SOUTHWEST CHAPTER

AMERICAN COLLEGE OF SPORTS MEDICINE

2010 ANNUAL MEETING

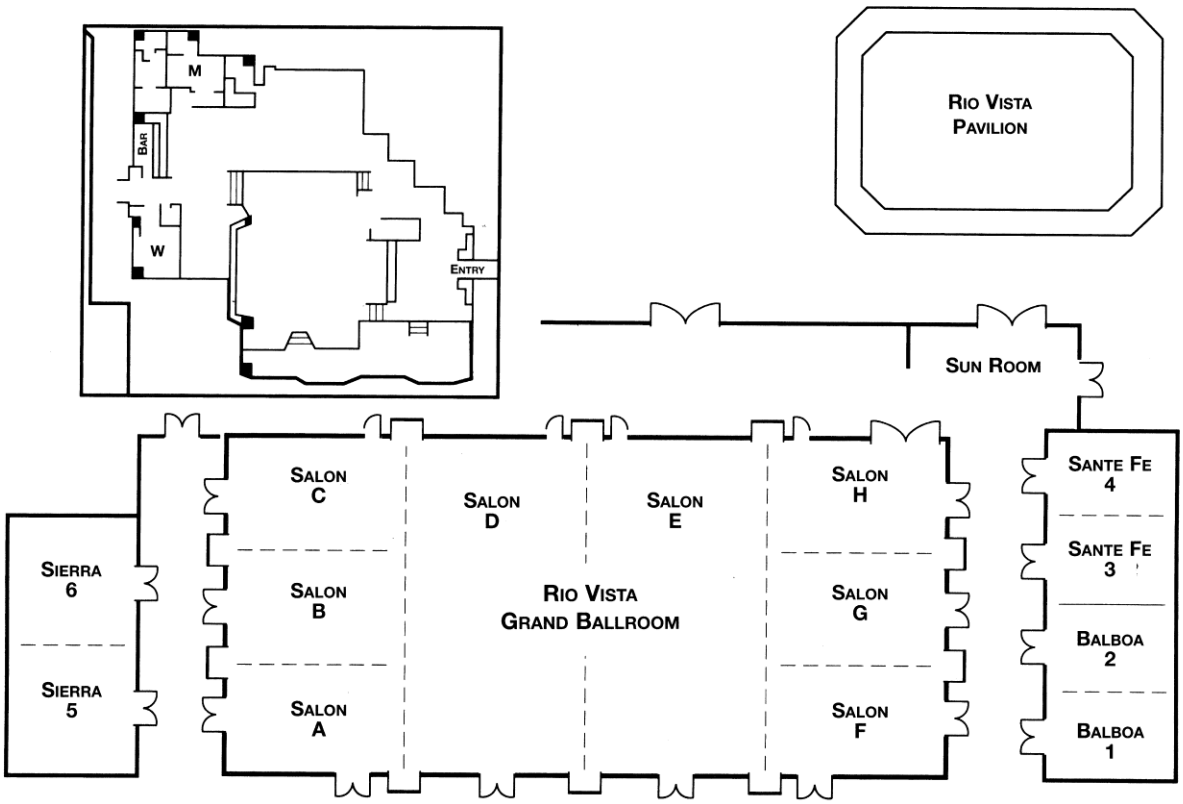
October 22-23, 2010

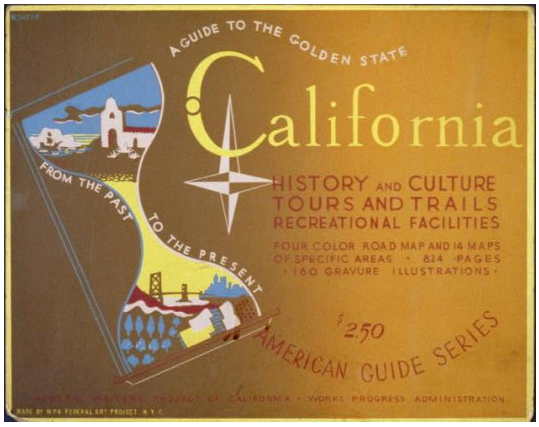
Marriott Mission Valley
San Diego, California

Jointly sponsored by the American College of Sports Medicine
and the Southwest Chapter of the American College of Sports Medicine

Marriott Mission Valley

Meeting and Banquet Facilities





Welcome to the

30th Annual Meeting

of the

Southwest Regional Chapter

of the

AMERICAN COLLEGE of SPORTS MEDICINE SM

October 22-23, 2010

Marriott Mission Valley
San Diego, California

Jointly sponsored by the American College of Sports Medicine and the Southwest Chapter of the American College of Sports Medicine

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The Southwest ACSM annual meeting has been approved for 14 Continuing Education Credits by the American College of Sports Medicine. There is no separate fee for CECs. Please retain the Certificate obtained at registration.

FRIDAY, 22 OCTOBER 2010

Registration **Rio Vista Grand Ballroom Foyer** **7:00 am – 4:00 pm**

Concurrent Colloquia **8:30 am – 9:30 am**

Clinical Exercise Physiology Association (CEPA): What, Why, and How **Salon A**
Ann Gibson, Ph.D., University of New Mexico

New Perspectives in Resistance Training Adaptations **Salon B**
Thomas Fahey, Ed.D., California State University, Chico

Body Image for Fitness Professionals – Healthy Bodies, Healthy Minds **Salon C**
Robyn Stuhr, M.A, Sports Medicine, University of California, San Diego

The Biomechanics Associated with Increased ACL Injury Risk in Female Athletes **Sierra 5**
Christopher Powers, Ph.D., P.T., University of Southern California

High Intensity Training: A New Exercise Paradigm for Health and Fitmess **Sierra 6**
Todd Astorino, Ph.D., California State University, San Marcos

General Session **9:45 am – 11:45 am** **Salon D/E**

Moderator: Steven Hawkins, Ph.D., FACSM, President, SWACSM

SWACSM Recognition Award
Presenter: Gene Adams, Ph.D., FACSM

Preview of Meeting: Mike Hogan, Ph.D., FACSM
University of California, San Diego

D.B. Dill Lecture

Skeletal Muscle Inflammation and Repair – The Good and Bad: From Bench to Sideline

Thomas Best, M.D., Ph.D., FACSM
President, American College of Sports Medicine
Ohio State University

LUNCH **11:45 AM - 1:15 PM**

FRIDAY, 22 OCTOBER 2010, continued

Symposium **1:15 pm – 2:45 pm** **Salon E**

Metabolic Regulation: Cellular and Nuclear Signaling

Moderator: Lorraine Turcotte, Ph.D., University of Southern California

1:15 – 1:45 ***AMPK-SIRT1 Signaling: Can Drinking Red Wine Really Help in Preventing Insulin Rresistance?***
Lorraine Turcotte, Ph.D., FACSM, University of Southern California

1:45 – 2:15 ***ERalpha: "Strong Enough for a Man, But Made for a Woman" - From Exercise to the Metabolic Syndrome***
Andrea Hevener, Ph.D., University of California, Los Angeles

2:15 – 2:45 ***Orphan Nuclear Receptors at the Crossroads of Skeletal Muscle Metabolism and Growth: Targeting ERRs in Metabolic Disease***
Janice Huss, Ph.D., City of Hope Medical Center, Duarte, California

Concurrent Colloquia **1:30 pm – 2:30 pm**

Starting Your Own Fitness Company from the Ground Up: The "Pinnacle Training Systems" Story **Salon A/B**
Felicia Greer, Ph.D., California State University, Fresno

Cholesterol Management: An Inconvenient Truth about Statins, Exercise, and Muscle Damage **Sierra 5/6**
Beatrice Golomb, M.D., Ph.D., University of California, San Diego

Respiratory System Influences on Locomotor Muscle Fatigue and Exercise Performance **Salon D**
Markus Amann, Ph.D., University of Utah

FRIDAY, 22 OCTOBER 2010, continued

Colloquium **3:00 pm – 4:00 pm** **Salon D**

Chocolate: an Exercise Mimetic?
Francisco Villarreal, M.D., Ph.D., University of California, San Diego

Student Research Award **3:00 pm – 4:30 pm** **Salon A/B**

Moderator: Linda Wilkin, Ph.D., California State University, San Bernardino

3:00 **The Effect of Concurrent Cell Phone Use and Walking on Gait Characeteristics**
Jennifer Aldridge, University of Nevada, Las Vegas

3:15 **Effects of Menstrual Status on Bone Turnover Markers in Female Athletes**
Lesley Naliboff, University of California, Davis

3:30 **AICAR and Metformin Preferentially Activate Different AMP-Activated Protein Kinase (AMPK) Isozymes to Regulate Muscle Metabolism and SIRT1 Activity in L6 Muscle Cells**
Lindsey Bogachus, University of Southern California

3:45 **Hepatic Fat Fraction Changes are Predicted by Insulin Receptor Signaling Pathway mRNA Levels with a Nutrition Education and Strength Training Intervention in Latino Adolescents**
Daniel Croymans, University of California, Los Angeles and University of Southern California

4:00 **An Evaluation on the Effectiveness of Different Hypoxic Manipulation Models: A Meta-Analysis**
Roy M. Salgado, California State University, Sacramento

4:15 **Effectiveness of Interval Training in Small Ability Groups to Improve Cardiorespiratory Fitness**
Bradley J. Warr, Arizona State University

FRIDAY, 22 OCTOBER 2010, continued

Symposium **3:00 pm – 4:30 pm** **Sierra 5/6**

Sports Medicine in Practice: Preventing and Treating the Most Common Sports Injuries

Moderator: Catherine Robertson, M.D., University of California, San Diego

3:00 – 3:45 ***Surgical Injuries***
Catherine Robertson, M.D., University of California, San Diego

3:45 – 4:30 ***Non-Surgical Injuries***
Natalie Voskanian, M.D., University of California, San Diego

SOCIAL EVENT

Rio Vista Pavilion **4:30 -7:00 PM**

Poster Presentations

Graduate School Fair

No Host Wine/Cheese Reception

SPECIAL EVENT

Salon A/B/C **6:30 PM**

Student Jeopardy Bowl

SATURDAY, 23 OCTOBER 2010

Registration **Rio Vista Grand Ballroom Foyer** **7:30 am - 11:00 am**

Concurrent Colloquia **8:00 am – 9:00 am**

How to Survive Your Ph.D.: Secrets to Conquering the Ph.D. Process **Salon A/B**

Jason Karp, Ph.D., RunCoachJason.com

Skeletal Muscle Calcium Handling and SERCA Function During Exercise **Sierra 5/6**

Leonardo Nogueira, Ph.D., University of California, San Diego

Concurrent Symposia **8:00 am – 9:15 am**

The Science of Sports Drinks and Human Performance **Salon D**

Moderator: George Brooks, Ph.D., FACSM, University of California, Berkeley

8:00 – 8:35 ***Lactate: The Link Between Glycolytic and Oxidative Metabolism***
George Brooks, Ph.D., FACSM, University of California, Berkeley

8:35 – 9:10 ***The Application of Basic Science to Sports Drink Technology***
Jack Azevedo, Ph.D., California State University, Chico

Exercise at Altitude **Salon E**

Moderator: Dale Wagner, Ph.D., Utah State University

8:00 – 8:35 ***Exercsie at Extreme Altitude: Physiological Stress and Health Concerns***
Dale Wagner, Ph.D., Utah State University

8:35 – 9:10 ***The Use of Moderate Altitude to Improve Sea-Level and High-Altitude Performance***
Daryl Parker, Ph.D., California State University, Sacramento

SATURDAY, 23 OCTOBER 2010, continued

Concurrent Colloquia 9:30 am – 10:45 am

Nutritional Strategies to Optimize Performance and Training Adaptations **Salon A/B**

Ellen Coleman, M.A., M.P.H., RD, Author and Nutrition Consultant, The Sport Clinic

Athletes, Academics, and Agency: Observations of a Sporting Life **Sierra 5/6**

Scott Tinley, Institute for Athletes in Retirement and Transition,
San Diego State University

Symposium 9:30 am – 10:45 am Balboa ½

Exercise and Aging Vasculature

Moderator: D. Walter Wray, Ph.D., University of Utah

9:30 – 10:05 ***Vascular Regulation and Age***
D. Walter Wray, Ph.D., University of Utah

10:05 – 10:40 ***Exercise, Oxidative Stress, and Age***
Russell Richardson, Ph.D., University of Utah

General Session 11:00 – 12:30 Salon D/E

Moderator: Steven Hawkins, Ph.D., FACSM, President, SWACSM
California Lutheran University

Student Awards
Recognition of Host School: Occidental College
Business Meeting

Founders Lecture

Determinants of Maximal Oxygen Transport and Uptake
Peter Wagner, M.D.
University of California, San Diego
President, American Physiological Society

SOUTHWEST ACSM RECOGNITION AWARD

1982	D.B. Dill
1983	Albert Behnke
1984	Steve Horvath
1985	Fred Kasch
1986	John Boyer
1987	Herbert de Vries
1988	Charles Tipton
1989	G. Lawrence Rarick
1990	Lawrence Morehouse
1991	William Haskell
1992	Ralph Paffenbarger
1993	Franklin Henry
1994	George Brooks
1995	James Skinner
1996	Christine Wells
1997	Lawrence Golding
1998	Ken Baldwin
1999	Robert Conlee
2000	Gail Butterfield
2001	R. James Barnard
2002	Gene Adams
2003	Vivian Heyward
2004	Fred Roby
2005	Marta Van Loan
2006	Jack Wilmore
2007	Larry Verity
2008	Steven Loy
2009	Lorraine Turcotte
2010	William Beam

Southwest Regional Chapter of the
AMERICAN COLLEGE of SPORTS MEDICINE
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President	Steven Hawkins, Ph.D., FACSM
President-Elect	Mike Hogan, Ph.D., FACSM
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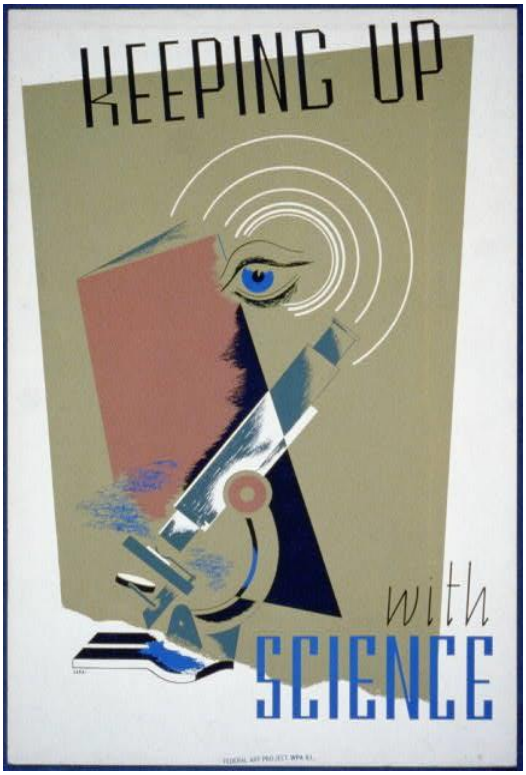
Member-at-Large	Guillermo Noffal, Ph.D.
Regional Chapter Representative	Marialice Kern, Ph.D., FACSM
Student Representative	Megan Grimstvedt
Newsletter Editor	Pauline Entin, Ph.D.
Associate Executive Director	Ben B. Yaspelkis III, Ph.D., FACSM
Founders	Gene Adams, Ph.D., FACSM Robert Conlee, Ph.D., FACSM Robert Bielen, M.D. Janet Lunn, M.A. James McIlwain, M.S. Marge Murphy, Ph.D. Gary Adams, Ph.D. (deceased)

2010 SWACSM

Annual Meeting

ABSTRACTS

Student Research Award
Poster Presentations



STUDENT RESEARCH AWARD

1. EFFECTS OF FRACTIONIZED AND CONTINUOUS EXERCISE ON AMBULATORY BLOOD PRESSURE IN PREHYPERTENSIVE ADULTS

Dharini M. Bhammar, Siddhartha S. Angadi, Glenn A. Gaessser, FACSM
Healthy Lifestyles Research Center, Exercise & Wellness Program, Arizona State University, Mesa, AZ

Aerobic exercise has been shown to reduce blood pressure in the post-exercise setting for up to 22 hours. However, the effect of fractionized aerobic exercise on 24-hour ambulatory blood pressure (24-hour ABP) in pre-hypertensive individuals is unknown.
PURPOSE: To study the effects of fractionized aerobic exercise (3x10min, one every 4 hours) as compared to traditional continuous exercise (30 min) on 24-hour ABP. **METHODS:** Seven healthy prehypertensive subjects aged 29.1 ± 2.8 years (Mean ± SE) completed three of the following trials in this randomized 3 x 3 cross-over study; 1) 3 x 10-minute sessions of fractionized aerobic exercise (FRAC), 2) 1 x 30-minute session of continuous exercise (CONT) and, 3) non-exercise control period (NO-EX). 24-hour ABP monitoring was carried out with an automated, ambulatory blood pressure monitoring device (OSCAR 2 ™). BP measurements were initiated prior to exercise start and continued for a 24-hour period. Post-exercise BP values between trials were compared using the Friedman test. **RESULTS:** There was a significant main effect of the different exercise trials on 24 hour systolic ABP (P = 0.015) and waking systolic ABP (P = 0.004), but not on sleeping systolic ABP (P = 0.927). Twenty-four hour systolic BP values were significantly lower following the FRAC trial (127.4 ± 2 mm Hg) compared to the CONT (129.6 ± 2 mm Hg) and NO-EX (131.1 ± 2 mm Hg) trials (P = 0.009 and 0.029 respectively). There were no differences in diastolic BP between the three trials (P = 0.935). **CONCLUSIONS:** The findings of this study suggest that fractionized exercise has a potent effect on SBP in prehypertensive individuals. These data have implications for exercise prescription and cardiovascular risk reduction in this population.

2. PRESSURE AND TIME DEPENDENCE OF REACTIVE DILATION

Eric J. Gray, Matthew R. Carter, and Jeffrey L. Jasperse
Department of Sports Medicine, Pepperdine University

The magnitude of forearm reactive hyperemia is related to both occlusion duration and arm position, suggesting that it has both a metabolic and a myogenic component. We tested the hypothesis that decreasing intraluminal pressure in isolated rat soleus feed arteries (N=11) would cause a dilation when baseline pressure was restored and that this dilation would be increased with greater pressure difference and increasing duration of pressure reduction. Arteries were isolated, cannulated, and pressurized at 90 cmH_2O for 1-h equilibration period. Baseline pressure was then set at either 65 or 115 cmH_2O to mimic arterial pressure in the arm in the above and below heart positions. Reductions in pressure to 14 cmH_2O (to mimic arm occlusion) from both baseline pressures for periods of 30s, 1 min, 2 min, or 5 min were performed. Both increasing duration and elevated baseline pressure increased the magnitude of dilation (30s-65 = 19.6±5.1, 30s-115 = 22.1±5.4, 1m-65 = 20.4±4.2, 1m-115 = 34.3±5.4, 2m-65 = 28.5±5.6, 2m-115 = 47.8±7.5, 5m-65 = 47.4±7.6, 5m-115 = 63.6 ± 7.5 % dilation.) These data indicate that vasodilation to a period of reduced pressure is enhanced by both increasing duration and increased magnitude of the pressure reduction. These results suggest that reactive hyperemia is significantly impacted by myogenic properties of the vasculature.

3. FEASIBILITY OF MEASURING ACUTE CHANGES IN OS CALCIS STIFFNESS INDEX FOLLOWING WHOLE-BODY VIBRATION WITH RESISTANCE AND JUMP TRAINING IN YOUNG WOMEN.

Heumann, K.J., & Swan, P.D.
Program in Exercise and Wellness, College of Nursing and Health Innovation, Arizona State University

Aims: This study assessed the feasibility of using quantitative ultrasound for measuring bone strength changes in women following either vibration plus resistance exercise (VR) or jumping (J). **Methods:** Women age 18-45 years with normal 21-40 day menstrual cycles were recruited for this study. Participants were excluded if they reported diseases known to affect bone, orthopedic problems or eating disorders. Subjects were matched by Os Calcis Stiffness Index (OCSI), a measure of quantitative ultrasound and randomized into VR (n=24) or J (n=24). Subjects trained 3 d/wk for 6 weeks. VR performed 7 whole-body exercises on a vibration platform. Resistance was added by having subjects hold weighted bars. J jumped for 1-2 min/d, 2 days at home and 1 day in the lab. OCSI was measured weekly. Bone mineral density (BMD) by Dual Energy X-ray absorptiometry (DXA) was measured pre-post. Group differences in OCSI and DXA by time were assessed by repeated measures ANOVA. **Results:** 19 VR and 16 J completed the study. No significant between group differences existed at baseline for age, height, weight, body composition variables or bone indices. Significant increases in right OCSI values were found in both groups between weeks 1 and 4 ($p=0.03$) whereas, decreases were shown between weeks 4 and 8 ($p<0.05$). Tests of within subject contrasts show a significant difference between weeks 3 and 4 with 8 ($p<0.02$). No significant time effects were found for left OCSI or BMD. **Conclusions:** OCSI values changed over the 8 weeks of VR and J training and thus using ultrasound to assess acute changes in bone strength was feasible. This study indicated that the pattern of OCSI changes in response to acute exercise over time was variable. However, there was no control group. It remains unknown what aspect of bone turnover this variable response of OCSI reflects.

4. CARDIORESPIRATORY AND METABOLIC RESPONSES TO THE NINTENDO WII FIT AEROBICS

Ashaleigh N. Parker and Peggy A. Plato
Kinesiology, San Jose State University

This study investigated whether the basic Nintendo Wii Fit aerobic games elicit sufficient intensity for the improvement and maintenance of cardiorespiratory fitness. Cardiorespiratory and metabolic responses were measured in 20 young adults (9 men aged 23.8 ± 3.3 years and 11 women aged 24.5 ± 2.1 years, M±SD) while playing three trials of the beginner Nintendo Wii Fit aerobic games: Basic Hula Hoop, Basic Step, and Basic Run. Intensity during the Nintendo Wii Fit aerobic game-play protocol averaged 37% (±9) of heart rate reserve (HRR). Overall, participants' rating of perceived exertion was 10 (±2) on the Borg 6-20 scale. Oxygen consumption was measured during the game-play protocol using a Medgraphics metabolic cart. The average intensity was 3.4 (±1.1) metabolic equivalents (METS), resulting in an estimated energy expenditure of 131 (±45) kcals over 30 min. For maintenance and improvement of cardiorespiratory fitness, the American College of Sports Medicine (ACSM) recommends a minimal exercise intensity of 40/50% HRR and an RPE of 12. To receive health benefits, ACSM recommends exercising at a minimum intensity of 3 METS and expending a daily minimum of 150 kcals per exercise session. Out of the four variables measured, METS was the only variable that met ACSM recommendations for improving health and fitness. It was concluded that the basic Nintendo Wii Fit aerobic games may improve health and aid in weight loss, but they will not maintain or improve cardiorespiratory fitness in healthy, young adults.

5. THE EFFECT(S) OF CAFFEINE ON RUNNING ECONOMY.

James Salassi[1], Jeff Sullivan[1], Cindy Swann[2], and Brandon J. Sawyer[1].
[1.]The Department of Kinesiology, Point Loma Nazarene University; [2.]The Department of Family and Consumer Sciences, PLNU.

Running economy (RE) is a strong factor in determining endurance performance; therefore improvement in RE is very valuable to runners. Caffeine (CAF) is a popular pharmacological agent that has been shown to be ergogenic in fatigue resistance. The purpose of this study is to examine the effects of CAF on RE amongst 13 athletes [11 endurance and 2 sprint; 3 females (20 ±1.73 years) and 10 males (19.9±6.12 years)]. A single group, longitudinal, double-blind design was used. Each subject performed two identical bouts of treadmill running. One bout was performed while under the influence of CAF (6mg/kg body weight) and the other with a placebo (PLA) solution. Subjects ran for five minutes at each of the following speeds: 6mph, 6.5mph, 7.0 mph, 7.5mph, and 8mph. Oxygen consumption and pulmonary gas exchange were recorded continuously. The last two minutes of each stage were averaged and used for analysis. A significant difference ($p<0.05$) was found between CAF and PLA with VO_2 ml/kg/min at every stage in running when comparing the entire subject group and males only ($V0_2$ CAF > VO_2 PLA). The only significant difference found in respiratory exchange ratio (RER) was at 6.5 mph (0.05 = f) when analyzing all subjects together. Although significance was not found, mean RER was lower during the CAF condition at every running speed. The major finding of the present study was that CAF consumed at a dose of 6mg/kg one hour prior to endurance activity causes an increase in oxygen consumption, therefore decreasing running economy, when compared to running at the same speeds without CAF. There was an insignificant trend showing lower RER values at each speed during the CAF condition. Further research is needed to verify that this increase in oxygen consumption is caused by an increased reliance on lipid

6. BLOOD FLOW AND OXYGENATION ARE MODULATED BY EXTERNAL PRESSURE DURING ISOMETRIC MUSCLE CONTRACTIONS

Mehria Sayad-Shah, Pranav R. Chawla, Alan R. Hargens
Clinical Physiology Laboratory, University of California San Diego

Purpose: The aim of this study is to examine the effects of external pressure on muscle microvascular flow and oxygenation before, during, and after isometric dorsiflexion of the ankle joint. **Methods:** The effects of external pressure on muscle microvascular flow and oxygenation were studied in six healthy volunteers. After baseline data were collected, an isometric dorsiflexion of the ankle joint was maintained at 50% maximum voluntary contraction for 60 sec at three different pressure levels: +30, zero, and -30mmHg with respect to ambient pressure. Using photoplethysmography, microvascular blood flow of the anterior tibialis muscle was measured before, during, and after the dorsiflexion exercise at each pressure condition. Simultaneously, muscle oxygenation was measured continuously in the tibialis anterior muscle using near-infrared spectroscopy. Statistical analysis using ANOVA was performed with $p < 0.05$ being considered statistically significant. **Results:** During contraction, tissue oxygenation decreased the most at -30mmHg pressure (37 ± 7.5%) and decreased the least for 0mmHg pressure (48 ± 12%). The average tissue oxygenation during contraction was the least at -30mmHg. The result did not show statistical significance. Tissue oxygenation for post-exercise hyperemic response was greatest for 0mmHg (124 ± 15%) and smallest for -30mmHg group (100 ± 17%). Pre-exercise tissue oxygenation values for 0mmHg (100 ± 0%) and for +30mmHg (98 ± 5.4 %) were similar. Pre-exercise tissue oxygenation at -30mmHg (80 ± 20%) tissue oxygenation was lowest. Tissue oxygenation levels followed blood flow changes closely. **Discussion:** Our results demonstrate that negative pressure decreases tissue oxygenation, but positive pressure does not counteract the drop in tissue oxygenation as expected. Moreover, previous studies have shown that positive pressure increases tissue oxygenation which was not reproduced in our study. Evaluating the effects of pressure on exercise and post-exercise hyperemic response has applications in sports medicine, space medicine, and wound healing.

POSTER PRESENTATIONS

1. EFFECT OF DIFFERENT LEVELS OF ASSISTED JUMPING ON COUNTERMOVEMENT UNLOADING FORCE AND VELOCITY

Nick W. Aguirre, Lee E. Brown FACSM, Jared W. Coburn FACSM, Scott K. Lynn, Guillermo J. Noffal, Diamond Nguyen, Kristen Cochrane, Tai T. Tran, Vanessa Cazas, Matthew S. Biagini, Martim Bottaro.
Human Performance Laboratory, Department of Kinesiology, California State University Fullerton, Fullerton, CA.

Elastic bands have commonly been used in sprint training to elicit higher than normal velocities for sprinters. However, the use of elastic bands for vertical jump (VJ) training may alter countermovement (CM) mechanics. Therefore, the purpose of this study was to investigate the effect of elastic band assistance on VJ CM unloading force and velocity. Thirty recreationally trained college men and women (M=15, W=15) completed three VJ testing sessions consisting of five conditions: 0%, 10%, 20%, 30%, and 40% body weight reduction (BWR). In all BWR conditions, subjects wore a full body harness while attached to two elastic cords suspended from the ceiling and performed three maximal VJ's with CM and arm swing on a force plate. In addition, a linear velocity transducer was attached to the subject's hip to determine the velocity-time curve. Percent unloading from body weight to minimal CM force and maximal CM velocity at each condition were recorded for analysis. Results indicated there were no sex by condition interactions ($p>.05$), but there were significant ($p<.05$) main effects for condition for both force and velocity. Countermovement unloading percentages were not different between 0% (64.62$\pm$22.51%) and 10% (70.75$\pm$14.41%), or between 20% (77.05$\pm$15.71%) and 30% (81.08$\pm$15.48%), or between 30% and 40% (83.88$\pm$13.79) BWR. Both 30% and 40% were greater than 10% and 0%, but only 40% was greater than 20%. CM velocities under all elastic conditions were significantly faster than 0% (0%=.99$\pm$.25 m/s, 10%=1.19$\pm$.26 m/s, 20%=1.24$\pm$.30 m/s, 30%=1.29$\pm$.26 m/s, 40%=1.23$\pm$.17 m/s). Only 30% was significantly faster than 10%. These data suggest that assisted jumping alters countermovement mechanics. Therefore, future research should investigate the chronic effects of assisted jumping on normal bodyweight VJ performance.

2. REGULAR FOLLOW-UP INCREASES GROUND REACTION FORCES DURING A 9-MONTH HOME-BASED EXERCISE INTERVENTION TO IMPROVE BONE MASS IN YOUNG WOMEN.

Amiton C, Nessler, J, Xavier A, Martin B, Witzke KA
California State University San Marcos, Department of Kinesiology, Bone Research Laboratory, San Marcos, CA

Home-based exercises are convenient but do women follow the protocols they are given? We compared ground reaction forces (GRFs) during a home-based jumping program. **Methods**: 205 women, 102 in cohort 1 (CH1) and 103 in cohort 2 (CH2) (aged 23.4±4.5y) were randomly assigned to one of three box jump height groups (4", 8", 12"). During a pretest visit, correct jumping technique was demonstrated and critiqued for each subject. All were instructed to perform training at home from their prescribed box height while adhering to the correct technique. CH1 subjects returned for posttest evaluation 9 months later, while CH2 subjects returned for evaluation at 3 and 6 months, and posttest at 9 months. Posttest evaluation consisted of 10 jumps on a Kistler force platform using the box height and technique practiced at home. Average peak GRF was determined for filtered peaks within each subject's mean ±1SD. **Results**: GRFs for CH1 were not different across box heights, but were different for CH2 subjects using the 4" and 12" box. Subjects in CH2, 8" and 12" groups also achieved higher GRFs than those in CH1. **Conclusion**: This study highlights the importance of regular follow-up to ensure subjects adhere to the proper protocol when performing home-based training. This has direct implications for programs to prevent bone loss in women who may unknowingly attenuate prescribed exercise-induced loading by altering kinematics during the landing phase of a box jump.

3. UTILITY OF MULTIFREQUENCY BIOELECTRICAL IMPEDANCE COMPARED TO DEXA FOR ASSESSMENT OF REGIONAL LEAN MASS

LJ Anderson, DN Erceg, and ET Schroeder FACSM
Division of Biokinesiology and Physical Therapy at the University of Southern California

Purpose: To compare regional lean mass measurements using the BioSpace InBody 520, 720, and S10 bioelectrical impedance (BIA) devices to dual-energy x-ray absorptiometry (DEXA). **Methods:** After an 8-hour fast, 50 participants (25 men and 25 women) 18-49yrs, 73.6±15.4kg performed two measurements each on the BioSpace InBody 520, 720, and S10 BIA devices and one DEXA scan. BIA measurements used for analyses were the average value of the two measurements. Appendicular (sum of 4 appendages), trunk, and total lean body mass (LBM) and total fat mass (FM) BIA values were compared to the same regional values obtained by DEXA. Independent t-tests were used to assess within-group differences ($p<0.05$), one-way ANOVA was used to assess between-group differences, and bivariate Pearson correlation was used to assess associations between variables. **Results:** There were no significant differences comparing the InBody BIA devices to DEXA for appendicular, trunk, and total LBM and total FM. Mean$\pm$SD for appendicular lean mass values are DEXA (23.40$\pm$5.64), S10 (22.93$\pm$5.20), 710(23.11$\pm$5.25), and 520 (23.60$\pm$6) and values for trunk lean mass are DEXA (25.28$\pm$5.61), S10 (24.75$\pm$5.19), 710(25.02$\pm$5.44), and 520 (25.36$\pm$5.86). Similarly, when separated by gender, men and women showed no differences between devices for appendicular, trunk, and total LBM and total FM. Significant positive Pearson correlations between each DEXA value and the corresponding BIA values ranged from r=0.92 to r=0.98. **Conclusions:** The BioSpace InBody 520, 720, and S10 BIA devices appear to adequately assess appendicular and trunk lean mass compared to DEXA and may be used in place of DEXA to assess regional and total lean mass and total fat mass.

4. POST EXERCISE HYPOTENSION AFTER MODERATE-INTENSITY AND HIGH-INTENSITY INTERVAL EXERCISE

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Purpose: Moderate-intensity exercise has been shown to lower blood pressure (BP) in the postexercise setting. However, the effects of shorter, high-intensity interval exercise sessions on postexercise hypotension (PEH) are unknown. Methods: Eleven healthy subjects (10 male, 1 female; Age = 25.5 $\pm$ 3.7 years; VO_2peak = 44.9 $\pm$ 7.5 ml/kg/min; SBP = 124.4 $\pm$ 20.9 mmHg, DBP = 67.6 $\pm$ 6.9 mmHg) underwent, in randomized order, one control (CON) trial and three exercise conditions on a cycle ergometer: moderate-intensity continuous exercise (MOD ; 80% HRmax for 30 min), aerobic interval exercise (AIE ; 4 x 4-min bouts at 90-95% HRmax separated by 3 min of active recovery), and sprint interval exercise (SIE ; 6 "all-out" 30-sec sprints (Wingate tests) separated by 4min active recovery). Seated BP was measured with an automated BP cuff prior to the start of exercise and for 3 hr postexercise at 15-min intervals. Results: All exercise conditions resulted in a significant PEH. Systolic BP was significantly ($p< 0.05$) lower after AIE than CON (-6.4 $\pm$ 0.9 mmHg), MOD (-4.1 $\pm$ 0.9 mmHg), and SIE (-3.7 $\pm$ 0.9 mmHg; SIE and MOD resulted in equivalent and significant BP reductions as compared to control (-2.7 $\pm$ 0.9 and -2.3 $\pm$ 0.9 mmHg; $p < 0.05$). DBP was also lower ($p< 0.05$) after AIE compared to CON (-3.6 $\pm$ 0.6 mmHg), MOD (-2.8 $\pm$ 0.6 mmHg), and SIE (-1.6 $\pm$ 0.6 mmHg); DBP was also lower after SIE compared to CON (-1.9 $\pm$ 0.6 mmHg). Discussion: Aerobic interval exercise resulted in superior reductions in both SBP and DBP as compared to SIE and MOD for up to three hours postexercise. AIE may be a useful exercise strategy to help lower BP in otherwise healthy young adults. Extremely high-intensity sprint-type exercise (e.g., Wingate) is not necessary to maximize PEH.

5. A PILOT STUDY OF SHOCK ATTENUATION IN LANDING AND BODY LOCALE

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Shock attenuation (SA) has been well studied in activities such as walking and running (Chu, et al. 2004; Derrick, et al. 2004; Mercer, et al. 2003); however, there is a lack of research regarding SA during landing. Furthermore, there is lack of information regarding which structures attenuate shock. The purpose of this study was to examine SA among the leg-hip, hip-head, and leg-head during landing. Each subject (n=3, age 24.3±1.5yrs, mass 56.2±7.4kg, height 1.6±.06m) was instrumented with accelerometers at the leg, hip and forehead. Subjects then performed landings from three heights: 30cm, 60cm, and 90cm. For each height, subjects completed 5 landing trials. Rest was provided between each trial. Order of conditions was randomized to account for fatigue and learning. During each landing, accelerations were recorded at 1008 Hz for the leg, hip, and head respectively using light-weight accelerometers. Data were reduced by identifying the peak impact accelerations for the leg (PkLeg), hip (PkHip), and head (PkHD. After peak impact accelerations were identified, SA was calculated for three locations using the following formulas: Total (between leg and head) = [1-PkHd/PkLeg]*100, Lower (between leg and hip) = [1-PkHip/PkLeg]*100, Upper (between hip and head) = [1-PkHd/PkHip]*100. SA was compared between Height (30, 60, 90cm) and Location (total, lower, upper) using a repeated measures ANOVA (α=0.05). It was determined that SA was not influenced by the interaction of Height and Location ($p>0.05$) nor different among Heights ($p>0.05$) but was different among Locations ($p<0.05$). Specifically, Total SA was greater than both Upper and Lower SA ($p<0.05$). It appears that the majority of shock is attenuated by the lower extremity.

6. OPTIMAL ELASTIC CORD ASSISTANCE TO INCREASE ACUTE SPRINTING PERFORMANCE IN NCAA DIV I WOMEN SOCCER PLAYERS

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Overspeed exercises are commonly integrated into a training program to help athletes perform at a speed greater than what they are accustomed when unassisted. Overspeed methods such as downhill sprinting or tow training, have been shown to decrease sprinting time. The purpose of this study was to examine different assisted sprint conditions on sprint running performance. Eighteen NCAA Division I Women soccer players completed three testing sessions, which consisted of a 5-minute warm-up, followed by randomized experimental conditions of 0%, 10%, 20%, 30%, and 40% body weight assistance (BWA). In all BWA experimental sessions subjects wore a belt while attached to two elastic cords, which were attached to a fence post. Subjects performed two maximal sprints under all conditions. Three minutes of rest was given between each sprint attempt and between conditions. Split times (0-5, 5-10, 10-15 and 15-20 yards) for each condition were used for analysis. Results showed a significant main effect for condition. Post hoc comparisons revealed that as BWA loads increased sprint times decreased up to 30%. (0BWA: 3.20 $\pm$ .12; 10BWA: 3.07 $\pm$ .09; 20BWA: 2.96 $\pm$ .07: 30BWA: 2.81 $\pm$ .08; 40BWA: 2.77 $\pm$ .10) There was also a main effect for condition for each split distance. Post hoc comparisons revealed that as BWA loads increased sprint times tended to increase up to 30% and 15 yards. These results demonstrate that 30% of BWA appears effective in decreasing acute sprint times in Division I women soccer players from 0-15 yards.

7. TIME COURSE OF FLUID DISTRIBUTION DUE TO POSTURAL CHANGE IN A DIVERSE SAMPLE OF HEALTHY ADULTS: PRELIMINARY DATA FINDINGS

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Introduction: Standard body composition guidelines indicate participants should be supine for at least 10 minutes before assessment via bioelectrical impedance analysis (BIA). Little research has been found substantiating this guideline or addressing standing posture prior to assessment with new vertical BIA devices. Extracellular water (ECW) and intracellular water (ICW) from BIA are used to measure total body water (TBW) and estimate fat-free mass (FFM) and body cell mass. This study investigated the time required for ECW and ICW to stabilize in standing and supine positions. **Methods**: Forty-five healthy volunteers (36 ± 16 yrs, 169.6 ± 9.1 cm, 68.2 ± 10.2 kg) followed standard pretest guidelines for body composition assessment. ECW and ICW were measured with a Xitron multifrequency BIA analyzer every 5 minutes for 30 minutes per position. The starting position was randomized. A 2 (posture) x 6 (time) repeated measures ANOVA was conducted to investigate possible differences in postural fluid shifts over time. Significant main effects were further evaluated using paired samples t-tests. **Results:** There were significant within-group main effects over time for supine ECW, ICW, TBW, FFM, and standing ECW ($p < .05$). There was no significant main effect for posture. Pairwise comparisons revealed significant differences between each 5-min increment (5- 10, 10 - 15, 15 - 20, 20 - 25, 25 - 30 min) for supine ECW and ICW; supine FFM differed between 10 and 15 min ($p < .01$). Standing ECW pairwise differences were found for the first three 5-min increments ($p < .01$). **Conclusion:** The results of this study show that waiting 5 min is an adequate amount of time for stabilization of calculated TBW and FFM for both supine and standing positions. However, if BIA is used for measuring ECW and ICW, more time is needed for stabilization in the standing and supine positions.

8. EFFECTS OF THERAPEUTIC ULTRASOUND ON THE RECOVERY OF A LACERATED ACHILLES TENDON IN A RUNNER: A CASE STUDY

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This case study of a runner who suffered a partial Achilles' tendon laceration examined the effects of therapeutic ultrasound (TU) after surgical repair. To track progress, baseline evaluations (4 weeks post-surgery) included transverse and longitudinal Rehabilitative Ultrasound imaging (RUSI) (GE Logiq P5, GE Healthcare) of the tendon at the calcaneal insertion and injury area, visual analog scale (VAS), and lower extremity functional index (LEFI). After the initial data collection, TU (Omnisound, Accelerated Careplus, Reno, NV) at 3MHz 1.0W/cm^2 for 3.5 min was administered 5 days/week for two weeks, along with theraband exercises. After two weeks the tests were administered again, the subject increased physical therapy to strengthening the injured leg and resumed running. A third measurement was taken four weeks later. Results show decreases in fluid and tendon disruption in the RUSI between pre and post TU measurements. The transverse image showed a decrease of 0.6 mm and the longitudinal image showed a decrease of 3.4 mm of the combined inflammation and thickness of the tendon. One inter-tendon fluid pocket decreased 7.8 mm in length, while the deeper fluid pocket had dispersed. The third measurements showed decrease in the tendon thickness of 0.4 mm. Images found only small fluid disruptions superficial to the tendon and on the lateral portion at the site of sutures, while the previous inter-tendon fluid pocket of 11 mm in length was resolved. Perceived pain using the VAS decreased 32.5% with movement (24 hour average) and 33% for current pain after TU; perceived pain with movement decreased an additional 10.5% at the third measurement. LEFI showed an increase of 23 points after TU,

9. EFFECT OF ELASTIC CORD ASSISTANCE ON VERTICAL JUMP INTERPEAK TIME BETWEEN GROUND REACTION FORCE, POWER, AND VELOCITY.

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Recently, a new form of assisted training has demonstrated acute vertical jump improvements. However, it is unknown if assisted training alters jump mechanics. The purpose of this study was to examine the effect of elastic cord assistance on the time between peak ground reaction force (GRF), power (P), and velocity (V) during the vertical jump. Thirty recreationally trained college students (15 men, 15 women; age 22.76 ± 1.81 yrs, height 167.45 ± 7.61 cm, mass 63.17 ± 5.22 kg) completed three testing sessions consisting of five different conditions: 0%, 10%, 20%, 30%, 40% body weight reduction (BWR). In all BWR conditions, subjects wore a full body harness that was attached to two elastic cords suspended from the ceiling as they completed three maximal countermovement jumps with arm swing. All jumps were performed on a force plate and subjects were attached to a linear velocity transducer with data sampled at 1000Hz. Peak values from the trial that achieved the highest velocity in each condition were used for analysis. Results indicated no main effect ($p>0.05$) for sex, but did show a main effect for condition ($p<0.05$). The time between peak GRF and P at 10% (.125±.102s) and 30% (.143±.106s) BWR was greater than 0% (.084±.081s) and 40% (.077±.076s) BWR. Also the time between GRF and V at 10% (.162±.104s) and 30% (.179±.106s) BWR was greater than 0% (.123±.081s) and 40% (.114±.076s) BWR. There was no significant difference in interpeak time between P and V. The increased interpeak times between GRF and P and V may be due to altered jump mechanics caused by the assistance of the elastic cord. This may lead to altered mechanics during body weight jumping. Future research should evaluate the long-term impact of assisted training on jump mechanics.

10. THE EFFECTS OF PLAYING A BRASS INSTRUMENT ON PULMONARY PRESSURES AND DIAPHRAGM THICKNESS

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In the context of testing non-clinical strategies for rehabilitating and strengthening respiratory muscles, we hypothesized that regularly playing a musical instrument with high resistance would increase respiratory muscle strength. To test this hypothesis we recruited 11 (9 male, 2 female) brass instrument players (IN) and compared them to 11 (9 male, 2 female) non-instrumentalist controls (CO) of the same size, age (18-22), and gender. Subjects of the IN group played a brass instrument with high resistance ≥10 hours per week. The CO group played no instruments. All subjects were non-smokers and sedentary. As indices of respiratory muscle strength, we measured maximum inspiratory pressure (MIP), maximum expiratory pressure (MEP), as well as diaphragm thickness (DT) using an ultrasound. The average difference of matched pairs between the two groups was compared using a paired t-test. The averages of MIP, MEP, and DT for brass instrumentalists were not significantly greater than the average MIP, MEP, and DT for the controls. These findings suggest that playing a brass instrument regularly is not a sufficient training stimulus for strengthening respiratory muscles.

11. MULTIFACTORIAL VARIABLES ASSOCIATED WITH DISCIPLINARY SANCTIONS IN SOCCER

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Soccer has become a well researched topic in the educational community, but because not all areas have been covered, the purpose of this study was to 1) determine if there were any game setting differences with regards to red cards between league and knockout games from various professional leagues and confederation club tournaments, 2) verify the relationship between temperature and ejections in France and Japan and 3) determine if there were any gender differences with regards to disciplinary sanctions (both yellow and red cards) and fouls committed in the FIFA World Cups. Various official websites that provided the relevant information for collection were searched. Once the data was collected, relative equations (Total Yellow / Game; Total Red / Game; Total Yellow / Fouls; and Total Red / Fouls) were used to make comparisons between males and females and between league and knockout games. It was found that there were no gender differences in disciplinary sanctions for all World Cups analyzed, but males received significantly ($P < 0.05$) more disciplinary sanctions within contemporary World Cups (4.26 +/- 0.82 and 2.18 +/- 0.58) and committed more fouls within the last two World Cups than females. With regards to game setting, there was no difference between league and knockout games for red cards, but there were significant ($P < 0.05$) differences within the leagues and also the confederation club tournaments analyzed (0.63 +/- 0.20 and 0.20 +/- 0.05 and 0.31 +/- 0.27). Finally, there was no relationship between temperature and ejections.

12. THE EFFECTS OF CARBOHYDRATE FEEDING 60 MIN PRIOR TO EXERCISE ON BLOOD GLUCOSE AND AEROBIC ENDURANCE IN CAUCASIAN AND LATINO POPULATIONS

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While carbohydrate feeding less than 60 min prior to exercise may put individuals at risk for reactive hypoglycemia, it is unclear if ethnic differences exist in this response. The purpose of this study was to examine the effects of carbohydrate ingestion 60 min prior to exercise in Latino and Caucasian populations. After history of insulin resistance was assessed via questionnaire, eight Latino and nine Caucasian individuals ran two random-order tests on a treadmill to volitional fatigue at 60-70% HRR, each after an eight hour fast. The control trial (T1NG) was performed with no glucose feeding; for the intervention trial (T2WG) subjects ingested 1000 mg/kg of carbohydrate 60 min prior to exercise. Blood glucose concentration, heart rate, rating of perceived exertion (RPE) and exercise time were used to assess differences within and across ethnicities by ANOVA ($p<0.05$). Mean blood glucose was not different between T1NG trials and T2WG trials within Caucasian and Latino populations; however it was greater in the Latino population for both the T1NG trial (89±10 vs. 101±8 mg/dL) and the T2WG (90±5 vs. 106±12 mg/dL) trial ($p<0.05$). Mean RPE and Heart Rate (HR) were not different within or across ethnicities in either the T1NG trial or the T2WG trial. Running time was greater in the T1NG vs. the T2WG trial independent of ethnicity ($p<0.05$). No correlation was found between initial glucose values and final times in the Caucasian or Latino population during the T1NG trial; however there was a significant inverse correlation between initial glucose values and final times in the Latino population for the T2WG trial ($r = -0.78$, $p<0.05$). In conclusion, carbohydrate feeding 60 min prior to exercise may reduce endurance performance regardless of ethnicity.

13. DIET QUALITY AND ACTIVITY LEVEL OF COLLEGE FRESHMEN

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This study was conducted to evaluate the dietary and physical activity habits of freshmen students at Utah State University (2009). Of the 1400 students enrolled in a freshman orientation course, 414 (n=135 males, 279 females), students completed an online survey. The average age of participants was 18 years, and 94.4% were non-Hispanic white. The online survey assessed usual dietary intake using the Youth and Adolescent Questionnaire (YAQ), and usual physical activity using the International Physical Activity Questionnaire (IPAQ). The DASH (Dietary Approaches to Stop Hypertension) diet is high in fruits, vegetables, low-fat dairy food, and whole grains and is endorsed by the American Heart Association and the Dietary Guidelines for Americans. Diet quality was quantified by calculating a DASH score based on quintile of intake of 8 food/nutrient components of the DASH diet; 40 points were possible. The average DASH score was 22.39±4.39. Of those surveyed, 43 (10.4%) were inactive, 145 (35%) were minimally active, and 226 (54.6%) were highly active. Average DASH scores for participants who were inactive or minimally active were below average (20.43±4.3 and 22.17±4.3), while the average DASH score of highly active participants was above average (22.9±4.3), (p=.002). Although all freshmen could improve their diets, those who were less physically active had the lower-quality diets than did physically active freshmen. Results from this study suggest that health promotion efforts for freshmen should focus on both nutrition and physical activity.

14. PREDICTING BMI BASED ON INCOME AND EDUCATION

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Obesity is a growing epidemic in the United States. The current economic climate is unstable and unemployment is at the highest level in recent times. Joblessness may affect long term health and increase obesity based on body mass index (BMI). The purpose of this study was to predict BMI based on income and education level. Collected data from the Behavioral Risk Factor Surveillance System (BRFSS) from all 50 states was used to form linear regression equations and spline interpolation equations to determine if the income and education levels would predict whether a person's BMI is normal (BMI ≤ 24.9), overweight (BMI 25.0 – 29.9) or obese (BMI ≥ 30.0). The linear spline equations were used to give an approximation of the behavior of the predicted BMI. A continuous curve was used to determine the difference between the spline points and the suggested points due to erroneous results due to round-off error and overshoot. We considered any absolute difference between spline and smooth curves greater than 1.0, to be significantly different. When using income to determine BMI, in most cases, the difference was greater than 1.0. The exception being income of $25K-35K [for example, x=20 (income level), y=35.261 (spline, BMI), y=36.258 (curve, BMI), absolute difference of 0.997], $35K-50K and $50K+ with BMI of 25.0-29.0. Determining BMI from education level had significant differences except for education level greater than high school and college graduate with BMI of 25.0-29.9. Also, some post high school and BMI greater than 30.0. The results will vary depending on the data. For this data, the smooth curve resulted in conservative prediction. This is the first step of many to create a valid way to predict BMI using income and education level as well as other factors such as sex, race and physical inactivity.

15. GESTATIONAL WEIGHT GAIN RELATIVE TO INSTITUTE OF MEDICINE RECOMMENDATIONS IN HISPANIC WOMEN.

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BACKGROUND: Factors associated with gestational weight gain in Hispanic women are not completely understood. METHODS: Postpartum Hispanic women were assessed through medical, demographic, and acculturation data on gestational weight gain (GWG), total gain above and below the amount recommended by the Institute of Medicine (IOM), as well as rate of gain in the 3rd trimester above and below the amount recommended by the IOM. Apparently healthy Hispanic women (18-35 yr) between 1-6 mos. postpartum were recruited from a tertiary care clinic in Ventura County, California. Subjects completed a written questionnaire (translated into Spanish) on health behaviors during pregnancy and the postpartum period. Medical records were obtained for clinical data. RESULTS: Of the current total sample (n=30, age 24.6±4.4yr), 43% of the women were considered overweight or obese (BMI 28.8±4.5kg/m^2) prior to pregnancy, 27% gained above IOM recommended total weight gain (range: 7.0-44.2 lbs), and 90% gained above IOM recommended rate of weight gain in the 3rd trimester (range: 0.47-3.61lbs/wk). Rate of weight gain in the 3rd trimester was significantly related to the %GWG achieved (relative to IOM recommendations) (r=0.40; $p<0.05$), with no significant relationship to rate of gain in the 1st and 2nd trimesters. BMI was significantly related to %GWG achieved relative to IOM recommendations (r=0.37; $p<0.05$). CONCLUSIONS: Overweight and obese Hispanic women were more likely to gain above IOM recommendations for total weight during pregnancy. Educating Hispanic women on recommended weight gain relative to prepregnancy BMI is important given the risk for postpartum weight retention and type 2 diabetes.

16. ECCENTRIC TORQUE/VELOCITY AND POWER/VELOCITY RELATIONSHIPS OF THE ELBOW FLEXORS

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While athletes of different sports work to increase their performance through specificity of training, they may benefit from training some aspects eccentrically. The purpose of this study was to investigate the eccentric torque/velocity and power/velocity relationships of the elbow flexors. Twenty recreationally trained males (age 24.60 ± 2.18yrs, height 179.15 ± 7.55cm, mass 84.88 ± 17.32kg) and 20 recreationally trained females (age 23.30 ± 1.82yrs, height 163.17 ± 6.24cm, mass 61.96 ± 7.54kg) randomly performed four maximal elbow flexor eccentric actions at five different velocities (60, 120, 180, 240 and 300 ^{0}/s) on a Biodex System 3 Isokinetic Dynamometer. There was no interaction of sex x velocity for either peak torque or peak power, but there were significant ($P < 0.05$) main effects for velocity and sex (males > females). Pairwise comparisons for torque demonstrated that the peak value at 180^O/sec (76.59±34.97 N/m) was significantly less than 240^0/sec (79.58±35.28 N/m) and 300^0/sec (81.02±35.40 N/m). Pairwise comparisons for power demonstrated that peak values significantly increased with each increase in velocity (60^0/s 82.40±37.49 W; 300^0/s 424.28±185.36 W). These results demonstrate that an increase in velocity had little or no effect on eccentric elbow flexor peak torque, but eccentric elbow flexor peak power significantly increased with each increase in velocity. It may be beneficial and important for those individuals who are continuously yielding to high speed movements to incorporate eccentric training into their programs as a means to prevent high force induced injuries.

17. ROLE OF POTASSIUM CHANNELS IN MEDIATING ENDOTHELIUM-DEPENDENT DILATION

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Inhibition of nitric oxide (NO) and prostacyclin (PGI_2) only partially blocks endothelium-dependent dilation. The remaining dilation may be due to one or more endothelium-derived hyperpolarizing factors (EDHF). We tested the hypothesis that K^+ channels (specifically K_V, K_{ATP}, K_{IR} and the Na-K pump) may mediate the EDHF response. Rat soleus feed arteries (n=37) were isolated, cannulated and pressurized at 90 cm H_20. Acetylcholine (ACh) dose response curves (10^{-9} - 10^{-4} M) were performed in the absence and presence of various K+ channel inhibitors and in conjunction with inhibition of NO (300□□M L-NNA) and PGI_2 (5□□M indomethacin) production. 1mM 4-aminopyradine was used for K_V inhibition, 30 □M $BaCl_2$ for K_{IR} inhibition, 100 □M ouabain for Na-K pump inhibition, and 50 □M glibenclamide for K_{ATP} inhibition. In the first group, ACh caused an 87.3 ± 2.8% dilation, which was reduced by K_V inhibition to 80.1 ± 3.5% dilation, and reduced further by combined K_v and K_{ATP} inhibition (41.5 ± 7.5%). In the second group, ACh caused 80.6 ± 7.2% dilation. NO and PGI_2 inhibition reduced dilation to 31.4 ±9.5%. Inhibiting K_V as well as NO and PGI_2 did not further significantly decrease the dilation, but adding combined K_V and K_{ATP} inhibition reduced ACh dilation to 8.3 ± 3.7%. In the third group, ACh caused an 82.6 ± 3.5% dilation, which was not reduced significantly by Na-K pump inhibition. Coupled Na-K pump and K_{IR} channel inhibition reduced dilation to 64.6 ± 5.9%**.** NO and PGI_2 inhibition reduced dilation to 32.7 ± 7.9%. Combined Na-K pump, K_{IR}, NO and PGI_2 inhibition reduced dilation to 16.4 ± 3.9%. Collectively, these data indicate that K_V, K_{ATP}, K_{IR} and the Na-K pump all contribute to EDHF dilation.

18. POST-EXERCISE HEART RATE RECOVERY IN CHILDREN: INTERACTIONS BETWEEN ADIPOSITY AND EXERCISE INTENSITY

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Background: Post-exercise heart rate recovery (HRR) is a predictor for all-cause mortality. The purpose of this study was to investigate the independent and combined effects of adiposity and exercise intensity on HRR. Methods: Children aged 8-11 years (17 normal weight [NW = body fat % > 2nd percentile and < 85th percentile] and 14 obese [OB = body fat % > 95th percentile]) completed baseline anthropometric and heart rate (HR) measurements. HR was recorded 60 seconds following 1) a graded, maximal and 2) a 30-minute discontinuous submaximal cycling protocol completed at an intensity eliciting a HR of ~160 bpm. Results: NW and OB children had similar relative peak power (3.8 ± 0.6 vs. 3.6 ± 0.6 W·kg LBM^{-1}), resting HR (86 ± 9 vs. 82 ± 9 bpm), and peak HR (188 ± 12 vs. 187 ± 13 bpm) (p > 0.05), suggesting similar aerobic fitness between groups. NW children reached a higher HR during submaximal intensity exercise than OB children (168 ± 9 vs. 160 ± 10 bpm; p < 0.022) at a similar relative power output between groups of children (2.6 ± 0.6 vs. 2.3 ± 0.4 W·kg LBM^{-1}; p = 0.219). However, NW children recovered faster following submaximal versus maximal intensity exercise (52 ± 12 vs. 40 ± 10 bpm; p = 0.001), while HRR was similar for both submaximal and maximal exercise intensities in OB children (46 ± 10 vs. 44 ± 8 bpm, respectively; p = 0.887). Discussion: Although we expected to see greater HRR after submaximal than maximal exercise, obese children displayed no differences in HRR between exercise intensities. This similarity in HRR between different workloads might indicate an adiposity-induced delay in sympathetic withdrawal following submaximal intensity exercise.

19. CORRELATION OF PHYSICAL ACTIVITY WITH SLEEP-WAKE PATTERN IN PATIENTS WITH STROKE

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Cerebral vascular accidents can produce neurological dysfunction that can lead to development of motor sensitivity, cognitive, perceptual and language deficits. Despite the fact that sleep disorders in stroke patients are known, it would be therapeutically beneficial to assess which mechanisms of sleep regulation and wakefulness are affected and correlated to levels of physical activity. Therefore, the purpose of this study was to evaluate changes in the circadian and homeostatic control of sleep-wake cycles in stroke patients and correlate with respective levels of physical activity. The study analyzed 22 stroke patients (55± 12 years old) and 24 healthy subjects (57 ±11 years old) of both genders. The instruments used were the International Physical Activity Questionnaire (IPAQ), Pittsburgh Sleep Quality Index (PSQI) and actigraphy, a non-invasive method of monitoring human rest/activity cycles. The data were analyzed using the Student's t-test, Mann-Whitney, ANOVA and Spearman correlation. Findings of the PSQI showed significant differences in sleep quality between patients and healthy subjects, in which patients had poorer quality of sleep (patients: 8.4 ± 3.4; healthy: 6.2 ±2.5; p= 0.0001). IPAQ data found that 86.6% of the patients had low levels of physical activity, while only 13.6% had levels of moderate physical activity. The correlation analysis showed a greater association between the IPAQ with the sum of actigraphic activity among circadian variables (R= -0.38, p< 0.01) and with sleep efficiency among homeostatic variables (R= 0.24, p<0.01). The

20. EFFECT OF ELASTIC ASSISTANCE ON VERTICAL JUMP DECELERATION BETWEEN MEN AND WOMEN

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The ability to land and stop quickly from a vertical jump may play a role in ACL knee injuries. Research has shown that ACL injuries are greater in women than men and men decelerate more quickly. The purpose of this study was to determine the effect of elastic assistance on vertical jump deceleration between men and women. Thirty recreationally trained subjects (15 men, 15 women; age 22.76 ± 1.81yrs, height 167.45 ± 7.61cm, mass 63.17 ± 5.22kg) completed three testing sessions consisting of five conditions: 0%, 10%, 20%, 30%, and 40% body weight reduction (BWR). In all BWR conditions, subjects wore a full body harness that was attached to two elastic cords suspended from the ceiling as they completed three maximal countermovement jumps with arm swing. All jumps were performed on a force plate and subjects were attached to a linear velocity transducer. Maximum values from the peak velocity repetition for each condition were used for analysis. Deceleration was defined as peak descent velocity divided by the time to come to a complete stop. Results showed there were no significant (P>0.05) main effects for condition or sex (men 0% -15.70 ± 7.92m/s^2, women 0% -15.81 ± 4.28m/s^2). However, absolute descent velocity was significantly (P<0.05) greater at each condition for men (0% -2.66 ± .31m/s) when compared to women (0% -2.30 ±.19m/s) due to greater jump height in men. Since deceleration was not different between men and women, the elastic cord assistance may have attenuated descent velocity and may help reduce stress on the ACL during jumping.

21. RELIABILITY OF PERFORMANCE MEASURES OF AN ASSISTED AND UNASSISTED JUMP.

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Vertical jump is a widely used technique for measuring leg power. However, the use of assisted jumping is novel and the reliability of this method has not been determined. The purpose of this study was to determine the reliability of peak velocity (PV), power (PP), ground reaction force (GRF) and jump height (JH) during an assisted and unassisted vertical jump. Nine recreationally trained college men (age 22.1 ± 1.9yrs, height 162.9 ± 36.6cm, mass 75.5 ± 7.5kg) completed two testing sessions separated by 24 hours consisting of two conditions: 0%, and 30% body weight reduction (BWR). In the BWR condition, subjects wore a full body harness while attached to two elastic cords suspended from the ceiling and performed three maximal countermovement jumps with arm swing on a force plate. In addition, a linear velocity transducer was attached to the subject's hip to determine the velocity-time curve. Intraclass correlation coefficients (ICC) were used for analysis. For the 0% BWR condition high significant ($p<0.05$) reliability was found for GRF (ICC=0.925), PP (ICC=0.862) and PV (ICC=0.868). For the 30% BWR condition high significant ($p<0.05$) reliability was found for GRF (ICC=.811), PP (ICC=.843) and PV (ICC=.946). JH resulted in moderate significant reliability in both conditions, 0% (ICC=.640) and 30% (ICC=.571). Our results demonstrate that both unassisted and assisted vertical jump performance measures are reliable and may therefore be used to assess jump changes across time.

22. RELIABILITY AND VALIDITY OF THE VELOTRON RACERMATE TO ASSESS ANAEROBIC CAPACITY

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This study assessed the reliability and validity of the Velotron Racermate electromagnetically braked cycle ergometer to assess anaerobic capacity. Men (7 cyclists and 10 recreationally-active) and women (8 recreationally-active) with a mean ± SD age and body mass equal to 26.2 ± 4.5 yr and 71.2 ± 9.8 kg, respectively, performed two Wingate tests on the Velotron or three Wingate tests (two on the Velotron and one on the Monark Peak Bike). One test was performed per day over 3-7 d with at least 24-48 h between trials. Subjects fasted for 3 h and refrained from exercise for 24 h before each visit. Initially, subjects warmed up for 5 minutes before performing the Wingate test against a resistance equal to 7.5 % BW. Test order was randomized in subjects who completed three Wingate tests. Peak power (PP), average power (AP), minimum power (MP), fatigue index (FI), maximum heart rate (HR), peak cadence (PC), and minimum cadence (MC) were assessed. Results revealed high reliability for AP ($r = 0.91$, $p < 0.05$) and a trend for MP ($r = 0.73$, $p = 0.057$) in response to repeated bouts on the Velotron, yet reliability for PP was moderate ($r = 0.66$, $p = 0.332$). There was no significant difference in MP (4.51 ± 0.53 Watts vs. 4.38 ± 0.55 Watts) or PC (184.96 ± 18.27 rev/min vs. 193.00 ± 31.88 rev/min); however, PP and FI were significantly higher on the Velotron (10.17 ± 1.40 Watts/kg and 55.02 ± 6.63 %, respectively) versus the Monark (9.21 ± 1.16 Watts/kg and 51.65 ± 6.36 %, respectively). AP was significantly higher on the Monark (6.99 ± 0.84 Watts) versus the Velotron (6.38 ± 0.60 Watts). Data reveal that multiple variables obtained from the Wingate test vary based on the cycle ergometer employed.

23. EFFECTS OF SPEED AND GENDER ON SPATIO-TEMPORAL CHARACTERISTICS OF WALKING IN OVERWEIGHT/OBESE VS NORMAL WEIGHT MIDDLE- AND HIGH SCHOOL AGED CHILDREN

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It has been shown that speed influences walking characteristics for obese vs non-obese adults walking at matched speeds; however these differences are mitigated when walking at preferred speed. It is not known if gait characteristics similarly change for overweight/obese (OWO) vs normal weight (NW) children. The purpose of the study was to examine the effects of walking speed and gender on selected spatio-temporal characteristics of walking for OWO vs NW children. Child assent and parental permission was obtained from 111 children (47 female, 64 male) enrolled in grades 7-10 (height=1.62±0.9m; mass=65.2±20.1kg; age=14.17±1.35yr). Height and weight were measured and body mass index (BMI) calculated using procedures established by the Centers for Disease Control and Prevention. Participants were assigned into the OWO group if their BMI was at the 85th percentile or greater (n=55). All others were assigned to the NW group (n=56). Each participant wore their own footwear and walked twice at both their preferred and a fast speed across a 4.27m instrumented walkway (CIR Systems, Haverhill, PA; 120 Hz). Data were concatenated for each walking speed producing 8-14 strides per person averaged within speeds. Five dependent variables were extracted: walking velocity (Vel), single support% (SS), double support% (DS), swing phase% (Sw%) and step width (StW). Results of group x speed mixed model ANOVAs ($p<0.05$) revealed significantly greater Vel (0.07m/s) for NW. DS (4.2%), Sw% (2.1%) and StW (0.025m) were significantly greater for OWO. Vel (0.37m/s), SS (1.6%) and Sw% (1.7%) were significantly greater for the fast speed; DS (3.3%) greater during preferred. Group x gender ANOVAs conducted at levels of speed revealed significantly greater StW (0.01m) for males. Differences between groups converged with increased speed, averaging 25.1% less across variables. Results suggest walking speed influences gait characteristics differentially for OWO and NW children.

24. CHANGES IN REGIONAL BODY COMPOSITION FOLLOWING 18 MONTHS OF BEHAVIORAL INTERVENTION IN BREAST CANCER SURVIVORS

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Obesity, particularly excess trunk adipose tissue, is known to be detrimental to the health of breast cancer patients. Specifically, obesity may lead to breast cancer reoccurrence or other chronic health issues that would negatively affect patient quality of life. Furthermore, it has been shown that weight gain independent to cancer treatment drugs or significantly increased food intake, is common after breast cancer diagnosis. The purpose of this study was to compare changes in regional body composition in overweight breast cancer survivors exposed to a Cognitive Behavior Therapy (CBT) for diet and exercise intervention versus an intent-to-treat control group over an 18-month period. One hundred forty-two overweight or obese female breast cancer patients (N = 142) were randomly assigned to either an intervention group or an intent-to-treat control group. DXA scans at baseline, 6 months and 18 months were utilized to analyze total and regional body composition. A repeated measure ANOVA was conducted for each variable to detect significant differences between groups over time at each time point. Following the intervention, it was indicated that there was a significant improvement in overall body composition (total body fat mass $p \leq 0.012$, percent total body fat $p = 0.00$ and Total body fat mass $p \leq 0.012$), specifically trunk adipose tissue ($p = 0.000$). Though there was no statistical significant difference found between groups for total body lean tissue mass ($p = 0.067$) the trended toward significance. This study confirms and expands upon current understanding of body composition changes in breast cancer patients. Significant improvements in overall body composition were found following an 18 month CBT diet and exercise intervention. It is suggested that future studies examine specific regional body composition changes over several periods of time in which improvements may occur to determine appropriate intervention length in various types of cancer.

25. THE OVERHEAD SQUAT AND SIT-AND-REACH TESTS: ARE THE RESULTS RELATED?

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Muscular Flexibility is one component of both health-related and performance-related fitness. A commonly used method to assess muscular flexibility is the sit-and-reach test (SRT). More recently, the overhead squat test (OST) has been used by fitness professionals and clinicians as a means to assess, in part, total body flexibility. This test is considered by many to be a better, more practical assessment of flexibility; however, there is very little published data to support this. The purpose of this study was to investigate the relationship between the results of the SRT and OST obtained by following published testing procedures. Thirty college-age students (15 male; 15 female) screened for musculoskeletal injuries participated in this study. Testing for each subject took place in one day (approximately 15 min). After a brief dynamic warm-up consisting of 5 exercises (e.g., walking lunges), subjects performed the OST and SRT in a randomized order. SRTs were performed using the Acuflex® I Modified Sit-and-Reach Test Box; the median score of 3 trials was recorded for statistical analysis. OSTs consisted of 3 sets of 5 repetitions of body-weight squats with arms overhead; one set each for anterior, lateral, and posterior views. OSTs were video recorded for later review (Dartfish Advanced Video Analysis Software) and scoring using a 5-category evaluation rubric. The nonparametric test statistic (L) was used to compare the two sets of test data. Results indicate that there was no significant relationship between SRT and OST measures ($L = 1.363$; $p>.05$). This finding indicates that these two tests should not be considered as comparable with respect to evaluating muscular flexibility. However, this study does not imply that one test has greater validity than the other.

26. EFFECTS OF EXERCISE INTENSITY ON RATING OF PERCEIVED EXERTION DURING RESISTANCE EXERCISES FOR UPPER BODY

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Purpose: The aim of this study was to compare the rating of perceived exertion (RPE) in two intensities along one resistance exercise session for upper body. **Methods**: Fourteen men (22.9 ± 3.8 years) completed two experimental sessions in random order: resistance exercise at 50% of 1-RM (E50%) and resistance exercise at 70% of 1-RM (E70%). In both trials, five exercises (bench press, standing row, frontal raises, arm curl, and forehead triceps) were performed in three sets with 12, 9 and 6 repetitions respectively. Active muscles RPE were collected from the OMNI-RES scale after every repetition. **Results**: RPE increased as resistance exercise intensity increased (from 50 to 70% of 1-RM). Moreover, RPE increased at E70% session between sets (from the first to third set) for all exercises. Furthermore, there were no differences in RPE between exercises in both intensities and the effect size indicated small differences between exercises in the two intensities. **Conclusion**: RPE was higher with 70% of 1-RM than with 50% of 1-RM in all sets and exercises and that differences between intensities were observed since the first repetition. Moreover, in a multiple set prescription, the RPE did not change between sets with 50% of 1-RM, whereas RPE increased between sets with 70% of 1-RM.

27. EFFECTS OF SHORT TERM SODIUM BICARBONATE SUPPLEMENTATION WITH ACUTE CAFFEINE INGESTION ON 3-KM CYCLE PERFORMANCE

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The effects of ingesting sodium bicarbonate (SB) in four equal doses totaling (0.3 g/kg BW), acute ingestion of caffeine (CAFF) (6 mg/kg BW) and their combination (SB+CAFF), was examined during a 3-km simulated time trial. 17 trained male cyclists (38 ± 5.7 yr; VO_{2max} 60.9 ± 5.4 ml/kg/min), completed four treatment possibilities in randomized double-blind, placebo (PL)-controlled cross-over trials. The treatments were PL+PL, PL+CAFF, PL+SB, and SB+CAFF. In Day 1, subject's supplemented a total of 0.3 g/kg BW SB or PL in four equal doses; the final dose taken two hours before the trial. In Day 2, participants ingested 6 mg/kg BW of CAFF or PL, one hour before the trial. Blood lactate (BL) samples were drawn upon arrival and one hour after ingesting CAFF or PL. Subjects performed a standardized 15 minute warm-up then completed the 3-km trial as fast as possible. BL samples were taken immediately upon completion then at three and ten minutes post-exercise. Average and peak power, speed, heart rate and time to complete the 3-km were measured with a PowerTap hub. No significant differences were observed for performance time ($p>.05$). Trial time was the fastest in the SB+CAFF treatment (298.80 ± 34.08s), followed by CAFF treatment (305.00 ± 35.35s), the SB treatment (312.67 ± 35.6s) and PL treatment (315.07 ± 34.11s). Three minutes post-exercise, BL concentration for the SB+CAFF treatment (13.72 ± 1.92mmol/L) was significantly higher ($p<.05$) than the PL treatment (11.56 ± .07mmol/L). 10 minutes post-exercise BL concentrations were significantly higher ($p<.05$) for the SB+CAFF treatment (11.99 ± 2.52mmol/L) when compared to CAFF (8.15 ± 2.09mmol/L), SB (8.99 ± 1.97mmol/L) or (PL 7.92 ± 2.13mmol/L). Combined supplementation of SB with CAFF appeared to be ergogenic with trained male cyclists in a single 3-km time trial and elicited significantly higher post exercise BL level.

28. EFFICACY OF CHOCOLATE MILK AS A RECOVERY SUPPLEMENT ON SUPRAMAXIMAL EXERCISE

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Recovery after intense exercise is vital for optimizing subsequent performance. Nutritional supplements containing carbohydrate (CHO) and protein (PRO) are the primary constituents in exercise recovery drinks. The purpose of the present study was to examine the effects of chocolate soymilk on performance subsequent to supramaximal intermittent exercise. Men and women (age= 23.7±4.08 yr, BMI=23.1±2.64 kg/m^2) of varying fitness levels participated in this study. They abstained from intense exercise for 24 hours prior to each session. Subjects completed two Wingate Tests (load = 7.5 % body weight) separated by a 5 min recovery and repeated exercise 24 hours later at the same time of day. Twenty minutes post-exercise on day 1, subjects ingested a 12 oz recovery drink consisting of chocolate soy milk (CSM) (n=8), soy milk (SM) (n=5), or water (H_2O) (n=7). Assignment of drink was randomly allocated to subjects. Peak power, mean power, minimum power, fatigue index, and heart rate were recorded during all trials. Tukey's Post Hoc Test determined that H_2O demonstrated lower peak power output across the average of the four bouts (9.45 ± 1.26 W/kg), compared to SM (9.74 ±1.29 W/kg) and CSM (9.91 ±1.50 W/kg) ($p<0.05$). The data also showed no significant difference in fatigue index across drinks ($p>0.05$). Performance was similar among chocolate and regular soymilk, but the two milk-based drinks containing CHO and PRO elicited significantly higher power outputs than H_2O. Previous studies matched calorie content and/or determined drink volume by body weight; whereas, this study did neither. Neglecting to account for macronutrient differences may have adversely affected the results. Further research should require subjects to consume all beverages in a randomized, placebo-controlled design and rigidly standardize caloric and specifically CHO content of the diet.

29. AN EXAMINATION OF THE LOS ANGELES SUMMER FOOD SERVICE PROGRAM AND ITS IMPACT ON CHILDREN'S DIETARY HEALTH

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Childhood obesity rates continue to rise in low income neighborhoods. Although both poor diet and physical inactivity have been linked to obesity, recent evidence suggests that physical inactivity is the result of children becoming overweight rather than the cause. Therefore, programs aimed at improving the diets of children in these neighborhoods must be scrutinized. The purpose of this study was to evaluate the Los Angeles Summer Food Service Program (SFSP), a lunch program designed to provide children with free nutritious meals when school lunch is unavailable. Surveys were distributed to parents with children participating in SFSP (experimental) and to parents with children not participating in SFSP (control) at five recreation centers. BMI was not different between groups (P>0.05) and 34.4% of all children were considered obese according to CDC BMI-for-age growth charts. While 93.0% of control parents indicated they would participate in a free lunch program, 80.7% were unaware SFSP existed. In addition, 57.1% of experimental parents are somewhat or very dependent on SFSP; yet, 35.3% disagreed that the food served by SFSP is healthier than food served at home. The daily servings of fruits and vegetables was not different between groups (P>0.05). Furthermore, 42.3% of all children consume only 1-2 servings/day and 43.1% of parents indicated that fruits and vegetables are cost prohibitive at least some of the time. Frequency of fast food and soda consumption was not different between groups (P>0.05), but was greater compared to the school year (P<0.05). In conclusion, lack of awareness minimizes the impact of SFSP. Additionally, the program fails to improve the dietary habits of children it serves. Ineffective nutrition programs like SFSP may help explain why attempts to increase physical activity and decrease childhood obesity rates have been unsuccessful in low-income neighborhoods.

30. PHYSICAL ACTIVITY, ACCULTURATION, AND PSYCHOSOCIAL WELL-BEING DURING PREGNANCY AND POSTPARTUM

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Although physical activity during pregnancy and postpartum is associated with better maternal health outcomes, national data indicate that Hispanic women are less active than non-Hispanic white women. Correlates of physical activity during pregnancy and postpartum are not well understood in Hispanic women relative to level of acculturation or psychosocial well-being. METHODS: Apparently healthy Hispanic women (18-35 yr) between 1-6 mos. postpartum were recruited from a tertiary care clinic in Ventura County, California. Subjects completed a written questionnaire (translated into Spanish) in order to assess physical activity (Kaiser Physical Activity Survey) and level of acculturation. Medical records were obtained for clinical data including gestational anthropometrics and psychosocial well-being as measured by the Patient Health Questionnaire (PHQ-9). All results are expressed as mean ± standard deviation. RESULTS: In the current sample of women (n=33), the mean for each of the three sub domains (household/caregiving, active living habits, and sport/exercise) of physical activity as well as overall total physical activity was higher during pregnancy than the postpartum period ($\bar{x}$ ± SD; 7.8 ± 1.4 and 6.6 ± 1.6, respectively). Total physical activity during pregnancy was significantly related to total physical activity in the postpartum period(r=0.7; $p<0.05$). Depression score during the 3rd trimester was significantly related to *household/caregiving (HCI)* activity during early postpartum (r=0.55; $p<0.05$) when controlling for parity. Age of arrival into the U.S. was related to level of acculturation (r=¯0.66; $p<0.$005) and a non-significant trend between level of acculturation and *active living habits* was found. CONCLUSIONS: Hispanic women who had higher depression scores during the 3rd trimester of pregnancy were more likely to have higher levels of household/caregiving activity early in the postpartum period, independent of parity. It is possible that some domains of physical activity (household/caregiving) may not have the same positive relationship on psychosocial well-being.

31. A COMPARISON OF FLEXIBILITY AFTER A SINGLE-BOUT OF ASHTANGA AND BIKRAM YOGA

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Purpose: The purpose of this study was to compare flexibility after single sessions of Bikram and Ashtanga yoga. **Methods:** Sixteen subjects (5 men, 11 women) with at least 6 months yoga experience were randomly assigned to one of two groups. The groups completed one session of Bikram and another of Ashtanga Yoga with a reversed order design separated by one week between yoga sessions. Each subject participated in one Ashtanga and one Bikram yoga session with the order randomly determined and balanced across subjects. **Results:** This study found increases in trunk flexion flexibility following single sessions of both types of yoga, but there were no difference between the yoga styles or gender. The yoga sessions did not influence the trunk lift. **Conclusion:** Ashtanga and Bikram yoga were equally effective in increasing trunk flexion flexibility, but did not influence the trunk lift.

32. THE EFFECTIVENESS OF A 7-WEEK EXERCISE ROUTINE ON TOTAL FUNCTIONAL MOVEMENT SCORES IN COLLEGE-AGED PARTICIPANTS

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The purpose of this study was to evaluate the effectiveness of a 7-week exercise program on functional movement scores involving 20 undergraduate students (16 females, 4 males) enrolled at Brigham Young University. During the first and last weeks, students were evaluated by a trained and certified instructor using the Functional Movement Screen (FMS) which consists of seven simple tests. Following pretesting, students participated in class (50 minutes in length, 4 times per week) by working on specific exercises to improve their ability to perform functional movements. The mean (+/- SE) pretest total FMS scores (out of 21 points) were 16.0 +/- .41 and 13.8 +/- .83 for females and males, respectively; while the posttest scores were 17.8 +/- .41 and 15.3 +/- .83 for females and males, respectively. Females scored significantly better than males (t=2.4, p<.01) and scores were significantly better posttest across both genders (t=1.6, p<.01). The analysis was performed using a mixed model to appropriately account for participant variability. There was no significant interaction between gender and test improvement. Based on the FMS scoring rubric, when a given participant scores a total of 14 points or less this indicates that none of the seven tests was passed at an acceptable level. Thus, at pretest the average female student passed two of the seven tests, while the average male student passed none of them. On the other hand, at posttest the average female student passed three to four of the seven tests, whereas the average male student passed one to two of the tests. These data suggest that before exercise training typical undergraduate students pass only a small percentage of the functional movement tests, but by participating in a regular functional fitness training program, meaningful improvements can be achieved.

33. ANTIMICROBIAL PROTEIN RESPONSE TO PROLONGED RUNNING

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Prolonged exercise may be related to an increased incidence of sickness, potentially through a reduction in concentration and secretion rate of salivary antimicrobial proteins (AMPs). AMPs represent the first line of defense against upper respiratory tract infections (URTI). While salivary IgA (IgA) has been extensively studied, little is known about the effect of acute exercise on other AMPs including lysozyme (Lys) and lactoferrin (Lac). **PURPOSE:** To determine the effect of a 50-km trail run on salivary cortisol, IgA, Lys, and Lac. **METHODS:** 12 subjects (5 females, 7 males: 42±10 years, 18±7 % BF, 47±4 ml/kg/min) completed the 50 km Jemez Mountain Trail Run near Los Alamos, NM (elevation: 2,231m). Ambient temp was 18.8 ºC at 0600, 21.1 ºC at 1200, and 26.1 ºC at 1700. The course consisted of 4,000 m of elevation change. Un-stimulated whole saliva was collected for 4 min through passive drooling prior to the race (pre), immediately post (0) and 1.5 hrs post race (+1.5). Saliva was analyzed for cortisol, IgA, Lys, and Lac using ELISA. **RESULTS:** Mean finishing time was 6.61±3.1 hours. Cortisol increased 78.8±36.6% from pre to 0 ($p < .05$), but was not different from pre at +1.5 ($p > .05$). IgA concentration decreased by 43.5±36.2% from pre to +1.5 ($p < .05$). IgA secretion rate decreased 41.4±44% from pre to +1.5 ($p < .05$). Lys secretion rate decreased 43.3±39% from pre to +1.5 ($p < .05$). Lac was not affected by the race. Only IgA was correlated with cortisol ($r = -.373$, $p < .05$). **CONCLUSION:** Our results suggest that IgA and Lys are more sensitive to acute, prolonged running than Lac. Further, only IgA was correlated with the increase in cortisol. Thus, there may be independent mechanisms responsible for the decline in IgA and Lys. Future studies should target IgA and Lys as potential mediators of URTI.

34. EFFECTS OF EXERCISE INTENSITY ON SWEAT-RATE KINETICS

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Numerous studies have shown that at the onset of exercise the sweat rate increases in what appears to be an exponential manner. However, these data have not been modeled, which limits describing sweat rates at exercise onset. **Purpose:** The purpose of this study was to model the sweat rate response at varying exercise intensities. **Methods:** On separate days, six healthy volunteers completed one bout of cycle ergometry (18-25 min) at four intensities (60% of lactate threshold (LT), 80% LT, LT, and at 30% of the delta between LT and maximal O_2 uptake). Forearm sweat responses were measured during exercise with a ventilated sweat capsule using resistance hygrometry. Changes in relative humidity in the sweat capsule were recorded in 5-s intervals and converted to a sweat rate. The sweat response was modeled using nonlinear regression analysis. One-way repeated measures ANOVA was performed to examine the effects of exercise intensity on the sweat rate amplitude, time delay, time constant, and initial rate of change (amplitude/time constant). **Results:** There were significant main effects for the sweat rate amplitude, time delay, and initial rate of change ($P < 0.001$), but not for the time constant ($P > 0.05$). Follow-up Bonferroni comparisons revealed that the sweat rate amplitude increased with exercise intensity accompanied by a decrease in the time delay. Furthermore, the initial rate of change in sweat rate increased with intensity up to LT, although there was no further change above the LT. **Conclusion:** Not surprisingly, the decreasing time delay indicated that subjects sweated sooner as the exercise intensity increased. In addition, they sweated more with higher intensity as evidenced by the greater amplitude. The novel finding of this study, however, is that there appears to be an upper limit to the initial rate of change in the sweat rate, i.e. how quickly sweat glands begin producing sweat upon stimulation, which is reached at approximately the LT.

35. THE EFFECT OF CREATINE AND/OR CAFFEINE INGESTION ON REPEATED BOUTS OF HIGH INTENSITY EXERCISE

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The purpose of this study was to determine the performance-enhancing effects of caffeine, creatine, and their combination on multiple bouts of high intensity exercise performance. Previous research has shown caffeine and creatine to illicit an ergogenic effect on repeated bouts of high-intensity performance, but research regarding their combination is inconclusive. Furthermore, The condition (field vs lab) in which participants are tested following supplement ingestion may impact its ergogenicity. Subjects were asked to consume 4 separate treatments (placebo, caffeine only, creatine only, creatine + caffeine) for 9 days and then participate in 2 different experimental conditions; 6, 6-second Wingates (lab) or 6, 50-meter running sprints (field). Peak power, mean power, minimum power and percent decline in power were measured in the Wingates and sprint time was measured in the running trials. Repeated measures ANOVA revealed an ergogenic effect of creatine loading plus acute caffeine ingestion ($p < 0.05$) on peak power and mean power in the 1st and 2nd 6-second Wingates. The ingestion of caffeine only improved 50 m sprint time ($p < 0.05$) during the 4th, 5th, and 6th sprints over placebo. This is the first study to show that the ergogenic effect of caffeine and/or creatine might be specific to the type of activity performed and the environment in which the supplement is used.

36. ADHERENCE TO HEALTHY LIFESTYLE HABITS IN US CHILDREN AND YOUTH

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Healthy lifestyle behaviors are associated with cardiovascular disease and cancer mortality in adults. The purpose of this study was to compare adherence to healthy lifestyle habits in US children and youth. We used data from 2,179 children (6 to 11 years of age) and 3,428 youth (12 to 17 years of age) who participated in the National Health and Nutrition Examination Survey (2003-2006). Body weight and height, plasma vitamin C, and physical activity were assessed with standardized protocols. We created an index of healthy low-risk profile from the following variables: physically active (≥60 minutes of moderate or vigorous activity/day), healthy diets (≥50 mmol/L of plasma vitamin C), and normal body weight (BMI <85th percentile for age and sex). We combined these low-risk factors and categorized them as 0, 1, 2, or 3 combined low-risk factors. A χ^2-test was used to compare frequency differences across gender, race, and low-risk factor categories. The prevalences of healthy diet, physically active, and normal weight were 62.2%, 21.1%, and 62.4%, respectively. The prevalences of all three healthy low-risk behaviors in children and youth were 22.9% and 3.1%; respectively ($P<0.001$). The prevalences of healthy low-risk behaviors across male and female were 13.1% and 8.5% ($P<0.001$). There were no statistical differences of healthy low-risk behaviors across race groups: non-Hispanic whites (10%), African-American (10.7%), Mexican-American (10.8%), and others (14.9%) ($P = 0.05$). We observed that the prevalence of metabolic syndrome across a greater number of healthy low-risk factors (0,1,2,3) were 0%, 0.3%, 1.6%, and 5%, respectively. Overall, the prevalence of healthy low-risk behaviors in US children and youth is low. Public health agencies should emphasize the importance of adhering good lifestyle behaviors in children and youth.

37. ACUTE EFFECTS OF A LOW-CALORIE CAFFEINE-TAURINE ENERGY DRINK ON REPEATED SPRINT PERFORMANCE AND ANAEROBIC POWER IN COLLEGIATE FOOTBALL PLAYERS

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Consumption of energy drinks is very common among athletes; however, there is a lack of research on the efficacy of energy drink consumption before and during short-duration, intense exercise. The purpose of this research was to investigate the acute effects of a low-calorie, caffeine-taurine, energy drink (AdvoCare Spark) on repeated sprint performance and anaerobic power in NCAA Division I football players. Twenty well-trained Division I football players (age: 19.7±1.8 years, height: 184.9±5.3 cm, weight: 100.3±21.7 kg) participated in a double-blind, randomized crossover study in which they received the energy drink or an isoenergetic, isovolumetric, noncaffeinated placebo. The two trials were separated by 7 days. The Running Based Anaerobic Sprint Test (RAST), consisting of 6 35-m sprints with 10 sec of rest between each sprint, was used to assess peak and average power output. Sprint times were recorded with an automatic electronic timer. The difference in the power output of the 5th sprint reached statistical significance (AdvoCare Spark = 425.39±84.96 W vs. placebo = 402.36±95.98 W, P = 0.05). However, the energy drink and placebo did not differ significantly (P > 0.05) for maximal power, average power, and fatigue index [(maximum power – minimum power) / total sprint time]. There was a significant interaction effect between sprint times and the subjects' caffeine history: $F(11,187) = 2.390$, P = 0.009, partial η^2 = 0.123 indicating that acute ingestion of a caffeinated energy drink will likely have a greater ergogenic effect on non-users of caffeine. In conclusion, a caffeine-taurine energy drink did not improve the anaerobic power of collegiate football players during repeated sprints.

38. GROUND REACTION FORCES GENERATED BY TWENTY-EIGHT HATHA YOGA POSTURES

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Aim-Adherents claim many benefits from the practice of yoga, including promotion of bone health and prevention of osteoporosis. However, no known studies have investigated whether yoga enhances bone mineral density. Furthermore, none have estimated reaction forces applied by yoga practitioners. The purpose of this study was to collect ground reaction force (GRF) data on a variety of hatha yoga postures that would commonly be practiced in fitness centers or private studios. **Methods**-Twelve female and eight male volunteers performed a sequence of 28 hatha yoga postures while GRF data were collected with an AMTI strain-gauge force plate. The sequence was repeated six times by each study subject. Four dependent variables were studied: peak vertical GRF, mean vertical GRF, peak resultant GRF, and mean resultant GRF. **Results**-Univariate analysis was used to identify mean values and standard deviations for the dependent variables. Peak vertical and resultant values of each posture were similar for all subjects, and standard deviations were small. Similarly, mean vertical and resultant values were similar for all subjects. **Conclusion**-This 28 posture yoga sequence produced low impact GRF applied to upper and lower extremities. Further research is warranted to determine whether these forces are sufficient to promote osteogenesis or maintain current bone health in yoga practitioners.

39. EFFECTS OF HIGH-INTENSITY INTERVAL EXERCISE ON POSTEXERCISE OXYGEN UPTAKE

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Background: Sprint interval training has been shown to result in greater weight loss as compared to traditional moderate intensity exercise training, despite a significantly lower energy cost during training sessions. Whether postexercise oxygen uptake is significantly elevated following sprint interval exercise in comparison to moderate-intensity exercise remains unknown. Methods: Eleven healthy subjects (10 men/ 1 female), age (24.5 + 3.7 yrs), % body fat (14.2 ± 4.8), VO_2 peak (44.9 ± 7.5 ml/kg/min) underwent one control (CON) and 3 exercise conditions in a randomized order: continuous moderate-intensity (MOD; 30 min at 80% HRmax), aerobic interval exercise (AIE; 4 X 4-min bouts at 95% HRmax with 3 min active recovery), and sprint interval exercise (SIE; 6 "all-out" 30-sec sprints (Wingate tests) separated by 4 min active recovery). Ventilation and gas exchange data were continuously recorded prior to, during, and following the exercise bouts for 180 min. Results: Postexercise VO_2 was significantly ($p<0.05$) greater following SIE (68.3 ± 1.0 l/min) when compared to all the other conditions (CON: 51.1 ± 9.2 l/min, MOD: 59.2 ± 10.8 l/min, AIE: 60.7 $\pm$ 12 l/min). AIE and MOD resulted in significantly ($p<0.05$) greater postexercise VO_2 compared to CON (9.6 $\pm$ 2.5 l/min and 8.1 $\pm$ 2.5 l/min, respectively). SIE also resulted in significantly ($p<0.05$) lower RER values during the third hour postexercise. Discussion: Sprint interval exercise resulted in significantly greater 3-hour postexercise oxygen uptake as compared to aerobic interval exercise and moderate intensity exercise. Because fat oxidation appeared to be greater during the last 60 min of the 3-hour postexercise period, the greater weight loss reported with sprint interval training compared to moderate-intensity training may in part be due to the significant increase in caloric expenditure and fat oxidation in the acute postexercise period.

40. EFFECT OF ONE VS TWO STAIR CLIMB TRAINING ON SPRINT SPEED

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Currently, little research has been conducted on the effect of stair climb training on track sprint times. The purpose of this study was to investigate the effects of running the stairs either one stair (1s) or two stairs (2s) at a time on sprint times. Fourteen college track & field male athletes (in season) were randomized into three groups (1s), (2s), or control (C). All groups were pre and post tested for 1s, 2s, and 40 meter sprint times. The 1s and 2s groups trained twice per week, for four weeks, performing ten repetitions of climbing sixty-eight total stairs with two-and-a-half minutes rest between trials. Max values from pre & post stairs and sprinting were used for statistical analyses. There was a significant ($p<0.05$) interaction of group x time for stair climb. The 1s group decreased time for the 1s test (pre-14.69±1.82, post-13.25±1.10) with no change in the 2s test (pre-9.21±2.01, post-8.99±.86) while the 2s group decreased time for the 2s test (pre-9.72±.29, post-8.59±.46) with no change in the 1s test (pre-15.03±.51, post-14.93±.53). The C group showed no change in either stair test ((1s)pre-15.19±1.85, post-15.24±1.02, (2s)pre-9.29±1.00, post-9.40±1.05). There were no significant interactions or main effects for 40 meter sprint times (pre-5.58±.32, post-5.59±.30).Therefore, training with climbing sixty-eight stairs either one or two at a time did not directly decrease 40m sprint times but decreased the specific training stair type.

41. THE INFLUENCE OF WALKING GRADE ON MUSCLE AND BONE HEALTH IN OLDER ADULTS

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Walking is considered the ideal exercise for older adults for cardiovascular and metabolic health; however, the effect of walking on bone and muscle health is unclear. Moreover, the influence of walking grade has not been studied. The purpose of this study was to determine the effect of walking over various grades on bone density (BMD), muscle mass and strength, and physical function. Thirty-one elderly subjects (≥64 years of age) were recruited for participation in the study. Two groups were defined; Flat Walkers (FW) (age: 75.3 ± 6.0 yrs; Body mass: 74.7 ± 16.0 kg; n=15) and Hill Walkers (HW) (age: 69.0 ± 3.2 yrs; Body mass: 73.3 ± 14.4 kg; n=16). All participants completed a consent form and health/activity questionnaire, and height and weight were measured using a standard scale and stadiometer. BMD was measured using DXA. Postural stability was measured during a quiet static stance with eyes open and eyes closed using Kistler force plates. Ground reaction forces and velocity during walking were measured using Kistler force plates and video analysis. A Modified Timed Get Up and Go test was performed to assess mobility. Strength was determined on a Keiser leg press. Groups were compared by independent sample t-tests ($p < 0.05$). No significant differences were found between FW and HW for any of the measured variables (FW: Hip BMD 0.86 ± 0.12 g/cm2, Spine BMD 1.02 ± 0.22 g/cm2; HW: Hip BMD 0.88 ± 0.14 g/cm2, Spine BMD 0.98 ± 0.21 g/cm2), (FW: Leg strength 359.1 ± 147.8 lb; HW: Leg strength 423.9 ± 142.7 lb) but there were significant differences between population norms and study subjects. Walking may be an effective activity for muscle and bone health in older adults regardless of grade.

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43. OXALOACETATE ENHANCES RESISTANCE TO FATIGUE IN *IN VITRO* MOUSE SOLEUS MUSCLE.

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Oxaloacetate is a four-carbon substrate involved in the rate-determining first step of the tricarboxylic acid (TCA) cycle. We tested the hypothesis that an increase in supplementary oxaloacetate would increase the supplementary ATP production from substrate-level phosphorylation within the mitochondria and thereby improve skeletal muscle fatigue resistance. Soleus muscles (n=16 muscles) were dissected from mice and kept in Tyrode's solution at 33-34ºC during the experimental procedures. Muscles were mounted within an experimental chamber and separated into a control group (C; n=7) and an experimental group (OAA; n=9). Each muscle then had 2 contractile work bouts conducted (separated by a 60-min rest period) in which the stimulation frequency was increased every minute until the final contraction force had fallen to 60% of the initial force. All muscles had an initial contractile fatigue run that was identical for the C and OAA groups. During the 60-min rest period between the contractile work bouts, the OAA group was perfused with a solution containing oxaloacetate (1 mg/L), while no changes were made in the solution perfusing the control group. After the rest period, the second fatigue run was conducted. The control group displayed no significant difference in fatigue resistance between the first and the second contractile trials (186.1±12.4 vs. 190.3±13.8 sec, respectively). However, the OAA group displayed a significantly greater resistance to fatigue ($P<0.05$) in the second contractile period compared to the first (210±10.1 vs 236.9±8.0 sec). The results of this study demonstrate that acute exposure to oxaloacetate increases resistance to fatigue in mouse soleus muscle, and suggest that treatment with oxaloacetate increases substrate-level phosphorylation within the mitochondria and thereby enhances muscle fatigue resistance.

42. DESCRIPTIVE EPIDEMIOLOGY OF PHYSICAL ACTIVITY SPACE

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The ability to accurately assess an individual's physical activity (PA) is important with nearly 50% of US adults being inactive. Therefore, it is necessary to investigate new ways to measure PA to achieve a better understanding of PA behavior.
PURPOSE: To use the Movement and Activity in Physical Space (MAPS) score to assess PA Space in a population of healthy adults. METHODS: A cross-sectional descriptive epidemiological design was used to evaluate the distribution of MAPS scores in 75 healthy adults with a wide range of PA levels. Seventy-Five participants (n=38 females, n =37 males; age=40.4±13.8 yrs; percent fat=28.9±9.5%) completed three days of monitoring while wearing an accelerometer and GPS receiver on a waist belt during all waking hours. Mean daily belt wear time was 845.5 ± 149.3 minutes. All analyses were performed in SAS 9.2 with alpha level 0.05. The basic MAPS formula is determined by the dividing the activity (intensity/steps) that occurs at each location by the time (minutes) and summed over each day. A higher MAPS score indicates a higher level of PA space based on a combination of PA (intensity and volume) and environment interaction.

$$MAPS = \sum_{L=1}^{n} \left(\frac{Activity}{Minutes} \right)$$

RESULTS: Overall MAPS scores were higher in males (82.6 ± 62.1) than females (65.9 ± 44.6)($p>0.05$) with a combined mean of 75.1 ± 55.1 and range 266.0. Participants took 6.6 ± 2.8 trips/day (Males = 6.9 ± 2.8; Females = 6.2 ± 2.8; $p>0.05$). Correlation of MAPS with age and percent fat were not significant ($p > 0.05$). Tertile distribution for MAPS was low=34.0, middle=64.1, and high=104.2.CONCLUSION:This study showed the distribution of MAPS scores in a healthy adult population which has provided the groundwork for future research and comparison using PA Space and MAPS scores as part of a PA intervention or behavioral assessment.

44. AN INVESTIGATION OF TRABECULAR BONE STRENGTH, DENSITY, AND ARCHITECTURE

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Bone density measurements are frequently used to access the quality of a person's bone. However, bone density values do not give complete information on the bone's mechanical characteristics which ultimately determine the likelihood of bone fracture. **Purpose:** The purpose of this study was to investigate the relationship between bone density, bone strength and trabecular bone architecture. **Methods:** Twelve femurs were harvested from six mature rabbits. Each femur's bone mineral density (BMD) was measured using DXA. Femur compression strength was determined using an Instron with a sample of the distal end of one femur per rabbit. Two thin cross-sections of the other femur were prepared for imaging with a scanning electron microscope of three regions (medial, middle and lateral) per sample . BoneJ software was used to compute various measurements of trabecular architecture for each region: ratio of bone volume to trabecular volume, trabecular thickness, and trabecular separation. For each of these three values the median value between the three regions was used for analysis. Pearson correlation coefficients were analyzed ($p < 0.05$). **Results**: Strength and stiffness measurements were positively correlated ($r = 0.995$), while bone ratio and trabecular separation were negatively correlated ($r = -0.849$). BMD and trabecular thickness were positively correlated ($r = 0.792$), but BMD and strength were not. **Conclusions:** High bone mineral density values do not necessarily indicate good bone quality. Additionally, it was confirmed that trabecular architecture is not uniform within a cross-section or even within a specific region of that cross-section. This further raises the concern for using BMD values to make conclusions about a particular bone's quality when it is clear that trabecular bone is not a homogenous tissue.

45. EFFECTS OF STATIC STRETCHING ON HEART RATE AND FITNESS CLASSIFICATION FOLLOWING THE YMCA STEP TEST

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Purpose: To determine the effects of static stretching on heart rate and aerobic fitness classification following the YMCA step test. **Methods:** Twenty participants visited the lab on three occasions. The first visit involved familiarization with the static stretching exercises and the YMCA step test. The two other visits involved a control condition (no stretching) and an experimental condition (stretching) prior to performance of the YMCA step test. The experimental condition involved performing four static stretches for the quadriceps femoris muscles prior to performing the step test. Heart rate was recorded each minute during the step test. Recovery heart rate was measured for one minute within five seconds after the last step. The control visit was identical to the experimental visit except that no stretching was performed. **Results:** Recovery heart rate was not affected by stretching. There was a significant difference between stretch and no-stretch conditions for exercise heart rate, with the heart rate higher for the stretching condition. In addition, there was a difference in fitness classifications for eight out of twenty participants, with five of the eight having better fitness classifications for the no-stretch condition. **Conclusion:** Static stretching prior to the YMCA step test might affect the test results. Furthermore, the direction of the effect may be to increase or decrease fitness categorization.

46. RELATIONSHIP BETWEEN FUNDAMENTAL MOVEMENT SKILLS AND WEIGHT STATUS IN 4 -TO – 11 YEAR OLD CHILDREN

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BACKGROUND: Childhood obesity is a growing epidemic. Numerous studies have demonstrated a negative relationship between overweight and physical fitness. Studies have also found a positive relationship between movement skills and physical activity. However, there is a paucity of data on movement skills and overweight. **PURPOSE:** To compare movement skills between overweight/obese children and their normal-weight peers. **METHODS:** Children (n=90, mean age 8.7 ± 1.95 years) were recruited from three schools in Moorpark School district to participate in the Gameday study. BMI percentiles for age and gender were determined using EpiInfo Version 1.1 – 2.0 (CDC, Atlanta, GA). Normal Weight was defined as having a BMI <85th percentile and overweight a BMI > than the 85th percentile for age and gender. Hip and waist circumference were measured using anthropometric tape to the nearest 0.1cm, and used to calculate hip/waist ratios. Level of motor skill was assessed using the 11 point Movement Assessment Battery for Children. Two-way ANCOVAs investigated the difference in movement skills with BMI percentile-group and gender as fixed factors, and participant age as a covariate. **RESULTS:** As hypothesized, there was a significant difference in weight ($p<0.001$) and BMI percentile ($p<0.001$) between normal weight and overweight children. This mean difference was present across both male (weight, $p<0.01$; BMI, $p<0.01$) and female participants (weight, $p=0.01$; BMI, $p<0.001$). In addition, normal weigh children were significantly better at the skill of running, ($p=0.05$). **CONCLUSION:** This study suggests that there are no differences in fundamental movements skill levels by weight status. Further work is clearly warranted.

47. HEART RATE RESPONSE TO MULTIPLE ACTIVE VIDEO GAMES COMPARED TO ACSM GUIDELINES

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Active video games are increasingly being examined as a new type of activity for daily exercise. The purpose of this study was to determine if active video games were able to elicit an appropriate cardiovascular response as defined by the ACSM. Participants in this study were between the ages of 18-35. 43 males and 41 females participated in the study. The average age was 22.6 $\pm$ 2.2 years, average height was 168.2 $\pm$ 9.9 cm, the average weight was 69.3 $\pm$ 15.5 kg, and the average BMI was 24.3 $\pm$ 3.7 kg/m^2. Different participants were recruited for each game. Participants played each game, Gold's Gym (GG), Just Dance (JD), and Your Shape (YS), at their own pace for 20-30 minutes. The heart rate (HR) was recorded at rest and during game play with a Polar® Heart Rate Monitor. The average HR during game play was 131.2 $\pm$ 17.0 bpm, 126.5 $\pm$ 22.2 bpm, and 116.7 $\pm$ 19.4 bpm, for YS, GG, and JD respectively. Each game increased HR above resting levels ($p<0.001$). When using percent heart rate reserve (%HRR), GG and YS led to a HR which would be considered moderate (40-60% HRR) but not vigorous (>60% HRR) exercise, according to ACSM guidelines for improvements in health/fitness. An ANOVA revealed that the average HR during JD was significantly lower than the average HR when playing the other two games ($F = 3.876$; $p<0.05$).YS and GG led to a higher average HR than JD in this group of participants. None of the three games elicited a %HRR at or above ACSM's "ideal recommendation for improvement of health/fitness in most adults." However, YS and GG could be a good start for an untrained person, in that it meets the cut off for moderate intensity activity.

48. THE EFFECT OF PREGNANCY ON RESPIRATORY MUSCLE STRENGTH

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Pregnancy causes a suite of physical changes, including a significant increase in abdominal pressure. We hypothesized that the increased inspiratory work associated with elevated abdominal pressure during pregnancy leads to increased respiratory muscle strength. To test this hypothesis, maximal inspiratory and expiratory pressures and diaphragm thickness (via ultrasound) were measured as indices of respiratory muscle strength in both post-partum (within 14 days of delivery) and control women. Both groups of women were retested >15 weeks later, by which time any adaptations of pregnancy would be expected to have reverted. To date, 7 post-partum and 6 control women have been tested twice. Via paired t-test, no significant differences were found in MIP or MEP in either group, however diaphragm thickness was significantly greater post-partum than >15 weeks later ($p < 0.05$). These findings suggest that the diaphragm may have hypertrophied during pregnancy. Ultimately the results may improve understanding of respiratory adaptations to pregnancy.

49. LIFESTYLE BEHAVIORS AND METABOLIC SYNDROME IN US ADOLESCENTS

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The impact of lifestyle factors on metabolic syndrome (MS) in US children and adolescents has not been thoroughly explored. We examined the combined effects of healthy lifestyle factors on MS in 4,022 US adolescents, aged 13 to 19 years, from the National Health and Nutrition Examination Survey (2003-2006). Body weight and height were assessed with standardized protocols. Plasma vitamin C was measured using isocratic high performance liquid chromatography with electrochemical detection at 650 mV1. Physical activity monitor was used to assess physical activity status. We defined a low-risk (healthy lifestyle) profile as physically active (≥60 minutes of moderate or vigorous activity/day), healthy diets (≥50 mmol/L of plasma vitamin C), and normal body weight (BMI <85th percentile for age and sex). We combined these low-risk factors and categorized them as 0, 1, 2, or 3 combined low-risk factors. The metabolic syndrome was defined as 3 or more of the following abnormalities using the modified version of Adult Treatment Panel III definition: abdominal obesity, hypertriglyceridemia, low high-density lipoprotein cholesterol, high fasting glucose, and hypertension. Multivariable logistic regression was used to investigate the association between combined number of low-risk factors and MS in US adolescents. After adjustment for age, sex, race, and family income, there was an inverse association between a greater number of low-risk factors and MS (P for trend <0.001). Adolescents who were physically active, had healthy diets, and with a normal weight had a 97% lower odds of having MS (95% CI, 89%-99%) as compared with adolescents with zero low-risk factors. Adolescents with at least 2 low-risk factors had a 70% (95% CI, 52%-81%) lower odds of having MS when compared with adolescents with 0 low-risk factors. Being physically active, eating healthy diets, and maintaining a normal weight is associated with lower risk of MS in US adolescents.

50. THE EFFECTS OF CALORIC RESTRICTION AND RESISTANCE TRAINING ON BONE MINERAL DENSITY AND BONE STRENGTH DURING THE GROWTH PERIOD IN RATS

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The purpose of this study was to examine the impact of caloric restriction and resistance training on bone mineral density (BMD) during the growth period using an animal model. Thirty-two male rats (~ 8wks old) were randomly divided into animals fed a normal diet that were either: sedentary (NF, n=8) or resistance trained (n=8); or fed a caloric restricted diet (CR) that were either: sedentary (n=8) or resistance trained (DT, n=8). All resistance trained animals (RT) were conditioned to climb a vertical ladder with weights appended to their tail 3 days/wk for 6 wks. Rats fed the CR diets were given 60% of the food eaten by a paired normal fed counterpart. The CR diets were supplemented with additional protein, fat, vitamins, and minerals to prevent deprivation of these essential nutrients. Tibial BMD was measured via DXA and bone strength (Fmax) was measured via a 3-pt bending rig. After 6 wks, the body mass for CR animals was significantly less (355.5 ± 6.5 g) compared to normal fed animals (456.5± 11.8 g). There were significant main effects of diet (CR = 0.206 $\pm$ 0.002 g/cm^2 vs. normal fed = 0.224 $\pm$ 0.005 g/cm^2) and exercise (sedentary = 0.207 $\pm$ 0.003 g/cm^2 vs. RT = 0.224 $\pm$ 0.004 g/cm^2) on BMD as well as diet (CR = 115.8 $\pm$ 4.5 N vs. normal fed = 131.3 $\pm$ 5.3 N) and exercise (sedentary = 112.0 $\pm$ 2.4 N vs. RT = 135.1 $\pm$ 5.4 N) on Fmax. There were no interaction effects between diet and exercise. The results indicate that CR diets can lower, whereas RT can elevate, both BMD and Fmax. In support, there were no significant differences in BMD or Fmax between DT and NF. Thus, resistance training was able to prevent the caloric restriction-induced decline in BMD and Fmax.

51. ACUTE AND CHRONIC CHANGES IN RPE AND PAIN IN RESPONSE TO HIGH-INTENSITY INTERVAL TRAINING

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This study examined the effect of high intensity interval training (HIIT) on Rating of Perceived Exertion (RPE) and pain perception. Eleven active young men (25.3 ± 5.5 years, 80.3 ± 11.2 kg, 45.6 ± 4.0 mL/kg/min) and 9 active young women (25.2 ± 3.1 years, 62.1 ± 6.8 kg, 41.1 ± 6.1 mL/kg/min) underwent 6 d of HIIT, 2 d/wk over a 3 wk period. During week 1, subjects completed 4 30 s Wingate tests with 5 min active recovery between bouts. The number of bouts was increased to five during the second week and six during the third week. Subjects were instructed to maintain their physical activity during training. RPE was recorded using a 0 – 10 categorical scale. Perceived pain intensity was assessed utilizing a category-ratio scale with verbal anchors. Pain perception and RPE were recorded 4 min into recovery during all trials. Two-way ANOVA with repeated measures was used to assess differences in pain and RPE across training and bouts. The data indicated a significant difference between the mean RPE of bouts 1 and 4. RPE decreased across 6 days of training during bout 4 ($p=0.001$). A significant interaction was found between training and pain across bouts ($p=0.001$). RPE and pain perception were affected by gender across bouts ($p=0.007$). Training significantly altered ($p < 0.05$) pain perceived by subjects across bouts, as pain was attenuated from day 1 bout 4 (6.20 ± 2.29) of HIIT versus day 6 bout 4 (5.20 ± 2.04). Pain increased across bouts on each day of training. For example, pain increased from 1.98 ± 1.12 after bout 1 and peaked at 6.20 ± 2.29. In conclusion, these data show that RPE and pain are significantly influenced by short-term HIIT.

52. CAFFEINE INGESTION AND INTENSE RESISTANCE TRAINING AMELIORATE POST EXERCISE HYPERTENSION IN NORMOTENSIVE AND HYPERTENSIVE MEN

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Hypertension is a major public health problem, leading to over $73 billion in direct and indirect costs. Regular exercise is one strategy recommended to reduce blood pressure, and it is evident that acute exercise reduces blood pressure directly after exercise (post-exercise hypotension) as well as long-term. Approximately 90 % of adults consume caffeine, which exerts a pressor effect at rest and during exercise in persons with normal and high blood pressure. Yet, caffeine-mediated changes in cardiovascular function are relatively unexplored in response to intense resistance training. The primary aim of the study was to compare cardiovascular function in normotensive and hypertensive men completing resistance exercise following caffeine (CAF) ingestion. Normotensive (n = 7) and hypertensive men (n = 7) who regularly consumed caffeine and participated in resistance training ingested CAF (6 mg/kg) or placebo 1 h pre-exercise in a randomized, double-blind crossover design. They refrained from CAF and strenuous exercise for 48 h before each trial. Subjects completed four sets of barbell bench press, seated leg press, lat pull-down, and barbell shoulder press to fatigue at loads equal to 70 - 80 % one repetition maximum (1-RM). Heart rate (HR) and blood pressure (BP) were measured pre-exercise, during exercise, and for 75 min post-exercise at regular intervals. Results demonstrated significantly higher ($p < 0.05$) resting, exercise, and recovery systolic BP with CAF versus placebo, yet no change in HR ($p = 0.16$) or diastolic BP ($p = 0.10$). HR, systolic, and diastolic BP were significantly higher ($p < 0.05$) in hypertensive men versus normotensives throughout the protocol. Post-exercise hypotension did not occur in either treatment, thus intense total-body resistance training with or without caffeine intake may be contraindicated in persons with elevated BP due to a sustained pressor effect.

53. PILOT STUDY OF THE VALIDITY OF A PORTABLE 4-STEP STAIR CLIMB TASK TO DETERMINE POWER IN THE ELDERLY

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Stair climbing is an increasingly difficult task of daily living for older adults that is dependent upon many factors of fitness and performance such as muscular strength, power, agility, and balance of the lower body. The purpose of this study was to validate a portable 4-step stair climb task as a functional measure of muscular power in a group of community dwelling older adults. Thus far 18 participants (10 women & 8 men) with an average (± SD) age of 77.9 ± 8.1 yrs and a BMI of 26.0 ± 3.4 kg/m^2 have completed a health screening and senior fitness test including 1-RM seated isotonic leg-press, isotonic leg-press power at 70% 1-RM, balance (Romberg, unipedal, foam stance), gait, and 4-step stair climb task. For the men, their 1-RM lower-body strength was 213.1 ± 78.9 lbs and measured power was 275.7 ± 104.0 W or 3.2 ± 1.2 W/kg. For the women, their 1-RM lower-body strength was 177.8 ± 45.8 lbs and measured power was 156.3 ± 95.0 W or 2.5 ± 1.5 W/kg. The calculated power during stair climbing was 334.6 ± 112.3 W or 3.9 ± 1.2 W/kg for the men and 169.3 ± 77.6 W or 2.7 ± 1.1 W/kg in the women. Normal gait speed was 1.1 ± 0.2 m/s in men and 1.0 ± 0.3 m/s in the women. Stair climb power was correlated with measured power ($r = 0.79$, $p = 0.001$), gait ($r = 0.74$, $p = 0.001$), balance ($r = 0.82$, $p = 0.001$), and age ($r = - 0.68$, $p = .003$) in the whole group. These data suggest that a portable 4-step stair climb task is a valid measure of lower body power in the elderly and that this task requires greater than 70% maximal effort.

55. EFFECTS OF A CUSTOM ORTHOPEDIC BRACE ON BALANCE CHARACTERISTICS FOR CHARCOT-MARIE-TOOTH PATIENTS

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Charcot-Marie-Tooth (CMT), a neuromuscular disorder, creates challenges in locomotion and balance. The study purpose was to examine the effects of a custom orthopedic brace on balance performance among CMT patients. Eight CMT patients (age=55.7±9.8yrs, height=1.72±0.07m, mass=83.0±16.4kg) were fitted with a custom orthopedic brace. After a 6-8 week accommodation period balance was assessed in both unbraced (UN) and braced (BR) conditions by performing Limits of Stability (LOS) tests using a NeuroCom Balance Master (NeuroCom International, Inc., Clackamas, OR) balance assessment system. The LOS test objective was to move one's center of gravity (COG) as far as possible in eight directions without falling. Dependant variables examined were reaction time (RT) defined as time from command execution until initiation of movement, movement velocity of the COG (MVL), maximum excursion (MXE) expressed as the percent traveled out of a total distance toward a target point, and directional control (DCL) expressed as the percentage of time spent moving toward the target. LOS data were analyzed individually (Model Statistic, $\alpha = 0.05$) and collectively by tabulating participant's intra-testing fall frequency expressed as a percentage of total tests resulting in falls. Results comparing UN and BR were inconclusive as improvements were observed almost universally during BR, however only two participants exhibited statistically significant improvements ($p<0.05$) across all parameters during BR. Significant differences were identified intermittently or were non-evident across other participants. When all participant data were combined, mean improvement for MXE (31.9%) and DCL (29.3%) were significant for BR ($p<0.05$), while mean improvement of RT (0.43s) and MVL (0.91deg/s) were not significant. Examination of fall frequency suggested BR significantly improved LOS results vs. UN (14.1% vs. 43.7%, respectively). CMT patients improved balance during BR; however additional testing is needed to determine the range of balance improvement to be expected by future CMT patients using orthopedic braces.

54. A METHOD TO DETERMINE CARDIOVASCULAR AND POWER OUTPUT EQUIVALENCE IN A HYPERTHERMIC VS. THERMONEUTRAL ENVIRONMENT IN TRAINED CYCLISTS

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The purpose of the current study was to compare cardiovascular responses and performance parameters in thermoneutral (TN, 22±1^{o}C) and hyperthermic (HT, 35±1^{o}C) ambient temperatures in endurance trained cyclists during exercise. Fifteen endurance trained male cyclists (30±9 years old; 57.7±5.5ml•kg^{-1}•min^{-1}) were recruited for this study. Subjects underwent exercise at 40, 60, and 80% $VO_{2max,}$ for ten minutes at each stage in either TN or HT ambient temperature; Heart rate (HR), oxygen intake (VO_2), oxygen ventilatory exchange ratio (V_E/VO_2), carbon dioxide ventilatory exchange ratio (V_E/VCO_2), and rate of perceived exertion (RPE) were recorded. Body weight (BW) and urine specific gravity (USG) were measured pre and post testing. In order to assure proper hydration USG had to be ≤1.020 (NCAA, 1998) prior to testing. Data analysis was performed via a multivariate analysis of variance (MANOVA) and was statistically significant when $p < .05$. A Tukey's Post-Hoc-Test was performed to determine the source of significance. As expected, VO_2 increased with an increase in intensity, but there was no significant effect of temperature on VO_2. While HR increased with each increment in intensity, the only significant temperature effect was at 60% VO_{2max} in the HT vs TN environment. V_E/VO_2 and V_E/VCO_2 were significantly higher in the HT vs TN environment at all exercise intensities. The HT condition may have exacerbated the cardiovascular system by increasing core and skin temperature thus diverting blood flow to the skin in order to increase heat dissipation. Further need to maintain exercise intensity, in the HT condition, may have induced a greater O_2 uptake and greater CO_2 production via the anaerobic pathway which further challenged the homeostatic balance.

56. THE EFFECT OF MODERATE MUSCLE FATIGUE ON NONLINEAR MEASURES OF LOWER EXTREMITY KINEMATICS DURING TREADMILL WALKING

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Nonlinear time series analysis of lower extremity kinematics has been shown to be useful for the detection of subtle abnormalities in gait. For example, previous researchers have reported reduced statistical persistence in stride time in Huntington's patients and older adults at risk for fall, and increased maximal Lyapunov exponents have been observed following musculoskeletal injury. However, these measures are also known to vary under relatively normal circumstances in otherwise healthy individuals, and such behavior presents implications for the interpretation of nonlinear analysis of gait in patient populations. Therefore, the purpose of this study was to contribute to an overall understanding of the nonlinear dynamics of healthy gait by examining the effects of moderate muscular fatigue on lower extremity movement during treadmill walking. Twenty recreationally active subjects performed two 10 minute bouts of treadmill walking at their preferred speed while knee and ankle kinematics of their right limb were captured via optical motion capture. Following the first walking trial, subjects performed a series of lower extremity resistance exercises designed to induce moderate muscular fatigue. Immediately following the final exercise, subjects were asked to perform their second walking trial. Detrended fluctuation analysis of stride length and stride time revealed that statistical persistence was unaffected by moderate muscle fatigue ($p=0.290$ & 0.597, respectively). Estimates of finite-time maximal Lyapunov exponents for ankle angle, knee angle, and step height were also unaffected by a single bout of resistance training ($p=0.254$, 0.298, & 0.290, respectively over 0-1 stride, and $p=0.965$, 0.686, & 0.593, respectively over 4-10 strides). These results demonstrate that control of locomotion in healthy individuals, as measured by the nonlinear dynamics of lower extremity movement, appears to be relatively robust to moderate muscular fatigue. Additional work with greater levels of fatigue will be necessary to fully characterize the effects of muscular fatigue on gait.

57. THE INFLUENCE OF GROUND REACTION FORCES FROM RUNNING ON BONE STRENGTH

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Ground reaction forces (GRF) and muscle forces are both known to load bone and increase bone strength, but there is debate about which makes the greatest contribution to bone strength. The purpose of this study was to investigate the effects of typical GRF from running on bone density (BMD) by investigating relationships between various BMD measures, GRF, and muscle forces. Forty male runners (18-30yrs) were selected as subjects. Training history was recorded, and BMD determined for the whole body, spine, and hip. Body composition was determined during the whole body scan. Running kinematics were determined by motion analysis, GRF during running were measured with force plates, and muscle strength, power and endurance were measured. Lower extremity fiber type was estimated from muscle endurance. Pearson correlation coefficients were computed ($p < 0.05$). Relative muscle strength was significantly related to mid-tibial BMD ($r = 0.32$, $p < 0.05$). Fast fiber type percentage was significantly related to mid-tibial BMD ($r = 0.31$, $p < 0.05$) and mid-femur BMD ($r = 0.31$, $p < 0.05$). Peak vertical GRF normalized for body weight was inversely related to mid-femur BMD ($r = -0.36$, $p < 0.05$), but was not related to any other BMD measures. In conclusion, muscle forces appear to play a larger role than GRF in determining bone strength in this group of homogeneous runners.

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58. ETHNIC DIFFERENCES IN WEIGHT STATUS, FUNDAMENTAL MOVEMENT SKILLS AND FITNESS IN 4 -TO -11-YEAR-OLD CHILDREN

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BACKGROUND: The epidemic of overweight and obesity has not eluded children. According to NHANES 2003-04 data, the prevalence of overweight among adolescents has increased from 5 to 17% in the last 3 decades. Simultaneously, levels of physical activity have dramatically decreased. This decrease in activity may also have an impact on movement skills. This may be markedly larger in the Latino community as research suggests that Hispanics are more overweight and are less physically active then their White Non-Hispanic peers. **PURPOSE:** To compare weight status, movement skills, strength and cardiovascular fitness between White Non-Hispanic and Hispanic children. **METHODS:** 198 children (96 Hispanic, 102 White Non-Hispanic, mean age 7.8 ± 2.1 years) were recruited from three Schools in Moorpark School district to participate physical activity and motor skill study (Gameday). BMI percentiles for age and gender were determined using EpiInfo Version 1.1 – 2.0 (CDC, Atlanta, GA). Hip and waist circumference were measured using anthropometric tape to the nearest 0.1cm, and used to calculate hip/waist ratios. Level of motor skill was assessed using the 11 point Movement Assessment Battery for Children. Fitness was assessed using the Fitnessgram®. Independent Sample T-Test were used to assess ethnic differences. **RESULTS:** Hispanics had significantly larger BMI percentiles ($p=0.004$) and waist:hip circumferences ($p=0.001$) than their White Non-Hispanic peers. White Non-Hispanic children were significantly better than their Hispanic peers at all of the movement skill tests ($p<0.05$). In addition, White-Non-Hispanic children were significantly better at the push-ups ($p = 0.005$). There were no significant ethnic differences for flexibility ($p=0.15$) or 1-mile run ($p=0.313$). **CONCLUSION:** The White Non-Hispanic children were significantly leaner, more physically fit and have better movement skills than their Hispanic peers. Future studies should focus on clarifying the cause of these discrepancies with the ultimate goal of reducing these health disparities.

59. DIFFERENCES IN WAIST CIRCUMFERENCE AMONG ADULTS WITH VARYING INACTIVITY PATTERNS STRATIFIED BY FREQUENCY AND DURATION

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Introduction: There is emerging literature that suggests large amounts of inactivity (sitting) time is associated with increased waist circumference (WC) and higher mortality in adults. In 2008, Healy et al. reported the frequency of breaks in inactivity periods was associated with a lower WC in adults. Little is known about differences in waist circumference between adults with varied patterns of inactivity time or periods??
Purpose: To compare the WC of adults with varied frequencies of accelerometer determined periods of inactivity, after adjusting for moderate-to-vigorous physical activity (MVPA).
Methods: Thirty nine adults (n=33 women, n=6 men), ages 40.5 + 11.8 yrs were randomly selected from 142 participants enrolled in a six month walking study. An ActiGraph GT1M was worn for 7-days at baseline. All participants had 650 to 750 min of total inactivity (cts < 100) on 2-5 days separated into ≥ 5, ≥ 15, ≥ 30, ≥ 45, and ≥ 60 minute periods. The frequency of inactivity periods was stratified as low- or high using a median split. The levels were compared using t-tests, adjusted for moderate-vigorous PA (1952-5724 cts/min).
Results: The mean WC was 87.6 + 14.1 cm with no differences observed by frequency of inactivity periods ($p > .05$) for each duration.
Discussion: Participants in the study were enrolled in a walking intervention to accumulate > 10,000 steps/day, which may have influenced their inactivity patterns. Further assessment is needed in a population with diverse physical activity patterns.

60. PREDICTING ENERGY EXPENDITURE FROM HEART RATE DURING EXERCISE: WHAT VARIABLES ARE MOST IMPORTANT?

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Background: Assessing the energy expenditure (EE) of physical activity is of interest to researchers, fitness/health professionals, and individuals engaging in physical activity. Accordingly, there have been attempts to develop accurate calorie prediction equations based on exercise heart rate (HR) using an equation that takes into account exercise HR and a few other variables (i.e., body weight, age, sex). Unfortunately, they do not factor in other key variables such as aerobic capacity, resting metabolic rate (RMR), and percentage body fat. **Purpose:** The aim of the present investigation was to provide a regression equation to predict EE from HR during aerobic exercise. **Methods:** Sixty-five apparently healthy adults between 18 and 45 years of age (22 males and 43 females; Mean Age = 28.1 years ± 7.4, mean weight = 77.2 kg ± 13.5) made 3 visits to the laboratory. *Experimental design: Visit 1*: RMR was assessed followed by treadmill exercise at five different randomized workloads in which VO_2 and HR were continuously recorded via an EKG and a metabolic cart. *Visit 2*: Aerobic capacity was assessed via a symptom-limited graded exercise test (SL-GXT). *Visit 3:* Percent body fat was assessed via hydrostatic weighing. *Data analysis*. Energy expenditure was reported as kilocalories per minute (kcal/min). Data from the metabolic cart was correlated with the EKG. *Statistical analysis*: Stepwise linear regression was used to create models for predicting EE from percent heart rate reserve (%HRR) and other measured predictors, and was stratified by intensity. **Results:** Three models were created for males, three for females, and three for both sexes combined. The variables that were consistent significant predictors of EE were %HRR, RMR, and age. **Conclusion:** Depending on intensity, prediction of EE is most accurate when %HRR, RMR, and age are used in the prediction equation.

61. MUSCLE ACTIVITY WHILE RUNNING AT 20-50% OF BODY WEIGHT

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Lower extremity muscle activity is lower when body weight (BW) is reduced upto 60% BW (Liebenberg et al., SWACSM, 2009). However, it is not clear if muscle activity continues to decrease with further reductions in BW. The purpose of this study was to determine muscle activity levels of selected lower extremity muscles while running at 20-50% of BW at different speeds. Subjects (3 male, 1 female; 32±8.1 yr, 1.8±0.1 m, 72±8.8 kg) participated in the study. Muscle activity of the right bicep femoris (BF), rectus femoris (RF), tibialis anterior (TA), and medial gastrocnemius (GA) was recorded using surface electromyography (EMG). Subjects were instrumented with a uniaxial electrogoniometer placed across the lateral side of the right knee to record flexion and extension for each running trial. All running conditions were completed using a lower-body positive pressure treadmill (G-Trainer Pro Version 1.20). Subjects ran at 100%, 115%, and 125% of preferred speed at 100%, 50%, 40%, 30%, and 20% of BW (3 speeds x 5 BW conditions). Data were collected for one minute at 1000Hz. The AVG and RMS were calculated for each muscle and compared between speeds and BW using repeated measures ANOVAs ($\alpha = 0.05$). All statistical results for AVG and RMS variables were identical. BF was the only muscle that was influenced by the interaction of BW and speed ($p>.05$). RF was not different between either BW or speed ($p>.05$). TA was different between BW and speed ($p<.05$) while GA was only influenced by BW ($p<.05$). The trend for all muscles was lower activity with reductions in BW. However, the trend was that muscle activity was less influenced by speed with greater reductions in BW. In contrast to running between 60-90% BW, it seems that speed has less influence on muscle activity as BW is reduced below 50%.

63. NEAR-INFRARED LIGHT TREATMENT INCREASES NITRIC OXIDE LEVELS IN VENOUS BLOOD; IMPLICATION FOR SPORT PERFORMANCE?

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Background: The use of near infrared light (NIR) has become more popular in the treatment of different ailments. The hypothesis behind its working mechanism is its purported ability to generate nitric oxide (NO) in the treated area. NO is a powerful, endogenously synthesized, free radical gas which influences vascular and neural activity. Both of these factors play an important role in athletics. For this reason it might possible that NIR could used in the future to enhance sport performance. **Methods**: We conducted a single blind, placebo controlled randomized clinical trial to measure NO, by its metabolites nitrite and nitrate, in venous blood draining from tissue receiving NIR light therapy. 15 healthy subjects received NIR treatment to the forearm and blood samples were taken immediately before, at 1, 5, 15 and 30 minutes as well as 15 minutes post treatment to check for NO content. **Results:** The data for one treatment subject was excluded because his baseline value was five times larger than the average baseline values. We found a significant treatment effect at 5 minutes into the treatment ($F = 5.37$, $p = 0.037$) compared to baseline measures. The area under the treatment curve was significantly larger than the area under the sham treatment curve ($t = 2.26$, $p = 0.037$). **Conclusion:** While the treatment effect is relatively large, the physiological amount of NO increase in venous blood was small. However, it seems to be sufficient to bring about clinical changes in patients and might be beneficial in improving sports performance.

62. PARENTAL RULES AND THEIR RELATIONSHIP TO ADOLESCENT PHYSICAL ACTIVITY

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Parental rules can influence youth physical activity (PA) attitudes, opportunities, and behaviors. This study aimed to understand which rules are associated with PA among boys and girls. Adolescents (ages 12-18; N=176; 48.1% racial/ethnic minority) completed a survey assessing PA environments, nutrition, and rules. Adolescents were stratified by gender (N=84 boys, 92 girls) based on hypothesized rule differences, and because preliminary analyses indicated that gender was a significant covariate. The youth PA outcome was a sum of 5 z-scores assessing overall PA, walking or biking to and from school, and extramural sports teams. The rules included active play and sedentary rules. Bivariate correlations were calculated to select the variables ($p<0.20$) for hierarchical regression models, controlling for site and race. Correlations for boys found the following rules significant (*r*s: -.194-.176): don't go into street, stay within neighborhood, homework before playing, and not too much TV. For girls, the following rules were significant correlates (*r*s: .147-.304): don't climb trees/fences, don't go places alone, stay within neighborhood, bike helmet, cell phone, avoid strangers, homework before playing, check in frequently, don't cross busy streets, and not too much TV. Variable blocks were entered into regression in order: demographics, then rules. For boys, no rules remained significant in the regression. The full model explained 4.9% of the PA variance, and the rules block wasn't significant. For girls, "avoiding strangers" was significant in the regression (partial $r=.231$). The full model explained 7.3% of the variance, and the rules block was marginally significant ($p=.084$). That more rules were correlated with PA for girls may indicate that parents are more protective, or girls are more aware of their rules. Limits on media time may be important for parental interventions. Given the significant regression result for girls, avoiding strangers can also be useful in promoting PA and increasing feelings of safety. Active families can enforce rules and increase PA levels.

64. IMPACT OF NITRIC OXIDE ON SWEAT GLAND FUNCTION IS DEPENDENT ON THE BLOCKADE OF PROSTAGLANDIN PRODUCTION.

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The interaction between nitric oxide and prostaglandins on thermoregulatory sweating was examined in 19 subjects. Local sweat rate (SR, dew point hygrometry) and skin blood flow (SkBF, laser Doppler velocimetry) were measured at two local skin sites during 30 min of cycle ergometry exercise (60% VO_2 *max*) at 30°C. One skin site received 10 mM of the nitric oxide synthase (NOS) inhibitor L-NAME via an intradermal microdialysis probe and the other site received normal saline (Control). One group of subjects (n=10) ingested 1000 mg of aspirin to block the COX enzyme and prostaglandin (PG) production. The other group (n=8) did not receive aspirin. Exercise caused an average increase in esophageal temperate of 1.9 ± 0.4 °C and elicited significant thermoregulatory sweating and cutaneous dilation. The SkBF response was blunted by L-NAME in the presence of COX inhibition ($p<0.05$) but not in its absence. Combined COX and NOS inhibition blunted local sweat rate between 10 and 30 minutes of exercise ($p<0.05$). In the presence of COX inhibition peak local SR averaged 1.76 ± 0.21 mg•min^{-1}•cm^{-2} and was reduced to 1.52 ± 0.22 mg•min^{-1}•cm^{-2} with L-NAME. In the absence of COX inhibition, NOS inhibition did not blunt local sweat rate ($p=0.64$) during exercise. Peak local SR was similar in control (1.60 ± 0.18 mg•min^{-1}•cm^{-2}) and L-NAME (1.74 ± 0.16 mg•min^{-1}•cm^{-2}) skin sites during exercise. ANOVA identified a "not quite significant" interaction ($p = 0.08$) between COX and NOS inhibition trials. Overall, these data support the hypothesis that COX inhibition "unmasks" a nitric oxide dependent action on sweat glands. A similar interaction has been observed for the SkBF response during reactive hyperemia. Our data point to a possible novel interaction between prostaglandins and nitric oxide in regulating sweat gland function and SKBF during exercise in humans.

65. THE EFFECT OF COMPRESSION GARMENTS ON RECOVERY AND RUNNING PERFORMANCE IN COLLEGIATE DISTANCE RUNNERS

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Over the course of a competitive season, distance runners will increase training load in an attempt to maximize performance. Although elevations in training load are necessary to attain peak performance, if done in combination with inadequate recovery, elevations in training load may be detrimental to performance. One option for maintaining a healthy balance between high training volumes and recovery could be the utilization of compression garments following intense training sessions. **Purpose:** To determine if wearing compression garments following daily workouts during intense run training will result in additional performance improvements in collegiate distance runners. **Methods:** 15 male collegiate distance runners were separated into a sock group (SG; n=7; 21±2 yrs, 176±9 cm, 69±9 kg) or a control group (CG; n=8; 21±2, 183±7, 70±5 kg). Subjects selected to SG were required to wear graduated compression socks ≥4 hrs immediately following daily workouts or races (~6d/wk) for a period of 4 wks during the outdoor track season. To assess performance, racing times for each runner's preferred distance (1500 m to 10,000 m) were adjusted for altitude and converted to a standard metric using IAAF scoring tables. 7 subjects (SG, n=3; CG n=4) were unable to complete the study due to illness or injury. **Results:** SG subjects ran 66±38 km/wk and wore compression socks 31±11 hrs/wk compared to 79±32 km/wk and no socks in CG. Running scores over the course of the study improved to a similar degree within the SG (8%; 810±109 to 875±135) and CG (9%; 773±136 to 840±148) groups, respectively (P≤0.05). There were no differences in running score improvements between the groups. **Conclusion:** Similar performance improvements were achieved in both groups following 4 wks of intense run training, suggesting that the compression garments worn during recovery did not provide an additional performance benefit in collegiate distance runners.

67. STRESS AND RECOVERY DURING A PROFESSIONAL BASEBALL SEASON

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This study explored stress and recovery in professional baseball players, and examined the relationship between baseball performance measures and values on the RESTQ-Sport subscales. Twenty-one minor league baseball players completed the RESTQ-Sport at five specific time periods over the course of the 2008 season: pre-season physicals, end of spring training, pre-All Star Break, post All Star Break, and end of season. A significant ($p<.05$) decrease was observed in "Social Recovery", "Being in Shape", and "Self-Efficacy" scale values. A significant ($p<.05$) increase was observed in values on the "Fatigue" scale. Significant ($p<.05$) inverse relationships were observed between pitches thrown/innings pitched and the following scales: "Quality of Sleep," (r=-.761); "Physical Recovery," (r=-.727); "Self-Efficacy," (r=-.717); "Lack of Energy," (r=-.953); "Conflict and Pressure," (r=-.872); and "Fatigue," (r=-.762). Significant ($p<.05$) direct relationships were observed between pitches thrown/innings pitched and "Lack of Energy" (r=.853), and "Disturbed Breaks" (r=.821). There were significant ($p<.05$) inverse relationships between batting performance, as measured with OPS numbers, and the following scales: "Conflict and Pressure," (r=-.844); "Physical Complaints," (r=-.684); "Physical Recovery," (r=-.813); "General Well Being," (r=-.954); "Social Recovery," (r=-.939); "Being in Shape," (r=-.880); "Personal Accomplishment," (r=-.861); and "Self-Efficacy" (r=-.871). There were also significant ($p<.05$) direct relationships between OPS numbers and "Physical Recovery," (r=.960), and "General Well Being," (r=.737), scales. These results indicate that perceived fatigue increases for players across a professional season and performance is most closely related to a player's perceived recovery.

66. PHYSIOLOGICAL PROFILE OF PROFESSIONAL BMX FREESTYLE RIDERS

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Although many scientific research studies have looked at the physiological profiles of traditional sport athletes, little scientific research has been done on extreme sport participants, in particular professional bicycle motocross (BMX) freestyle riders. The purpose of this study was to examine the physiological profile of BMX freestyle riders. Seven men (age 25.85 ± 1.86 yrs, height 173.44 ± 6.20cm, mass 76.51 ± 8.53kg) with at least 3 years of professional BMX freestyle riding experience participated. Tests performed included cardiovascular endurance VO_2 max test on a cycle ergometer (43.48 ml/kg/min ± 6.10), flexibility sit-and-reach (38.78 cm ± 4.32), muscular strength one-repetition maximum bench press (86.04 kg ± 9.41), isometric pull (2350.55 N ± 355.68), grip strength with a hand dynamometer (52.85 kg ± 5.24), lower limb power was tested with the vertical jump (54.25cm ± 4.42), anaerobic power Wingate test (802.50 ± 91.44), and body composition 3-site skin-fold test (15.32% ± 4.27). The results indicate that BMX freestyle riders exhibit similar fitness characteristics of other elite athletes such as wrestlers, soccer players, and baseball players, and were above average in overall fitness when compared to the general male population between the ages of 20-29. Findings showed that the BMX riders lacked in upper body strength, and lower limb power when compared to elite football, baseball, and basketball players indicating areas for improvement in their training programs.

68. EFFECTS OF A COMPREHENSIVE EXERCISE PROGRAM ON FUNCTIONAL CAPACITY OF OLDER ADULTS

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Introduction: Power training has been shown to improve muscular strength, which translates into better balance and mobility for older adults. Balance and Tai Chi training have been shown to enhance proprioception, which translates into better agility and dynamic balance. **Purpose:** This study investigated the effects of a whole body exercise program, compared to a walking program, on the functional capacity of older adults. **Methods:** For the exercise program, 22 older adults (16 women, 6 men, 75.6 ± 7.5 years) met 2 days a week for 8 weeks and performed warm-up and stretching activities; upper and lower body, abdominal, and balance exercises; and perceptual-motor games. For the walking program, 4 older adults (3 women, 1 man, and 65.7 ± 2.2 years) met 2 days a week for 8 weeks and walked at a comfortable pace. Upper and lower body power were assessed using the 30 s Arm Curl and 30 s Sit-to-Stand tests, respectively. Static balance was assessed by measuring how long the participants could balance on one leg with the eyes open. Agility and dynamic balance were assessed using the 8-Foot Up-and-Go test. **Results:** Although no external weight was used during training, the exercise program enhanced functional capacity by increasing upper and lower body power ($p < 0.001$), and improving agility and dynamic balance ($p < 0.001$), and static balance for the right leg ($p = 0.022$). The walking group improved static balance for both the left and right legs ($p = 0.018$ and $p = 0.004$, respectively). **Conclusion:** Older adults can improve some components of functional capacity by exercising 2 days a week for 8 weeks using either a structured exercise program or a self-paced walk.

69. THE RELATIONSHIP BETWEEN CORE STRENGTH/POWER AND MEASURES OF PERFORMANCE

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The core is believed to play an integral role in sports performance, however there is little scientific evidence to support this. Therefore, the purpose of this study was to investigate the relationship between two core field tests and measures of performance. Participants consisted of 20 healthy, recreationally active males (age 23.40 ± 1.87years, height 174.63 ± 5.81 cm, mass 76.08 ± 7.67 kg). They were tested on four performance variables (40 yd sprint, 10 yd shuttle run [5-10-5], vertical jump, and 1RM back squat) and two core field tests (front abdominal power throw [FAPT] and side abdominal power throw [SAPT]. Significant, moderate correlations were identified between the FAPT and 1RM back squat (r = 0.652) and relative back squat (r = 0.509). No other significant correlations were found. Results indicate that although the FAPT and SAPT tests are easy to perform in the field, they are not specific to the performance measures used in this study. Perhaps the core musculature does not play an integral role in sports performance. In order to properly evaluate the core and its role in performance, sport/skill specificity, the energy system being utilized, and the action being performed in the sport must be taken into account.

70. THE EFFECTS OF ACUTE EXERCISE ON EXECUTIVE FUNCTION IN HEALTHY MIDDLE-AGED ADULTS

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Previous research suggests that chronic exercise positively affects cognitive function, but little is known about acute exercise effects on cognition, specifically executive function. This study examined the effects of a single acute exercise bout, aerobic vs. balance vs. stretching, on executive function in middle-aged adults (40-59 years). Twenty middle-aged adults (9 males, 11 females; 51.0 $\pm$ 6.4 years) completed the study, which involved one session per week for five weeks. The first session familiarized the participant with the executive function tasks, the Stroop task (Stroop, 1935) and Letter Number task (Wechsler, 1997), and each exercise condition. During the following weekly sessions, participants completed one of 4 counterbalanced conditions: **aerobic** (walk/jog on treadmill at 60-70% heart rate reserve), **balance** (structured square stepping routine), **stretching** (major muscle groups), or the **control** (leisure reading). Each 2 hr session was conducted according to the following schedule: assessment of executive function, 30 minutes of an exercise or control condition, immediately followed by re-assessment of executive function. Two-way ANOVA for repeated measures (4 conditions and pre/post test) were performed on Stroop and the Letter-Number measure of executive function. There was no significant effect of condition, nor was there a significant exercise x practice interaction on performance of the Stroop or Letter Number task. There was a significant practice effect for performance on the Stroop, F (1,19) = 6.7, p = 0.02, eta = .26) with a 9.8% improvement seen from pre to post condition. Similarly for the Letter Number, a significant practice effect was seen, F (1,19) = 4.7, p =0.04, eta = .19, with an improvement of 2.9%. In conclusion: a single bout of exercise, in healthy middle-aged adults did not significantly affect executive function but a single practice session did significantly improve executive function.

71. IMMEDIEATE EFFECTS OF CRYOTHERAPY AND ACUPUNCTURE ON QUADRICEPS MOTONEURON POOL EXCITABILITY IN EXPERIMENTALLY INDUCED ANTERIOR KNEE PAIN

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Purpose: To examine the immediate effects of acupuncture and cryotherapy on vastus medialis (VM) motoneuron pool (MNP) excitability in subjects with experimentally induced anterior knee pain (AKP). We asked: (1) Will experimentally induced knee pain alter perceived pain (visual analog scale: VAS) and/or MNP excitability? and (2) Will treatments (acupuncture, cryotherapy, sham treatment, and normative-no treatment & no injection) alter perceived pain and/or MNP excitability? **Methods:** A 4X4 randomised controlled laboratory study with repeated measures was used. Thirty-six, neurologically sound volunteers (age: 22.7 $\pm$ 1.79 yr, height: 1.82 $\pm$ 0.08 m, mass: 76.72 $\pm$ 10.15 kg) underwent one of four treatments. To mimic AKP, 5% of hypertonic saline (total volume of 8.5ml) was injected into the infrapatellar fat pad on the dominant leg. The VM Hoffman reflex (H-reflex) and motor response (M-response) was recorded from each subject at baseline (pre-injection), pre-tx (post 20 min injection), post-tx (post 50 min injection), and post20-tx (post 70 min injection). The maximum H-reflex and M-response and VAS were measured at each time period for data analysis. **Results:** An injection of 5% hypertonic saline increased perceived pain (interaction: $F_{42,448}$=4.58, P<0.001). We did not find any change on the MNP excitability (H:M ratio) among the four treatments ($F_{3,31}$=1.68, P<0.19) or at any of the time intervals ($F_{2,64}$=0.66, P<0.52). Cryotherapy significantly reduced perceived pain compared to acupuncture (P=0.0003) and sham treatment (P=0.0002). There was no difference between acupuncture and sham treatment (P=0.98). Nine minutes following application, cryotherapy decreased perceived pain (P=0.02) and the reduced pain level remained until the last measurement (70 min post injection, P=0.05). **Conclusions:** Our pain model caused AKP but did not change the VM MNP excitability. Cryotherapy reduced pain while acupuncture and sham treatment did not.

72. CHANGES IN BONE MINERAL DENSITY IN DIVISION I FEMALE SOCCER PLAYERS

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Female athletes are prone to bone injuries due to a lack of strength combined with high-intensity training and inadequate nutrition. Decreases in body fat and menstrual disorders combined with low calcium intake result in a decrease in bone mineral density. Because of the varying demands placed on collegiate athletes as they move from pre-season training through the competitive season to off-season training, we were interested in determining bone mineral status in female athletes over the course of an academic year. Subjects were 13 members of a division 1 university women's soccer team. Bone mineral density and percent body fat were determined by dual-energy X-ray absorptiometry (DEXA) at the beginning of pre-season training (August), immediately after the competitive season (November) and at the end of spring training (April).

	Body Weight (kg)	% Body Fat	Bone Mineral Density (g/cm^2)	Z score
August	62.36 ± 1.83	26.59 ± 1.65	1.238 ± 0.02	1.68 ± 0.40
November	63.15 ± 1.90	27.82 ± 1.56	1.246 ± 0.02	1.77 ± 0.32
April	62.54 ± 2.01	27.80 ± 1.75	1.261 ± 0.03	1.77 ± 0.31

Values are mean ± SE; P<0.05

There was no significant difference in body weight or percent body fat over the course of the academic year. Although differences were not significant, there was a tendency for bone mineral density to be higher at the end of the spring training period, reflecting a greater emphasis on strength training in the off season. These results indicate that bone mineral density does not change over the course of a competitive season and illustrates the importance of off-season training and conditioning programs in maintaining bone mineral density.

73. GLIDECYCLE MOBILITY DEVICE REDUCES GROUND REACTION FORCES COMPARED TO RUNNING IN HEALTHY INDIVIDUALS

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Purpose: This study quantified the ground reaction forces (GRF) of participants riding the GlideCycle (alternative method of exercise for individuals with amputation or decreased weight-bearing status which allows for cardiovascular exercise in the outdoors). No previous studies have quantified the GRFs of this method of exercise. Methods: The dominant leg of twenty participants (age 22 ± 2.8 years, weight 68.2 ± 10.8 kg, height 1.77 ± 0.1 m) was determined; this leg struck the force plate (Kistler North America) embedded in an indoor track in all trials during the study. Participants were given instructions on how to use the GlideCycle. The GlideCycle was adjusted individually by moving the seat height so that a 40° knee angle was obtained with the foot flat on the ground. Familiarization of the GlideCycle included ~650 meters running practice. Participants then ran unsupported and then supported in the GlideCycle for 6 trials each. Participants started approximately 50 m from the force plate and traveled at a speed estimated to be ~4 m/s. Force data was normalized to the participant's body weight (BW) and was analyzed using custom LabView software.
Results: GlideCycle reduced ground reaction force significantly compared to running ($t = 22.3$ $p < .001$). On average, running produced a peak GRF of 2.39 ± .14 BW, while the GlideCycle .34 ± .004 BW, a difference of 2.05 BW.
Discussion/conclusion: GlideCycle GRFs were far smaller than traditional running. This device is suggested to allow amputees and other individuals with decreased weight-bearing status due to pathology, such as osteoarthritis, to engage in outdoor exercise. Based on the results of this study it does allow outdoor exercise with reduced impact to joints compared to running. However, due to the unstable nature of the GlideCycle, some users may need training to accommodate to the device.

75. EFFECT OF CHRONIC l-ARGININE SUPPLEMENTATION ON UPPER BODY MUSCULAR STRENGTH IN RECREATIONAL BODY BUILDERS

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L-arginine has been advertised as a potential ergogenic aid for resistance training. However scientific studies that have been conducted have not been successful in fulfilling or supporting manufactures claims. The purpose of this study was to examine the effects of L-arginine supplementation on upper body muscular strength in the bench press in healthy, male, recreationally trained body builders. Twenty male college-aged volunteers were randomly assigned to one of two groups in a double-blind design: L-arginine supplementation (8 weeks at 12 grams/day) or placebo (cornstarch). During the course of the investigation, subjects met on 6 separate occasions. Subjects' 1 repetition max (1RM) was estimated on visit one, three and five (V1, V3, V5). On visit two (V2), strength was assessed based on the maximum number of repetitions that a subject can perform at 87.5% of their originally established 1RM. During each trial, all subjects were asked to perform at their maximum effort. Subjects loaded for 4 weeks and were tested again; both for a newly established 1RM (V3) and another muscular strength test (V4). Subjects then loaded for an additional 4 weeks after which the exact same measurements were determined (V5 & V6). Subject's 1RM was not significantly increased ($p > .05$) following the 4 weeks of L-arginine supplementation. No significant increase ($p > .05$) in strength was found following the 8 weeks of L-arginine supplementation. This was the first study to test the ergogenic effects of L-arginine on college-aged resistance trained males. This study adds to the body of literature which suggests that supplementing with arginine does not have an ergogenic effect on strength.

74. A PILOT STUDY ON THE ROLL OF EXERCISE HABITS ON HEART RATE RECOVERY IN OLDER ADULTS

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Post-exercise heart rate recovery (HRR) is a strong indicator of an increased risk of cardiovascular mortality, and is used as a tool to predict cardiovascular events and mortality. A slow HRR is a sign of abnormal autonomic function whereas a faster HRR is associated with a high vagal tone, good health, and aerobic fitness. This study tested the hypothesis that physically active older adults would exhibit a faster HRR following a sub-maximal (50% of age predicted maximum HR reserve) exercise bout when compared to physically inactive older adults. METHODS: HRR was calculated by measuring heart rate (HR) at 3 separate times (30-sec, 60-sec, and 120-sec) and then subtracting each HR from the HR recorded at the end of exercise. Twenty-eight older adults (mean age 72.79 ± 7.59) were selected and identified as being either physically active (N = 18, average weekly exercise days = 4.22) or non-physically active (N=10, average weekly exercise days = .67) based on self-reported exercise habits. Exercise testing was performed on an exercise bike and began with 3 minutes of warm-up followed by 5 minutes of work. A dynamic cool-down followed during which the participants pedaled with no resistance for 3 minutes. RESULTS: A mixed model ANOVA showed significant group differences in HRR intervals ($p < .01$), but no significant group differences in HRR ($p = .29$). DISCUSSION: The results of this study suggest that HRR is not this population when tested at 50% of age predicted maximum heart rate reserve. However, this was a pilot study with a small sample size and low statistical power ($\eta^2 = .05$). Future studies with larger sample sizes may find differences at this intensity that could benefit trainers to help them safely determine autonomic function before beginning an exercise program.

76. PLASMA NEUROPEPTIDE Y DURING HIGH VOLUME STRENGTH ENDURANCE TYPE OF TRAININGS IN MALE ROWERS

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This study investigated the effect of high volume muscle strength and endurance training on plasma neuropeptide Y (NPY) concentration in rowers. Leptin and ghrelin, as markers for body energy balance concentrations, were monitored. Methods: 12 highly trained national and international level male rowers participated in this study. The study was conducted during the beginning of the preparatory period and lasted for four weeks (Weeks 1-4). A four-week training period was designed with increases in training load at weeks 2 and 3, and recovery during week 4. About 50 % of the training sessions were of low intensity resistance training in the gym and the other 50 % of low-intensity rowing, cycling or running. The participants were measured three times – after reference week (T1), after two weeks of high training volume (T2) and after a recovery week (T3).Results: The submaximal rowing performance was decreased (P = 0.019) after high volume training period. Fasting leptin decreased (from 2.05±0.88 to 1.28±0.53 ng/ml; P = 0.009) after high volume training and increased (from 1.28±0.53 to 1.79±0.79 ng/ml; P = 0.002) after the recovery period. Fasting ghrelin decreased (from 980±300.2 to 873.35±198.6 pg/ml; P = 0.036) after the recovery week compared to high volume training period. Exercise induced decreases in leptin were observed at T2 (from 1.13±0.5 to 1.08±0.5 ng/ml; P = 0.012) and increases in NPY at T2 (from 128.1±23.2 to 155.1±28.9 pmol/L; P = 0.002) and at T3 (from 131.3±20.5 to 159.7±32.8 pmol/L, P = 0.004). In conclusion, high volume resistance and endurance training induces decreases in fasting leptin and influences post-exercise changes in leptin, NPY and ghrelin concentrations.

77. DEVICE MEASURING HEART RATE, RESPIRATION RATE, AND MOTION ACCURATELY ESTIMATES ACTIVITY LEVEL AND ENERGY EXPENDITURE

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Purpose: To estimate energy expenditure and activity level using the variety of sensors contained in the Zephyr Bioharness device. **Methods:** Twenty physical activities were measured with the Oxycon Mobile portable metabolic unit, an Actigraph accelerometer worn on the hip and the Zephyr Bioharness (worn around the chest, similar to a heart rate monitor). Twenty-four subjects completed twenty steady-state activities during two clinic visits. Output from the Bioharness, including heart rate (HR), respiration rate (RR, measured by expansion and contraction of the chest), and motion from an accelerometer (ACC) were compared to METs measured using an Oxycon Mobile monitoring system. A direct comparison was made between the Zephyr ACC and the Actigtaph. **Results:** The participants included adult men (N=10) and women (N=14) over a variety of ages (23-71) that were in good health. The participant group height (69.9±4.1 inches), weight (80.2±13.5 kg) and BMI (23 for women, 25 for women) indicate a normal weight sample. A regression model using HR, RR and ACC from the Bioharness resulted in an acceptable prediction of energy expenditure (R^2=0.81). The output from the Actigraph provided the same information as the activity data from the Zephyr (R^2=0.9). **Conclusions**: The Bioharness can be used with some confidence to replace indirect calorimetry for estimating energy expenditure in field studies. Additionally, it can provide similar information as an accelerometer worn on the hip. In particular, this device can be used to estimate energy expenditure and activity level during sporting events or continuous daily monitoring, two situations that require unobtrusive recording for long periods of time.

79. IMPAIRMENT OF VASCULAR ENDOTHELIAL FUNCTION DESPITE IMPROVEMENTS IN TRADITIONAL LIPID MARKERS IN LOW-CARBOHYDRATE VS. HIGH-CARBOHYDRATE, HIGH-FIBER DIET IN ADULTS WITH METABOLIC SYNDROME

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Purpose: Endothelial dysfunction is a strong predictor of cardiovascular morbidity and mortality. Fasting serum lipids and changes in dietary quality have been shown to be associated with changes in endothelial function. This study compared the effects of a low-carbohydrate diet to a high complex-carbohydrate, high-fiber diet on lipid markers and endothelial function in adults with metabolic syndrome. **Methods:** Subjects (n=23; 6 males) with metabolic syndrome participated in this randomized, single-blind, cross-over study. The macronutrient content of the low-carbohydrate diet (LC) was 15-20% carbohydrate ($\leq$ 10 g/day of fiber), 55-60% fat, and 25-30% protein; the high complex-carbohydrate, high-fiber (HCHF) diet was 55-60% carbohydrate (~45g/day of fiber), 20-25% fat, and 15-20% protein. Diets were not energy restricted. Diet order was randomized and included a 4-week washout period between diets. Brachial artery flow-mediated dilation (BAFMD) was assessed using B-mode ultrasound and edge detection software. Fasting blood samples were drawn at baseline and after 4 weeks. **Results:** Significant decreases (p<0.05) in VLDL (-7.48 $\pm$ 10.6 mg/dl), triglycerides (-59.65 $\pm$ 73.23 mg/dl) and non-HDL (-10.48 $\pm$ 22.72 mg/dl) were observed following LC while HCHF resulted in significant decreases in total Cholesterol (-13.17 $\pm$ 21.85 mg/dl) and non-HDL (-9.22 $\pm$ 19.78 mg/dl). HDL was significantly lowered following HCHF (-3.87 $\pm$ 5.46 mg/dl). A strong trend for reduced BAFMD was observed after LC (10.1 $\pm$ 1.4% vs. 7.2 $\pm$ 1.1%; p=0.06), while BAFMD remained unchanged after HCHF (9.5 $\pm$ 1.3% vs. 10.4 $\pm$ 1.5%; p=0.61), producing a significant diet interaction (p=0.01). Serum lipids were not associated with endothelial dysfunction.

78. THE EFFECTS OF ACUTE CAFFEINE INGESTION ON ENDURANCE PERFORMANCE IN RECREATIONALLY ACTIVE WOMEN

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The primary aim of this study was to assess the effect of acute caffeine intake on endurance performance in active women. Ten healthy women (age = 22.1 ± 1.9 yr) completed a 5 mile, "all out" time trial on an electrically-braked cycle ergometer over a span of three non-consecutive days. All participants completed physical activity a minimum of 3 d/w. On day one, a practice trial was completed to eliminate learning effects of repeated exercise trials. Also, participants were informed not to consume products containing caffeine and refrain from lower-body exercise for 24 h prior to subsequent trials. Every mile during exercise, heart rate (HR), rating of perceived exertion (RPE), and leg pain were recorded. Participants ingested anhydrous caffeine (6 mg/kg body weight) or placebo (glucose) 1 h pre-exercise following a randomized, counterbalanced, crossover design. Each solution contained 6 mg/kg body weight of glucose and was mixed with 8 oz of cold water and 4 oz of a non-caloric soft drink. Two-way ANOVA with repeated measures was used to examine differences in performance, HR, RPE, and pain across distance and treatment. Results showed that compared to placebo, caffeine significantly improved ($p < 0.05$) endurance performance by 3% (17.50 ± 0.042 min vs. 18.0 ± 0.047 min), as cycling time was attenuated in 8 of 10 subjects. RPE and pain perception were increased ($p < 0.05$) with exercise, yet there was no effect of caffeine. HR ranged from 182.6 ± 8.2 b/min to 194.6 ± 7.1 b/min at the end of exercise, but was unaffected ($p > 0.05$) by caffeine ingestion. The ergogenic effects of caffeine for intense, non-steady state cycling may be independent of perception of exertion or pain.

80. THREE-DIMINSONAL BODY SCANNING: A NOVEL TECHNIQUE FOR BODY COMPOSITION ASSESSMENT

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INTRODUCTION: Accurate body composition assessment is crucial for determining health consequences of obesity. The Three Dimensional (3D) body scanner is a novel body composition assessment method that may provide an alternative to dual energy x-ray absorptiometry (DXA) and Air displacement plethysmography (Bod Pod). The purpose of this study was to validate the 3D body scanning against DXA and Bod Pod. Furthermore, a new prediction equation was developed and compared to the existing equation used by the 3D body scanner developed by the Department of Defense (DoD). **METHODS:** Eighty-Five male subjects (21.7 ± 2.3 yrs old; 81.0 ± 12.2 kg; 25.4 ± 3.4 kg/m^2) completed DXA, Bod Pod and 3D body scanning assessments on the same day. Subjects did not eat or drink 2 hours prior to testing and did not exercise 4 hours prior to testing. Data were analyzed using SPSS version 17.0. Bland-Altmand plots, Pearson correlations, and a one-way ANOVA comparing means were performed. A prediction equation (3D MU) was created using a stepwise regression based on correlation to DXA. **RESULTS:** Comparisons of percent body fat across methodologies indicated significant differences between the 3D body scanning with both DXA 16.3 ± 4.7% and Bod Pod 12.2 ± 7.2%. The 3D MU equation showed improvement over the DoD equation (3D MU = 16.5 ± 4.2%, SEE=3.09; DoD = 13.5 ± 6.4%, SEE=3.67) when compared to DXA. **CONCLUSION:** Although the 3D body scanner shows promise as a method of evaluating body fat, more work is needed before it can be considered an acceptable laboratory method of assessment. The 3D MU prediction equation developed may improve the precision of the 3D body scanner.

81. DETERMINING CORRELATES OF VERTICAL JUMP PERFORMANCE IN ACTIVE MEN

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Vertical Jump, a critical parameter in power-based sports, is commonly used to assess an individual's jump height. The aim of this study was to determine if an individual's % Body Fat (%BF), circumference of the thigh and calf, and a 1-repetition maximum (1-RM) leg press correlates with vertical jump. Subjects (N=12) were college-aged males (22-31 yr) who completed exercise a minimum of 2.5 h/wk. Initially, circumferences of the thigh and calf were measured using a measuring tape. Body Mass Index (BMI) and %BF were determined via Omron Bioelectric Impedance Analysis (BIA). Following standardized warm-up, vertical jump was determined by using a Vertec Vertical Height Device. Each subject performed up to 5 jump trials, with 30 s of recovery provided between efforts, to attain their peak vertical jump. On the same day, lower-body strength was assessed with a seated leg-press machine following standardized procedures. Results demonstrated a significant moderate inverse correlation between vertical jump and thigh girth (r^2=0.39), calf circumference (r^2=0.36) and 1-RM leg press (r^2=0.31). There was also a significant inverse correlation between vertical jump and %BF (r^2=0.47). In conclusion, 1-RM in leg press was not correlated with vertical jump and %BF had a significant inverse correlation with vertical jump. You need to denote significance level (p-value) of correlations b/w predictors of vertical jump performance, w/o this the results are improper.

82. FRUIT AND VEGETABLE CONSUMPTION AND BONE HEALTH IN OLDER ADULTS

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BACKGROUND: Consumption of alkaline-forming foods may be important in buffering the fixed acid load imposed by the ingestion of foods with the potential to form acid in the body and decrease bone mineral density (BMD). Due to their alkaline-forming properties fruits and vegetables may be protective for bone health. **AIM**: To examine the effects of vitamins and nutrients found in fruits and vegetables on bone mineral density in an elderly cohort. **METHODS:** Participants (n=90, mean age 72.4 ± 8.6 years) were recruited from three local senior centers in Ventura County to participate in the study. Bpdy Mass Index (BMI) was calculated by measuring height to the nearest 0.1cm using a tape measure and weight to the nearest 0.1kg using a portable scales. BMD of the calcaneus was performed in duplicate using the Sahara Clinical Bone Sonometer (Hologic). Dependent variables from bone densitometry included BMD, broadband ultrasound attenuation (BUA) and speed of sound (SOS) of the calcaneus, and T and Z-scores. Dietary intake was assessed using 5-day dietary recalls in conjunction with the multiple pass method. Associations between vitamins and nutrients consumed in fruit and vegetables and bone health were assessed using partial correlations, controlling for weight, vitamin C, vitamin D and total energy intake. RESULTS**:** There were no significant associations between any of the B vitamins (p>0.05), vitamin A (p=0.81) or magnesium (p=0.61) and bone health. **CONCLUSION:** Our results do not support the current literature as we did not find any significant associations between vitamins and nutrient found in fruits and vegetables and bone health. Further work is clearly warranted.

83. VO2MAX MAY NOT BE REACHED DURING EXERCISE TO EXHAUSTION ABOVE CRITICAL POWER

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Purpose: To determine whether VO_2 reaches a true maximum during "submaximal" fatigue-inducing constant-load exercise bouts above critical power (CP).
Methods: 9 males (age 24.6 ± 3.6 yr.; ht: 182.8 ± 6.9 cm; wt: 77.8 ± 12.1 kg) and 4 females (age 29.0 ± 7.3 yr.; ht: 170.8 ± 3.2 cm; wt: 61.8 ± 8.2 kg) underwent an incremental VO_2max test (IET) on a cycle ergometer, followed by 4 or 5 randomly assigned, constant-load exercise bouts to exhaustion, each on a separate day. Ventilation and gas exchange were measured continuously during all exercise bouts. Critical power for each subject was estimated using linear and non-linear regression models.
Results: IET VO_2max averaged 3.55 $\pm$ 0.92 l/min (Respiratory exchange ratio = 1.21 $\pm$ 0.05; heart rate = 186.4 $\pm$ 10.3 bpm; 96.1 $\pm$ 6.3% age-predicted max). Peak VO_2 (range 3.32 $\pm$ 0.88 to 3.54 $\pm$ 0.91 l/min) during the 3 highest constant-load bouts (two of which were 53 to 82 W less than peak work rate attained during IET) was not significantly different than IET VO_2max (3.55 ± 0.92 l/min). However, peak VO_2 (3.14 $\pm$ 0.78 l/min) during the lowest constant-load exercise bout (11-44 W above CP) was significantly lower than IET VO2max. These data suggest that for some power outputs above CP, VO_2 at the point of exhaustion does not reach a true maximum. The data also suggest that there are "submaximal" power outputs above CP (but lower than that reached during an IET) that elicit a VO_2 equal to, or greater than, VO_2max attained during an IET.
Conclusions: At work rates above CP, VO_2 does not necessarily increase to maximum during constant-load exercise to exhaustion. The highest VO_2 values measured during a traditional VO_2 "max" test (i.e., IET) may not reflect the highest attainable VO_2 even though VO_2max criteria are met.

84. ACUTE EXPOSURE TO (-)-EPICATECHIN DOES NOT AFFECT RESISTANCE TO FATIGUE IN SINGLE ISOLATED *XENOPUS* MYOFIBERS

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Flavonoids are most well known for their antioxidant activity. Some studies have found that some flavonoids (e.g. quercetin) yield a positive effect in improving endurance and performance in muscles, while other studies have shown no effect. The purpose of the present study was to examine the acute effect of (-)-epicatechin, a flavonoid found in cocoa, on skeletal muscle performance. Single muscle fibers (n= 12) were microdissected from lumbrical muscle of adult female *Xenopus laevis*, and tension was continually monitored while fibers were electrically stimulated (250 ms trains, 70 Hz, 8V) at progressively increasing frequencies (2 min each at 0.25, 0.33, 0.5 and 1 contractions per sec) until fatigue (50% initial tension) had been established. The recovery period of the fiber was tracked by a single tetanic contraction (70 Hz) every 5 min. A second fatigue run, with the stimulation paradigm identical to the first, was conducted after full recovery of the fiber contractile force (45-120 min). Fibers were separated into two groups, control (n=7) and (-)-epicatechin (n=5), where the (-)-epicatechin treated fibers were incubated with 1 µM (-)-epicatechin during the rest period between the two fatigue runs. No significant difference was found in the time to fatigue between the first and second contractile periods, and no significant difference was found in time to fatigue between control and (-)-epicatechin groups in the second fatigue runs (311.4 ± 104.9 sec vs. 319.0 ± 104.6 sec, respectively). There was also no significant difference in the recovery time between fatigue runs in the presence or absence of (-)-epicatechin. The results show that an acute treatment of (-)-epicatechin does not affect muscle performance in single *Xenopus* muscle fibers.

85. PRESERVING LOWER LIMB MUSCLE FUNCTION FOLLOWING SPINAL CORD INJURY: A COMPARISON OF THREE ROBOTIC TRAINING ALGORITHMS

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Robotic devices are often used as part of an overall rehabilitation program to facilitate locomotor recovery following spinal cord injury. While many investigators have focused on optimizing training techniques to improve neurological function, few studies have examined the effects of automated training on muscle physiology. The purpose of this study was to compare several measures of muscle function in three groups of rats subjected to three different training algorithms following SCI. Twenty-four female, Sprague-Dawley rats received mid-thoracic spinal cord transections as neonates. Animals were assigned to one of three training conditions: 1) standard robotic training, 2) robotic training with increased plantarflexion load applied during stance, and 3) robotic training with increased plantarflexion load and tail nerve electrical stimulation (TANES). All animals received five minutes of continuous training per day at 90% body weight support, and were trained for five days per week for four weeks while the robotic device recorded step trajectories and ground reaction forces. Following the fourth week of training, all animals were euthanized and their hindlimb muscles dissected. Results indicated that the number of steps, the magnitude of the ground reaction force, and the ground reaction force projection angle increased significantly with time across all animals ($p<0.001$). Conditions 2 and 3 resulted in a significantly greater increase in number of steps and ground reaction force magnitude when compared to condition 1 ($p=0.026$ & 0.001, respectively). Comparison of *en vitro* muscle mass revealed no difference between rats trained by each condition. These results suggest that application of a plantarflexion load during stance has a beneficial effect on the outcome of automated training in rats following SCI, but TANES does little to improve muscle function. Additional work is needed to understand the role that TANES and robotic loading might play in the optimization of robotic gait training.

86. EFFECT OF CIRCUIT TRAINING ON PHYSICAL ACTIVITY ENJOYMENT AND FITNESS AMONG MIDDLE AGED FEMALES

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Physical activity (PA) enjoyment is an important construct because of its correlation with adherence to PA. The purpose of this study was to determine the effect of a 6-week circuit training program on levels of PA enjoyment and fitness among previously sedentary middle-aged women. Ten women, ages 31 to 51y, were assessed for physical fitness (curl up test, push up test, and step test) and given the Physical Activity Enjoyment Scale (PACES). Participants completed 6 weeks of progressive circuit training, 2 days a week, 60 minutes each day. The circuit consisted of 10 stations with cardiovascular and muscular endurance exercises. A 1 (group) x 8 (time) repeated measures ANOVA with follow-up pairwise comparisons was used to determine if there were significant ($p<.05$) differences in the PACES score. Results indicated a significant ($p < .05$) increase in PACES scores from the pretest (85.80 +/- 19.95) to the posttest (102.10 +/- 15.19). Pairwise comparisons also revealed posttest (Q = 102.10, SD = 15.19) scores were significantly greater than weeks 1 (Q = 98.70, SD = 11.75), 2 (Q = 92.90, SD = 11.66), 6 (Q = 99.15, SD = 11.73). For the fitness variables, curl up scores were significantly ($p < .05$) greater from pretest (CU=15.80, SD = 12.09) to posttest (CU = 23.80, SD = 5.22). Push up total was significantly ($p < .05$) greater during the posttest (PU = 18.00, SD = 9.35) than during the pretest (PU = 11.70, SD = 7.73). The results indicated no significant ($p<.05$) difference in recovery heart rate. These results indicate that a relatively brief physical activity program can increase physical activity enjoyment and fitness levels among a sedentary middle-aged female population.

87. EFFECT OF ELASTIC CORD ASSISTANCE ON VERTICAL JUMP RELATIVE PEAK POWER

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Heavy-load low velocity or light-load high velocity exercise has been traditionally used to develop power. Power is defined as the rate of work or the product of force and velocity. At this time, there is limited research on the unique concept of overspeed training via the assistance of elastic cords to maximize power in a jumping environment. Therefore, the purpose of this study was to determine the effect of elastic cord assistance on vertical jump power. Thirty recreationally trained college men and women (M=15, W=15) completed three testing sessions consisting of five conditions: 0%, 10%, 20%, 30%, and 40% body weight reduction (BWR). In all BWR conditions, subjects wore a full body harness while attached to two elastic cords suspended from the ceiling and performed three maximal countermovement jumps with arm swing on a force plate. In addition, a linear velocity transducer was attached to the subject's hip to determine the velocity-time curve. Maximum values from the peak velocity repetition for each condition were used for analysis. Peak power was expressed relative to body mass (rPP). ANOVA revealed a significant ($P < 0.05$) interaction of condition by sex. Both men (0%: 62.76±9.21 W/kg, 10%: 64.30±10.73 W/kg, 40%: 85.63±11.40 W/kg) and women (0%: 46.93±9.27 W/kg, 10%: 48.12±7.64 W/kg, 40%: 63.52±10.73 W/kg) significantly increased rPP across all conditions except between 0% and 10%. These results demonstrate that using 20-40% BWR via the assistance of elastic cords enhances rPP in recreationally trained men and women. Future research should investigate the effects of long-term elastic cord overspeed training on normal body weight vertical jump performance.

88. ACUTE EFFECTS OF CAFFEINE ON STRENGTH AND MUSCLE ACTIVATION OF THE ELBOW FLEXORS

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Purpose: To examine the effects of caffeine on maximal strength, rate of torque development, electromyographic (EMG) and mechanomyographic (MMG) signals, and electromechanical (EMD) and phonomechanical (PMD) delay. **Methods:** Fourteen male volunteers came to the laboratory four times. Visit one served as a familiarization visit. During visit two, subjects ingested a randomly assigned drink, either with or without caffeine (0, 5, or 10 $mg \cdot kg^{-1}$ of body mass), and performed three maximal isometric muscle actions of the elbow flexors sixty minutes after ingestion. Maximal strength and rate of torque development (RTD) were recorded. EMG and MMG amplitude and frequency, and EMD and PMD were measured from the biceps brachii. Visit three was identical to visit two, but one of the remaining two drinks not administered was assigned. Visit four followed the same procedures as visit three, but the one remaining drink not assigned was administered. **Results:** There were no significant differences for maximal strength, RTD, EMG amplitude and frequency, MMG amplitude, EMD and PMD. MMG frequency was significantly lower after ingestion of the 5 $mg \cdot kg^{-1}$ of body mass of caffeine compared to the placebo trial. This was most likely an isolated finding as MMG frequency was the only variable to have a significant difference across all trials. **Conclusion:** The results suggested that ingestion of either 5 or 10 $mg \cdot kg^{-1}$ of body mass of caffeine does not provide an ergogenic effects during isometric muscle actions of the elbow flexors.

89. DISPOSITIONAL MINDFULNESS DOES NOT MEDIATE THE RELATIONSHIP BETWEEN PERCEIVED STRESS AND MEASURES OF OBESITY IN MEN AND WOMEN.

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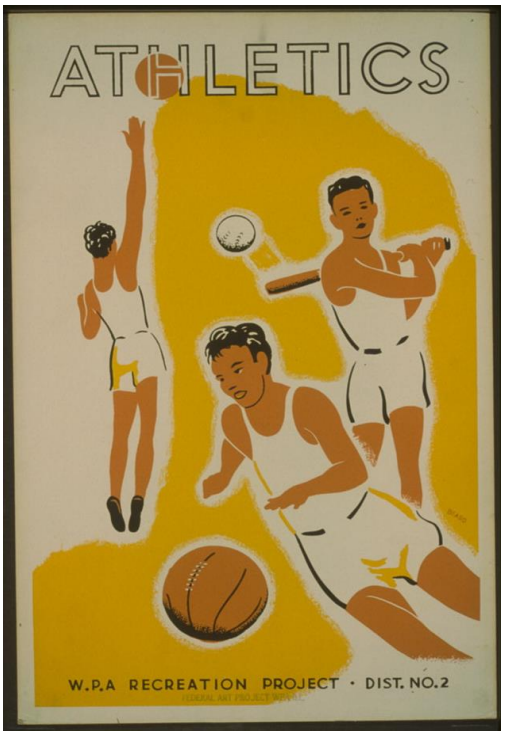
Background: The physiological stress response has been shown to increase specific types of obesity. Mindfulness (a way to self-regulate one's attention to the present moment) may mediate the relationship between stress and weight gain. **Purpose:** This study examined mindfulness as a mediator between perceived stress and specific indices of obesity. **Methods:** Participants (N=2085, 79% female; BMI 24.9±4.9 kg/m^2; Age 42±12) entering a six-month pedometer based walking intervention completed an online survey. The Perceived Stress Scale (PSS) (10 item, 4-point scale, higher score indicates increased stress) and the Mindfulness Attention Awareness Scale (MAAS) (15 item, 6-point Likert scale, higher value indicating higher mindfulness) were completed at the start of competition. Participants self-reported weight and height. Randomly selected participants (N = 354, 73% female; BMI 25.3±5.5 kg/m^2) had body composition (%fat, waist circumference (WC) and sagittal diameter (SD)) measured at baseline. Body mass and % fat were measured by bioelectrical impedance (Tanita), WC and SD were measured at the level of the umbilicus using a Gulick tape (WC) or Holtain-Kahn calipers (SD). Pearson correlations were computed in SAS 9.2. Simple mediation analysis was analyzed in AMOS 18 and Sobel test were conducted to measure indirect effects. **Results:** MAAS did not significantly mediate the relationship between PSS and BMI or with any body composition indices (β=.018, z= 1.636, p=.10). MAAS had a significant inverse association with PSS (r= -.42, p <.0001). BMI showed a small significant positive association with PSS (r=.04, p=.04). **Conclusion:** The lack of a significant indirect effect with mindfulness suggests that the relationship between perceived stress and obesity is not a mere function of the alterations in one's perceptions of stress. Perceived stress can trigger the physiological stress response but additional mediators may be present that can alter obesity indices. Future analysis will be needed to address the possible mechanisms.



AUTHOR INDEX

San Diego Trolley

Trolley Fares

Trolley fares are based on trip distance. Select your correct fare from the chart below, or see the Trolley route map posted on the ticket machines at each station. Some machines require exact change, some accept $1.00 or $5.00 bills. Susan B. Anthony coins are also accepted.

One-way Fare, if You Travel:	
Within Downtown San Diego*	*$1.25**
1 Station	$1.50
2 Stations	$1.75
3 Stations	$2.00
4-10 Stations	$2.25
11-19 Stations	$2.50
20+ Stations	$3.00

*Downtown San Diego cash fare allows unlimited rides (including round trips) within the Center City area only for two-hours from the time of ticket purchase.

Trolley Tickets are good for travel for two hours from the time of purchase and may be used to travel until the expiration time stamped on the ticket. Round-trip Trolley tickets are available from vendomats (at 2 times the one-way fare) and can be used at any time on MTS Trolleys throughout the operating day. Day Passes are available from vendomats and are good for unlimited rides for all MTS Bus and Trolley routes as well as NCTD BREEZE buses and FAST. Good for the day or dates designated on the pass. *Valid for partial fare on the Coaster (upgrade required).*