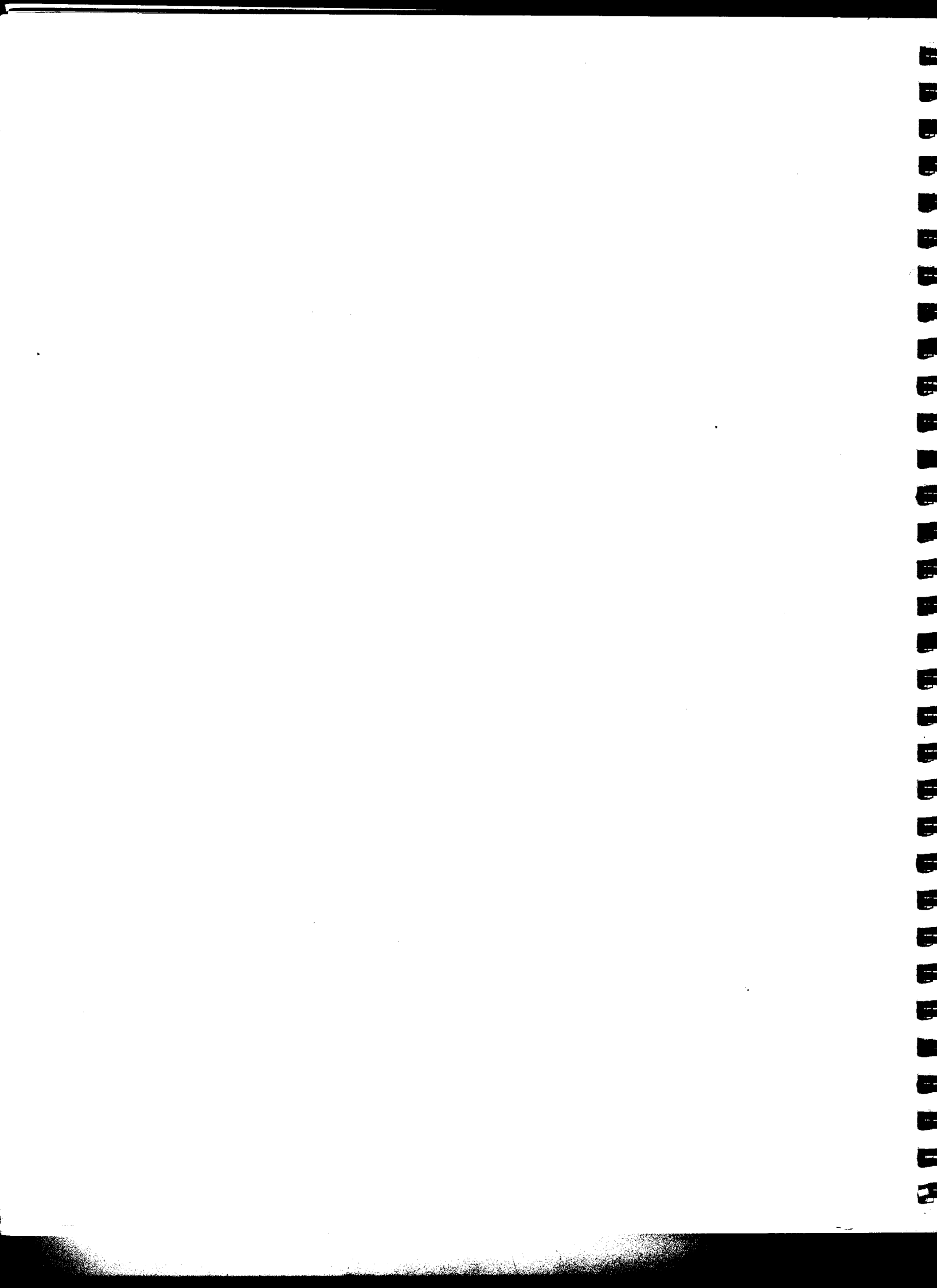
1. To explore what is known about the extent to which diseases that customarily manifest themselves relatively late in life, such as coronary artery disease, non-insulin dependent diabetes mellitus and osteoporosis, actually begin during childhood;
2. To review recent cross-sectional and prospective cohort studies suggesting that already in childhood, various components of body composition are associated with risk factors for these adult diseases;
3. To review recent experimental studies concerning how physical training in childhood influences body composition and other risk factors for adult diseases;
4. To propose some hypotheses and research strategies that might help members of the audience to advance knowledge of this topic further.

The target audience is graduate students, teachers, clinicians and clinical scientists who are interested in how lifestyle factors such as exercise and body composition influence the early etiology of adult diseases.

TS 29

Utilizing a unique multidisciplinary approach to structural bodywork you will not only isolate the missing link responsible for chronic low back pain but also realize the compensations resulting in conditions such as sciatica. To assure long lasting structural balance and pelvic stabilization you will learn to use skills such as myofascial release, neuro muscular therapy, cross fiber friction, muscle energy, work, proprioceptive neuro muscular facilitation, and how to interact with sports psychologist to retrain the subconscious mind through specific neuro muscular re-education which assures long lasting results. The purpose of this presentation is to look at causes of mechanical back pain. The term "facet syndrome" has been used throughout the literature to describe pain originating from suspected biomechanical origin. The term remains controversial. This presentation will discuss suspected etiology, differential diagnosis, physical examination findings and treatment. Treatment includes the options of natural history, conservative care, anti-inflammatory medications and injections. Emphasis will be placed on the conservative approach to treatment utilizing flexion-distraction, manipulation and will also feature a discussion of specific exercises designed to aid in the control of pain associated with this disorder. The treatment presented represents 20 years of clinical experience. When treating back pain of suspected biomechanical origin, one should consider conservative treatment including flexion-distraction and manipulation.

TS 30



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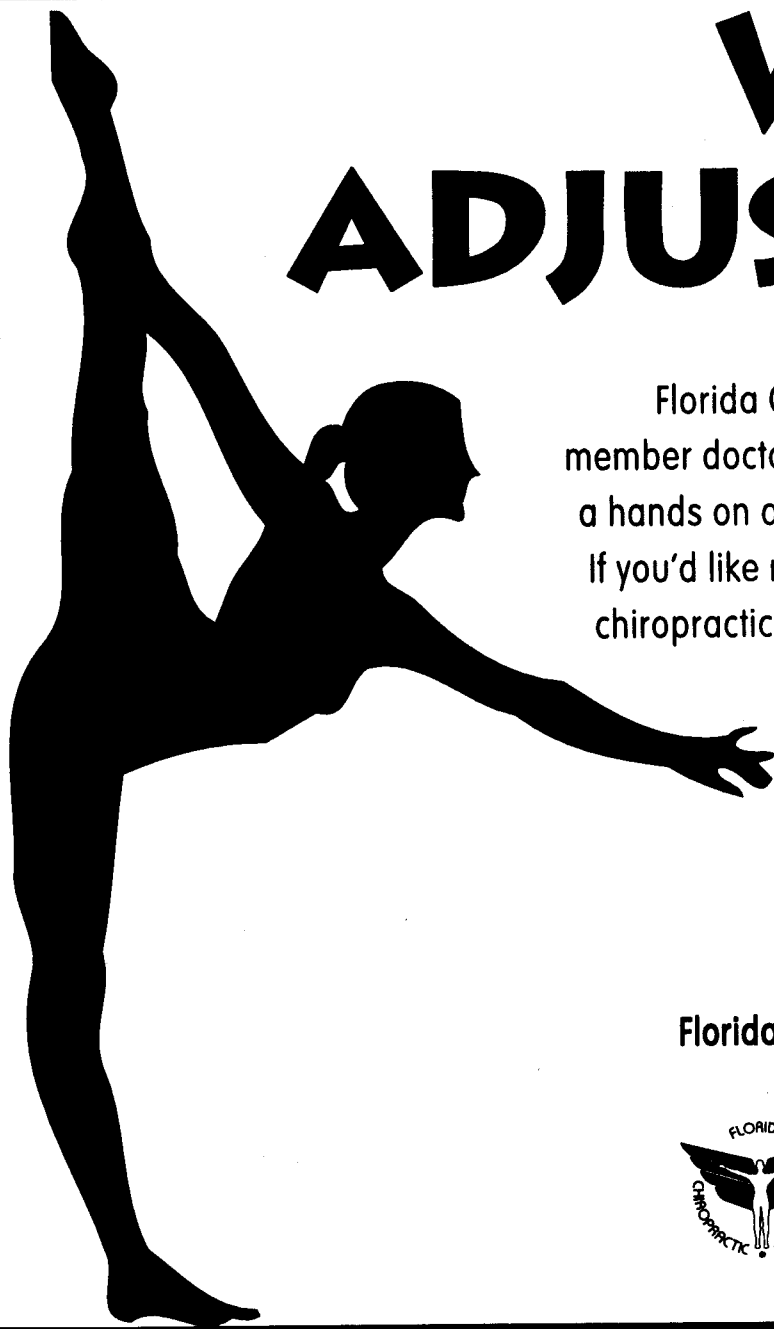
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