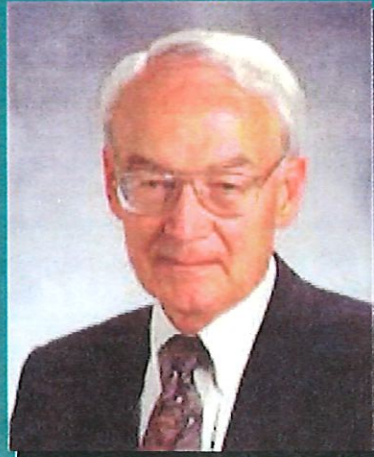


Central States Regional Chapter American College of Sports Medicine

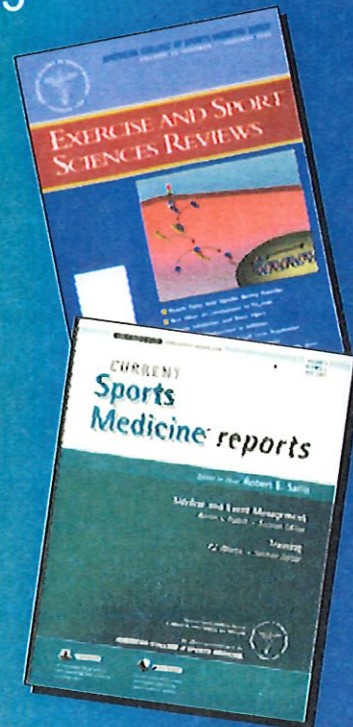
Kansas City, October 20 & 21, 2005

Featured Speakers



Jack Wilmore, PhD, FACSM

“The Obesity Epidemic:
Focus on Treatment or Prevention?”
“The HERITAGE Family Study:
An Overview and Selected Results”



Wojtek Chodzko-Zajko, PhD, FACSM

“The National Blueprint to Promote Physical
Activity for People Age 50 and Older”

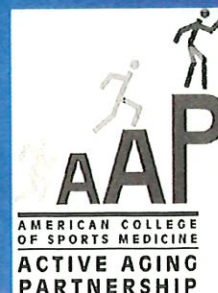
Aging & Obesity



Phil Page, MS, PT, ATC

“The Active Aging Toolkit”

Also: Oral and Poster Research
Presentations
& Student Awards



**American College of Sports Medicine-
Central States Chapter Annual Meeting**

Embassy Suites, Kansas City, Missouri

Thursday, October 20th through Friday, October 21st, 2005



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The American College of Sports Medicine's Professional Education Committee certifies that this Continuing Education offering meets the criteria for 8.00 credit hours of ACSM Continuing Education Credit.

American College of Sports Medicine- Central States Chapter Annual Meeting

Embassy Suites, Kansas City, Missouri
Thursday, October 20th through Friday, October 21st, 2005



Thursday, October 20th, 2005 (Afternoon)

- | | | |
|--------------|--|---|
| 12:00 – 1:00 | <u>Room: Lobby/Atrium</u>
Registration/Voting Begins | |
| 1:00 – 1:15 | <u>Room: Morelia I</u>
Michael E. Rogers, PhD, FACSM
Welcome and Announcements | |
| 1:15 – 2:15 | <u>Room: Morelia I</u>
Jack Wilmore, PhD, FACSM
<i>“The Obesity Epidemic: Focus on Treatment or Prevention?”</i>
<i>Sponsored by the Gatorade Sports Science Institute</i> | |
| 2:15 – 3:00 | <u>Room: Morelia I</u>
Mark Stovak, MD
<i>“Pediatric Sports Injuries and Prevention”</i> | <u>Morelia II</u>
E. Laurette Taylor, PhD
<i>“Measurement of Postural Sway and Physical Function”</i> |
| 3:00 – 3:45 | <u>Room: Morelia I</u>
Sarah Hampl, MD
<i>“Childhood Obesity: A Community’s Response”</i> | <u>Morelia II</u>
Phil Page, MS, PT, ATC
<i>“Sensorimotor Training: Current Concepts in Progressive Balance Training”</i> |
| 3:45-4:00 | Refreshment Break | |
| 4:00-4:45 | <u>Room: Morelia I</u>
Rich Sabath, EdD, FACSM
<i>“Recognition, Evaluation and Treatment of Non-Cardiac Chest Pain in Pediatric Populations”</i> | <u>Morelia II</u>
Joel T. Cramer, PhD
<i>“The noninvasive assessment of muscle function in older vs. younger adults”</i> |
| 4:45-5:30 | <u>Room: Morelia I</u>
Beth Bubolz, MD
<i>“Sudden Cardiac Death: Prediction, Evaluation, Prevention”</i> | <u>Morelia II</u>
Barbara Quaney, PT, PhD
<i>“Brain function in older adults: Using aerobic exercise to drive neuroplasticity”</i> |
| 5:30-7:00 | <u>Room La Paz 1</u>
Central States Administrative Council Meeting
Joe Pujol, PhD, FACSM | |

3:00-3:15 Student Paper: Amy Flewelling
3:15-3:30 Student Paper: Kevin Farmer
3:30-3:45 Student Paper: Sandra Billinger
3:45-4:00 Student Paper: Eric Ryan
4:00-4:15 Student Paper: Cecilie Fjeldstad
4:15-4:30 Student Paper: Luke Acree

4:30-5:30

La Paz

Poster Session

Poster #1 – Jermaine Gales
Poster #2 – Stephen Hrcir
Poster #3 – Doug Young
Poster #4 – Thomas Buford
Poster #5 – Alison Egan
Poster #6 – R. Scott Rector
Poster #7 – Heidi VanRavenhorst-Bell
Poster #8 – Carl Giaachi
Poster #9 – Holly Hull
Poster #10 – Michael Paddock
Poster #11 – Melissa Powers
Poster #12 – Stephen Rossi
Poster #13 – Pam Hinton
Poster #14 – Bert Jacobsen
Poster #15 – James Navalta
Poster #16 – Elizabeth Stewart
Poster #17 – Doug Smith
Poster #18 – Jeremy Patterson

Central States Chapter Social

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LEARNING OBJECTIVES

Intended Audience

ACSM members, students and professionals interested in the field of sports medicine and exercise science.

Learning Objectives

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

- Recognize contemporary controversial issues related to sports medicine, exercise science, and health promotion
- Identify new approaches to, and perspectives on, problems in exercise science and sports medicine through interaction among scientists and clinicians in related fields.
- Discuss the role of orthotics in injury prevention.
- Identify current issues related to fluid balance in children and adolescence during hot weather exercise.
- Recognize the importance of research in understanding problems related to physical inactivity.

Statement of Need

A need for this annual program has been determined by CSC/ACSM Board Members as well as evaluations from previous annual meetings.

CEC Credit

The American College of Sports Medicine's Professional Education Committee certifies that this Continuing Education offering meets the criteria for 8.0 credit hours of ACSM Continuing Education Credit. Individuals who wish to receive CEU's must complete an attendance verification form and send it to the National Office along with the appropriate fee (\$15.00 ACSM members and \$20.00 for non-members).

Commercial Sponsors

The American College of Sports Medicine and the Central States Chapter gratefully acknowledge the educational grants provided by ACSM, Gatorade Sports Science Institute, and Hans Rudolph

Doctoral Student Award Recipient

Leonardo Ferreira
Kansas State University

**EFFECTS OF ALTERED NITRIC OXIDE AVAILABILITY ON RAT MUSCLE
MICROVASCULAR OXYGENATION DURING CONTRACTIONS**

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Aging, chronic heart failure (CHF) and diabetes are all associated with vascular endothelial dysfunction. Compared with muscles from young healthy individuals those from old and CHF/diabetic individuals exhibit a reduced muscle microvascular O₂ pressure (PO_{2mv}) at the onset of contractions that is expected to impair blood-myocyte O₂ exchange. **PURPOSE:** To explore the putative role of nitric oxide (NO) in controlling PO_{2mv} at rest and during contractions, we tested the hypotheses that at the onset of contractions (1 Hz) sodium nitroprusside (SNP, ↑ NO) would raise PO_{2mv} and slow the kinetics of PO_{2mv} change whereas L-nitro arginine methyl ester (L-NAME, ↓ NO) would decrease PO_{2mv} and speed its kinetics. This would assess the potential for derangements in NO production to induce the PO_{2mv} and O₂ kinetics impairments characteristic of aged and CHF/diabetic individuals. **METHODS:** Separately, we superfused the spinotrapezius muscle of female Sprague-Dawley rats (n = 7, body mass = 298 ± 10 g) with a NO donor SNP (300 μM) and the NO synthase inhibitor L-NAME (1.5 μM) during muscle contractions. Microvascular PO₂ was measured by phosphorescence quenching. **RESULTS:** SNP decreased mean arterial pressure (92 ± 5 mmHg) below that of control (CON, 124 ± 4 mmHg) and L-NAME (120 ± 4 mmHg) conditions. SNP did not raise PO_{2mv} at rest but it did slow the response kinetics by lengthening the time delay (TD, 14 ± 5 s), time constant (τ, 24 ± 10 s) and mean response time (MRT, 38 ± 4 s) of the response compared with CON (TD, 8.4 ± 3.3 s; τ, 16 ± 4.5 s and MRT, 25 ± 1.5 s, P < 0.05). In contrast, L-NAME decreased PO_{2mv} at rest and speeded τ (10.1 ± 3.8 s, P = 0.05), while TD (8.1 ± 1 s) was not significantly different. However, the MRT (18 ± 1 s) was faster for L-NAME compared to CON. Moreover, L-NAME caused PO_{2mv} to transiently fall below steady-state values. **CONCLUSION:** These results indicate that NO availability can significantly affect PO_{2mv} at rest and during contractions and suggests that PO_{2mv} derangements in aging and chronic disease conditions may potentially result from impairments in NO availability.

Supported by AHA (0455582Z), NIH-HL (50306), NIH-AG (19228) and CAPES/Brazil (164902-7)

ORAL PRESENTATION #2

Undergraduate / Master Student Award Recipient

Justin Bland
Harding University

EFFECTS OF LOW-MODERATE DOSES OF CAFFEINE ON SUBMAXIMAL EXERCISE RESPONSES IN 7-9 YEAR OLD CHILDREN

J.R. Bland, B.L. Phillips, K.R. Turley, FACSM. Human Performance Laboratory,
Harding University, AR

Only two studies have systematically investigated the effects of caffeine during exercise in children (Barta, *Acta Paediatr.*, 1982; Turley, *Med. Sci. Sports Exerc.*, 2005). Both studies used relatively high levels of caffeine (4.0 and 5.0 mg caffeine/kg body mass, respectively). No study has used lower doses to determine their effects on physiological responses to submaximal exercise in young children. **PURPOSE:** Investigate the effects of low-moderate doses of caffeine on metabolic and cardiovascular responses to exercise in young children. **METHODS:** Six 7-9 year old children (3 girls & 3 boys) voluntarily participated in a double-blind, counter-balanced study design. Children received either a placebo (drink only-PL), 1.0 mg/kg body mass (CAF-1), and 3 mg/kg body mass (CAF-3) of anhydrous caffeine (mixed in cherry flavored Sprite[®]) on three separate days. Following a 60 minute absorption period children rode at 25 W and then 60% VO_2 max for 8 minutes each on an electronically braked cycle ergometer at 60-80 RPM while heart rate (HR), oxygen consumption, and respiratory exchange ratio (RER) were monitored continuously, and blood pressure (BP) was measured every two minutes. **RESULTS:** HR was similar at both 25 W (122 ± 15 , 116 ± 9 , 120 ± 8 bpm) and 60% VO_2 max (162 ± 11 , 157 ± 10 , 158 ± 10 bpm) in PL, CAF-1, and CAF-3, respectively. There were no differences in systolic BP (SBP) at 25 W (126 ± 10 vs 125 ± 5 mmHg) or 60% VO_2 max (148 ± 8 vs 148 ± 8), and diastolic BP (DBP) at 25 W (64 ± 4 vs 67 ± 5) or 60% VO_2 max (66 ± 5 vs 67 ± 5) between PL vs. CAF-1, respectively. There was a trend for lower SBP at 25 W (126 ± 10 vs 135 ± 5 mmHg - $p=0.06$) and 60% VO_2 max (148 ± 8 vs 153 ± 7 - $p=0.22$), and lower diastolic BP (DBP) at 25 W (64 ± 4 vs 70 ± 8 - $p=0.09$) and 60% VO_2 max (66 ± 5 vs 70 ± 4 - $p=0.06$) between PL vs. CAF-3, respectively. VO_2 was the same at both 25 W (0.65 ± 0.07 , 0.68 ± 0.10 , 0.69 ± 0.11 l \cdot min) and 60% VO_2 max (1.12 ± 0.16 , 1.14 ± 0.20 , 1.14 ± 0.21 l \cdot min) in PL, CAF-1 and CAF-3, respectively. RER was also the same at both 25 W (0.93 ± 0.04 , 0.89 ± 0.01 , 0.94 ± 0.06) and 60% VO_2 max (0.97 ± 0.04 , 0.94 ± 0.03 , 0.97 ± 0.04) in PL, CAF-1 and CAF-3, respectively. **CONCLUSION:** In young children, low (1 mg/kg body mass) doses of caffeine do not have an effect on cardiovascular or metabolic responses to submaximal exercise. Moderate (3 mg/kg body mass) doses of caffeine have no metabolic effects in young children, but there is a trend for elevated blood pressure at this dose.

ORAL PRESENTATION #3

INFLUENCE OF BODY FAT ON EXERCISE-INDUCED BRONCHOCONSTRICTION

A.M. Flewelling¹, M.D. Haub² and C.A. Harms¹ FACSM. Department of Kinesiology¹ and Department of Human Nutrition², Kansas State University, Manhattan, KS. email: amyflew@ksu.edu

The prevalence of obesity and asthma (including exercise-induced bronchoconstriction, EIB) are both increasing in the United States. While previous research suggests a link between obesity and EIB, the effect of body fat on airway hyper-reactivity following exercise is not known. **PURPOSE:** To determine the effect of body fat on airway function in subjects with EIB. **METHODS:** Thirteen subjects (4 M, 9 F) with EIB (determined by >10% decrease in FEV₁ following an exercise bout and a eucapnic voluntary hyperventilation test: EVH) were divided into 3 groups (high fat HF, n=5; mod fat MF, n=4; low fat LF, n=4) based on total body fat (g) relative to height (HF 161.4±19.5; MF 117.5±8.5; LF 63.5±9.9 g/cm; P<0.05) determined via DXA (Lunar). Pulmonary function tests (PFT) and exhaled nitric oxide (eNO; Sievers) were determined in triplicate pre and post (min 5, 15, 30) exercise. Subjects completed a steady state 8 min exercise test on a cycle ergometer at a workload based on a target ventilation of ~50-60% predicted maximal voluntary ventilation while breathing dry air. **RESULTS:** There was no difference (P>0.05) between groups in resting PFT and eNO, or metabolic and ventilatory variables during exercise. However, the decrease in FEV₁ from baseline to 5 min post exercise was less (P≤0.05) in MF (-15.5 ± 1.4%) compared to LF (-28.5 ± 6.6%) and HF (-31.2 ± 1.4%). Also, at 5 min post exercise, the decrease in eNO was significantly greater in MF (-18.6±2.7%) vs. HF (-8.8±2.5%). There was no difference (P>0.05) at min 15 or 30 post exercise in any variable. **DISCUSSION:** These results suggest that both high and low body fat negatively influences airway hyper-reactivity in subjects with EIB compared to subjects with moderate body fat amounts. The mechanism responsible may be a greater brochoprotective role of airway nitric oxide in moderately fat individuals.

Supported by Kansas State University Small Research Grant

ORAL PRESENTATION #4

EFFECTS OF CHEST CONSTRICTION ON AEROBIC CONDITIONING

K.L. Farmer, J.A. Patterson, Department of Kinesiology and Sports Studies,
Wichita State University, Wichita, KS, 67208; email:

jeremy.patterson@wichita.edu (Sponsor: M.E. Rogers, FACSM)

The aim of the present study was to determine whether a reduction in lung volume and chest wall movement using an externally applied thoracic constriction band over an eight-week training period, can improve an individuals' performance. **METHODS:** 21 healthy, non-active adults (26 ± 4 yrs (mean \pm SD)) were studied over a period of 8 weeks during which they participated in aerobic exercise (3 days/week for 30 minutes/session at a moderate intensity estimated at 65% to 80% of their maximal exertion). Aerobic capacity ($\text{VO}_{2\text{max}}$) and pulmonary lung function (FVC, FEV₁, FEF, PEF) was measured Pre, Mid, and Post 8 weeks. Following the pre testing, participants were randomly placed into one of two groups: (1) Chest Wall Restriction Group (CWR), or (2) Control (the Non-Chest Wall Restriction Group (N-CWR)). The CWR Group performed the exercise sessions while wearing an elastic strap. Participants were encouraged to use a treadmill, elliptical machine, and/or stationary cycle randomly and in any order to complete the exercise session. **RESULTS:** Pulmonary lung function measures were not changed over the 8 weeks for both groups. At 8 weeks experimental and control groups had significant increases in $\text{VO}_{2\text{max}}$ (33.55 ± 6.48 to 37.78 ± 7.11 and 33.30 ± 10.39 to 36.01 ± 9.09 respectively). Units for $\text{VO}_{2\text{max}}$ are shown in $\text{ml}\cdot\text{min}^{-1}\cdot\text{kg}^{-1} \pm \text{SD}$. However, a significant $11 \pm 4\%$ improvement in aerobic capacity was observed in the experimental group at just 4 weeks compared to the control group $3 \pm 6\%$ ($P < 0.05$). **CONCLUSION:** An externally applied thoracic constriction band during aerobic exercise may assist in increasing aerobic capacity more rapidly than training without an externally applied thoracic constriction band.

ORAL PRESENTATION #5

USE OF A RECUMBENT STEPPER TO OBTAIN MAXIMAL OXYGEN CONSUMPTION

S.A. Billinger, J.K. Loudon, and B. Gajewski . Georgia Holland Cardiopulmonary and Neuromuscular Research Lab, Department of Physical Therapy and Rehabilitation Science, University of Kansas Medical Center, Kansas City, KS;
Email:sbillinger@kumc.edu

Maximal oxygen consumption (VO₂max) is the primary measure for cardiorespiratory fitness. The VO₂max value achieved on the treadmill is considered the gold standard. Some populations (e.g. individuals following stroke) can not tolerate a treadmill test. Therefore, an exercise mode such as the recumbent stepper would be beneficial for measuring VO₂max in this population.

Purpose: To assess the validity of a maximal exercise test using a recumbent stepper in determining maximal oxygen consumption (L/min). **Methods:** Eighteen healthy adults (6 females, 12 males; 26.89 ± 6.05 years of age) participated in two maximal exercise tests. The first exercise test was performed on the treadmill using the Bruce protocol and the second exercise test performed used the recumbent stepper. **Results:** Statistical analysis of data was conducted using simple linear regression where the dependent variable was the VO₂ max from the Bruce protocol and the independent variable was the VO₂ max from the recumbent stepper. A 95% prediction interval (PI) was used to assess the strength of the prediction of VO₂ from Bruce protocol. The slope and intercept point estimates were 0.96 and 0.57 respectively with an R-squared of 0.851. **Conclusion:** Preliminary data suggests that the recumbent stepper may be a valid test to predict maximal oxygen consumption when treadmill testing is not feasible.

ORAL PRESENTATION #6

ALLOMETRIC SCALING MODELS OF ISOMETRIC BICEPS STRENGTH AND THE EFFECTS OF RESISTANCE TRAINING IN MEN

E.D. Ryan^{1,2}, R.F. Zoeller², H. Gordish³, T. Price⁷, T. Angelopoulos⁴, N. Moyna⁵, P. Gordon⁶, S. Bilbie⁷, P.D. Thompson⁷, E.P. Hoffman³. ¹University of Oklahoma, Norman, OK; ²Florida Atlantic University, Davie, FL; ³Children's National Medical Center, Washington, DC; ⁴University of Central Florida, Orlando, FL; ⁵Dublin City University, Dublin, Ireland; ⁶University of West Virginia, Morgantown, WV; ⁷Hartford Hospital, Hartford, CT. email: eryl@ou.edu

Muscle strength indices are commonly used to assess muscle function within groups. However, strength testing results are confounded by body size or normalized using inappropriate methods. **PURPOSE:** The purpose of this study was to 1) derive allometric scaling models using pre-training muscle cross-sectional area (CSA) of the non-dominant arm and body mass (BM) as scaling variables, 2) test model appropriateness using regression diagnostics, and 3) cross-validate the models before and after training to determine if the relationship between the scaling variables (BM and muscle CSA) and isometric strength are effected by 12 weeks of resistance training. **METHODS:** A subset of males from the FAMuSS (Functional SNP's Associated with Muscle Size and Strength) study data (N=136) was randomly split into two groups (A n=68) and (B n=68). A log-log-linear regression analysis was performed to determine scaling exponents for both variables with Group A's pre-training data. Homoscedasticity and the independence of the power ratio were determined via residual examination and linear regression of the newly scaled variable. Group A's scaling variables were then applied to Group B and evaluated for independence of the power ratio. Group A's scaling exponents were then applied to post-training measures and evaluated for independence of the power ratio. **RESULTS:** Group A pre-training data for male BM, and male CSA models produced scaling exponents of 0.63 and 0.68, respectively. Both models met statistical criteria yielding a random residual distribution and independence of the power ratio. Cross-validation to Group B pre-training data revealed that the male BM model was independent of the power ratio ($p > 0.05$), while the male CSA was not ($p < 0.05$). Cross-validation to post-training measures revealed both models were independent of the power ratio. **CONCLUSIONS:** Twelve weeks of resistance training did not alter the relation between BM, CSA, and muscular strength assessed by allometric scaling in adult males.

ORAL PRESENTATION #7

OBESITY, QUALITY OF LIFE AND FACTORS AFFECTING STANDING BALANCE

C. Fjeldstad, A.S Fjeldstad, L.S Acree, K.J Nickel, and A.W Gardner. Department of Health and Exercise Science, University of Oklahoma, Norman, OK

Purposes: To determine (1) whether obese older adults had higher prevalence of falls and ambulatory stumbling, impaired balance and lower health-related quality of life than their normal weight counterparts and, (2) whether the falls and balance measures were associated with health-related quality of life in obese adults. **Methods:** Measures were obtained from 216 individuals, males (n = 91) and females (n = 125). Subjects who had a body mass index (BMI) greater than 30 kg/m² were classified into an obese group (n = 128; BMI = 35.5±6.8 kg/m²; mean ±s.d.) while those with BMI < 25 kg/m² were included into a normal weight group (n = 88; BMI = 22.9±2.8 kg/m²). A battery of functional tests was performed for assessment of balance, and questionnaires were administered to obtain information on the history of falls and stumbling during ambulation, as well as quality of life relating to various aspects of their physical and mental health. **Results:** The obese group reported a significantly higher prevalence of falls (27% vs. 15%, $P = .038$) and ambulatory stumbling (32% vs. 14%, $P = .003$) than the normal weight group. Furthermore, the obese group had lower health-related quality of life measures than the normal weight group for physical function (63 ± 27 vs. 75 ± 26, $P = .002$), role-physical (59 ± 40 vs. 74 ± 37, $P = .004$), vitality (58 ± 23 vs. 66 ± 20, $P = .017$), bodily pain (62 ± 25 vs. 74 ± 21, $P = .000$) and general health (64 ± 19 vs. 70 ± 18, $P = .016$). A history of falls was related to lower health-related quality of life domains of social function ($r = -.20$, $p \leq 0.05$), bodily pain ($r = -.21$, $p \leq 0.05$), physical function ($r = -.20$, $p \leq 0.05$) and role limitations due to physical health ($r = -.24$, $p \leq 0.01$). A history of ambulatory stumbling is related to lower health-related quality of life in all domains but role emotional in obese men and women ($p \leq 0.01$). **Conclusion:** In older men and women, obesity is associated with a higher prevalence of falls and stumbling during ambulation, as well as lower values in multiple domains of health-related quality of life. Further, lower health-related quality of life values were seen with prevalence of falling.

ORAL PRESENTATION #8

EFFECTS OF A SINGLE BOUT OF EXERCISE ON ARTERIAL ELASTICITY IN OLDER ADULTS

L.S. Acree,¹ K.J. Nickel,¹ and A.W. Gardner.²

¹*Department of Health and Exercise Sciences, University of Oklahoma, Norman, Oklahoma 73019;* ²*CMRI Metabolic Research Center, University of Oklahoma Health Sciences Center, Oklahoma City, OK 73117; Email: lacree@ou.edu*

PURPOSE: To determine if arterial elasticity was elevated immediately following exercise, as well as 24 hours later. **METHODS:** Thirty two subjects were recruited who were greater than 60 years of age, free of known cardiovascular disease, had a BMI < 30, were non-smokers, and were untrained as shown by participating in less than 3 moderately intense activities per week. Subjects participated in 3 consecutive days of testing that included non-exercise control, exercise session, and 24 hours post exercise. The order of the exercise and non-exercise sessions was randomized. The exercise session consisted of 30 minutes on a bicycle ergometer at 45% Heart Rate Reserve (HRR). Large and small arterial elasticity were measured, along with other cardiovascular measures. **RESULTS:** The large (14.6 ± 4.0 ml/mmHg·10) and small (4.2 ± 2.6 ml/mmHg·100) arterial elasticity indices obtained at rest remained unchanged immediately following exercise ($p = 0.085$ and $p = 0.627$, respectively), and 24 hours later ($p = 0.100$ and $p = 0.520$). However, systemic vascular resistance (1621 ± 278 dyne·sec·cm⁻⁵) and diastolic blood pressure (71 ± 6 mmHg) obtained at rest were reduced immediately following exercise ($p < 0.05$), and remained lower 24 hours later ($p < 0.05$). **CONCLUSION:** A 30-minute exercise session at moderate intensity does not alter large and small arterial elasticity indices immediately after exercise or one day later. However, systemic vascular resistance and diastolic blood pressure are both lower for at least 24 hours following this modest volume of exercise.

POSTER – BOARD #1

EFFECTS OF SHORT TERM WHEAT GRASS SUPPLEMENTATION ON AEROBIC CAPACITY, ENDURANCE PERFORMANCE, AND ANAEROBIC THRESHOLD

J. Gales, J.W. Navalta, D.R. Young, S.P. Hnrcir, and B.D. Bennett. Southern Arkansas University, Magnolia, AR, 71753, jgales1775@stumail.saumag.edu

It has been speculated by various advocates of herbal medicine that the chlorophyll content of wheat grass (WG) has the ability to increase oxygen levels in the body if consumed orally. The ability to uptake and use oxygen is the primary determinant of aerobic capacity (VO_{2max}). **Purpose:** To our knowledge, there has been no prior published research assessing the potential relationship between WG and maximal oxygen uptake. Therefore, this study was designed to determine the effect of WG on aerobic capacity. **Methods:** Collegiate athletes (N=10) participated in this double-blinded study. Participants consumed WG powder capsules on one occasion, placebo (PLA) on another occasion, just prior to performing an incremental graded maximal effort exercise test, followed by a timed endurance trial to exhaustion. The values evaluated were of VO_{2max} , endurance, and anaerobic threshold. Dependent variables were analyzed via t-tests for dependent samples. **Results:** There was no significant difference reported for VO_{2max} (WG=43±2 ml·kg⁻¹min⁻¹, PLA=42±3 ml·kg⁻¹min⁻¹, p =0.865), endurance (WG=19±7 min, PLA=13±3 min, p=383), and anaerobic threshold (WG=84±2 % of VO_{2max} , PLA=79±4 % of VO_{2max} , p= 0.14). **Discussion:** Wheat Grass had no effect on the ability to uptake and use oxygen at a maximal level. Although values were not statistically significant, for certain individuals the consumption of WG may provide some practical benefits. Consecutive days of consumption prior to testing and number of participants are key issues that need to be addressed upon future investigation.

POSTER – BOARD #2

EFFECTS OF PRE-EXERCISE TYPE ON STATE ANXIETY LEVELS BETWEEN ATHLETES AND NON-ATHLETES

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PURPOSE: The purpose of this study was to provide physical educators, coaches, and athletes with information that may help them structure or improve their warm-up regimens in regard to the psychological anxieties associated with different types of pre-exercise. **METHOD:** The state anxiety levels were recorded from 54 college students (22 athletes, 32 non-athletes) using Spielberger's State Anxiety Inventory (S-STAI) before and after a predetermined treatment in which one third of the subjects performed an active warm-up, another third performed static stretching, and the remaining subjects performed no warm-up activities. **RESULTS:** There was no significant three-way interaction (P = 0.16). However, there was a significant group x test interaction (P<0.0001). At rest, both groups produced similar scores on the S-STAI (athletes = 34.7± 1.5, non-athletes = 38.4±2.1). Following treatment, athletes displayed significantly greater anxiety immediately before the perceived performance task when compared to the non-athletes (athletes = 53.1 ± 2.3, non-athletes = 38.8 ± 1.9). Interestingly there was no significant main effect for type of pre-exercise treatment (P = 0.26). **DISCUSSION:** There was no significant difference in the mean anxiety between treatment subgroups, athletes displayed significantly higher anxiety prior to the perceived performance task, and the non-athlete group demonstrated no significant difference between pre and post-test anxiety levels. Findings showed that athletes viewed the performance task as more of a threat resulting in high post-test scores. The non-athletes were threatened by participation in a performance-based study, resulting in a higher pre-test score, and a consistent post-test score.

POSTER – BOARD #3

EFFECT OF BREATHING PATTERNS ON BODY COMPOSITION DETERMINED VIA AIR DISPLACEMENT PLETHYSMOGRAPHY

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INTRODUCTION: The determination of body composition is done to quantify lean tissue and fat. Values are used to indicate general health, to assess risk for disease, and as a factor that is considered in the prescription of exercise programming. The Bod Pod is an instrument that utilizes the principle of air displacement for determining whole body densitometry. To date, no studies have reported the effect of varied respiration on measurements obtained using this instrument. Therefore, the purpose of this study was to compare the effect of different breathing patterns on body composition measurements using the Bod Pod. **METHODS:** Eight male and female subjects participated. Participants reported to the measurement site once for two consecutive body composition measurements in the Bod Pod. One measurement was taken with subjects performing normal tidal breathing, and another was obtained while a respiratory puffing mechanism was performed. Order of testing was counterbalanced between subjects. The data were analyzed using a paired t-Test with significance at $P \leq 0.05$. **RESULTS:** Altered respiratory patterns had no effect on body composition measures obtained using the Bod Pod ($P=0.49$). **DISCUSSION:** Air displacement plethysmography is becoming more popular. Measures compare favorably with hydrostatic weighing but take significantly less time to perform. Due to the fact that the Bod Pod utilizes air displacement, it was hypothesized that alterations in respiratory pattern could affect body composition values. The findings of this study indicate that varied breathing has no effect on percent body fat derived from the Bod Pod.

POSTER – BOARD #4

EFFECT OF BODY WEIGHT ON MAXIMAL PEAK TORQUE OF LEG EXTENSOR MUSCLES IN COLLEGIATE WRESTLERS.

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The effects of rapid weight loss associated with wrestling have a history of interest with investigators. It has previously been shown that performance decrements are associated with significant weight loss. **PURPOSE:** The purpose of the present study was to examine the effect of body weight (BW) during a competitive wrestling season on maximal peak torque (PT) in leg extensor muscles. **METHODS:** Twelve Division I collegiate wrestlers were tested for leg extension PT mid-season and post-season. Subjects were seated in a Biodex III isokinetic dynamometer chair with the lever arm 60° below horizontal. Subjects used their dominant limb, based on kicking preference, for testing. Three maximal isometric voluntary knee extensions (MVC) were performed for a period of 2 seconds each. The PT measurements were recorded from the Biodex III isokinetic dynamometer. The highest torque output of the three trials was taken as the PT. A paired samples T-test was run comparing PT (Newton/meters) to BW (kg) ratios mid-season and post-season. **RESULTS:** PT in the leg extensors was significantly greater ($p < 0.05$) post-season than during the competitive season while the wrestlers were cutting weight. PT-BW ratios (mean \pm SD) were 2.48 ± 0.56 and 2.95 ± 0.51 for mid-season and post-season, respectively. **CONCLUSION:** These data indicate that weight-cutting for competitive wrestling purposes lowers the force production ability of the leg extensor muscles. Incorporating appropriate in-season strength training programs may help to eliminate strength deficits associated with weight loss in wrestlers. Further research is warranted on which type of strength training program would most effectively reduce the strength decrements associated with weight loss.

POSTER – BOARD #5

EFFECTS OF SHORT-TERM ISOKINETIC RESISTANCE TRAINING AND EIGHT DAYS OF CREATINE SUPPLEMENTATION

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Rapid increases in strength may decrease the rehabilitation time necessary for injured athletes, possibly allowing them to return-to-play sooner. **PURPOSE:** The purpose of this study was to examine 3 days of isokinetic resistance training combined with 8 days of creatine monohydrate supplementation on the vastus lateralis muscle during maximal, concentric isokinetic leg extension muscle actions. **METHODS:** Twenty-five men (mean age \pm SD=21 \pm 3 years; height 177 \pm 6 cm; weight=80 \pm 12kg) participated in this 9-day, double-blind, placebo-controlled study. Participants were randomly assigned to either the creatine (CRE; n=13) or the placebo (PLA; n=12) group. CRE ingested the treatment drink (280 kcal; 68 g carbohydrate; 10.5 g creatine), while PLA received an isocaloric placebo (70 g carbohydrate). On days 1-6 CRE and PLA received two servings per day (morning and afternoon), with groups only receiving one serving on days 7-8. Before (pre; day 1) and after (post; day 9) the resistance training, maximal voluntary concentric isokinetic leg extensions at 30, 150, and 270 $^{\circ}$ ·s $^{-1}$ were performed on a calibrated dynamometer. On days 3, 5, and 7, three sets of 10 repetitions at 150 $^{\circ}$ ·s $^{-1}$ were performed. **RESULTS:** From pre- to post-training peak torque (PT) increased ($p=0.005$), while acceleration time (ACC) decreased ($p<0.001$) for both CRE and PLA at each velocity (30, 150, and 270 $^{\circ}$ ·s $^{-1}$). Although PT increased by 13% and 6%, while ACC decreased by 42% and 34% for the CRE and PLA, respectively, these differences were not statistically significant. **CONCLUSION:** These results indicated that 3 days of isokinetic resistance training elicited small but significant improvements in PT and ACC for both the CRE and PLA groups. Future studies should examine longer training durations to elucidate a potential benefit for concomitant creatine supplementation and short-term strength training.

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POSTER – BOARD #6

AEROBIC TRAINING INCREASES MARKERS OF BONE FORMATION DURING SHORT-TERM WEIGHT LOSS

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Previous studies have demonstrated significant reductions in bone mineral density and markers of bone formation following energy restriction-induced weight loss. However, physical activity helps prevent osteoporosis and preserve bone integrity. **PURPOSE:** We investigated the effects of weight loss by exercise training and energy restriction on the measures of: bone formation, osteocalcin (OC), bone alkaline phosphatase (BAP), osteoprotegerin (OPG); bone resorption, C-terminal cross links of type-I collagen (CTX) and soluble receptor activator of nuclear factor- κ B ligand (sRANKL); and on hormones that affect bone remodeling: cortisol, leptin, and insulin-like growth factor-I (IGF-I). **METHODS:** Subjects (N=19) underwent six weeks of energy restriction (~750 kcal/d) and aerobic exercise training (~400 kcal/d) to induce a 5% reduction in body weight. Exercise training consisted of 45 min/d, 5 d/wk of walking and/or treadmill jogging at 60% $\dot{V}O_{2max}$. Fasting serum samples were collected at baseline and post weight loss (wk 6). **RESULTS:** Despite a 5% reduction in body weight and decreased calcium intake ($p < 0.05$) at wk 6, bone formation markers OC and BAP were significantly elevated and OPG levels were maintained during exercise training- and diet-induced weight loss. Changes in OPG concentration during weight loss were negatively correlated with changes in leptin ($r=-0.57$, $p=0.01$) and cortisol ($r=-0.42$, $p=0.07$). The combination of exercise and energy restriction significantly reduced the concentration of leptin but did not alter IGF-I or cortisol levels. sRANKL was detectable in only 7 of the 19 study participants and was not affected by the intervention. Neither the ratio of OPG/sRANKL nor concentrations of CTX were significantly influenced by treatment conditions. **CONCLUSION:** Aerobic exercise training may protect against reductions in bone mineral density during weight loss by increasing bone formation.

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POSTER – BOARD #7

EFFECTS OF CIRCUIT WEIGHT TRAINING ON FITNESS IN COLLEGE-AGED WOMEN

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Circuit weight training (CWT) has been a popular form of exercise for more than three decades. However, little research has examined the effects of a single CWT program on multiple components of fitness.

PURPOSE: The purpose of this study was to assess the effects of CWT on body composition (BC), VO_{2peak} , bone mineral density (BMD), bone mineral content (BMC), muscular strength (MS) and muscular endurance (ME). **METHODS:** Twenty-four young adult women 18 to 35 years of age were randomly assigned to one of two groups: circuit weight training group (CTG; n=12) or control group (CN; n=12). The CTG exercise sessions (20 min, 3d wk⁻¹ for 8 wk) consisted of a 5 minute warm-up on the treadmill followed by a CWT routine (10 stations, 30/30 sec work-to-rest ratio). Resistance was initially set at 60% of 1-repetition maximum and increased 2.5 lb every two weeks. CN was asked to remain inactive throughout the 8-wk study. CTG and CN were asked to maintain their usual dietary patterns throughout the 8-wk study and completed a 3-day dietary log during week one and week eight to verify compliance. **RESULTS:** Compared to CN, CTG improved ($p \leq 0.05$) on several measures: BMD (1.8%), lean body mass (LBM) (1.2%), fat mass (FM) (-2.4%), body fat percentage (BF %) (-1.9%), upper MS (22.7%), lower MS (22.9%), upper ME (23.3%) and lower ME (20.8%). Although VO_{2peak} did not improve (-2.9%) in CTG, there were some identifiable tendencies within CN that may have affected the results of this variable. CTG observed no improvements for height, weight, and BMC.

CONCLUSION: The results of this study indicate that this CWT program enhances LBM, FM, BF%, BMD, MS, and ME in college-aged women. Additional research is needed to identify the effects of CWT dosage (sets, repetitions, frequency, intensity, duration, work-to-rest ratio) on these fitness parameters.

POSTER – BOARD #8

MICROVASCULAR PO₂ ON-KINETICS AND TENSION DEVELOPMENT IN THE RAT DIAPHRAGM

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As the only skeletal muscle that is continuously active throughout life, the diaphragm is critically reliant on the adequate delivery of oxygen and nutrients to support its function. Respiratory muscle fatigue negatively impacts gas exchange and reduces work capacity. Bazzzy et al. (*J Appl Physiol* 66:2305, 1989) reported that respiratory muscle fatigue induced by resistive breathing in sheep that was unrelated to the development of diaphragmatic hypoxemia. **PURPOSE:** The purpose of this study was to measure changes in the microvascular partial pressure of oxygen (PO_{2m}) and diaphragm tension development in the rat during moderate (1 Hz, 60 breaths/min) and high-frequency (4 Hz, 240 breaths/min) electrically stimulated contractions, and to correlate changes in PO_{2m} with changes in diaphragm tension and the development of fatigue. **METHODS:** PO_{2m} was measured in the medial costal diaphragm (MCD, abdominal surface) of female Sprague-Dawley rats (n=7, 288 ± 7 g) using the phosphorescence quenching method. The phrenic nerves were sectioned bilaterally to eliminate background activity. The central tendon was cut, and the right medial hemi-diaphragm was connected to a force transducer and muscle tension analyzer to permit measurement of diaphragm muscle force. The right MCD was stretched using a micromanipulator to replicate the *in vivo* costal length. PO_{2m} and MCD tension were measured in the quiescent state, and during 90 s bouts at 1 and 4 Hz electrical stimulation (6.5 V and 2 ms duration). **RESULTS:** Arterial PO₂ was 85 ± 5 mmHg. PO_{2m} in the quiescent MCD was 52 ± 2 mmHg at a resting tension of 36 ± 8 g/g. At the onset of 1 Hz contractions, PO_{2m} during fell 29 ± 2 mmHg to a steady-state value of 23 ± 2 mmHg. The mean response time (time to reach 63% of the total fall in PO_{2m}) averaged 13 ± 1 s. Peak MCD tension at 1 Hz was 91 ± 13 g/g with no evidence of fatigue. During the 1 Hz to 4 Hz transition, PO_{2m} fell an additional 12 ± 1 mmHg with a mean response time of 10 ± 2 s, and tension was unchanged at 91 ± 13 g/g. Tension fell during the 90 s 4 Hz bout to 70 ± 10 g/g, representing a 22 ± 4% fatigue. Coincident with the fall in MCD tension, PO_{2m} increased by 2 ± 1 mmHg. **CONCLUSION:** These data suggest that at 1 Hz, PO_{2m} is sufficient to provide adequate oxygen delivery to the working diaphragm cells, as evidenced by the lack of fatigue. In contrast, 4 Hz stimulation elicited marked diaphragm fatigue at PO_{2m} values that are not typically associated with fatigue in skeletal muscle (13 ± 3 mmHg). Further, since PO_{2m} tended to increase in concert with diaphragm fatigue, these data suggest that fatigue was not due to inadequate oxygen delivery and/or availability.

(Supported by A.T. Still University Graduate Program and the Heartland Affiliate of the American Heart Association.)

POSTER – BOARD #9

THE IMPACT OF BIRTH WEIGHT ON OBESE ADOLESCENT'S BODY COMPOSITION AND DISTRIBUTION

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Low birth weight is associated with obesity later in adulthood, which may be due to the thrifty phenotype, an adverse intrauterine environment, or poor maternal nutrition. However, some studies show a linear relationship between birth weight and future body mass index and obesity in adulthood, while other research indicates a U shaped relationship. **PURPOSE:** The purpose of this study was to better understand the impact of birth weight on body composition and distribution later in life in obese 12-17 years old adolescents. **METHODS:** Twenty-six male and female adolescents (14 ± 2 y, 94 ± 13 kg, 167 ± 7 cm, 34 ± 4 kg/m²) had their body composition (i.e. %body fat, total fat mass, total fat-free mass, and trunk fat mass (a surrogate of visceral fat) and anthropometry (i.e. waist and hip circumferences and waist-hip ratio) assessed utilizing dual energy X-ray absorptiometry and anthropometry after an overnight fast at the General Clinical Research Center. Birth weight was by self-report of the mother. **RESULTS:** No significant relationships existed between birth weight and %body fat ($r = 0.34$; $P = 0.11$), total fat mass ($r = 0.32$; $P = 0.12$), total fat free mass ($r = 0.08$; $P = 0.70$), trunk fat mass ($r = 0.24$; $P = 0.26$), waist ($r = 0.11$; $P = 0.62$) and hip circumferences ($r = 0.02$; $P = 0.92$) or waist-hip ratio ($r = 0.07$; $P = 0.74$) respectively. **CONCLUSIONS:** These data suggest that birth weight was not associated with body composition or distribution later into adolescence, though caution should be used considering the small sample size.

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POSTER – BOARD #10

IMPACT OF DIABETES ON MICROVASCULAR PO₂ AND TENSION IN RAT SKELETAL MUSCLE

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Streptozotocin-induced diabetes in rats has been shown to cause both structural (e.g., altered capillary-to-fiber geometry) and functional changes (e.g., reduced vasodilatory capacity) in the skeletal muscle microcirculation. We have previously demonstrated that microvascular PO₂ (PO_{2m}) on-kinetics are accelerated in the spinotrapezius muscle of diabetic rats (*Am J Physiol* 283: H926, 2002). The faster PO_{2m} on-kinetics in diabetic skeletal muscle may be associated with the structural and/or functional changes previously cited, however no direct functional correlations have been performed. **PURPOSE:** The purpose of this study was to test the hypothesis that the faster PO_{2m} on-kinetics in diabetic rat skeletal muscle would be correlated with greater oxygen utilization due to greater relative muscle work. **METHODS:** Female Sprague-Dawley rats were divided into control (C, n=6; plasma glucose, 113 ± 19 mg/dL) and diabetic (D, n=6; 50 mg/kg streptozotocin; plasma glucose, 461 ± 21 mg/dL) groups. Experiments were performed 8-9 weeks after the induction of diabetes. Phosphorescence quenching was used to measure PO_{2m} was at rest and during electrically stimulated muscle contractions (1 Hz, 6.5V, 2 ms duration). Blood flow measurements (radiolabeled microspheres) were determined in a second group of C and D rats. The distal tendon of the extensor digitorum longus (EDL) muscle was attached to a force transducer and muscle tension analyzer to determine twitch tension. **RESULTS:** Mean arterial pressure (C, 121 ± 13; D, 133 ± 7 mmHg) and arterial PO₂ (C, 87 ± 2; D, 68 ± 7 mmHg) were not different between C and D rats. PO_{2m} in the resting EDL was not different (C, 31 ± 4; D, 36 ± 2 mmHg). At the onset of contractions, the time delay was similar (C, 5 ± 2; D, 6 ± 2 s), however, the time constant was less (C, 24 ± 3; D, 12 ± 2 s) indicating a greater rate of fall in PO_{2m} at the onset of contractions in the D EDL. The total fall in PO_{2m} was similar (C, 20 ± 3; D, 12 ± 3 mmHg; P=0.09). There was a significant “undershoot” in PO_{2m} in D muscle such that steady-state PO_{2m} was 3 ± 1 mmHg greater. Mass specific blood flow in the contracting EDL was not different in C and D rats (C, 64 ± 10; D, 75 ± 14 mL/min/100 g). Peak twitch tension was not different in D rats (C, 25.2 ± 2.6; D, 20.2 ± 2.4 g). However, due to the marked EDL atrophy in D rats (C, 175 ± 4; D, 76 ± 6 mg), peak muscle tension per gram muscle mass in D was significantly greater (C, 143 ± 15; D, 276 ± 46 g/g). **CONCLUSION:** Since mass-specific blood flows were similar in the contracting EDL of C and D rats, the faster PO_{2m} on-kinetics in EDL of D rats may be attributed to greater mass specific work and oxygen consumption in D skeletal muscle.

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POSTER – BOARD #11

THE IMPACT OF CAREGIVING ON SALIVARY CORTISOL LEVELS

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Caregiving is often associated with greater levels of chronic perceived stress and negative health impacts. High cortisol levels, irregular cortisol secretion patterns, obesity, and abdominal obesity may occur as a result of the caregiving experience and may explain, in part, the negative health impact. **PURPOSE:** The purpose of this pilot study was to compare salivary cortisol levels, body composition, and perceived stress among employed caregivers and employed non-caregivers. As this study is a pilot, secondary purposes included a preliminary examination of relationships between all variables and an evaluation of research methodology. **METHODS:** Eight employees of a land grant institution were divided into a caregiver group (CG) (N = 5, age = 52.8 ± 15.7 years) or a non-caregiver group (NC) (N = 3, age = 50.3 ± 6.4 years) based on self-reported caregiving status. Anthropometric measures of height, weight, waist girth, hip girth, waist-to-hip ratio (WHR) and sagittal abdominal diameter (SAD) were taken to assess obesity and abdominal obesity. Perceived stress was measured using the 10-item Perceived Stress Scale (PSS) developed by Cohen and colleagues. Finally, participants collected saliva samples for three days (two work days and one non-work day) at six times throughout the day (waking, 45 minutes, 2 hours, 4 hours, and 8 hours after waking, and bedtime). Area under the curve (total daily exposure to cortisol) was calculated using the trapezoidal rule. **RESULTS:** An independent samples t-test indicated significant differences between caregivers and non-caregivers in only one variable: WHR ($P < 0.05$). Non-significant, but potentially meaningful, differences were observed between the groups in weight (CG: 174.7 ± 65.0 lbs, NC: 129.6 ± 22.0 lbs), SAD (CG: 12.0 ± 6.3 cm, NC: 5.6 ± 2.2 cm), and waist girth (CG: 83.4 ± 16.4 cm, NC 65.7 ± 5.4 cm). No differences were seen between caregivers and non-caregivers in any salivary cortisol measure or the PSS. Among all participants, strong correlations were observed between body composition measures and AUC on workdays ($r = 0.44 - 0.75$) with the strongest relationships observed on the second continuous workday. These results support the hypothesis of inter-relationships between employment, salivary cortisol, and body composition. **CONCLUSIONS:** While few significant differences between caregivers and non-caregivers were observed in this small pilot study, the results do point to the need for further study of the impact of caregiving and employment on cortisol levels and body composition.

POSTER – BOARD #12**COMPARISON OF PHYSICAL CONDITION IN COLLEGIATE SOCCER PLAYERS.**

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Physical demands of a soccer match have previously been demonstrated to vary between playing position. Studies have reported different positions require varying times spent sprinting, jogging, walking, jumping, kicking, and tackling. Therefore it could be speculated that these differences may transfer to measurements of performance. **PURPOSE:** The aim of the present investigation was to evaluate the physical condition of collegiate soccer players at different playing positions. **METHODS:** Twenty-three collegiate varsity soccer players participated in the present study. Subjects were tested for height and weight, percent body fat, vertical jump performance, agility (Illinois test), bench press and squat 5 repetition max, 20 and 40 yard speed, 400 meter time, and 1.5 mile run. A one-way ANOVA was run on each test variable and results were then compared between defenders, midfielders, and strikers.

RESULTS: No significant differences existed between defenders, midfielders, and strikers for all test variables ($p > 0.05$). The means and standard error for each test by position are presented below.

CONCLUSION: No differences in physical condition were observed between positions. It appears that conditioning demands for each playing position are similar.

Test	Defenders		Midfielders		Strikers	
	N	Mean \pm S.E.	N	Mean \pm S.E.	N	Mean \pm S.E.
Body mass (kg)	8	76.1 \pm 2.4	8	75.6 \pm 1.6	7	77.6 \pm 2.5
Height (cm)	8	177.8 \pm 1.3	8	176.5 \pm 2.8	7	180.4 \pm 3.0
Body comp (% fat)	8	14.2 \pm 1.6	8	13.2 \pm 1.8	7	15.0 \pm 3.1
Vertical Jump (cm)	8	51.8 \pm 1.8	8	50.6 \pm 1.8	7	54.7 \pm 1.9
Illinois Test (sec)	8	13.7 \pm .20	8	13.7 \pm .20	7	13.7 \pm .30
Bench press (kg)	8	78.5 \pm 4.6	8	76.1 \pm 7.1	7	67.2 \pm 5.1
Squat (kg)	8	113.9 \pm 7.9	8	111.1 \pm 9.1	7	94.2 \pm 16.8
20 yd sprint (sec)	8	2.9 \pm .04	8	2.9 \pm .02	7	2.9 \pm .03
40 yd sprint (sec)	8	5.1 \pm .06	8	5.0 \pm .08	7	5.0 \pm .08
400 meter (sec)	8	63.3 \pm 1.8	8	60.8 \pm 1.4	7	62.3 \pm 1.7
1.5 mile run (min:sec)	8	10.1 \pm .24	8	9.1 \pm .49	7	9.8 \pm .48

POSTER – BOARD #13

SERUM TNF- α IS INCREASED IN WOMEN WITH HYPOTHALAMIC MENSTRUAL DISORDERS AND IN HORMONAL CONTRACEPTIVE USERS

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Postmenopausal women are at a significantly greater risk for cardiovascular disease (CVD) than eumenorrheic, premenopausal women due to hypoestrogenemia. The protective effect of estrogen may be partially due to improved inflammatory status. **PURPOSE:** We investigated the effects of exercise-associated menstrual disorders and exogenous estrogen (hormonal contraceptives-HC) on systemic inflammatory markers, tumor necrosis factor- α (TNF- α), interleukin-6 (IL-6), soluble vascular cell adhesion molecule-1 (sVCAM-1), and C-reactive protein (CRP) in active, premenopausal young women. **METHODS:** Thirty-nine active women (≥ 5 h of aerobic exercise per wk), aged 18–33 y, participated in this cross-sectional study comparing women with menstrual disorders (AMD; 0–9 cycles \cdot y $^{-1}$), eumenorrheic women (AE; 10–13 cycles \cdot y $^{-1}$), and HC users (AHC; 12 cycles \cdot y $^{-1}$). Fasting serum samples were collected during the early follicular phase (d2-5) for the menstruating women. **RESULTS:** Leutinizing hormone and follicle stimulating hormone confirmed that women in the AMD group were anovulatory. Estradiol, progesterone, and cortisol were not statistically different between AMD and AE groups; cortisol was significantly greater in the AHC versus AE group. TNF- α was significantly higher in the AE ($p=0.001$) and AMD ($p=0.06$) groups compared with the AE group. There were no significant group differences in the concentrations of sVCAM-1, IL-6, or CRP. TNF- α and cortisol were positively correlated ($r=0.31$, $p=0.058$), as were sVCAM-1 and estradiol ($r=0.41$, $p=0.010$). **CONCLUSION:** Highly active young women with menstrual disorders or who use HC have increased levels of TNF- α in serum, associated with greater serum concentrations of cortisol.

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POSTER – BOARD #14

COMPARISON OF LAND- AND AQUATIC-BASED PLYOMETRICS ON A SELECTED MEASUREMENT OF POWER

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Plyometric training is a popular method by which athletes may increase power and explosiveness. However, plyometric training is considered a highly intense and potentially damaging activity particularly if practiced by the novice individual or if done to the extreme. **Purpose:** The purpose of this study was to compare power as measured by vertical jump performance prior to and following land and aquatic-based plyometric training. **Methods:** A convenience sample of 21 college-age (24 ± 2.5 years) male subjects were randomly and evenly assigned to one of three groups following oral briefing and completion of the university approved IRB consent document: Group I – aquatic (AQ), Group II – land (LN), and Group III – control (CT). Training for the AQ and LN groups consisted of three sets of 15 repetitions each of squat jumps, side hops, and knee-tuck jumps separated by 1 min rests. A 10 min warm-up preceded the training trials. The AQ group performed the exercises in knee-level water adjusted to parallel the axis of the knee joint (± 1 in). The LN group performed identical plyometric exercises on land. The CT group engaged in no training. Participants trained 2 times pre week for a period of 6 wks and all training sessions were monitored by trained assistants. Pre-test and post-test data were collected on maximum vertical jump height. **Results:** A 2x3 analysis of variance (ANOVA) with repeated measures was used to compare vertical jump height among the three groups. Results suggested that the aquatic and land-based groups significantly ($p<0.05$) outperformed the control group in the vertical jump and that no difference was found in vertical jump performance between the aquatic and land-based groups. **Conclusion:** It was concluded that aquatic training resulted in similar training effects as land-based training with a possible decrease in potentially damaging stress forces due to a reduction in impact afforded by the buoyancy and resistance of the water upon landing.

POSTER – BOARD #15

THE ROLE OF CORE STABILIZATION MUSCLES IN LACTATE CLEARANCE FOLLOWING HIGH INTENSITY EXERCISE

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Exercise above the anaerobic threshold results in the accumulation of lactic acid. An active recovery involving large muscle groups is known to significantly reduce lactate values following exercise. The core stabilization group are postural muscles that may lead to improvement in athletic performance if properly trained. Stabilization training involves little joint motion and is primarily designed to improve intrinsic stabilization of the muscle complex. It is unknown whether activation of the core musculature through these exercises have the ability to decrease lactic acid following intense exercise. **PURPOSE:** The purpose of this study was to assess the role of the core stabilization muscles in lactate clearance following high intensity anaerobic exercise. **METHODS:** Twelve healthy subjects participated (age = 21 ± 0.5 years, height = 169.5 ± 3 cm, weight = 85.2 ± 6 kg). Participants reported two separate days for testing. On each occasion blood lactate was obtained following 5-min seated rest. Subject then performed a 30-sec Wingate anaerobic cycle test, immediately followed by a blood lactate sample. In the 5-min post-exercise period, subjects either rested quietly or performed core strengthening exercises. A final blood lactate sample was obtained following the 5-min treatment period. Data was analyzed using a 2 x 3 repeated measures ANOVA ($P \leq 0.05$). **RESULTS:** Analysis revealed a significant interaction ($P = 0.05$). Lactate values were similar at rest (Core = 1.4, Rest = 1.7) and immediately after exercise (Core = 4.5, Rest = 5.4). However, core stabilization exercises performed during the 5-min post-exercise period reduced lactate values when compared to rest (5.9 vs 7.6). **DISCUSSION:** The results of this study show that performing core stabilization exercises during a recovery period significantly reduces lactate values. The reduction in lactate is probably due to the blood flow provided by contracting muscles during the core stabilization exercises. More research is needed to assess whether core stabilization training reduces lactate in individuals who are previously untrained with regard to that muscle group.

POSTER – BOARD #16

WEIGHT MANAGEMENT STRATEGIES OF SUCCESSFUL MAINTAINERS

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PURPOSE: This study sought to determine whether individuals who participated in a structured weight loss/maintenance program maintained a clinically relevant weight loss and if so, what strategies they employed to do so. **METHODS:** Surveys asking about current weight and diet/exercise habits were mailed to 515 participants who enrolled in university weight management program over the past 5 years. Each program began with a 3-month weight loss phase followed by 6 to 21 months of maintenance. Participants were required to eat ≥ 5 fruits and vegetables/day, exercise ≥ 300 min/wk of exercise, and attend weekly meetings for education and support. Surveys were anonymous except for a small code that allowed clinic staff to track respondents' verified weights during the program. Descriptive analysis and chi square were used to find significant differences between maintainers and gainers. **RESULTS:** Of the 229 respondents with complete data, almost 70% had maintained a loss of 5% of initial body weight (clinically relevant by NHLBI guidelines) and 48% of that 70% maintained a loss of more than 10% of initial body weight. There were significant differences in weight management strategies between gainers and maintainers. Significantly more maintainers than gainers reported eating >5 fruits and vegetables a day to control their weight (77% vs. 22%, respectively) and using low-calorie meal replacements on a regular basis (80% vs. 19%). Significantly more maintainers than gainers reported planning out meals/snacks every day (80% vs. 20%) as well as making a conscious effort to practice portion control (85% vs. 14%). Significantly more maintainers than gainers reported making exercise plans, keeping records for exercise, using pedometers on a regular basis (84% vs. 16%) and performing planned exercise for 30-60 minutes every day (85% vs. 15%). There were also significant differences in the perception of weight maintenance, with 35% of the maintainers rating it as "somewhat easy" and 95% of the re-gainers rating it as "very difficult" or "impossible." **CONCLUSION:** This study provides some evidence that it is possible to maintain a clinically relevant weight loss following a structured program and that there are significant difference in diet and exercise behaviors between those who maintain and those who regain.

POSTER – BOARD #17

SEASONAL CHANGES IN BODY WEIGHT AND HYDRATION LEVELS IN ELITE COLLEGE WRESTLERS

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PURPOSE: The present study examined mid-season and post-season body weight (BW) to hydration (HYD) ratios in elite college wrestlers. **METHODS:** Twelve collegiate male wrestlers volunteered for this study. Body weight and hydration levels were recorded mid-season and post-season. Specific gravity of urine was used to evaluate hydration level. **RESULTS:** The results indicated that the BW/HYD ratio was significantly ($p<0.05$) greater post-season vs mid-season. Further analysis indicated that for BW alone, there was a significant ($p<0.05$) increase in post-season vs mid-season weight. However, there was no significant change in HYD post-season vs mid-season. Therefore, the significant increase in BW/HYD ratio was due to increases in BW and not decreases in urine specific gravity. **CONCLUSION:** For elite collegiate wrestlers, increases in post-season body weight do not necessarily result in increases in hydration. One possible reason for this may be that many elite college wrestlers are continually training and competing following the college season. Finally, finding a wrestling weight at which hydration is optimal may increase performance.

Subject	BW/HYD 1	BW/HYD2	BW 1	BW 2	HYD 1	HYD 2
1	69.4	78.6	71.4	79.6	1.023	1.018
2	69.1	73.1	71.4	74.1	1.028	1.012
3	97.2	96.2	98.6	98.6	1.019	1.025
4	59.4	64.1	60.5	65.9	1.018	1.028
5	77.6	82.6	79.1	84.3	1.019	1.020
6	87.9	90.5	89.6	92.7	1.024	1.024
7	55.0	63.0	56.8	63.6	1.032	1.010
8	69.5	75.4	71.4	77.3	1.028	1.025
9	69.5	76.4	71.4	78.2	1.028	1.024
10	81.6	83.8	83.6	86.0	1.025	1.026
11	61.9	73.4	64.1	75.0	1.035	1.022
12	81.5	85.3	83.6	88.4	1.025	1.036
Mean	73.3*	78.5*	75.1**	80.3**	1.025	1.023

* significant increase ($p<0.05$) in BW/HYD ratio

** significant increase ($p<0.05$) in BW

POSTER BOARD #18

PILOT STUDY ON THE EFFECTS OF CHEST CONSTRICTION AT REST ON AEROBIC CAPACITY

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PURPOSE: This was a pilot study investigating whether an externally applied thoracic constriction band at rest over a four-week period, can improve aerobic capacity without having to perform aerobic exercise. **METHODS:** 15 sedentary college age individuals (between 18 -35 yrs) were studied over a period of 4 weeks during which they participated in their normal everyday activities. Participants completed an activity questionnaire, a Physical Activity Readiness Questionnaire (Par-Q) and an aerobic capacity (VO_{2max}) test. VO_{2max} was measured Pre and Post 4 weeks using the 1.5-mile run/walk field test. Participants were instructed to cover the specified distance in the fastest time possible. A VO_{2max} prediction equation ($VO_{2max} (ml \cdot kg^{-1} \cdot min^{-1}) = 3.5 + 483 / (\text{time in minutes})$) was used. Following pre testing, participants were randomly placed into one of two groups: (1) Chest Wall Restriction Group (CWR)(n=10), or (2) Control (Non-Chest Wall Restriction Group (N-CWR))(n=5). Each participant in the Chest Wall Restriction Group (CWR) had their chest wall restricted with the use of an elastic strap for 1.5 hours 5 days / week. Strap widths ranged from 10 to 15 cm adjusted to fit just beneath the axillae and around the chest to envelop the rib cage. It is worth noting that this apparatus does not prevent the chest wall from expanding like earlier studies, but offers elastic eccentric resistance for the inspiratory muscles to work against. **RESULTS:** A significant $11 \pm .07\%$ improvement in aerobic capacity was observed in the experimental group ($P < 0.05$). Estimated VO_{2max} values for CWR increased from 27.92 ± 5.98 to 31.46 ± 6.42 , while the N-CWR group showed no significant change (30.22 ± 5.67 to 30.51 ± 5.61). Units for VO_{2max} are shown in $ml \cdot min^{-1} \cdot kg^{-1} \pm SD$. **CONCLUSION:** This pilot study shows the potential benefit of wearing an externally applied thoracic constriction band at rest. Sedentary individuals with low exercise tolerance may be able to increase their aerobic capacity without performing aerobic exercise.

