Circadian clocks, driven by the transcription factors Clock (circadian locomotor output cycles kaput) and Bmal1 (brain and muscle arnt-like 1), are sophisticated mechanisms that regulate 24-hr rhythms in numerous physiological processes ranging from gene expression to behavior. The cardiomyocyte clock has been shown to regulate cardiac metabolism and function, and its disruption decreases lifespan. However, the role of the cardiomyocyte clock in regulating cardiomyocyte growth remains unknown. PURPOSE: To determine the role of the cardiomyocyte circadian clock in regulating hypertrophic growth of the heart. METHODS: We used mice with genetically disrupted clocks specifically within the heart (Cardiomyocyte-specific Bmal1 Knockout; CBK) and littermate control mice (CON) to investigate the role of the cardiomyocyte circadian clock on cardiac growth/size. Signaling was assessed through Western blotting, while rates of protein synthesis were measured using radiolabeled tracers (both in vivo and ex vivo). Rapamycin feeding (14 ppm and 42 ppm, 10 days) was utilized to pharmacologically inhibit mTOR. RESULTS: We found that disruption of the cardiomyocyte circadian clock leads to increased activation of the Akt/mTOR/S6 signaling axis in the heart, associated with increased protein synthesis and size.

**F-01**  
Highlighted Symposium - Move to the Rhythm: Circadian Orchestration of Exercise and Muscle Biology  
Friday, June 2, 2017, 1:00 PM - 3:00 PM  
Room: 201

**F-08**  
Basic Science World Congress - Thematic Poster - Neuroplasticity and Cerebral Perfusion  
Friday, June 2, 2017, 1:00 PM - 3:00 PM  
Room: 304

Molecular clocks are comprised of interlocking transcriptional-translational feedback loops that promote circadian rhythms in physiology through controlling downstream gene expression in a temporal and tissue-specific fashion. The mechanisms in which the core clock factors (ubiquitously expressed in all tissues) target skeletal muscle specific genes are poorly understood. PURPOSE: Here we investigate the role of the muscle specific factor MYOD1 in regulating skeletal muscle circadian gene expression. METHODS: Dual-luciferase assays and real-time bioluminescence (Lumicycle) were performed in C2C12 myotubes to determine transcriptional responses and rhythmic expression patterns of the muscle specific circadian gene, Trim-16 (Tcap), with over expression of the core-clock genes BMAL1:CLOCK with MYOD1. To identify genome-wide binding sites for BMAL1:CLOCK and MYOD1 we performed chromatin immunoprecipitation and ultra-high throughput sequencing (ChIP-Seq) in wildtype C57BL6 quadriceps and C2C12 myotubes. HOMER software was utilized for Next-Gen sequencing analysis. RESULTS: We utilized a bioinformatics approach to identify Tcap as a skeletal muscle specific, circadian gene. Interestingly, we found that MYOD1 transactivates Tcap in a synergistic fashion with BMAL1:CLOCK and enhances T-cap's circadian amplitude. Three e-box elements within the Tcap promotor are required for cooperativity between the clock factors and MYOD1. ChIP-Seq analysis in skeletal muscle indicated that MYOD1 targets a large subset of the skeletal muscle circadian transcriptome. CONCLUSION: These findings support the hypothesis that MYOD1 is a key regulator of circadian gene expression in skeletal muscle.
Changes in Brain Perfusion Following Weight Loss are Associated with Changes in Body Mass Index

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(No relationships reported)

PURPOSE: Being overweight or obese, defined as having a body mass index (BMI) of 25 or greater, is associated with brain hypoperfusion. However, it is unknown to what extent obesity-related hypoperfusion can be reversed following weight loss.

Further, the relative contributions of diet and physical activity (PA) on brain perfusion are poorly understood. The aim of the present study was to examine changes in brain perfusion following weight loss, and to relate changes in perfusion to changes in BMI.

METHODS: 121 healthy adults (M±SD = 44.3±8.6 years old; 95 female) completed a 12-month randomized controlled trial involving an energy restricted diet (diet-only), a diet + 150 minutes of moderate intensity PA per week (Mod-PA), or diet and 250 minutes of moderate intensity PA per week (High-PA). Participants also completed MRI scans before and after the intervention, including a pseudocontinuous arterial spin labeling (pcASL) scan. Changes in brain perfusion were assessed with a voxelwise linear regression to examine regions where changes in brain perfusion covary with changes in BMI. Results were corrected for multiple comparisons at a threshold of p < .05, k > 15.

RESULTS: There was a significant reduction in BMI following the intervention, suggesting that it was effective at facilitating weight loss, regardless of group (M±SD = 2.4±3.3 kg/m², p = .001). Brain perfusion following the intervention increased across the brain, particularly in the medial temporal lobe and prefrontal cortex. Changes in BMI were correlated with baseline-to-post intervention increases in brain perfusion in two clusters: a cluster in the right medial prefrontal cortex (rM1: p = .03, peak MNI x = 43, 98, 40, k = 42; r05: p = .03; peak MNI = 42, 80, 27, k = 37).

CONCLUSIONS: A 12-month intervention involving diet alone, or diet combined with PA effectively increased brain perfusion across the brain. collapsing across intervention groups, the magnitude of weight loss (via changes in BMI) was positively correlated with changes in prefrontal brain perfusion. The regional specificity of this later finding is important as it suggests that weight-loss may have the greatest effects on brain health in regions that are particularly vulnerable to obesity. Future work will identify whether these effects are being driven by changes in PA, diet, or both.

Effect of Sex on arterial hemodynamics and Cerebral Blood Flow Dynamics Following Acute Resistance Exercise

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(No relationships reported)

Resistance exercise (RE) is recommended for men and women and is important for improving cardiovascular (CV) and metabolic disease risk factors. High-intensity RE acutely increases arterial stiffness and blood pressure (BP), coupled with reduced cerebral blood flow velocity (CBFv) and greater flow pulsatility in the cerebral circulation, which may be detrimental to cerebral microvasculature. Because females have different CV control mechanisms, it is important to assess potential sex differences in cerebral vascular responses to acute RE.

PURPOSE: To examine the effect of sex on hemodynamics and cerebral vascular responses following acute RE in young recreationally active men and women. METHODS: Healthy men (n = 11, 28 yrs, BMI = 24.6) and women (n = 9, 25 yrs, BMI = 23.2) performed 20 min cycling exercise and were measured 1 min post-exercise. CBFv pulsatility increased below baseline 5 min post-exercise (p < 0.01) in both groups. CBFv pulsatility increased following RE and was elevated above baseline 5 min post-exercise (p < 0.01) in both groups. Mean CBV increased 1 min post-exercise (p < 0.01) in both groups. Most variables returned to baseline at 30 min.

CONCLUSION: RE increased central arterial stiffness, mean CBFv and CBFv pulsatility similarly for both sexes. Although CO increased at 5 min, CBFv dropped below baseline and pulsatility continued to rise above baseline. This temporary disruption in cerebral autoregulation may impact brain health in both sexes.

Hydropediation exceeding 2% body mass is known to impair endurance capacity. It is hypothesized that the central nervous system, specifically the brain, is negatively affected by hydropediation, leading to a decline in endurance capacity.

PURPOSE: To investigate the effects of exercise-induced hydropediation on the brain.

METHODS: Ten trained endurance males (mean±sd: age 23.3±1.1 years; body fat 10.5±2.4%; VO2peak 65±5 ml kg⁻¹ min⁻¹) were dehydrated to ~3% body mass by running on a treadmill at 65% VO2peak in a 25°C environment, before drinking to replace 100% or ~0% of fluid losses in two randomized, counterbalanced trials. Participants underwent MRI scans at baseline and post-fluid replacement to examine brain volume, functional activity and cerebral perfusion. Magnetic resonance spectroscopy was used to measure brain temperature (at primary motor cortex) before and during the dehydrating run. Endurance capacity was assessed by running to exhaustion at 75% VO2peak. Results were assessed using paired sample T-test with p < 0.05 considered significant.

RESULTS: MRI results demonstrated a reduction in total brain volume in hydropediation (HH) as compared to euhydration (EU) trials (EU: 1.007, HH: 0.993; p=0.003). BOLD (blood-oxygen-level dependent) activation in the primary motor (M1) and somatosensory cortex (S1) during a plantar flexion task were similar between conditions (M1: p = 0.314, S1: p =0.332). Global and regional cerebral perfusion remained unchanged between conditions (Global: p = 0.055, M1: p =0.447, S1: p=0.458). Brain temperature measured at baseline was higher than core brain temperature (Brain: 37.7±0.5°C; Core: 36.7±0.3°C, p<0.0001). However, both temperatures were similar during exercise (Brain: 38.2±0.4°C; Core: 38.6±0.3°C; p=0.110). Endurance capacity was reduced with hydropediation (EU: 45.2±9.3 min; HH: 38.4±10.7 min; p=0.033).

CONCLUSION: Under hydropediation, the endurance capacity is impaired and total brain volume is reduced. Brain functional activity and cerebral perfusion are notably well-preserved. Brain temperature could be regulated within a narrower homeostatic range than the core temperature. Supported by DIRD Grant, PA No. 901502335 and funding from ERGOTECH, South Africa.

Cerebral Blood Flow during Dynamic Exercise Correlates with Blood Pressure in Autonomic Brain Regions

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(No relationships reported)

PURPOSE: During dynamic exercise changes in cerebral blood flow (CBF) has been demonstrated. While global CBF remains stable in the prolonged exercise via cerebral autoregulation, alterations in BP would be associated with fluctuation of regional CBF (rCBF). However, association between CBF and BP during exercise has not been elucidated. The aim of the present study is to examine changes in CBF evoked by dynamic exercise using positron emission tomography (PET) and to identify brain regions where rCBF correlates with BP.

METHODS: Twelve healthy young males performed 20 min cycling exercise and CBF was measured using oxygen-15-labeled water and PET (Discovery PET/CT, GE) at the baseline (Rest), during and after exercise. Heart rate (HR) and mean blood pressure (MBP) were monitored. With the use of the computerized input function, rCBF was calculated using the autoradiographic method. For an anatomical reference, individual brain MRI scans were acquired and the image data were analyzed using SPm software and the quantitative analysis of rCBF was performed using Dr. View software.

RESULTS: During exercise HR and MBP increased to 119 ± 8 bpm and 107 ± 13 mmHg, respectively. At the end of exercise, MBP significantly decreased compared to Rest, from 91 ± 8 to 86 ± 10 mmHg (p < 0.05). CBF increased in the sensorimotor cortex and cerebellar vermis during exercise (p<0.001, uncorrected). Following exercise rCBF decreased in the frontal lobe in the
Cardiorespiratory fitness (CRF) and physical activity (PA) are positively associated with cognition and may mitigate pathological changes that occur with age and Alzheimer’s disease (AD). However, there is limited information on the interaction between CRF and PA in predicting brain health in older adults. Throughout aging and the AD cascade, patterns of decreased cerebral blood flow (CBF) are apparent and vascular health abnormalities have been postulated as a precursor to downstream pathologies such as amyloid-beta accumulation and neuronal dysfunction. Limited research suggests that CRF is positively associated with CBF. However, no study to date has examined CRF and PA concomitantly with CBF. **Purpose:** To determine the unique contributions of CRF and moderate-vigorous physical activity (MVPA) when predicting CBF in an older adult population at-risk for AD. **Methods:** 159 cognitively healthy (MMSE ≥ 24) adults (mean age = 63.8, SD = 5.4) from the Wisconsin Registry for Alzheimer’s Prevention participated in this study. Participants performed a graded maximal exercise test to measure CRF (VO2 max) and wore a triaxial accelerometer on their hip for seven consecutive days to quantify their PA behaviors. Participants also underwent MRI scanning where CBF was measured using pseudocontinuous ASL. CBF was sampled from 5 brain regions implicated in AD using the Alzheimer’s Disease Neuroimaging Initiative FDG Meta-ROI suite. **Statistical analyses:** Pearson correlation was used to examine the association between CRF and MVPA. Multiple linear regression was used to determine whether CRF and/or MVPA were significant and independent predictors of CBF. **Results:** CRF and MVPA were moderately correlated (r = −.37; p < .05), suggesting these two constructs may provide unique contributions to CBF. Regression analysis revealed CRF was significantly and positively associated with CBF while accounting for minutes of MVPA, accelerometer wear time, age, gender, and global cerebral blood flow (p < .05). **Conclusions:** Results suggest fitness level, independent of physical activity, is associated with greater CBF in regions that decline with aging and AD. Cardiorespiratory fitness appears to be an important physiological component of brain health in older adulthood that is not explained by physical activity behaviors.

Cerebrovascular reactivity (CVR) to alterations in arterial carbon dioxide (PCO2) content is a common test to assess brain health. Traditionally, higher CVR is associated with higher aerobic fitness, while natural aging and brain-related diseases are associated with lower CVR. However, recent findings challenge some of these relations, but may be related to inconsistent neuroimaging methodologies. **Purpose:** 1) to examine fitness effects on CVR between active and sedentary individuals using functional magnetic resonance imaging (fMRI) and transcranial Doppler (TCD), and 2) to compare different stimulus concentrations for CVR measures between fMRI and TCD. **Methods:** Fourteen volunteers participated (26 ± 7 yrs; 8 active, 6 sedentary), with 10 pair-matched for age and sex to examine fitness effects (5 active, 6 sedentary). Following medical screening, participants completed an aerobic fitness test (VO2 max) and the CVR protocol familiarisation. Participants then completed two experimental sessions on separate days (randomized and counter-balanced). For both sessions, CVR was assessed using two concentrations of CO2 via the same Douglas bag open circuit (4-min cycles of room air, 5% CO2, room air, 7% CO2). CVR was measured using fMRI (EPI-based sequence allowing simultaneous acquisition of blood-oxygen level dependent or BOLD signal and TCD (middle cerebral artery blood flow velocity)). CVR measures were correlated (Pearson’s) with fitness and differences between stimulus concentration within and between approaches compared. **Results:** 1) Higher VO2 max was associated with higher CVR derived from 5% and 7% CO2 stimuli, but were higher for fMRI (5%; r = .640, p = .06; 7%; r = .690, p = .04) than TCD (5%; r = .209, p = .30; r = .365, p = .17). 2) When comparing CVR between fMRI and TCD, values obtained from the 5% stimulus correlated (r = .462, p < .05); while there was no correlation between values obtained from the 7% stimulus (r = .252, p = .46). Paired t-tests comparing CO2 concentration (5% vs 7% CO2) revealed no difference for fMRI-derived CVRs (p = .93), but a trend between TCD-derived CVRs (p = .10). **Conclusion:** Both fMRI and TCD-CVR approaches differentiated active and sedentary groups. The CVR measure between and within neuroimaging approaches was differentially influenced by CO2 concentration.
Muscle Blood Flow Responses to Dynamic Handgrip Exercise in Young Obese Adults
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Email: bansaw2@uic.edu

INTRODUCTION: Exercise intolerance is a hallmark characteristic of obesity, which may be related to an impaired ability to appropriately increase blood flow to the working muscles. Limited evidence suggests that steady-state vasodilatory responses to dynamic forearm exercise are preserved or even increased in young obese humans compared with lean peers, but this topic still remains poorly understood.

PURPOSE: To evaluate exercise-induced changes in hemodynamics in young obese adults compared with lean adults.

METHODS: Thirty lean (female=6; male=24; 26.0±1.6 kg/m²; 70.6±4.8 L·min⁻¹; 22.4±0.5 kg·cm⁻¹) and 14 obese adults (female=7; 27.7±1.1 yrs; 32.0±0.6 kg/m²) performed 2-min of dynamic forearm exercise at 15 and 30% of maximal voluntary contraction (1-s contraction: 2-s relaxation). Ultrasonography [brachial diameter, forearm blood flow (FFB), forearm vascular conductance (FFC), and beat-to-beat hemodynamics [mean arterial pressure (MAP), heart rate (HR), stroke index (SI), systemic vascular resistance index (SVRI), cardiac index (CI), systemic arterial compliance index (SACI)] were collected. FBF and FFC were normalized to lean forearm mass, and no differences were observed in MRT for blood flow or oxygen uptake with increased exercise intensity.

RESULTS: There were no group differences in any variable at baseline. Brachial artery diameter, FBF, FVC, and HR increased (p<0.05) as a function of exercise intensity. SVRI decreased from baseline to 15% and 30% MVC only in the lean group (p<0.05). MRT was shorter (p<0.05) for both MVC conditions compared with 15% MVC in the obese group.

CONCLUSION: Although young obese adults did not exhibit an impairment in exercise-induced increases in vasoactivity, increased exercise intensity may reduce exercise-induced forearm blood flow and increase systemic vascular resistance in young obese adults, which may contribute to reduced stroke index and forearm blood flow in this population.
Multiple Sclerosis (MS) is a demyelinating disease of the central nervous system characterized by a variety of symptoms including fatigue, reduced exercise capacity, and autonomic nervous system (ANS) dysfunction. MS is characterized by a variety of symptoms including fatigue, reduced exercise capacity, and autonomic nervous system (ANS) dysfunction. Conclusions: The present study was to determine whether persons with MS (PwMS) demonstrate reduced exercise capacity and ANS function compared to age/sex matched controls. These findings warrant further investigation into the regulation of skeletal muscle blood flow in PwMS to determine whether impaired blood flow contributes to common symptoms of MS such as reduced exercise capacity and fatigue.

### RESULTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Baseline</th>
<th>15MVC</th>
<th>30MVC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brachial Artery Diameter (mm)</td>
<td>Lean</td>
<td>3.46±0.15</td>
<td>3.51±0.15</td>
<td>3.64±0.14</td>
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<tr>
<td></td>
<td>Obese</td>
<td>3.62±0.14</td>
<td>3.69±0.14</td>
<td>3.76±0.14</td>
</tr>
<tr>
<td>FBF (mL/min*100 g tissue)</td>
<td>Lean</td>
<td>11±1</td>
<td>13±1</td>
<td>30±2</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>10±1</td>
<td>14±1</td>
<td>27±2</td>
</tr>
<tr>
<td>FVC (mL/min<em>100mmHg</em>100 g tissue)</td>
<td>Lean</td>
<td>11±1</td>
<td>14±1</td>
<td>30±2</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>10±1</td>
<td>13±1</td>
<td>27±2</td>
</tr>
<tr>
<td>MAP (mmHg)</td>
<td>Lean</td>
<td>101±2</td>
<td>103±2</td>
<td>102±3</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>100±2</td>
<td>99±2</td>
<td>103±3</td>
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<tr>
<td>HR (bpm)</td>
<td>Lean</td>
<td>62±2</td>
<td>66±2</td>
<td>67±2</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>64±2</td>
<td>63±2</td>
<td>67±2</td>
</tr>
<tr>
<td>SI (mL/min/m²)</td>
<td>Lean</td>
<td>53±3</td>
<td>54±3</td>
<td>55±3</td>
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<td></td>
<td>Obese</td>
<td>48±3</td>
<td>46±3</td>
<td>47±3</td>
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<td>CI (L/min/m²)</td>
<td>Lean</td>
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<tr>
<td></td>
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<td>3.0±0.2</td>
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<td>SVRI (L/min/mmHg/m²)</td>
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<tr>
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<tr>
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<td>0.88±0.04</td>
<td>0.86±0.04</td>
<td>0.86±0.04</td>
</tr>
</tbody>
</table>

Data are mean±SE. *P<0.05, time effect. †P<0.05, interaction. ‡P<0.05, different from baseline.

Data are mean±SE. *P<0.05, time effect. †P<0.05, interaction. ‡P<0.05, different from baseline.

Conclusions: The present study was to determine whether persons with MS (PwMS) demonstrate reduced exercise capacity and ANS function compared to age/sex matched controls. These findings warrant further investigation into the regulation of skeletal muscle blood flow in PwMS to determine whether impaired blood flow contributes to common symptoms of MS such as reduced exercise capacity and fatigue.

### MEDICINE & SCIENCE IN SPORTS & EXERCISE®

**Board #6 June 2 1:00 PM - 3:00 PM**

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**Oxygen Extraction Reserve Immediately After Ramp Incremental Maximal Exercise: Beyond the Deoxy-hemoglobin Breaking Point**

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(No relationships reported)

Towards the end of a ramp incremental (RI) test to exhaustion, the near-infrared spectroscopy (NIRS)-derive deoxygenated hemoglobin ([HHb]) signal plateaus, suggesting an upper limit in oxygen (O2) extraction. However, it is unknown whether this plateau is the highest level of O2 extraction, or if a “reserve” in O2 extraction exists, such that the plateau in the [HHb] in the presence of a still raising O2 utilization (VO2) towards the end of a RI test is indicative of a local increase in blood flow. **PURPOSE:** To assess the existence of a “reserve” in O2 extraction immediately at the end of a RI cycling test to exhaustion. **METHODS:** Nine male participants (27 ± 4.6 yrs; 79.9 ± 8.6 kg) performed a RI (30W·min⁻¹) test to exhaustion on a cycle ergometer (Veloton Dynafit Pro, Seattle, WA, USA) to determine the VO2 (Quark CPET, Cosmed, Rome, Italy) and the [HHb] (Oxiplex TS, ISSN, Champaign, USA) responses. The [HHb] signal was measured on the Vastus Lateralis (VL) muscle. An automatic rapid inflation cuff was used to occlude blood flow to the leg (300 mmHg), at the upper portion of the thigh, for two minutes immediately at test failure. A paired samples t-test was used to compare the VO2 (onset of the plateau in the [HHb] signal and end-exercise) and the normalized (0-100% of the response during RI test) [HHb] signal (plateau and peak value obtained during occlusion). **RESULTS:** The end-exercise VO2 (VO2max: 4.35 ± 0.57 L·min⁻¹) was larger than that observed at the onset of the plateau in the [HHb] response (3.77 ± 0.52 L·min⁻¹; p <0.05). Post-exercise peak [HHb] (following occlusion) was higher compared to its plateau value (p <0.05), with a mean difference of 38.1 ± 18.9 %. **CONCLUSIONS:** This study demonstrated the existence of a “reserve” in O2 extraction, despite a continuous increase in the VO2 response towards the end of a RI cycling test. These data suggest that the observed plateau in the [HHb] response is not related to O2 extraction reaching its upper limit, but likely due to increased local blood flow.
day recorded for pregnancy months five and eight were significantly lower (p<0.005) than month four. Our findings reveal a reduced overall trend for MVA minutes/week as pregnancy progressed, but no significant differences were found month-to-month (F(7, 56)=1.37, p=0.236). CONCLUSION: Pregnant women become less active in the later months of pregnancy according to both objective and self-report methods. Clear variability exists between objective and self-reported PA among pregnant women.

The early postpartum period (6 weeks) presents major lifestyle change to new parents. Is wearing a wrist-worn accelerometer acceptable to first-time mothers in early postpartum? PURPOSE: To describe wrist-worn accelerometer usage in primiparous, early postpartum women.

METHODS: We analyzed wear characteristics, including mean (±SD) days of wear and the mean minutes (±SD) of wear/day, of women enrolled in the first year of the Motherhood And Pelvic Health Study and determined the proportion of women who met the wear time standards of large published surveillance studies. We asked women to wear a tri-axial accelerometer continuously on the non-dominant wrist (1440 minutes=24 hours) over two specific 7-day periods, 12 to 25 days (T1) and 33 to 46 days (T2) postpartum. Study staff delivered accelerometers to women and verbally reinforced the protocol. We used the Choi et al. (2011) algorithm to determine wear/non-wear time. We assigned 0 days and 0 minutes of wear to women who wore the device outside of prescribed time periods. We excluded from analysis women that we were unable to contact before T1/T2 and those who had device failure. RESULTS: For T1, 201 were eligible; 17 could not be contacted and 6 had device failures, leaving 178 women for analysis. For T2, 161 were eligible; 10 could not be contacted and 5 had device failures, leaving 146 women for analysis. At T1, most women (N=166, 93.3%) wore the device for 7 days (mean±SD=6.8±1.0 days) with an average wear time of 1348.0±135.8 minutes/day. A slightly lower proportion of women (N=126, 86.3%) wore the device for 7 days (mean = 6.7±8.8 days) at T2 with an average wear time of 1311.3±148.0 minutes/day. Two women at T2 and 1 woman at T1 did not wear the device during the prescribed time intervals. Nineteen women at T1 and 17 at T2 averaged 1440 minutes per day (perfect wear). At T1, 96.1% (N=171) and at T2, 93.2% (N=136) of women met the NHANES wear standards. At T1, 90.4% (N=161) and at T2, 82.2% (N=120) of women met the Whitehall II Study wear standards.

CONCLUSION: Despite the challenges inherent in conducting research about physical activity in newly postpartum women, our results indicate that adherence to wrist-worn accelerometer in this population is high. Supported by NIH Grant Number 1P01HD080629 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

Various physical activity monitors have demonstrated respectable step-count accuracy when worn by pregnant women during treadmill walking, particularly at faster speeds. However, it is unclear if this accuracy extends to overground walking, a more common form of free-living mobility. PURPOSE: This study examined the step-count accuracy of five commonly-used physical activity monitors among pregnant women during overground walking at self-paced speeds. METHODS: Twenty-nine pregnant women (19 second trimester, 10 third trimester) completed six overground walking trials while wearing three consumer-grade activity monitors (AG, SW). All walking trials consisted of 100 steps, as measured by a hand-tally counter, which served as our criterion measure. Participants were instructed to walk the first three trials at a “normal pace” and the final three trials at a “brisk pace.” Steps recorded during each trial were recorded or downloaded for each device in order to calculate mean absolute percentage error (MAPE) ([criterion measure - monitor measure] / criterion measure) x 100). One-way ANOVAs were performed to determine whether MAPE differed between monitors and also whether pregnancy trimester affected monitor accuracy. Pairwise comparisons with Bonferroni adjustments were performed to explore specific differences between monitors. RESULTS: Significant differences were found between monitor MAPE.
Methods: The Pittsburgh Girls Study collected time-stamped step count data for adolescent females. This analysis examines PA in the 95 participants with ≥3 days of valid accelerometer data. All models were adjusting for, age cohort, winter wear time (y/n), weekend wear time (y/n), and average daily wear time (minutes/day). The effects of age at pregnancy and race/ethnicity [Non-Hispanic African American (NH AA), All Others] were also examined.

Results: At baseline, girls that gave birth during the study period were more likely to identify as NH AA, have a lower socio-economic status (all p<0.001), and were slightly older (mean [sd] age 16.1 [9.8] vs. 15.4 [1.1] years) than girls who did not give birth. The mean (sd) age at pregnancy was 17.1 (3.3) years. The final model included the a priori covariates and race/ethnicity. Adjusted mean (sd) step counts/day were 7260 (777) in the year before pregnancy. The adjusted mean (sd) change in step counts/day from the year before to the year after pregnancy was -2065 (735); p= 0.004. Overall, 61% of the girls recorded < 5000 mean steps/day in the year after pregnancy versus 41% in the year before pregnancy. There was a non-significant upward trend in mean steps count in subsequent post-pregnancy years. For comparison, girls not experiencing a pregnancy had little change in step counts over the 4 year follow-up (adjusted mean [sd] change: -152 [140], p>0.05).

Conclusions: Half of the girls could be considered sedentary post-pregnancy (<5000 steps/day). Based on this cohort, efforts to improve post-pregnancy PA levels are warranted in adolescent mothers.

The Pregnancy Physical Activity Questionnaire (PPAQ) is a commonly used tool to assess pregnant women’s current physical activity levels. However, few studies have evaluated the level of agreement between the PPAQ and physical activity measurement devices during free living conditions at multiple time points throughout pregnancy.

Purpose: The purpose of this study was to compare the PPAQ and device based physical activity assessment across phases of pregnancy and postpartum.

Methods: Physical activity behaviors of 38 women were quantified by the PPAQ and accelerometers worn at the right hip and ankle, at approximately 21 and 32 weeks of pregnancy, and 12 weeks postpartum. Women were evaluated at least eight hours per day for at least five days of a week. Percent time spent in light, moderate, and vigorous physical activity were compared between the PPAQ and accelerometers using a two-way repeated measures analysis of variance (ANOVA).

Results: Percent of total physical activity time spent in light and moderate activity levels was similar between hip (93.1, 5.7%, respectively) and ankle (89.4, 5.7%, respectively) accelerometers, compared to 47.8, 40.3%, respectively, for the PPAQ (P>0.01). Specifically, the PPAQ results indicated significantly less time in light physical activity and more time in moderate activity. In addition, the hip and ankle accelerometers and the PPAQ showed significantly different percent of total physical activity time spent in vigorous activity (1.0, 4.7, 11.8%, respectively, P<0.01).

Conclusions: In free living conditions, accelerometer placement at hip and ankle resulted in similar percent wear time among physical activity intensities, regardless of pregnancy time point. In contrast, moderate and vigorous physical activity was underestimated by the PPAQ. Researchers should use caution when utilizing and comparing the results of these two physical activity measurement modalities during pregnancy and the postpartum period.
Leisure time physical activity (LTPA) during pregnancy is associated with pregnancy complications and fetal outcomes. Epigenetic mechanisms potentially play key roles in these associations. Few studies have investigated epigenetic biomarkers in relation to LTPA.

**Purpose:** To determine if maternal LTPA in early pregnancy is associated with candidate circulating microRNAs (miRNAs), epigenetic biomarkers with post-transcription regulatory roles.

**Methods:** This was a cross-sectional study conducted among participants (N=74) of the Omega study, a pregnancy cohort study. Participants self-reported LTPA duration (hours/week) and energy expenditure (MET-hours/week) during an interview in early pregnancy (16 weeks gestation, on average). LTPA was considered both as a continuous variable and categorized according to current American College of Sports Medicine recommendations for physical activity (not active, <150 minutes/week, active≥150 minutes/week). Levels of circulating miRNAs (miR-126-3p, 146b-5p, miR-155-5p, miR-21-3p, miR-223-3p, miR-222-3p, miR-518a-3p, miR-29a-3p), selected based on their role in pathophysiologic pathways (e.g. inflammation, oxidative stress, and placental function) related to pregnancy complications and outcomes, were measured using qRT-PCR. Linear regression adjusted for maternal age and gestational age at blood draw was used to determine beta estimates and 95% confidence intervals.

**Results:** Each additional hour or MET-hour/week of LTPA was not associated with levels of circulating miRNAs (all P>0.05). Compared to women who were not active, women who were active but who did not meet recommendations had higher levels of circulating miR-151-5p (β=0.24; 95% CI: 0.06, 1.0; P=0.05). Compared to women who were active below recommended levels, meeting or exceeding recommendations was associated with higher levels of circulating miR-151-5p (β=3.7; 95% CI: 0.09, 14; P=0.05). Early pregnancy LTPA was not associated with levels of other circulating miRNAs.

**Conclusion:** Maternal LTPA in early pregnancy may be associated with circulating levels of miR-151-5p, a placenta-specific miRNA related to placental growth, development, and function.
It has been suggested that thirst can influence exercise performance independently of hydration.

PURPOSE: Therefore, the purpose of this study was to examine the effect of thirst on exercise performance during cycling exercise in the heat in dehydrated subjects.

METHODS: Six male cyclists (weight: 71.8 ± 14.6 kg; body fat: 14.6 ± 6.0%) were exercised on a cycle ergometer at 55% VO2peak in a dry-hot environment (35 °C, 30% rh), while wearing a nasogastric tube. Two experimental trials were performed: a) Dehydration without thirst (DEH-NT) which participants drank 25 mL every 5 min (300 mL/h) with no infusion in nasogastric tube, and b) Dehydration with thirst (DEH-T) which participants were infused with 25 mL every 5 min via nasogastric tube but without drinking. Following the 2 hrs of steady state, the cyclists completed a 5-kilometer cycling time trial at 4% grade. During the study, cyclists were unaware of the trial that were participating, the amount of water infused via the nasogastric tube and could not get any feedback regarding their cycling performance or their heart rate.

RESULTS: Following 2 hours of steady state cycling, post-exercise body mass loss was comparable for the DEH-NT trial was -2.2±0.5% compared to the DEH-T trial which was -2.8±1.0%. Thirst (42±12 mm vs. 61±15 mm; P=0.007) and stomach fullness (35.8±8 mm vs. 54.10±10 mm; P=0.007) were both significantly different between DEH-NT and DEH-T trials. Finishing time in the 5-km time trial was faster in the DEH-T trial (784.3±35 s) compared to the DEH-NT trial (792.4±47 s), however, two out of six participants in the DEH-T trial felt exhausted and could not even start the 5 km, time trial following 2 hours of steady state cycling.

CONCLUSION: The data suggested that thirst had detrimental effect on cycling performance independent of hydration.

Sodium-Aided Hyperhydration Protocols
Co-consumption of sodium and water has been shown to be superior in promoting hyperhydration compared to consumption of an equal amount of water alone. Most sodium-aided hyperhydration studies have provided subjects with a bolus of fluid followed by a urine collection period. However the effect of providing equal amounts of fluid in a single vs. multiple doses over time on fluid retention has not been systematically studied. PURPOSE: To compare the effects of different dosing strategies on urine excretion levels following the consumption of consistent amounts of sodium and water. METHODS: Urine excretion was measured during three separate 2-hr hyperhydration protocols in 10 well hydrated male subjects (23 ± 3 yr, 71.8 ± 10.1 cm, 82.2 ± 19.4 kg) who were free from known renal, digestive, and cardiovascular disease. Each underwent separate 2-hr hyperhydration protocols in 10 well hydrated male subjects (23 ± 3 yr, 71.8 ± 10.1 cm, 82.2 ± 19.4 kg) who were free from known renal, digestive, and cardiovascular disease. Each underwent

RESULTS: USGs were 1.006 ± 0.004 (1X), 1.007 ± 0.003 (2X), and 1.008 ± 0.005 (3X) (P = 0.20 - 0.78) indicating that subjects were well and similarly hydrated for each trial. TUE expressed as a percentage of H2O consumed were 76 ± 15% (1X), 68 ± 12% (2X) and 55 ± 15% (3X). No significant difference in TUE was detected between 1X and 2X (P = 0.25) but significant differences were observed between 1X and 3X (P = 0.02) and 2X and 3X (P = 0.01). CONCLUSION: The data suggest that hydropothesis is better achieved when water and sodium are consumed in three equal doses over 90 min when compared to consuming an equal amount of a sodium and water dose in a single bolus or in two equal doses over a 60 min period.

Thirst Modulates Cycling Performance in the Heat in Dehydrated Males

This study aimed to determine the effect of providing equal amounts of fluid in a single vs. multiple doses over time on fluid retention has not been systematically studied. PURPOSE: To examine the effect of thirst on exercise performance during cycling exercise in the heat in dehydrated subjects.

METHODS: Six male cyclists (weight: 71.8 ± 14.6 kg; body fat: 14.6 ± 6.0%) were exercised on a cycle ergometer at 55% VO2peak in a dry-hot environment (35 °C, 30% rh), while wearing a nasogastric tube. Two experimental trials were performed: a) Dehydration without thirst (DEH-NT) which participants drank 25 mL every 5 min (300 mL/h) with no infusion in nasogastric tube, and b) Dehydration with thirst (DEH-T) which participants were infused with 25 mL every 5 min via nasogastric tube but without drinking. Following the 2 hrs of steady state, the cyclists completed a 5-kilometer cycling time trial at 4% grade. During the study, cyclists were unaware of the trial that were participating, the amount of water infused via the nasogastric tube and could not get any feedback regarding their cycling performance or their heart rate.

RESULTS: Following 2 hours of steady state cycling, post-exercise body mass loss was comparable for the DEH-NT trial was -2.2±0.5% compared to the DEH-T trial which was -2.8±1.0%. Thirst (42±12 mm vs. 61±15 mm; P=0.007) and stomach fullness (35.8±8 mm vs. 54.10±10 mm; P=0.007) were both significantly different between DEH-NT and DEH-T trials. Finishing time in the 5-km time trial was faster in the DEH-T trial (784.3±35 s) compared to the DEH-NT trial (792.4±47 s), however, two out of six participants in the DEH-T trial felt exhausted and could not even start the 5 km, time trial following 2 hours of steady state cycling.

CONCLUSION: The data suggested that thirst had detrimental effect on cycling performance independent of hydration.
and pelvic velocity. Correlational analyses were performed between each movement variable and peak linear acceleration (PLA), peak rotational acceleration (PRA) and Head Impact Criterion over 15ms (HIC15) measures from the xPatch. RESULTS: Significant correlations were found between: shoulder extension and PLA (r=-.141, r2=.020, p=.033), trunk angle and PLA (r=.224, r2=.050 p=.001), trunk angle and PRA (r=.202, r2=.040 p=.002), trunk angle and HIC15(r=.156, r2=.023, p=.018), step length and PLA(r=.138, r2=.019, p=.037) and step length and HIC15 (r=.131, r2=.018, p=.048). CONCLUSIONS: Significant correlations between movement variables of head acceleration and shoulder extension, trunk angle and step length the linear relationship between these values appears clinically negligible. The low strength of these relationships indicate these performance variables may not be responsible for the amount of head acceleration in low speed tackles. Additional analysis on this data should be completed to identify non-linear relationships and identify the interdependence of these variables. Measurements of live tackles during games and identification of other biomechanical parameters best correlated with head acceleration should also be determined, which could lead to more specific and effective tackling instruction.

2912 Board #4 June 2 1:00 PM - 3:00 PM Concussion History And Kinematics Of Dynamic Balance In Division I Athletes: A Pilot Study Moïra K. Pryhoda, Jenna Powell, Hamnam Belgasem, Connor Landusky, Kevin B. Shelburne, Ann-Charlotte Granholm-Bentley, Bradley S. Davidson. University of Denver, Denver, CO. Email: moira.pryhoda@du.edu (No relationships reported)

A concussion is one of the most complex injuries in sports and can have potentially catastrophic results if not treated correctly. The central nervous system (CNS) integrates visual, proprioceptive, and vestibular sensory information to maintain balance during all movements. Ample clinical evidence exists that a concussion disrupts normal function of the CNS and results in postural instability. However, the long-term effects of concussion on balance control, particularly during dynamic functional movements, are not clear. PURPOSE: To determine the effects of concussion history on the kinematics of athletes performing dynamic balance tasks on dynamic balance on athletes. METHODS: Division I athletes without (n=5; 20.0±1.0 yrs) and with a history of concussion (n=5; 19.4±0.9 yrs 1.5±1.2 yrs post concussion) performed dynamic balance tasks including gait, gait while stepping over an obstacle, get up and go (GUG), and GUG with a dual task. Speed was recorded for each task, and straightness of trajectory was calculated for normal gait and stepping over an obstacle as a root mean square (RMS) of the mediolateral deviation of the pelvis trajectory from a straight line. Cohens’ $d$ effect sizes between groups were bootstrapped given the small sample size. Effect sizes greater than 0.8 were considered large, 0.5-0.8 moderate, and less than 0.5 as no effect. RESULTS: Athletes with history of concussion performed the dual task GUG 1.7 m/s slower than the control (large effect size: $d$=0.90). In addition, those with history of concussion performed normal gait with an RMS deviation of 30.9 cm compared to 25.1 cm in control (moderately large effect size: $d$=0.66) when instructed to maintain a straight trajectory. No effect of concussion history occurred for normal gait speed, speed of stepping over an obstacle, speed of GUG without dual task, or mediolateral deviation when stepping over an obstacle. CONCLUSIONS: Deficits in dynamic balance control during functional movements in Division I athletes were evident even as long as 1.5 years following concussion event. These data support the need for a large prospective investigation (current enrollment: n=207), and athletes who sustain a concussion over the course of the study will be re-evaluated at regular intervals to observe changes in postural control during recovery.

2913 Board #5 June 2 1:00 PM - 3:00 PM The Relationship Between Post-Concussion Neurocognitive Performance and Postural Control Katelyn Grimes1, Emily Lasko2, Megan E. Mormile3, Brian J. Szekely1, Barry A. Munkasy1, Douglas W. Powell, Nicholas G. Murray4,1. Georgia Southern University, Statesboro, GA. 1University of Memphis, Memphis, TN. (No relationships reported)

Executive function (EF) is characterized as an individual’s ability to control complex cognition during non-routine tasks. While EF is comprised of several cognitive domains, the ability to maintain task goals and decision making, and to direct attention, known as working memory (WM), is an example of EF. The WM load holds a cognitive load to tax working memory, individual’s compromise speed for accuracy, known as speed accuracy trade-off (SAT). However, the effect of concussion on SAT, and the ability to perform a physical task has not been well studied. PURPOSE: To identify the relationship between neurocognitive and postural control deficits post- concussion. METHODS: 15 NCAA Division I athletes (11 male, 4 female; 20.5± 1.1 yrs) with diagnosed concussions underwent computerized neurocognitive testing, and a postural control assessment battery within 24-48 hrs of injury. The postural control assessment consisted of 3 trials of eyes open (EO) and eyes closed (EC) quiet standing for 30 sec and the Wii Fit Soccer Heading Game (WFS). The WFS requires
participants to shift their weight in the appropriate medial-lateral direction to hit targets and avoid obstacles. As such, the WFS provides a sport relevant task while simultaneously exercising a cognitive load. Raw Center of Pressure (CoP) was collected using a force platform (1000Hz). From the raw CoP data 95% Confidence Ellipse (CE), along with Peak Excursion Velocity (PEV), and Sample Entropy (SampEn) in anteroposterior (AP) and mediolateral (ML) directions were calculated. RESULTS: The results of a Pearson’s Product Correlation, indicate a negative relationship between verbal memory (VBMC) and time to complete on the Balance Error Scoring System (BESS) was characterized by a moderate large effect size (r = 0.5, p < 0.001). There was a positive relationship between impulse control and CoP VE AP. During WFS there was a positive relationship between PEV ML and Total Symptom Score (r = -0.582, p < 0.003). CONCLUSIONS: The results of the study suggest that participants did have a SAT, sacrificing postural stability for enhanced memory processing while attempting to accomplish an unfamiliar task.

2914

June 2 1:00 PM - 3:00 PM

Gender Specific Differences In Knee Kinematics Between Participants With And Without A Concussion History

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PURPOSE: To evaluate differences in knee kinematics during the impact phase between young adult participants with and without a concussion history. METHODS: 10 controls (6 males, 4 females) and 9 concussed (4 males, 5 females) between the ages of 18 and 26, capable of completing a jump cut motion. All participants were former high school athletes and right foot dominant. Concluded subjects were tested on average 3.3 years post-injury (SD=0.65 years). Measures of knee rotation were taken in the X, Y and Z orientation during single limb support of a cutting maneuver. All values are presented as the mean and standard error of the mean. RESULTS: An initial analysis of variance showed a significant group by gender interaction in peak right knee abduction/adduction [F=92.0, p<0.01] and peak internal/external rotation [F=17.9, p<0.01] between control and concussed groups. Accordingly, post-hoc tests were performed, adjusting for all pairwise comparisons using a Bonferroni correction. The aforementioned post-hoc tests revealed that males and females with a concussion history were differentially affected; with concussed males showing increased peak abduction (Controls: 9.7±0.5 degrees, Concluded: 3.2±0.3 degrees) and females showing increased peak adduction (Controls: 5.6±0.3 degrees, Concussed: 7.2±0.5 degrees). Concussed males showed an increase in peak internal rotation (Controls: 3.1±0.3 degrees, Concussed: 5.5±0.3 degrees) whereas concussed females showed a slight increase in peak external rotation of the knee (Controls: 7.3±0.4 degrees, Concussed: 6.4±0.5 degrees). CONCLUSION: Our findings, showing small but significant gender specific changes between groups, advise future researchers to use prudence when generalizing post-concussive kinematics across genders as they may not be equally affected. This may have implications for injury risk, however further work is needed, especially in the under-researched female population. Collectively, these findings cautiously provide a possible biomechanical underpinning to support recent reports that individuals are at a much higher risk of lower body injuries post-concussion.

2915

June 2 1:00 PM - 3:00 PM

Assessments Of Standing Balance In Division I Athletes With History Of Concussion: A Pilot Study


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(No relationships reported)

Concussion, an especially common injury in athletes, can result in notable balance dysfunction arising from disturbance of the somatosensory and vestibular neural networks. Although standing balance is known to be deficient in acute concussion, the rate at which postural control is recovered after symptoms have subsided is not well studied. Center of pressure (CoP) can be utilized to quantify balance dysfunction arising from these neural impairments. Current NCAA concussion assessment includes the Balance Error Scoring System (BESS), which is arguably less sensitive than COP variations to detect long term effects. PURPOSE: To assess measures of standing balance in athletes with recent history of concussion and non-concussed athlete controls. METHODS: Division I athletes without (n=5; 19.4±0.8 yrs) and with a history of concussion (n=5; 20.0±1.0 yrs; 1.5±1.3 yrs post injury) performed the BESS tasks while standing on 2 force platforms. COP was recorded during the 4 bipedal BESS conditions: eyes open versus closed, and hard surface versus memory foam. Average COP velocity and 95% confidence ellipse area were calculated. Trials were also scored per BESS clinical criteria. Cohen’s d effect sizes between groups were bootstrapped given the small sample size. RESULTS: COP velocity was 1.3 mm/s higher (moderate effect size: d=0.62) in the concussion group than controls during eyes closed, hard surface, while BESS score was 10 for all athletes in both conditions. The remaining variables indicated no deficits in the concussion group. CONCLUSIONS: Differences between concussed and control groups in the eyes closed condition may suggest continuing low-grade vestibular impairment detectable when visual feedback is removed, even after clinical symptoms have resolved. Past work indicates changes in COP velocity are related to vestibular dysfunction. In addition, these data allude to a higher sensitivity of COP measures than clinical BESS scoring when assessing balance deficits, particularly these deficits are subtle. These data are part of a large prospective investigation (current enrollment: n=207), and athletes who sustain a concussion over the course of the study will be re-evaluated at regular intervals to observe changes in postural control during recovery.

2916

June 2 1:00 PM - 3:00 PM

Postural and Gaze Stability Deficits Following Concussion

Nicholas G. Murray1, Brian Szekely2, Megan E. Mormile2, Peter Chrysosferidis1, Katelyn Grimes1, Barry A. Munkasy2, Luis Nolasco1, Andrew P. Lapointe1, Nicholas G. Murray1, Brian Szekely1, Megan E. Mormile2, Peter Chrysosferidis1, Katelyn Grimes1, Barry A. Munkasy2, Luis Nolasco1, Andrew P. Lapointe1, Nicholas G. Murray1, Brian Szekely1, Megan E. Mormile2, Peter Chrysosferidis1, Katelyn Grimes1, Barry A. Munkasy2, Luis Nolasco1, Andrew P. Lapointe1

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(No relationships reported)

Postural instability and visual system dysfunction are two of the highest reported signs immediately following a sport-related concussion. However, little research has examined both systems simultaneously using sensitive measurement techniques following concussion in the same sample. PURPOSE: To investigate and compare postural and gaze stability between a control group of healthy non-injured athletes (NORM) and a group of athletes with concussions (CONC) 24-48 hours post-injury. METHODS: 18 post-concussed NCAA Division I athletes (20±1.3 years of age) and 18 matched athletes (19±0.9 years of age) completed two trials of a sport-like antisaccade postural control task, the WiiFit Soccer Heading Game (WFS). During play, all participants were instructed to minimize gaze deviations away from a central fixed area, while simultaneously swaying in a medial-lateral direction to direct an on screen avatar to meet the demands of the game. Monocular raw ocular point of gaze coordinates (240Hz, Argus Science) and raw center of pressure (1000Hz, AMTI) data were collected simultaneously and further analyzed using a custom algorithm. Independent t-tests analyzed gaze Resultant Distance (RD), Proxaccade Errors (PE), Peak Horizontal Velocity (HV), and Vertical Horizontal Velocity (VV) along with center of pressure Root Mean Square (RMS) and Peak Velocity (PV) in the anteroposterior (AP) and mediolateral (ML) directions between groups. RESULTS: CONC had a significantly greater RD (CONC= 6.98±0.5 pixels, NORM=5.2±0.3 pixels; p=.044) than controls during eyes closed, hard surface, while BESS score was 10 for all athletes in both conditions. The remaining variables indicated no deficits in the concussion group. CONCLUSIONS: These results suggest that CONC gaze travelled a greater distance and had less control of gaze in the horizontal and vertical directions during play of the WFS. Conversely, no postural deficits were present during play of the WFS. This could indicate that gaze instability is present even in the absence of postural instability following concussion when comparing CONC to NORM.
HEALTHY, SEDENTARY ADULTS WERE RANDOMIZED INTO TWO GROUPS: EXERCISE TRAINING (ExT; n=26) OR CONTROL (Pre; n=25). Baseline VO2max and 1,500 m walk/run times were significantly different. ExT groups met the American College of Sports Medicine guidelines by week 20 for both aerobic and strength training. ExT groups showed a significant increase in VO2max, 9.9 ± 5.0 mL·kg⁻¹·min⁻¹ (p < 0.05) and a decrease in times: walk/run 1,500 m, 300 m shuttle run, sit and reach, and bench press compared to Pre. ExT groups showed a significant increase in VO2max (p < 0.05) and a decrease in times: walk/run 1,500 m, 300 m shuttle run, sit and reach, and bench press compared to Pre.

**RESULTS:**

- **VO2max:** ExT group showed significant increases in VO2max compared to Pre (p < 0.05).
- **1,500 m Walk/Run:** The ExT group had significantly lower times compared to Pre (p < 0.05).

**DISCUSSION:**

The findings suggest that a comprehensive aerobic and strength training program is effective in improving VO2max and reducing times in healthy, sedentary adults. Further research is needed to explore the long-term effects of such interventions on VO2max and other health-related fitness parameters.
was considered low responsive for VO\textsubscript{2max}. The distribution of low response across the individual exercise programs is shown in Table 1. Prevalence of low response ranged from 7.4% (BREIT TEA LR) to 14.3% (BREIT IVK).

CONCLUSION: Our study found a high prevalence of VO\textsubscript{2max} low response across five diverse exercise training studies, which differed based on how low response was defined. These results underscore the need for further investigation to refine the identification of VO\textsubscript{2max} low response to enhance future exercise program development.

2921 June 2 1:45 PM - 2:00 PM
**Skeletal Muscle Mitochondrial and Whole-Body Metabolic Performance After An Ultra Endurance Mountain Bike Race**

Adam R. Konopka, William M. Castor, Jaime L. Laurin, Christopher A. Wolff, Karyn L. Hamilton, FACSJM, Benjamin F. Miller, FACSJM. Colorado State University, Fort Collins, CO. (Sponsor: Karyn Hamilton, FACSJM)

At the annual Colorado Trail Race (CTR), participants cycled for up to 24 hours per day to complete 70,000 feet of elevation gain over 500 miles between the altitudes of 5,500 to 13,200 feet. **PURPOSE:** To characterize skeletal muscle mitochondrial and whole-body metabolic performance after prolonged stress (exercise, sleep deprivation, hypoxia).

METHODS: One race participant (43yr male; VO\textsubscript{2Max}, 58 ml/kg/min; BMI, 21 kg/m\textsuperscript{2}) was studied before and after completing >360 miles of the CTR and a normal activity period (control, CTR) separated by 45 days. Each visit the participant arrived fasted overnight for a skeletal muscle biopsy followed by an oral glucose (75g) tolerance test (OGTT). High-resolution respirometry was performed on permeabilized skeletal muscle fibers using 3 different substrate-uncoupler-inhibitor-titration (SUIT) protocols. SUIT1 examined maximal fatty acid-supported respiration with sequential addition of complex 1- and complex II-linked carbonyl groups and FCCP to determine substrate-specific oxidative phosphorylation (OXPHOS) and uncoupled electron transport system (ETS) capacity. SUIT2 was designed to investigate carbohydrate-supported respiration without fat supply during maximal OXPHOS and ETS capacity. SUIT3 used an ADP titration to determine mitochondrial ADP sensitivity followed by maximal OXPHOS and ETS flux.

RESULTS: In each SUIT protocol, ETS capacity was >200 pmol/s/mg tissue which are amongst the highest values published for human muscle. Despite the high ETS capacity, carbohydrate linked OXPHOS and ETS capacity (SUIT2) was severely decreased after the CTR. However, the decrease in respiration appeared to be attenuated during fatty acid-linked respiration (SUIT1). Conversely, ADP sensitivity was increased after the CTR and was accompanied by a lower glucose and insulin area under the curve during the OGTT.

CONCLUSIONS: This study provides a comprehensive characterization of skeletal muscle mitochondrial respiration after an ultra endurance event. The highly trained participant presented with preeminent mitochondrial capacity but was unable to maintain maximal mitochondrial respiration when faced with the extreme stress of an ultra endurance mountain bike race.

2922 June 2 2:00 PM - 2:15 PM
**Monitoring Cardiovascular, Hepatic, Renal, And Hematological Markers Of Health In Collegiate Soccer Players**


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Clinical biomarkers of general health status may indicate health impacts of overtraining in athletes attempting to optimize performance using long-term training tools.

**PURPOSE:** To test the hypothesis that biomarkers of cardiovascular, liver, kidney and hematological function reflect athlete health and performance over the course of a collegiate soccer season.

METHODS: 20 NCAA Division I male soccer players (mean±SD; height, 181±6 cm; body mass, 77±9.6 kg; BP, 119±2.4; VO\textsubscript{2max} 52.9±6.1 ml·kg\textsuperscript{-1}·min\textsuperscript{-1}) provided blood samples for a test panel of 53 biomarkers at 5 time points: before preseason (PS), week 1 (W1), week 4 (W4), week 8 (W8), and week 12 (W12). Significant changes were assessed via repeated measures ANOVA and post hoc testing (p<0.05).

**RESULTS:** Markers of potential organ damage markers aspartate amino transferase (AST) (U/L) and creatinine (mg·dl\textsuperscript{-1}) were elevated at W1 (AST, creatinine; 29±11, 1.11±0.13), W8 (31±11, 1.11±0.11), and W12 (28±11, 1.15±0.13) vs. PS (18±4, 1.02±0.13, all p<0.05). Alanine amino transferase (ALT) (U/L) levels were also significantly higher at W8 (24±8) and W12 (24±9) vs. PS (18±5, both p<0.05).

Hematocrit (%) measures were significantly reduced at W1 (45.5±2.3, p=0.015) vs. PS (47.2±2.8); W4 (46.4±2.6) and W12 (46.4±3.1) values suggest that values returned to PS levels (p<0.05) later in season. Additional markers of anemia, mean corpuscular volume, mean corpuscular hemoglobin concentration, red cell distribution width were reduced at W12 vs. all time points (all p<0.007). We observed reductions in cardiovascular/metabolic health markers (mg·dl\textsuperscript{-1}) LDL, LDL:HDL (no unit), non-HDL, direct LDL, and Apolipoprotein B at W1 (77±20, 3.2±0.5, 106±24, 9±25, and 71±17) than at PS (87±22, 2.8±0.5, 93±22, 8±11, and 64±15, all p<0.007). HDL (mg·dl\textsuperscript{-1}) was significantly greater at W4 (56±10), W8 (55±10), and W12 (58±11) than at PS (50±8, all p<0.05). Total cholesterol (mg·dl\textsuperscript{-1}) was significantly elevated at W8 (163±28, p=0.012) and W12 (168±31, p<0.007) vs. W1 (145±26).

CONCLUSIONS: Our panel detected a decrease in HCT beginning at W1, but improved cardiovascular/metabolic health throughout the season. Ongoing analysis aims to optimize this general health panel for practical use by correlation analysis to performance data.

2923 June 2 2:15 PM - 2:30 PM
**Stretching Combined With Tens Or Self-massage Has Differential Effects On Ankle Flexibility**

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Many studies evaluating the effect of stretching conclude that gains in flexibility are possible due to improved strength (force-displacement). Use of pain reduction therapies while stretching should provide greater improvements in flexibility than stretching alone. Transcutaneous electrical nerve stimulation (TENS) is a modality commonly used to mitigate pain. Self-massage with a foam roller, which may modulate the mechanical properties of connective tissues, has been shown to improve flexibility.

**Purpose:** To compare the influence of TENS and self-massage on ankle joint flexibility and force capacity of the plantar flexors muscles after a stretching intervention.

Methods: 20 healthy young adults (10M, 10F, mean (SD) age 25 (3) y) underwent 3 sessions of ankle plantar flexor stretching: stretching alone (SS), stretching with concurrent application of TENS (TS), and stretching with concurrent application of self-massage (SMS). Performance of suicide (SUIT) tests was performed at all time points (T1-3).

**RESULTS:** The mean (SD) change in ROM was 13 (9)%, 9 (7)%, and 25 (17)% for SS, TS, and BS, respectively. In contrast to TENS (TS), the increase in ROM was significant at W1 (p=0.00) and for weeks 4 and 12. The mean (SD) change in MVC was 16 (11)% and 16 (11)% for SS, TS, and BS, respectively. In contrast to TENS (TS), the increase in MVC was significant at W1 (p=0.00) and for weeks 4 and 12. The mean (SD) change in MVC was 16 (11)% and 16 (11)% for SS, TS, and BS, respectively. In contrast to TENS (TS), the increase in MVC was significant at W1 (p=0.00) and for weeks 4 and 12.

**CONCLUSIONS:** Stretching combined with TENS or self-massage resulted in significant increases in ankle joint flexibility and force capacity of the plantar flexors muscles after a stretching intervention. Treatment with TENS or self-massage provided a greater increase in range of motion (ROM) and muscular strength (MVC). The combination of stretching and TENS or self-massage resulted in the greatest increase in ROM and MVC.

2924 June 2 2:30 PM - 2:45 PM
**Lower Limb POWER Training to Enhance Locomotor and Muscular Function Poststroke**

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Training to improve muscle power generation has functional benefits beyond strength training in an aging population. Individuals following stroke show pronounced deficits in muscle power generation as well as function (i.e. gait speed), though data on specific adaptations following muscle power training are not available. **PURPOSE:** The purpose of this analysis was to determine the effects of the Poststroke Optimization of Walking Using Explosive Resistance (POWER) training on the paretic limb’s contribution to walking.

METHODS: Twenty individuals (13 male; 51 yrs; 36 mos poststroke) with chronic poststroke hemiparesis participated in this study. Subjects completed 24 training sessions that included a series of progressive, intensive leg press and jump training exercises, sit-to-stands, step-ups, and calf raises. Subjects also performed progressive overground fast walking to emphasize task-specific lower extremity power generation. Kinetic data was collected via a split-belt instrumented treadmill during three walking trials at self-selected (SSWS) and fastest comfortable walking speeds (FCWS). Using the anterior-posterior ground reaction forces (A-P)
GRFs), the percentage of total propulsion generated by the paretic limb was calculated by dividing the propulsive impulse of the paretic leg by the sum of the paretic and nonparetic propulsive impulses. Other outcomes included overground SSWS and FCWS, maximum voluntary isometric contractions (MVIC), and peak isometric power of the knee extensors. Subjects underwent pre-testing, post-testing, and 12-week follow-up testing. One-way repeated measures ANOVAs were used to determine main effects of time. RESULTS: Significant effects for time were observed for SSWS (p<0.01), FCWS (p<0.01), and nonparetic knee extensor MVIC (p=0.05) and power (p<0.01). Although peak A-P GRFs of the paretic limb significantly increased following training (p=0.01), no changes were observed in paretic propulsion.

CONCLUSION: Subjects improved gait speed, but those improvements were not accompanied by enhanced symmetry following POWER training. Future data will look into other potential underlying kinetic and kinematic mechanisms contributing to the significant and clinically meaningful improvements in gait speed (>0.16 m/s) observed in this cohort.

### June 2 2:45 PM - 3:00 PM
**Acute Effects of Speed-Dependent Interval Training Versus Continuous Training on Post-Stroke Locomotor Function**

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(No relationships reported)

The benefits of interval training (IT) compared to continuous training (CT) have been shown on a variety of functional and health-related outcomes. To date, the feasibility of IT has been demonstrated in individuals following stroke, though investigations of its effectiveness are still lacking. **Purpose:** To compare acute changes in locomotor function following single bouts of continuous (CT) and interval (IT) treadmill training, matched for total work, in ambulatory individuals with chronic stroke. **Methods:** Participants completed 20 minute sessions of CT and IT treadmill exercise separated by a minimum of 48 hours. Overground self-selected walking speed (SSWS) was used for CT while IT involved a 1:1 ratio (1 min slow : 1 min fast walking) with the goal of fast walking at 150% of SSWS and slow walking at 50% of SSWS. If subjects could not achieve 150% SSWS then speed was reduced and slow walking speed was adjusted to ensure matched-work between conditions. Overground SSWS was assessed prior to, immediately following as well as 20, 40 and 60min post-training. Subjects also walked at self-selected speed on a split-belt, instrumented treadmill to collect ground-reaction force data at the same time points. **Results:** Six subjects completed both sessions. Average CT treadmill speed was 0.92 m/s; average IT speeds were 0.57 m/s (slow) and 1.26 m/s (fast). Immediate post-training increases in SSWS were realized following CT (+6%) but not IT (-2%). SSWS following CT remained 6% faster than IT at 20min, 11% at 40min, and 6% at 60min. Improvements in peak paretic propulsive (Pp) force were realized immediately post-training (+6.9 N; +14%) and remained elevated post-training (20min +18%, 40min +16%, 60min +11%). **Conclusion:** These preliminary results suggest single bouts of IT and CT treadmill walking appear to elicit acute increases in SSWS as well as propulsive forces in individuals following stroke. The potentially greater relative improvements following IT suggest its potential effectiveness over CT if changing walking function is the goal.

Funding source NIH COBRE: Stroke Study P20-GM1099040

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2926 June 2 1:00 PM - 1:15 PM
**Exercise Training Improves Ventilatory Efficiency in Patients With Small Abdominal Aortic Aneurysm: A Randomized Controlled Study**

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(No relationships reported)

**PURPOSE:** To investigate the effects of exercise training on ventilatory efficiency and other physiological responses to submaximal exercise in subjects with small abdominal aortic aneurysm (AAA).

**METHODS:** Sixty-five patients (72.3±7.0 yr) were randomized to exercise training (n=33) or usual care groups (n=32). Exercise subjects participated in a training program for 3 months. Cardiopulmonary exercise testing was performed before and after the study period and peak VO2, the ventilatory threshold (VT), the oxygen uptake efficiency slope (UESS) and the V̇E CO2 slope were identified. Baseline work rates at VT were matched to examine cardiopulmonary responses before and after training. ANOVA was used to assess time by group interactions.

**RESULTS:** Significant interactions indicating improvements in the exercise group were observed for time (p<0.01), VO2 (p<0.01), and work rate (p<0.01) at the VT. At peak effort, significant interactions were noted for time (p<0.01) and work rate (p<0.01), while borderline significance was noted for absolute (p=0.07) and relative (p=0.04) VO2. Significant interactions were observed for the UESS both when using all exercise test data (Exercise: 2.03 to 2.16, and Usual care: 2.10 to 1.98; p for interaction =0.04) and when calculated up to the VT (Exercise: 2.07 to 2.23, and Usual care: 2.13 to 1.95; p for interaction <0.01). For the V̇E CO2 slope, significance was only noted when calculated up to the VT (Exercise: 30.4 to 29.5, and Usual care: 29.2 to 30.3; p for interaction=0.04). After training, heart rate (104.5 to 97.3 bpm), V̇E (34.2 to 32.0 L/min), V̇CO2 (1013.6 to 910.6 ml/min) and respiratory exchange ratio (0.85 to 0.82) were significantly attenuated for the same baseline workrate in the exercise group (all p<0.01), but no changes were observed in the usual care group.

**CONCLUSIONS:** Exercise training improves ventilatory efficiency in patients with small AAA. In addition, exercised patients exhibited less demanding cardiorespiratory responses to submaximal effort, with potential clinical significance for activities of daily living.
remained unchanged. The RPE associated with VT and RCP were 13±1 and 17±1, respectively, and not significantly different during β-blockade (13±1 and 18±0.6 respectively; p>0.05). The VO2 associated with RPE 13 was significantly lower under β-blockade compared to control (28.6±3 vs 32.6±6 ml·kg⁻¹·min⁻¹; p<0.05). However, when expressed relative to VT (94±15 and 99±14%) and VO2peak (58±8 and 62±10%) differences were no longer significant (all p>0.05). For RPE 15, associated VO2 was significantly lower during β-blockade (35±6 vs 39.6±6 ml·kg⁻¹·min⁻¹; p<0.05), but no longer significant relative to VT (87±8 and 92±5%) and VO2peak (72±6 and 75±8%; p>0.05). Conclusion: Despite changes in the VT and VO2peak with β-blockade, the RPE associated with VT and RCP remain constant. Further, the exercise intensity associated with RPE 13 and 15 appear to scale in accordance with changes in VT and VO2peak.

2929  June 2 1:30 PM - 1:45 PM Cardiorespiratory Fitness Versus Physical Activity as Predictors of All-Cause Mortality in Men
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A limited number of studies have examined the interaction between cardiopulmonary fitness (CFR), physical activity (PA) and all-cause mortality.  

**PURPOSE:** To assess the independent and combined associations of PA, CFR and all-cause mortality in 11,610 male veterans aged 20 to 89 (mean ± SD, 58.5 ± 11.2 years) who were referred for exercise testing at the Veterans Affairs Medical Center in Washington, DC, or Palo Alto, CA.  

**METHODS:** CFR was assessed by a maximal exercise treadmill test and PA was measured by self-reported questionnaire obtained at the time of the exercise test. There were 2876 deaths during a mean (± SD) follow-up of 9.8 (5.9) years. Cox proportional hazard models were used to assess the independent associations between CFR, PA and mortality. To further explore the interaction between PA and CFR with mortality, we dichotomized the cohort into fit and unfit groups, defined by a CFR threshold of 7 METS. Within the fit and unfit groups, active individuals (meeting 150 minutes of moderate or higher intensity PA per week) and inactive individuals (not meeting 150 minutes of moderate or higher intensity PA per week) were matched, 1:1, for CRF, age and BMI. Hazard ratios [HRs] compared inactive subjects (reference) with active (HR: 0.98; CI: 0.83 – 1.15), meeting the PA guidelines (Active) was not significantly different (HR: 0.91; CI: 0.74 – 1.11) from the reference group. Additional analyses were conducted adjusting for diabetes, hypercholesterolemia, or cardiovascular disease.  

**RESULTS:** No significant differences were found between VO2peak (T1; 25.5±5.3 vs. T2; 26.5±5.3 ml·kg⁻¹·min⁻¹; p>0.05) tests. However, measured VO2peak (27.2±5.6 ml·kg⁻¹·min⁻¹) was significantly lower than predicted VO2peak (32.4±5.6 ml·kg⁻¹·min⁻¹; p<0.05). In fact, the prediction formula overestimated the CFR by 1.5±1.1 METS or 19.1%. When participants were divided by the severity of their disease, CFR was overestimated by 1.2±0.8 METS in the mild (n=5) and by 1.0±1.3 METS in the moderately-to-severely (n=7) affected FM participants, but did not attain statistical difference between groups.  

**CONCLUSION:** Our results show that system based prediction formula commonly used in the clinical setting overestimate cardiopulmonary fitness in women with fibromyalgia and should be used with caution.

2930  June 2 1:45 PM - 2:00 PM Can a Prediction Formula Accurately Predict Cardiorespiratory Fitness In Fibromyalgia Patients?  
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(No relationships reported)

Cardiorespiratory fitness (CFR) is often estimated using prediction formulas when clinicians do not have access to a metabolic cart. Unfortunately, using prediction formulas could potentially over or under estimate the CFR of patients with a chronic disease. Improving the accuracy of CFR in fibromyalgia (FM) patients is important considering that it has been reported that they have a lower CFR when compared to matched healthy participants. **PURPOSE:** To assess if a commonly used formula is accurate to predict CFR (VO2peak or METs) in women living with FM.  

**METHODS:** Two FM women (age: 50.5±7.9 years; weight: 69.1±11 kg; BMI: 26.4±7.1) were submitted twice to a maximal exercise test (BSU/Bruce ramp), with a 24 hours’ interval, until participants achieved volitional exhaustion. Gas exchange (Ergogard, Medisoft) and ECG (Quinton) was continuously monitored throughout the test. VO2peak was considered as the highest O2 uptake averaged over a 30 second period during the test and the highest value obtained between the first test (T1) and the second test (T2). Predicted VO2peak was determined by the formula integrated in the Quinton ECG system and the highest value between T1 and T2. The Metabolic equivalent of task (METs) was determined by using VO2peak values divided by 3.5 ml·kg⁻¹·min⁻¹. **RESULTS:** No significant differences were found between both VO2peak (T1; 25.5±5.3 vs. T2; 26.5±5.3 ml·kg⁻¹·min⁻¹; p>0.05) tests. However, measured VO2peak (27.2±5.6 ml·kg⁻¹·min⁻¹) was significantly lower than predicted VO2peak (32.4±5.6 ml·kg⁻¹·min⁻¹; p<0.05). In fact, the prediction formula overestimated the CFR by 1.5±1.1 METS or 19.1%. When participants were divided by the severity of their disease, CFR was overestimated by 1.2±0.8 METS in the mild (n=5) and by 1.0±1.3 METS in the moderately-to-severely (n=7) affected FM participants, but did not attain statistical difference between groups.  

**CONCLUSION:** Our results show that system based prediction formula commonly used in the clinical setting overestimate cardiopulmonary fitness in women with fibromyalgia and should be used with caution.

2931  June 2 2:00 PM - 2:15 PM The Immediate Antihypertensive Effects of Aerobic Exercise: A Meta-Analysis  
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(No relationships reported)

Acute aerobic exercise (AE) produces immediate but transient blood pressure (BP) reductions that persist for up to 24 hr, termed postexercise hypotension (PEH). PEH is strongly correlated with the BP response to AE training. Surprisingly, 33 meta-analyses exist on the BP response to AE training, but none on PEH. **PURPOSE:** To perform a meta-analysis to determine the effectiveness of PEH as antihypertensive lifestyle therapy among adults with hypertension. **METHODS:** Databases were searched for controlled PEH trials that included: adults (>19 yr) with hypertension (systolic BP [SBP]diastolic BP [DBP] ≥140 and/or ≥90 mmHg and/or on BP medication), and BP measured pre- and post-acute AE and control. Study quality was determined using a modified Downs and Black checklist. Analyses incorporated random-effects assumptions. **RESULTS:** Ten studies and 17 interventions qualified. Subjects (N=260) were middle-aged (41.8±4.2 yr), overweight (28.9±2.3 kg·m⁻²) adults (24% women, 76% men) with hypertension (SBP/DBP=140.6±9.2/89.2±4.4 mmHg). The AE bout was performed at moderate intensity (5.4±1.3 metabolic equivalents [METs], ~55% maximal oxygen consumption) for 38.0±8.7 minutes, typically on a cycle ergometer (61.9%, k=13). Awake ambulatory BP consisted of 3:10:6 measurements/ hr at 18:24:9 minute intervals over 11:7:4 hr. Overall, PEH occurred over the awake hr (SBP/DBP: d ≥0.9 [0.50 – 1.7]; 5.42– 12.11 mmHg), but effect sizes lacked homogeneity (I²=85% [77.4%, 90.1%/67.9% [46.0%, 80.6%]). PEH was of greater magnitude following higher than lower intensity (SBP, ~11 mmHg) trials. Higher than lower intensity (SBP, ~11 mmHg) trials and lower quality (BP, ~0.4 mmHg, p=0.03). PEH was of greater magnitude among trials of higher intensity (SBP, ~11 mmHg) and lower quality (DBP, ~4 mmHg). Of note, the antihypertensive benefits of PEH occurred during the awake hr when BP is typically at its highest levels. Future trials are warranted to confirm the effectiveness of PEH as antihypertensive therapy.

2932  June 2 2:15 PM - 2:30 PM Effect of Differential Exercise Intensities on Interleukin-22 in Metabolic Syndrome  
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(No relationships reported)

Elevated serum interleukin-22 (IL-22) concentration is independently associated with the incidence of type 2 diabetes and coronary artery disease. Individuals with metabolic syndrome (MetS) are at increased risk of developing both conditions. Previously, evidence also exists demonstrating that IL-22 may have a role in the alleviation of MetS. **PURPOSE:** We investigated the impact of moderate-intensity continuous training (MICT) and different volumes of high-intensity interval training (HIIT) on IL-22.
METHODS: This was a sub-study of the ‘Exercise in prevention of Metabolic Syndrome’ (EX-MET) multi-center randomized trial, based on data collected at the Brisbane site. Thirty-nine MetS individuals were randomized to one of three 16-wk interventions: 1) MICT (n=10,30 min at 60-70%HRpeak, 5x/wk); 2) HIIT (n=13,4x4min at 85-95%HRpeak, interspersed with 3min of recovery at 50-70%HRpeak,3x/wk); or 3) HIIT (n=16,1x4min at 85-95%HRpeak,3x/wk). Serum IL-22 concentration was measured following a 12-hr fast via enzyme linked immunosorbent assays, before/after the intervention. MetS severity, cardiorespiratory fitness (CRF), insulin resistance (IR), and visceral adipose tissue (VAT) were also measured via MetS z-score, HOMA-IR, dual-energy x-ray absorptiometry, and indirect calorimetry, respectively.

RESULTS: The median (IQR) IL-22 percent changes from pre- to post-intervention in the MICT, 4HIIT, and 1HIIT groups were -17% (-43.0%;31.5%), +16.5% (-18.9%;154.9%), and +15.9% (-28.7%;46.1%) respectively. Although there was no significant between-group difference in IL-22 change, there was a medium-to-large group x time interaction effect on this cytokine [F(2,35)=2.08, p=0.14, η²=0.18].

PURPOSE: People experiencing mental illness are at high risk of poor lifestyle factors such as physical inactivity, which contributes to a 15 to 25-year gap in life expectancy. To develop an international consensus statement on behalf of Exercise & Sports Science Australia (ESSA), the American College of Sports Medicine (ACSM) and Sport and Exercise Science New Zealand (SESNZ) on the role of exercise interventions as a key component of a global strategy towards achieving a 50% reduction in the life expectancy gap of people experiencing mental illness by 2032.

METHODS: The statement was sent to all signatory organizations for review and endorsement. RESULTS: Three factors were identified including i) culture change with psychiatric facilities to allow for the integration of exercise practitioners within routine care, ii) advocating for appropriate infrastructure for the provision of exercise interventions regardless of treatment setting, age, diagnosis or physical health status, and iii) prioritizing training of exercise practitioners to ensure adequate mental health literacy and competency to work within psychiatric facilities. Similarly, training of mental health professionals regarding the role of exercise practitioners within mental health must be addressed.

CONCLUSIONS: The organisations that endorse this consensus statement commit to promoting the role of exercise interventions as a key component of a global strategy towards achieving a 50% reduction in the life expectancy gap of people experiencing mental illness by 2032. We believe that enhanced training of our members, working with our medical, other allied health and health policy partners to facilitate culture change within mental health services and advocating for the provision of required infrastructure are the cornerstones of achieving this goal.
Exercise can alter pain sensitivity among Gulf War Veterans with chronic muscle pain (CMP). Anticipation of a painful experience can influence perceptual and neural responses to non-painful thermal stimuli among Fibromyalgia patients and this may extend to other patient groups with CMP. However, the association between physical activity or sedentary behavior and anticipation-related pain sensitivity has not been adequately studied. PURPOSE: To determine if (i) anticipation of pain influenced perceptual and neural responses to thermal stimuli among Veterans with CMP and (ii) anticipation-related pain sensitivity was associated with physical activity or sedentary behavior. METHODS: Gulf War Veterans with (n=29; 46±6.5 years) and without (n=29; 45±6.7 years) CMP were randomly assigned to conditions in which they were told that they would receive a painful or non-painful heat stimulus. Following one week of physical activity monitoring (ActiGraph GT3X), functional MRI responses to a 20-second warm stimulus (40°C) applied to the left palm were measured on a 3T MRI scanner (GE MR750). Participants were then asked to provide ratings of pain intensity and unpleasantness following thermal stimulus administration. RESULTS: Factorial ANOVA with group and condition as between-subjects factors revealed significantly higher pain intensity (p =.003; r = .35) and unpleasantness (p =.006; d =.76) ratings in the pain anticipation condition. A main effect for group and condition for group interaction was not found. Analyses of fMRI responses showed significantly different lateral postcentral gyrus activation in the pain anticipation condition. Linear regression analyses on Veterans in the pain anticipation condition showed that physical activity (e.g., moderate-vigorous physical activity) and sedentary behavior (e.g., average sedentary bouts of 30 or 60 minutes) did not significantly predict perception of pain intensity or unpleasantness. CONCLUSION: Pain anticipation influences perceptual and neural responses to non-painful stimuli among Gulf War Veterans with or without CMP, however, physical activity or sedentary behavior may not be related to anticipation-related pain sensitivity in this population. Supported by Dept. of Veterans Affairs grant: 561-00436

Previously, our group has shown that interacting with peers and/or parents, relative to playing alone, increases physical activity behavior in children without altering perceived exertion. It is possible that the enriching nature of interacting with peers and parents disrupts children from how intense their physical activity is thus disrupting their ability to accurately perceive exertion. PURPOSE: To determine if, relative to a condition where a child plays alone, playing with a friend or parent moderates the association between heart rate and RPE relative to a condition where children were playing alone. It is possible that when children played with a parent or friend it was more difficult to perceive effort because they were distracted by their exercise partner. That distraction may come in the form of greater enjoyment of or motivation for participating in physical activity.

RESULTS: Children were playing alone. It is possible that when children played with a parent or friend it was more difficult to perceive effort because they were distracted by their exercise partner. That distraction may come in the form of greater enjoyment of or motivation for participating in physical activity.

PURPOSE: To determine if, relative to a condition where a child plays alone, playing with a friend or parent moderates the association between heart rate and RPE relative to a condition where children were playing alone. It is possible that when children played with a parent or friend it was more difficult to perceive effort because they were distracted by their exercise partner. That distraction may come in the form of greater enjoyment of or motivation for participating in physical activity.

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CONCLUSION: Using a sit-stand desk during daily work activity resulted in better ratings of sleepiness and physical discomfort compared to sitting all workday. These measures are important for presenteeism of office workers and should be explored over a longer duration.

2941 June 2 2:15 PM - 2:30 PM
Perceptions At Moderate Work Intensity In Temperate And Hot Conditions In Trained And Untrained Individuals
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Ratings of perceived exertion (RPE) and thermal comfort (TC) scales are used to assess exercise intensity, subjects’ exertion and heat perception. For the safety of workers in the heat, it has been proposed that increased fitness levels may have a protective effect and could be associated with benefits to work in the heat, but it remains unclear if trained individuals perceive exertion and heat differently than untrained individuals at moderate work intensities. PURPOSE: This study compares RPE and TC in trained (TR) versus untrained (UT) individuals at a cycling intensity of 75%VO2max in the heat.

METHODS: Twelve young healthy males were categorized into two groups, TR (n=6, age=26±3.5 years, BMI=23±6.2kg/m2, aerobic exercise minutes=26±11.5 minutes/week) and UT (n=6, age=23.0±2.7 years, BMI=25±6.1kg/m2, aerobic exercise minutes=55±72.0 minutes/week) based on their self-reported exercise behaviors. Each individual completed a graded exercise test on a cycle ergometer to maximal exertion in a neutral (NORM; 25°C, 50% relative humidity) or hot (HYPER; 40°C, 50% relative humidity) environment. During the HYPER condition, participants also wore a heating garment with 45°C circulating water until their rectal temperature (Tre) increased by 0.5°C from baseline.

RESULTS: At the start of exercise or at 75% VO2max, neither HR nor Tre showed significant differences between TR and UT in either condition. RPE and TC did not differ between TR and UT in either condition at 75% VO2max: NORM: TR: RPE: 14±1.1, TC: 15±0.7, UT: 16±1.1, p = 0.141; HYPER: RPE: 13±6.0, TC: 12±6.2, p = 0.369. TC: 11±0.4, UT: 1±6.0, p = 0.649. RPE did not show differences between NORM and HYPER at 75% VO2max in TR (p = 0.557) nor UT (p=0.152).

CONCLUSIONS: Trained individuals perceive exertion and heat similarly to untrained individuals at 75%VO2max in normal or hot conditions. This conclusion has implications for workers safety and the risk for heat injuries in hyperthermia across individuals of varying fitness levels.

2942 June 2 2:30 PM - 2:45 PM
Comparison of Mood Response Through Five Weeks of a High Intensity Functional Training Competition
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(No relationships reported)

Mood is known to be affected by exercise, as well as the predictability of an event. By design, high-intensity functional training (HIFT) incorporates a wide variety of exercise modalities. Further, competitive HIFT events generally incorporate a unique design. The unique design of the HIFT competition did not seem to impact pre-exercise mood, but the different workouts resulted in differing mood responses, particularly for vigor and fatigue.

2943 June 2 2:45 PM - 3:00 PM
Establishing Thresholds for Visual Discrimination of Intrinsic and Novel Coordination Patterns
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Human movements are characterized with different coordination patterns. The ability to visually discriminate the coordination pattern is important for people to recognize the other’s movement and plan for the response. Two coordination patterns are known to be intrinsic for humans: in-phase (0°) and anti-phase (180°). They can be perceived and produced easily without practice. Any coordination pattern between 0° and 180° has to be learned through significant amount of practice. Neurological diseases or traumatic brain injury may result in decreased ability to perceive and produce the intrinsic coordination patterns, as well as to learn novel coordination patterns.

PURPOSE: To establish threshold for healthy controls to visually discriminate the intrinsic and novel coordination patterns. METHODS: A total of 15 healthy adults aged from 20-40s were recruited (23.47 ± 3.87). They were tested on the ability to visually discriminate three coordination patterns: 0°, 90°, and 180°. A computer display of a target pattern was shown, followed by displays of a pair of patterns, in which one was the target pattern and the other was the distracting pattern. Participants had to press a key to indicate whether the first or second of the pair was the target pattern. Logistic curve fitting was performed to calculate the individual threshold for discriminating each target coordination pattern. RESULTS: A one-way repeated measure ANOVA was performed to examine the difference of mean thresholds among three coordination patterns. A significant difference was shown (F2,29 = 54.88, p < 0.001). The threshold for discriminating 90° was the greatest with the largest variability (25.64 ± 12.39°). Although thresholds for discriminating the two intrinsic coordination patterns were smaller, discriminating 180° (4.97 ± 3.79°) was more challenging and variable than discriminating 0° (0.56 ± 1.00°). CONCLUSION: For health controls, visually discriminating intrinsic coordination patterns is easier and more consistent than discriminating novel coordination patterns. Establishing the normal thresholds for visual discrimination of intrinsic and novel coordination patterns helped to develop visual-motor coordination tests to screen the neurological diseases or traumatic brain injury.

F-16 Free Communication/Slide - Prospective Studies of Physical Activity and Health
Friday, June 2, 2017, 1:00 PM - 3:00 PM
Room: 507

2944 June 2 1:15 PM - 1:30 PM
The Level Of Physical Activity Post-myocardial Infarction Predicts Future Mortality
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Reported Relationships: M. Börjesson: Consulting Fee; Novo Nordisk, Astrazeneca.

There is little knowledge of the association between physical activity (PA) level and the mortality risk post myocardial infarction (MI). Smaller studies have indicated, that individuals who remain active or increase their level of PA after MI have a lower risk of death. However, in order to confirm this and adjust for confounders larger studies are needed. PURPOSE: Explore any association between PA level after MI and all-cause mortality during follow-up in a large MI-cohort.

METHODS: A national cohort study including all patients <75 years of age, with a diagnosis of MI between 1991-2014 (Swedish MI register SWEDHEART). From the register self-reported PA, 6-10 weeks post MI, (i.e. number of sessions during the past seven days with moderate and/or vigorous PA lasting ≥230 minutes) was obtained. The answers were grouped into 0-1 sessions (inactive), 2-4 sessions (moderately active) and 5-7 sessions (highly active). Associations were first assessed unadjusted, stratified by potential confounders (sex, age, smoking status, ejection fraction, ST-
There has only been one study examining the effect of cardiopulmonary fitness (CRF) on blood glucose with aging among Americans. Whether CRF also has a similar effect on aging-associated change in blood glucose among Japanese with lower prevalence of obesity as compared with Americans.PURPOSE: To investigate whether the aging-related increase of glucose in Japanese men with higher CRF is smaller than that of those with lower CRF.METHODS: We studied 6,153 Japanese men (age: 20-60 y) free of diabetes, cardiovascular disease and stroke in 1986. The participants completed annual health examinations including fasting blood glucose until 2009. CRF was measured by a submaximal exercise test between 1979 and 1986. Participants were divided into quartiles (Q1, Q2, Q3, and Q4) for CRF based on the cumulative mean of CRF during the period. Time-invariant covariates included BMI, smoking status, drinking habit, desk work, family history of diabetes, and frequency of measurements of blood glucose, and time-variant covariates included systolic blood pressure and fasting blood triglyceride. The trajectories of glucose with aging were analyzed using linear mixed models.RESULTS: Fasting glucose increased at a linear rate with aging. Glucose increased at a yearly rate of 0.49 mg/dL (95% confidence interval: 0.45-0.53) in Q1, 0.48 mg/dL (95% confidence interval: 0.44-0.52) in Q2, 0.47 mg/dL (95% confidence interval: 0.43-0.51) in Q3, and 0.46 mg/dL (95% confidence interval: 0.42-0.50) in Q4 (p<0.001). There was no significant difference in the rate of increase in glucose among Japanese men who had different levels of CRF.

A natural decline of muscle strength occurs during the aging process; however, preserving muscle strength may reduce the risk of many preventable diseases such as diabetes, especially in higher risk populations. PURPOSE: The purpose of this study was to examine the sex-specific association between muscle weakness and incident diabetes in older Mexican Americans. METHODS: A subsample of 1,903 Mexican Americans aged at least 65 years at baseline was followed for 13 years. Muscle strength was assessed with a hand-held dynamometer and was normalized to body weight (normalized grip strength (NGS)). Male and female participants were categorized as weak if their NGS was <9.46 and <10.30, respectively. Diabetes status and age of diabetes diagnosis was self-reported by participants. Sex-stratified Cox proportional hazard regression models were used to determine the association between muscle weakness and diabetes mortality. The associations persisted in the multivariate-adjusted models, sarcopenia was significantly associated with increased risk of all-cause mortality for ALM/BMI definition (OR: 1.44; 95% confidence interval [CI]: 1.06-1.97) but not for ALM definition (OR: 1.37; 95% CI, 0.90-2.09) while LMS was strongly associated with all-cause mortality (OR: 2.32; 95% CI, 1.70-3.18). In the joint analyses, a significantly increased all-cause mortality was observed only among participants with LMS and non-sarcopenia (OR range: 2.03-2.50) while those with LMS and sarcopenia (OR range: 2.25-2.56) were at a greater risk than those with sarcopenia and LMS were the reference group. Low knee extensor strength indicative of low muscular strength was independently and significantly associated with an increased risk of all-cause mortality among US older adults regardless of the presence or absence of sarcopenia.

Sarcopenia is defined as aging-related loss of muscle mass and knee extension strength serves as a marker of lower extremity muscle strength in populations. Sarcopenia and low muscular strength (LMS) may be important but understudied risk factors for aging-related morbidity and mortality in the older and elderly populations. PURPOSE: We aimed to prospectively examine individual or joint associations of sarcopenia and LMS with all-cause mortality in a nationally representative sample of US older adults in the National Health and Nutrition Examination Survey (NHANES). METHODS: Data sources included the NHANES 1999-2002 with public-use 2011 linked mortality files, which comprised 4,449 participants aged 50 years and older with complete data on body composition by dual-energy x-ray absorptiometry and isokinetic knee extensor strength measurement. Sarcopenia was defined by two definitions proposed by the National Institutes of Health Sarcopenia Project according to appendicular lean mass (ALM) and ALM divided by BMI (ALM/BMI). LMS was defined as the lowest 25% of measurements of knee extensor strength. Weighted multivariable logistic regression models were used to examine the association of sarcopenia and LMS with all-cause mortality. Thereafter, a multiple logistic regression was performed after adjustment for the possible confounders above. CONCLUSIONS: A higher level of physical activity 6-10 weeks after myocardial infarction, is associated with a lower risk of all-cause mortality at follow-up. These results suggest that physical activity assessment is important post-MI, not least as an important predictor of subsequent mortality.
old and have worn the accelerometer for 6 or 7 days (n = 4,206). Weekly moderate-to-
vigorous physical activity (MVPA) was categorized based on the US Federal Physical
Activity Guidelines: 1) <75 minutes; 2) 75-150 minutes; 3) ≥150 minutes per week
(recommended). Of those in the ≥150 minute group, participants who performed
≥50% of their weekly activity on only 1 or 2 days were classified as “weekend
warriors,” and the rest as “regularly active.” To compare mortality rates based on
physical activity category, we calculated hazard ratios (95% confidence intervals)
using Cox survival analysis and adjusting for relevant covariates. RESULTS: Over an
average of 79.4 (SD = 18.6) months of follow-up, there were 419 deaths. Participants
with some activity, but insufficient to meet the guidelines (75-150 minutes per week
MVPA), had a 61% reduction (HR = 0.39 (95% CI: 0.26, 0.58)) in mortality risk
compared to those with <75 minutes per week. Participants meeting the guidelines
had a similar mortality risk reduction, ~50%, compared to those with the least activity,
whether “weekend warriors” (HR = 0.50 (0.32, 0.81)) or regularly active participants
(HR = 0.48 (0.28, 0.81)). CONCLUSIONS: Active participants and those with some
activity, but insufficient to meet the guidelines, had both reduced mortality risk during
follow-up compared to the least active participants. “Weekend warriors” were observed
to have comparable magnitude of risk reduction as regularly active participants.

 Despite over 7 million participants in rugby union (‘rugby’) globally, the effect
of rugby on health, in terms of increasing or decreasing the prevalence of long-
term morbidity amongst players, has not yet been established. Where sport may be
associated with decreased morbidity, participation can be recommended as improving
specific health outcomes. Where former players are seen to demonstrate health deficits,
potential targets for population interventions may become evident. PURPOSE: To
determine the prevalence of self-reported physician-diagnosed morbidity amongst
former elite rugby players, and compare this with an age and gender-standardised
representative national population comparison. METHODS: A cross-sectional
questionnaire study was used. The English Longitudinal Study of Ageing (ELSA), a
nationally representative study of English adults, was used as a control population.
Age and gender matched standardised morbidity ratios (SMR) were calculated against
the ELSA reference population. A post-hoc sensitivity analysis examined morbidity
for the volume of activity.

RESULTS: Amongst former rugby players (n=259) and ELSA (n=5186) participants
aged 50 and over, daily physical activity was significantly lower amongst former players
(SMR 0.28, CI 0.11 to 0.66), whereas osteoporosis (SMR 2.69, CI 1.35 to 5.38) and osteoarthritis
(SMR 4.00) were significantly increased amongst former players. In unadjusted,
complete cohort sensitivity analyses, hypertension and heart problems were also
decreased compared with ELSA.

CONCLUSIONS: Morbidity differs amongst former elite rugby players and the
general population. The magnitude of musculoskeletal morbidity in this population
may warrant proactive osteoarthritus education and management in this at-risk
population.

PURPOSE: To determine the longitudinal associations of body mass index (BMI),
waist circumference (WC) and grip strength (GS) with objectively measured physical
activity (PA) in adults. METHODS: This study utilized data from the UK Biobank study, an ongoing
prospective cohort of over half a million UK adults aged 40-69yrs at recruitment
(2006 to 2010). Each participant underwent baseline measurements of BMI (kg/m2),
WC (cm) and GS (kg). GS was measured using a hand dynamometer. Values from
the two hands were averaged. Between 2013 and 2015, a sub-sample of over 100,000
participants each wore a tri-axial accelerometer on the dominant wrist for 7 days.
Measurements taken at baseline were not repeated during the follow-up accelerometer
protocol. Mean acceleration levels were calculated, and moderate-to-vigorous PA
(MVPA) was estimated as time when acceleration was above 125mg. BMI, WC and
GS were standardized, and PA outcomes were log-transformed. RESULTS: A total of
84,812 participants (46,947 women) with ≥72 hours of wear and no missing covariates
were included in the analysis. The median follow-up was 5.7 years (interquartile range:
4.9-6.5). Using multiple linear regression adjusted for GS and various potential
confounders (demographic, lifestyle, disease status, seasonality), every 1 standard
deviation increase in BMI and WC was associated with 0.071 (95% confidence
interval [CI]: -0.073, -0.069) and 0.070 (95% CI: -0.073, -0.068) lower log of mean
acceleration at follow-up, respectively, in women: in men, BMI (b: -0.066; CI: -0.069,
-0.063) and WC (b: -0.076; CI: -0.079, -0.073). Positive associations were found
between baseline GS and follow-up acceleration levels after adjusting for confounders
and BMI, in women (b: 0.013; CI: 0.010, 0.01) and men (b: 0.004; CI: 0.001, 0.007).
Marginal means (adjusted for confounders) of follow-up acceleration were lower in
individuals with higher adiposity levels and/or lower GS at baseline. Similar results
were observed with MVPA as an outcome.

CONCLUSIONS: BMI, WC and GS at baseline predicted objectively measured PA at
follow-up. Findings of our study provide compelling justification for interventions
and policies to focus on improving body composition and muscle strength to increase
or prevent decline in PA at the population level.
The reduction in partial pressure of oxygen (O₂) leading to reduced O₂ delivery to tissues at altitude has the potential to alter substrate utilization during exercise. Experiments at sea level suggest performance benefits from consuming multiple transportable carbohydrates, the impact of this at altitude is not known. PURPOSE: To investigate how carbohydrate (CHO) (glucose and fructose) ingestion effects fuel utilization during exercise at 2500m and the impact of this on performance. METHODS: Ingestion of 1.2 g.min⁻¹ glucose plus 0.8 g.min⁻¹ fructose was compared to 1.2 g.min⁻¹ glucose and a placebo during 120 minutes running at 70% VO₂max performed by eight males in a normobaric hypoxic chamber set at 2500m altitude. Exogenous and endogenous oxidation was quantified using ¹³C stable mass isotope tracing techniques. Performance was measured in a 5 km TT. RESULTS: CHO ingestion shifted fuel use to predominantly CHO (79.51 ± 7.11, 79.45 ± 1.88 and 56.66 ± 20.18% in glucose plus fructose, glucose alone and placebo, respectively) was the dominant fuel. Co-ingestion of glucose and fructose led to significantly (p< 0.001; ES= 3.82) greater peak exogenous CHO oxidation rates compared to glucose alone (1.51 ± 0.14 g.min⁻¹ and 0.96 ± 0.07 g.min⁻¹, respectively) and this result in a significantly (p= 0.007; ES= 1.01) lower contribution from endogenous CHO oxidation (49.15 ± 8.85% and 59.65 ± 1.80%, respectively). Co-ingestion of glucose and fructose did not improve performance in the 5 km TT (25.37 ± 03:01 minutes) compared to glucose alone (25:13 ± 02:53 minutes). However, time to complete the 5 km TT was significantly (p= 0.002; ES= 0.47) faster in the glucose only trial compared to placebo (26:33 ± 02:53 minutes). However, time to complete the 5 km TT was significantly (p= 0.002; ES= 0.47) faster in the glucose only trial compared to placebo (26:33 ± 02:59 minutes). CONCLUSION: CHO ingestion reduced the reliance on fat oxidation compared to placebo and the co-ingestion of glucose and fructose increased exogenous and spared endogenous CHO oxidation over glucose alone. However, the co-ingestion of glucose and fructose did not provide an ergogenic benefit at 2500m.

Ergogenic benefits of carbohydrate (CHO) supplementation during exercise at high altitude (HA) appear to vary depending on acclimatization status. However, longitudinal evaluation of potential performance benefits of CHO in the same volunteers, prior to- and following acclimatization to HA have not been reported. PURPOSE: To determine the impact of a CHO beverage consumed during steady-state exercise, on subsequent time trial (TT) performance (2 mi. run), of lowlanders to- and following acclimatization to HA have not been reported. METHODS: Seventeen unacclimatized men (mean ± SD; age, 23.4 ± 3.6 yr; body mass, 81.9 ± 13.9 kg; SL VO₂-max = 4.2 ± 0.7 L.min⁻¹, HA VO₂-max = 2.8 ± 0.5 L.min⁻¹) performed 80-min of treadmill walking (~55% of HA VO₂-max) and walking in a normobaric hypoxic chamber set at 2500m altitude. Exogenous and endogenous oxidation was quantified using ¹³C stable mass isotope tracing techniques. Performance was measured in a 5 km TT. RESULTS: CHO ingestion reduced the reliance on fat oxidation compared to placebo and the co-ingestion of glucose and fructose increased exogenous and spared endogenous CHO oxidation over glucose alone. However, the co-ingestion of glucose and fructose did not provide an ergogenic benefit at 2500m.

Numerous studies investigate the ergogenic effects of normobaric and hypobaric hypoxic acclimatization on endurance performance in normobaria. Likewise, numerous studies assessed the ergogenic effect of sodium bicarbonate ingestion on performance. Diuresis of bicarbonate ions induced by altitude exposure may reduce the extracellular buffering of H⁺, compromising the performance at high altitude. Purpose of this study was to investigate the effect of Sodium Bicarbonate ingestion during hypobaric hypoxic acclimatization on cycling performance. Eight, eight, and twelve subjects were exposed to hypobaric hypoxia (525mmHg) for 6, 8, and 12 hours, respectively. Sodium bicarbonate supplementation took place at 4.5 and 1.5 hours (200 mg kg⁻¹ and 250 mg kg⁻¹ of body mass, respectively) before performance test (525 mmHg). Subjects were tested in 4 conditions: Normobaric placebo (NBPlbo); Normobaric Bicarbonate (NBBC); Hypoxic Placebo (HBPlbo); and Hypoxic Bicarbonate (HBBBC). Time trials consisted of performing 360 revolutions of pedals as fast as possible against a resistance equal to 5% of body weight. Blood samples were collected from a venous catheter before the exposure, 15 min before the exercise, and 3-5 minutes after the exercise. Urinary bicarbonate excretion was measured during the exposure, and no differences in performance time, serum bicarbonate and lactate concentrations, as well as total urinary bicarbonate excretion between the 6-, 8-, and 12-hour acclimatization. Therefore the data were pooled and analyzed together. Serum bicarbonate concentration was significantly lower (26.4±2.8 vs 24±1.2±2 P=0.000) and urinary bicarbonate excretion was significantly higher (613±460.1 vs 322±264.9, P=0.003) in HBBBC than in NBPlbo at the end of acclimatization. Bicarbonate supplementation significantly improved cycling performance (2.0±4.21%) in hypobaric hypoxia, while the improvement was not significant in normobaria. It was concluded that sodium bicarbonate supplementation during short-duration acclimatization improves high intensity cycling performance.
supplementation on step test performance in a group of college students. The duration of the exercise bout, as well as the dosage and timing of nitrate supplementation may explain our inability to observe an ergogenic effect.

CONCLUSIONS: Acute NaNO3 supplementation does not alter SmO2 or sO2 during steady state or maximal exercise at altitude, but may lower frontal lobe ΔHbO2 only at maximal exercise.

F-31 Thematic Poster - Nutritional Status of Athletes II
Friday, June 2, 2017; 3:15 PM - 5:15 PM
Room: 101

Chair: Kelly L. Pritchett. Central Washington University, Ellensburg, WA.

No relationships reported

3002 Board #6 June 2 3:15 PM - 5:15 PM
Limb Muscle and Frontal Lobe Oxygen Saturation during Exercise at Altitude Following Acute Nitrate Loading
David M. Fothergill, Haley Dodson, Allison R. Loiselle. Naval Submarine Medical Research Laboratory, Groton, CT. Email: david.m.fothergill.civ@mail.mil

No relationships reported

BACKGROUND: It has been theorized that the ergogenic efficacy of nitrate (N3−) supplementation on aerobic performance may be best observed during exercise performed at altitude where the O2 independent N3− (nitrite) NO pathway may become an increasingly important source of NO bioavailability that could potentially favorably influence tissue blood flow and tissue oxygen saturation levels.

PURPOSE: To determine if acute N3− supplementation impacts limb muscle oxygen saturation (SmO2) and brain frontal lobe oxygen saturation (sO2) during exercise under hypobaric hypoxia.

METHODS: Recreationally active individuals (11 males, 1 female; mean ± SD age = 38.1 ± 12.6 yr, sea level maximal oxygen uptake (VO2max) = 41.7 ± 5.7 ml/kg/min) conducted 2 exercise trials (nitrate loading (N), and placebo (P)) while exposed to a simulated altitude of 3,048 m in a hypoboric chamber. Each trial consisted of 15 min of steady state cycle exercise at 45% of their maximum sea level work load, followed by an incremental exercise test to exhaustion. 110 minutes before starting the steady state exercise in the N and P trials, subjects drank 500 ml of water containing either 20.4 mg/kg of NaNO3 or the equivalent molar concentration of NaCl respectively, in a double-blind randomized, placebo-controlled cross-over fashion. Oxygen saturation of the vastus lateralis and frontal lobe of the brain were measured using near-infrared spectroscopy and were expressed as changes from their respective sea level rest conditions prior to analysis.

RESULTS: SmO2 decreased linearly with increasing workload (p=0.0001) but did not differ between the N and P trials during the steady state submaximal exercise or at any workload during the VO2 max exercise. sO2 also did not differ between the N and P trials during exercise at altitude. There was however a significant two-way interaction between workload and supplement condition for oxyhemoglobin concentration (AHbO2) of the frontal lobe during the VO2max test (F(4,40) = 4.37, p<0.01) that was due to a lower frontal lobe ΔHbO2 in the N trial compared to the P trial that occurred only at the maximal workload (p<0.05).

CONCLUSIONS: Acute NaNO3 supplementation does not alter SmO2 or sO2 during steady state or maximal exercise at altitude, but may lower frontal lobe ΔHbO2 only at maximal exercise.

3004 Board #1 June 2 3:15 PM - 5:15 PM
Comparison Of High And Low 25(OH)-Vitamin D Concentrations On Recovery From Resistance Exercise In Men
Leonardo P. Oliveira1, Sandro Bartolomei2, Elihua Sades1, David Church1, Elliott Arroyo1, Joseph A. Gordon, III1, Alyssa N. Varano1,2, Raam Wang3, Kyle S. Beyer1, Jeffrey R. Stout, FACSM1, John A. Rathmacher1, Jay R. Hoffman, FACSM1,2,3.

*University of Central Florida, Orlando, FL.*, *Metabolism Technologies, Inc., Aimes, IA. (Sponsor: Jay Hoffman, FACSM)* Email: loliveira@bsd.uchicago.edu

No relationships reported

BACKGROUND: Vitamin D status (VITD) has been related to impaired skeletal muscle function, and may be associated with recovery after muscle injury. Limited data exists on the relationship between VITD concentrations, muscle damage and inflammatory markers from an acute bout of exercise.

PURPOSE: Evaluate the relationship between soluble inflammatory markers from an acute bout of exercise.

METHODS: 15 resistance trained men (24±4 y) were recruited and randomly allocated to low 25(OH)-VITD (LVD; 37.2±7.2 ng·ml⁻¹) or high 25(OH)-VITD (HVD; 87.2±57.4 ng·ml⁻¹) groups at any time point, inferential analysis indicated that MB concentrations was not different between the LVD and HVD in CMJP (p=0.26), C (p=0.97), T (p=0.97) and MB responses and recovery indices from resistance exercise.

RESULTS: No significant interactions were noted between LVD and HVD in CMJP (p=0.26), C (p=0.97), T (p=0.97), CRP levels were "likely" lower at 24-h (549±373 mg·L⁻¹) vs.1079±1077 mg·L⁻¹) in the LVD group, based upon baseline (BL) 25(OH)-VITD concentrations. Participants performed 8 sets of 10-12 repetitions at 70% of the maximal strength of the squat exercise, with 75 s of rest between sets. Performance (counter movement jump (CMJ), endocrine (testosterone [T] and cortisol [C]), inflammatory (IL-6 and C-reactive protein [CRP]), muscle damage (creatinine kinase [CK], and myoglobin [MB]) assessments were performed at BL, 30-min, 24-h, 48-h and 72-h post-exercise. Data was analyzed using a repeated measures ANOVA. To complement this procedure, magnitude based inferences were used to provide additional interpretation of the differences that VITD concentrations may have had on the recovery response.

CONCLUSIONS: No significant interactions were noted between LVD and HVD in CMJP (p=0.26), C (p=0.97), T (p=0.97), CRP (p=0.30), IL-6 (p=0.58) or CK (p=0.16) responses to the exercise protocol. However, a significant interaction was observed in MB (p=0.05) responses. Although post-hoc analyses failed to see any significant differences between the groups at any time point, inferential analysis indicated that MB concentrations was "likely" higher at 30-min for LVD (87.2±57.4 ng·ml⁻¹) than HVD (51.3±21.9 ng·ml⁻¹). CRP levels were "likely" lower at 24-h (549±373 mg·L⁻¹ vs.1344±1654 mg·L⁻¹) and 48-h (563±386 mg·L⁻¹ vs.1079±1077 mg·L⁻¹) for HVD. Inferences for all other comparisons were unclear.

CONCLUSIONS: Results indicated that HVD provides a degree of resiliency towards acute muscle damage and enhances recovery of high velocity resistance exercise compared to LVD. Further research using greater sample size appears warranted.

3005 Board #2 June 2 3:15 PM - 5:15 PM
Exploring the Relationship between Soluble Fiber Intake and Bone Mineral Density in Athletes
Anneliese M. Kuenmerrle1, Jody L. Herman1, Emily N. Werner, FACSM1, Jacqui Van Grouw1, Rachel C. Kelley2, Francesco Alessio1, Michael L. Bruneau, 191021, Stella L. Volpe, 191021, FACSM1,2,3.

*Sponsor: Stella Lucia Volpe, FACSM*

PURPOSE: To evaluate the relationship between soluble fiber intake and total body BMD in athletes 18 years of age and older.

METHODS: Short chain fatty acids (SCFAs) produced by bacterial fermentation of soluble fiber in the gut enhance mineral absorption. SCFAs reduce luminal pH, affect signal pathways, after epigenetic regulation, and foster the proliferation of immune-modulating gut bacteria, suggesting a positive correlation between soluble fiber intake and bone mineral density (BMD).

Abstracts were prepared by the authors and printed as submitted.
Thirty-one participants (16 females, 15 males) who volunteered for a cross-sectional study underwent dual energy X-ray absorptiometry (DXA) scans and completed self-administered Block Food Frequency Questionnaires (FFQ). **RESULTS:** Participants’ mean age was 35.7±10.9 years, and mean body mass index (BMI) was 25.3±2.3 kg/m². Participants consumed an average of 1960±644.2 kilocalories/day. Mean daily soluble fiber intake was 7.1±2.3 grams/day. Average total body BMD was 1.28±0.12 g/cm². There was no significant correlation between soluble fiber intake and BMD (r=−0.185, p=0.312). No significant correlation was found between soluble fiber intake and BMD for women (r=0.057, p=0.835) or men (r=−0.477, p=0.073). A multiple linear regression was calculated to predict BMD based on soluble fiber intake controlling for intakes of calcium, vitamin D, and protein. No significant regression equations were found for the total sample (p=0.357), women (p=0.617), or men (p=0.177).

**CONCLUSIONS:** Soluble fiber intake was not correlated with BMD in this sample of athletes. Directions for future research include recruiting a larger sample and exploring the possibility of a synergistic relationship between soluble fiber and intake of minerals. These represent data from an unfunded research project.

**Purpose:** The purpose of the present investigation was to determine the predictive power of triathletes’ in-race nutrition plans during an Ironman triathlon on overall finish time. Aspects of the in-race nutrition plans considered were calories consumed per hour while biking, total caffeine consumed while biking, and total fluids consumed during the biking portion of the race. **CONCLUSIONS:** Total fluid consumed on the bike portion of the Ironman was not correlated to overall finish time; however, calories per hour and total caffeine consumed on the bike were negatively correlated with overall finish time. This suggests that greater calorie and caffeine consumption on the bike can contribute to decreased overall finish time, and hence an improvement in performance.

**Purpose:** Although mixed martial arts (MMA) has been around for decades, current peer-reviewed literature is limited to individual sports (such as boxing, judo, and wrestling) that compose mixed martial arts (MMA). Within other combat sports, weight cutting practices have included methods of extreme dehydration or food restriction; however data is lacking in professional MMA athletes. Thus, the purpose of this study was to survey professional MMA athletes about their current and past weight cutting methods as well as to investigate who is advising them nutrition and strength and conditioning.

**METHODS:** N=55 male professional mixed martial artists (18-40 yrs) were recruited from every weight class in the states of California and New Mexico. Participants were administered a questionnaire that had been reviewed by a registered dietitian, a certified strength and conditioning specialist, and an exercise physiologist. Data presented as percentage of frequency of responses calculated using IBM Analytics, SPSS v24.

**RESULTS:** The top 3 methods MMA fighters use in cutting weight were food restriction (37.3%), increased training (70.9%) and the sauna (69.1%). Most MMA fighters do not utilize a professional nutritionist/dietitian for advice during either the weight cut (74.5%) or off-season (75.4%). In fact, only 7.3% reported they regularly used a professional nutritionist/dietitian when cutting weight. Fighters are receiving nutrition advice primarily from teammates (78.2%), while only 23.6% are getting any advice during either the weight cut or off-season from a professional nutritionist.

**CONCLUSIONS:** Professional mixed martial artists report cutting weight for a fight using methods that can be considered dangerous and impair performance. Many reported receiving no professional advice on or off-season from a licensed nutritionist or dietitian.

**Purpose:** To outline nutrition goal(s) chosen during a nutrition education session among a sample of NCAA Division 1 male and female endurance runners enrolled in a nutrition education intervention focused on optimizing intake of energy, bone building nutrients, and reducing the risk of bone stress injury. **METHODS:** Fifty-nine collegiate distance runners from two institutions met with a sports dietitian for a 15-30 minute counseling session to address current food intake, exercise training, anthropometric measures and nutrition goals. Runners, with guidance from the sports dietitian, chose 1-3 goals from seven preselected goal options including adding >/=1 snacks/day; adding a meal/day; increasing intake of energy dense foods; increasing intake of carbohydrate rich foods; adding or modify a pre/post workout snack; increasing intake of calcium, vitamin D; eating more frequently. Chi-square analyses evaluated group differences.

**RESULTS:** The most common goals included 1) adding >/=1 snacks/day (45.8% of runners) and 2) adding or modifying a pre/post workout snack (40.7% of runners). Runners’ least common goal was to eat more frequently (8.5% of runners). Female compared to male runners were more likely to choose the goal of adding a meal/day (18.5% vs. 3.1%, p=0.001) and adding more runners with low BMI (<18.5 kg/m²) compared to >/=18.5 kg/m² chose goal of increasing intake of energy dense foods (50.0% vs. 12.7%, p=0.05). Runners characterized with “moderate” vs. “low” or “high” risk for the Female Athlete Triad (or comparable Male Triad) were more likely to choose the goal of adding a meal/day (18.5% vs. 3.1%, p=0.001) and adding more runners with low BMI (<18.5 kg/m²) compared to >/=18.5 kg/m² chose goal of increasing intake of energy dense foods (50.0% vs. 12.7%, p=0.05).
to choose the goal of increasing intake of carbohydrate-rich foods (30.8% vs. 3.7% and 0%, respectively, p = 0.02). A larger proportion of runners with “high” vs. “moderate” or “low” risk selected the goal of adding a meal/day (40.0% vs. 11.5% vs. 3.7%, p = 0.05).

CONCLUSIONS: While the most common goal runners selected focused on adding >1 snacks/day, those classified with “high” risk for the Triad or low BMI prioritized adding a meal/day or increasing the energy density of foods consumed. These findings may aid athletes and their sport dietitians in selecting goals for optimizing nutrient intake, which may benefit health and performance.

Board #7
June 2 3:15 PM - 5:15 PM
Influence of a Nutrition Recovery Station Following Exercise on Acute Dietary Intake.
Ben Desbrow, 42221, Katelyn Barnes1, Gregory Cox2, Caroline Young2, Chris Irwin1. 1Griffith University, Gold Coast, Australia. 2Australian Institute of Sport, Gold Coast, Australia. (Sponsor: Professor Louise Burke, FACSM)
Email: b.desbrow@griffith.edu.au
PURPOSE: Immediate post-exercise access to food/fluid via a recovery station is a common feature of mass participation sporting events. Yet little evidence exists examining their impact on improving recovery or influencing subsequent dietary intake. This study aimed to determine if access to food/fluid during a post-exercise recovery period significantly alters dietary and fluid intakes over a 24hr period.

METHODS: 127 (79 males) healthy participants (mean(SD), age=22.5±3.5y, body mass (BM)=73±13kg) completed two self-paced morning 10km runs separated by 1 week. Immediately following the first run, participants were randomly assigned to enter a “recovery station” (ad libitum water, sports drink and fruit) for 30min or leave without access to the recovery area. All participants completed the alternate recovery option the following week. Participants recorded meal BM before and after exercise and measured Urine Specific Gravity (Usg) before running and the following morning. Additionally, participants recorded all food and fluid consumed for both run days via a food diary and photographs which were analysed by a qualified dietitian. Paired-samples t-tests assessed differences in hydration and dietary outcome variables (Recovery vs No Recovery).

RESULTS: No difference in pre-exercise Usg or BM change during exercise were observed between intervention groups (p’s=0.05). Attending the recovery zone resulted in a greater total daily fluid intake (Recovery=3.37±1.4L, No Recovery=3.16±1.3L, p=0.001) but had no influence on total calorie intake (Recovery=10.15±4.2MJ, No Recovery=10.15±3.9MJ), carbohydrate (Recovery=376±131g, No Recovery=364±128g) or protein (Recovery=118±61g, No Recovery=122±54g) (p’s=0.05) intakes. Next day morning Usg values were not different between groups (Recovery=1.018±0.007, No Recovery=1.019±0.009, p=0.05).

CONCLUSIONS: Attending a recovery station following a 10km run has little impact on 24hr exercise dietary intake or rehydration in recreational runners.

板 #3001
June 2 3:15 PM - 5:15 PM
Is There A Shift In The Ideal Body In The Adolescents?
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PURPOSE: A healthy body image is important for adolescents. It serves as a predictor of good quality of life and should be given focus when working to improve health in adolescents. Unfortunately, previous studies have highlighted that a high prevalence of male and female adolescents are dissatisfied with their bodies, and especially females have high drive for thinness. However, a muscular and lean body is presented as the new ideal body in the social media. Therefore, it is expected that this might affect the ideal body in the adolescents. The purpose is therefore to investigate how male and female adolescents report that a muscular and lean body is important, if there are differences between what male and females report, and whether this drive for muscularity and leanness is more prevalent than drive for thinness among male and female high-school students.

METHODS: We used baseline data from an ongoing RCT aiming to enhance positive body image among high-school students in Oslo and Akerhus County. A total of 1703 students aged 16-17 years (n=630 males, BMI21.7 kg/m2 (2.8), and n=1073 females, BMI=21.4 kg/m2 (2.9)) were included. The Drive for Leanness Scale (DLS) and the Internalization, Thin-Low Body Fat subscale (of SATAQ-4) were used to assess prevalence of students with high scores on the Drive for leanness and Thin/Low Body Fat subscale. Pearson Chi-Square analyses were used to examine group differences. A p-value <0.05 was considered significant.

RESULTS: A significantly higher prevalence of female students (39%) compared to males (18%) had high scores on the Drive for leanness scale (p<0.001). A significantly higher prevalence of females (17%) compared to male students (13%) had high score on the Thin/Low Body Fat subscale (p<0.05). When comparing physically active male and females with non-active male and females, no significant difference was observed between groups on the Thin/Low Body Fat subscale.

CONCLUSIONS: Our results show that a drive toward a muscular and lean body is more common among both male and female students as compared to the drive for thinness. This might indicate a shift in the ideal body especially for the female adolescents.

Board #3002
June 2 3:15 PM - 5:15 PM
Thematic Poster - Physical Activity and Mental Health
Chair: Matthew P. Herrin. University of Limerick, Limerick, Ireland.
(NO relationships reported)
Board #3003
June 2 3:15 PM - 5:15 PM
Subjective and Physiological Predictors of Anxiety at Rest and During a Working Memory Task
Email: brooksleitner@gmail.com
(NO relationships reported)
Purpose: Prior research has suggested that an acute bout of moderate exercise is associated with reduced state anxiety in healthy adults and patients with anxiety disorders. However, it is unclear if low-intensity exercise would have the same or
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Influence of Sedentary Time Accumulated in Prolonged versus Short Bouts on Factors Related to Wellbeing

Excessive sedentary time is related to poor mental wellbeing. However, the differential effect of sedentary time as a predictor of changes in mental wellbeing, stress, and sleep duration remains unclear. The present study aimed to investigate the impact of sedentary time accumulated in prolonged versus short bouts on factors related to wellbeing, using a mixed-methods approach.

Methods: A total of 270 healthy adults (sex: 48% women; age 27.8 ± 3.7 years) were recruited from the general population. Participants were randomly assigned to two conditions: prolonged sedentary time and short bursts of sedentary time. Prolonged sedentary time was defined as more than 30 minutes of continuous sitting, while short bursts were defined as periods of sitting lasting less than 30 minutes.

Results: Participants in the prolonged sedentary time condition reported higher levels of anxiety and lower levels of mood compared to those in the short bursts condition. These effects were observed across multiple outcomes, including mood, stress, and sleep duration.

Conclusion: The findings suggest that the accumulation of sedentary time in prolonged versus short bursts has differential effects on mental wellbeing. Future research should explore the mechanisms underlying these effects and consider strategies to minimize the negative impact of prolonged sedentary time.

3016 Board #5 June 2 3:15 PM - 5:15 PM Acute Moderate Exercise Improves Working Memory Efficiency In Humans

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Background: Despite evidence indicating that a single bout of exercise can reduce state anxiety and improve cognitive function, (for review Chang et al. 2015, Ensari et al. 2015) few studies have examined the impact of acute exercise on the relationship between anxiety and cognition. The current study explores the modulatory effects of exercise on anxiety and working memory (WM) performance. Moderate exercise, compared to light exercise, was expected to improve WM performance, while decreasing self-reported anxiety and physiological measures (anxiety-potentiated startle) of anxiety.

Methods: Healthy adults (N = 21) of varied physical fitness levels underwent three exercise sessions on a cycle ergometer: one maximal exercise test and two subsequent randomized 30-minute exercise sessions at moderate (60-70% 1HR reserve (HRR)) and low (10-20% HRR) intensities. After exercise, subjects performed a WM task (n-back) under threat of unpredictable electric shock and safe conditions. Anxiety was probed using the acoustic startle reflex and response times. WM performance (accuracy and reaction time), subjective anxiety, and startle variables were analyzed using 3-way ANOVAs, with Condition (threat, safety), Load (0-back, 1-back, 3-back), and Exercise (light, moderate) as within-subject factors.

Results: Participants reported higher subjective feelings of anxiety and had a greater startle response in the threat compared to the safe condition. Moderate intensity exercise resulted in a faster reaction time at a trend level time (F(1,19) = 3.34, p = 0.04) without compromising accuracy. This was most notable during the 3-back WM level (F(2,18) = 3.69, p = 0.05) during both safe and threat contexts. There was no effect of exercise level on subjective anxiety or anxiety-potentiated startle.

Conclusion: Acute moderate exercise improves cognitive efficiency (shorter reaction times) without compromising accuracy but does not reduce elevated state anxiety. This might be due to an increase in arousal that affects reaction time but not the distribution of working memory resources between cognitive function and anxiety. If this pattern strengthens with the full sample (N=36), we will (1) move to a patient population, and (2) apply this protocol to a neuroimaging study.

3017 Board #6 June 2 3:15 PM - 5:15 PM Use of a Sit-Stand Desk Reduces Wake Time During the Subsequent Night’s Sleep

Christopher E. Kline, Robert J. Kowalsky, Sophy J. Perdomo, Bethany Barone Gibbs. University of Pittsburgh, Pittsburgh, PA. (Sponsor: John M. Jakicic, FACSM)
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Acute bouts of leisure-time physical activity commonly improve sleep on the subsequent night. However, the impact of sedentary behavior on sleep is unclear. Further, whether breaking up sedentary time during the workday improves the following night’s sleep is unknown. Purpose: To examine whether breaking up prolonged sedentary time by standing during the workday leads to better sleep the following night in comparison to a sedentary workday. Methods: 25 inactive adults with at least pre- or stage I hypertension (16 males, 43±12 yr, BMI 31.9±5.0 kg/m³) participated in a randomized crossover trial consisting of two simulated 8-h workdays: one with continuous sitting (SIT) and one with alternating periods of sitting and standing every 30 min (SIT-STAND). Sleep was assessed on the night following each simulated workday. Participants completed a diary to indicate sleep onset latency (SOL), number of awakenings, wakefulness after sleep onset (WASO), and depth and quality of sleep. Participants also wore an accelerometer on the non-dominant wrist (Philips Actiwatch Spectrum) to objectively assess sleep (bedtime, out-of-bed time, total sleep time, SOL, WASO). Paired t-tests and effect size calculations were used to evaluate differences in sleep following the two conditions. Results: Diary-based WASO was significantly lower following SIT-STAND compared to SIT (31.9±30.1 min vs. 23.2±38.6 min; p<0.03, d=0.47). Self-reported SOL, awakenings, sleep depth, and sleep quality were not significantly different between conditions, though SIT-STAND led to small-sized reduction in SOL and awakenings (d=0.33 and d=0.29, respectively). There was a small-sized reduction in actigraphic WASO following SIT-STAND compared to SIT (30.2±12.7 min vs. 37.7±25.0 min; d=0.39), though this difference was not statistically significant (p=0.09). Actigraphic estimates of bedtime, out-of-bed time, total sleep time, and SOL did not differ between conditions (p>0.1). Conclusion: Alternating sitting and standing during the workday leads to small improvements in sleep on the night following the simulated workday, particularly in reduced wake time. Whether this effect on sleep remains or is enhanced with long-term reduction in workplace sedentary behavior deserves further exploration.
Physical activity (PA) may reduce depression and stress. While Latinas have unique risk factors and buffers for depression and stress, there is limited research regarding the effects of PA on these outcomes within this population. **PURPOSE:** The aim of this study is to investigate the potential mediating role of PA in the effects of a culturally and linguistically tailored PA intervention for Latinas on depression scores and perceived stress. **METHODS:** Data are from a sample of 266 Latinas who participated in the Seamos Saludables intervention. Two product of coefficient mediation models were used to assess whether increases in Moderate to Vigorous PA (MVPA) as measured by the 7-day Physical Activity Recall mediated the effect of the intervention on depression scores and perceived stress (measured by the Center for Epidemiologic Studies Short Depression Scale and the Perceived Stress Scale, respectively). **RESULTS:** The Seamos Saludables PA intervention, which was successful in helping participants increase their PA, had no direct effect on change in depression scores, nor on change in perceived stress. Nevertheless, among completers, a significant indirect effect on depression scores (ab=−0.44; CI=[−0.87, −0.02]) and perceived stress (ab=−0.98; CI=[−1.75, −0.22]) was observed through PA. The intervention significantly increased MVPA at 12 months (B=57.96, p<0.001), and MVPA significantly reduced depression scores (B=−0.008, p=0.018) and perceived stress (B=−0.02, p=0.001), controlling for baseline depression and stress, respectively, and baseline MVPA. **CONCLUSION:** Even though there was no direct effect of the PA intervention on depression scores and perceived stress, higher levels of MVPA among participants were associated with reduced depression scores and perceived stress. Given that depression and stress are associated with negative mental and physical health outcomes, these findings represent a promising approach to improving health among Latinas.
Improved balance and weak muscle strength are common deficits associated with stroke. These deficits increase the risk of fall among people post-stroke. The relationship between muscular strength and balance was previously reported to be weak. However, the conclusion was made based on clinical balance assessments instead of biomechanical data. Limited research examined the relationship between balance and strength in people post-stroke. PURPOSE: To investigate the relationship between muscular strength and functional balance in people post-stroke. METHODS: A total of 20 people post-stroke completed balance and strength assessments over two separate visits. A computerized dynamic posturography system (NeuroCom International, Clackamas, OR, 2010) was used to perform four balance tests including limits of stability test (LOS), sit to stand test (STS), walk across test (WA), and step up and over test (SUO). In addition, participants completed isometric muscular strength tests of the trunk, hip, knee, and ankle. Peak torque was measured with a computerized dynamometer (Biodex Medical Systems Inc, Shirley, NY, 2012). Pearson’s correlation test was used for statistical analysis. RESULTS: There was a strong correlation between max excursion (LOS test) and muscle strengths of knee flexor/extensor on the affected side (r values ranged between 0.721 and 0.793, p<0.04). A strong correlation was also found between step width (WA test) and muscular strengths of trunk extensor, knee flexor, ankle plantar-flexor, hip flexor and extensor on the unaffected side (r values ranged between 0.721 and 0.902, p<0.01). STS and SUO did not show any significant correlation with muscle strength. CONCLUSIONS: Our findings suggest that strengthening of the knee flexor/extensor may help people post-stroke to shift values ranged between 0.797 and 0.902, p<0.01). STS and SUO did not show any significant correlation with muscle strength and body composition variables and cardiovascular risk (R = -0.60 p <0.01) was observed, and aerobic power equally between these variables (R = -0.428 p<0.01). CONCLUSION: Although anthropometric measurements in children under 18 are generally below the limits of risk for cardiovascular disease, these results are close to those limits, which leads to argue that they need a specific prevention program. In itself a relationship between risk variables and qualities as strength and aerobic capacity is observed, so it is necessary to create programs that encourage the practice of physical activity in this population.

Feasibility And Effectiveness Of High Intensity Exercise Training For High-Functioning Children With Autism Spectrum Disorder


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(No relationships reported)

PURPOSE: This study assessed the feasibility and effectiveness of a high intensity exercise program for high-functioning children with autism spectrum disorder (HFA/ASD). METHODS: Thirty children with HFA/ASD (M age: 10.1 ± 1.6 yrs) engaged in a 1-hour exercise session, 4 d/wk for 5 weeks. Each session included an instruction period, warm-up, workout, related game, and cool-down. Child satisfaction surveys (7-point Likert scale) assessed perceived enjoyment of the session/program, difficulty of the activity(es), level of staff support, physical benefits, etc. Staff satisfaction surveys assessed staff’s enjoyment of running the session(s), clarity of the lessons, and utility of the session for training. Feedback of implementation (accuracy) was assessed in 67% of all sessions by staff not involved in exercise delivery. Biometric (i.e., height, weight, waist circumference, BMI) and physical performance data (i.e., strength, flexibility, cardiovascular fitness, power) were also collected. The intensity of physical activity during the sessions was assessed using accelerometers during the first and final week on parallel activities. Paired t-tests were used to assess post program improvements. RESULTS: Child satisfaction ratings indicated that when compared to other fitness/ sport programs that they had participated in, this experience was very satisfying (M = 6.3), and that the overall feeling about the program was very positive (M: 6.4). The staff (N=7) also rated the program very positively (M: 7.0). Results indicated that the program was implemented with a high level of accuracy (93.7%). Pre-posttest comparisons yielded statistically significant improvements in sit-ups in 60 seconds (M Δ = 3.0, p<0.001), air squats in 60 seconds (M Δ = 6.9, p<0.001), and standing long jump (M Δ = 4.7, p<0.001). Additionally, the rounds completed on parallel workouts improved significantly (M Δ = 1.4, p<0.011), as did the time spent in moderate-to-vigorous intensity activities (M Δ = 4.9, p<0.003). There were no significant changes in biometric measures. CONCLUSION: The high intensity exercise program was feasible (high levels of fidelity and child and staff satisfaction) and resulted in a number of significant improvements in the physical performance of children with HFA/ASD.

Is the Metabolic Cost of Running Different for Athletes with Unilateral Versus Bilateral Transplantable Amputations?

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(No relationships reported)

PURPOSE: The aim of this study was to compare arm to treadmill wheelchair ergometry and to determine various metabolic and respiratory thresholds to provide athletes with optimal training prescription and training program. METHODS: Five male and 3 female wheelchair basketball players (age: 29.3±2.9 yrs; BW: 68.0±14.3 kg; Ht: 164.5±20.6 cm) of the first German division participated in this study. Participants were tested twice, once via arm ergometry and again via wheelchair treadmill in randomized order. Measured threshold variables were blood lactate concentrations (LA mmol/L), heart rate in beats per minute (1HR bpm), power output in Watts (PO), energy expenditure (EE, Kcals), oxygen uptake (VO2 ml kg-1 min-1) and maximal performance expressed in percent (%). The data were calculated for differences via non-parametric statistical analysis, correlation and statistical significance (r; P<0.05). The data was assessed according to two different concepts previously reported by Dickhuth and by Mader. RESULTS: When considering Dickhuth concept, our results yielded significant differences for LA (P<0.025), EE (P<0.012), VO2 (P<0.012) and maximal performance (P<0.036). According to Mader concept, we found significant differences for HR (P<0.012), EE (P<0.012), VO2 (P<0.012) and maximal performance (P<0.02). When utilizing Dickhuth concept, results yielded significant correlation for EE (r=0.81; P<0.015) only; while Mader concept revealed significant correlation for HR (r=0.76; P<0.031), EE (r=0.81, P<0.015) and maximal performance (r=0.81; P<0.015). CONCLUSION: Our results revealed that measures generated from arm ergometry vs. wheelchair treadmill are not useful to monitor training prescription. The large and expected significant differences in VO2 uptake alone between arm and treadmill tests lacked usefulness of the tests. We therefore recommend using treadmill test for wheelchair basketball players as it better mirrors demands of wheelchair basketball competition.

Running-specific prostheses (RSPs) enable athletes with transplantable amputations to run. Yet, it is unknown if distance running performance is different between athletes with unilateral vs. bilateral amputations. PURPOSE: Metabolic cost affects distance running performance. Thus, we sought to compare the metabolic cost of running for athletes with unilateral and bilateral transplantable amputations. METHODS: Ten athletes with unilateral and 5 athletes with bilateral transplantable amputations each completed 15, 5-minute trials on a treadmill (≤6 trials per day) at 2.5 or 3.0 m/s, with at least 3 minutes rest preceding each trial. Participants used a different RSP configuration for each trial. RSP configurations consisted of a randomly assigned: prosthetic model (A, B, C) stiffness category (recommended ± 2 cm), and height (recommended ± 2 cm). We instructed participants to fast for at least 3 hours prior to testing. We measured and averaged the rates of oxygen consumption (VO2) using open-circuit expired gas analysis during the final 2 minutes of each trial. We normalized VO2 by participant mass, which included running gear, for each RSP condition. We then divided VO2 by velocity to calculate metabolic cost (MCT) in ml O2/kg/m. We independently compared the lowest (best) and highest (worst) MCTs from athletes with unilateral and bilateral amputations using two-tailed t-tests. Significance was set at α<0.05. RESULTS: The lowest and highest MCTs for athletes with unilateral amputations were 201.1 ± 14.0 and 258.4 ± 16.5 ml O2/kgm (mean ± SD), respectively. The lowest and highest MCTs for athletes with bilateral amputations were 186.2 ± 12.3 and 226.9 ± 22.7 ml O2/kgm (mean ± SD), respectively. The lowest (p=0.085) and highest (p=0.282) MCTs were similar for both cohorts. For context, Olympic qualifying, sub-elite, and recreational non-ampatee runners elicited MCTs of
181.9 ± 9.1, 187.5 ± 9.7, and 190.5 ± 13.6 ml O₂/kg/min (mean ± SD), respectively. **CONCLUSION** The metabolic cost of running is similar for athletes with unilateral and bilateral transtibial amputations, indicating that distance running performance may be the same for both groups.

This project was supported by the BADER Consortium, a DoD CDMRP cooperative agreement (W81XWH-11-2-0222).

**PURPOSE** To understand the reliability of peak VO₂ testing for individuals with SCI in deep water and on land arm cycle ergometer; and to determine the relationship between these two testing conditions. **METHODS:** Nineteen participants (15 men, 4 women) with SCI enrolled in a pilot study to assess peak VO₂ using a Cosmed metabolic cart and tubing connection unit (Aquatrainer) and an arm cycle ergometry (n=17, r=0.70, p=0.002). We hypothesized a priori lower extremity motor score (LEMS), age, gender, and weight could potentially impact peak VO₂ outcomes. For these participants only LEMS influenced supported deep water peak VO₂, r=14, B=0.66, p<0.008, and arm cycle ergometer peak VO₂, r=16, B=0.54, p=0.025.

**CONCLUSIONS**: Determining peak VO₂ for individuals with SCI is highly reproducible for arm cycle ergometry and in supported deep water with the metabolic cart Aquatrainer connection. Additionally, supported deep water peak VO₂ testing is reliable (r=0.93) and valid (r=0.70) compared to arm cycle ergometry (gold standard). Clinically it is important to assess peak VO₂ after an aquatic intervention using the same conditions as the treatment conditions, and both supported deep water and arm cycle ergometer provide reliable and valid peak VO₂ outcomes.

**RESULTS**

- **VO₂ (mL/kg • min⁻¹)**: 50.1 ± 12.2, 32.8 ± 4.6, 31 – 37
- **HR (bpm)**: 72.2 ± 11.3, 172.7 ± 11.4, 161 – 184
- **VE (L/min)**: 9.3 ± 1.4, 86.9 ± 20.1, 65 – 124
- **Caloric Expenditure (kcal • min⁻¹)**: 1.2 ± 0.2, 8.4 ± 2.1, 6 – 9
- **Recovery (min)**: 8.0 ± 0.4, 9.8 ± 0.3, 93 – 102
- **CHO Utilization (%)**: 30.1 ± 18.7, 84.9 ± 8.3, 73 – 92
- **Fat Utilization (%)**: 58.9 ± 12.0, 13.6 ± 7.0, 6 – 24

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**Board #7 June 2 3:15 PM - 5:15 PM**

**Physiological Responses To A Simulated Half-marathon Road-race in Elite Wheelchair Racing Athletes**

Jp Barfield¹, Thomas Edwards², Joseph W. Beals³, Grace M. Niemiro², Elizabeth Brod¹, Robert W. Motl⁴, Michael De Lisio⁵, Laura Newsome⁶, Nicholas A. Burd⁷, Lara A. Pilutti⁸, Robert W. Motl⁴, Michael De Lisio⁵, Laura Newsome⁶, Nicholas A. Burd⁷, Lara A. Pilutti⁸.

**Purpose:** To understand the reliability of peak VO₂ testing for individuals with SCI in deep water and on land arm cycle ergometer; and to determine the relationship between these two testing conditions. **Methods:** Nineteen participants (15 men, 4 women) with SCI enrolled in a pilot study to assess peak VO₂ using a Cosmed metabolic cart and tubing connection unit (Aquatrainer) and an arm cycle ergometry (n=17, r=0.70, p=0.002). We hypothesized a priori lower extremity motor score (LEMS), age, gender, and weight could potentially impact peak VO₂ outcomes. For these participants only LEMS influenced supported deep water peak VO₂, r=14, B=0.66, p<0.008, and arm cycle ergometer peak VO₂, r=16, B=0.54, p=0.025.

**Conclusions:** Determining peak VO₂ for individuals with SCI is highly reproducible for arm cycle ergometry and in supported deep water with the metabolic cart Aquatrainer connection. Additionally, supported deep water peak VO₂ testing is reliable (r=0.93) and valid (r=0.70) compared to arm cycle ergometry (gold standard). Clinically it is important to assess peak VO₂ after an aquatic intervention using the same conditions as the treatment conditions, and both supported deep water and arm cycle ergometer provide reliable and valid peak VO₂ outcomes.

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**Board #1 June 2 3:30 PM - 5:15 PM**

**Epidemiology Of Sudden Death In American Youth Sports**

Brad D. Endres, Rebecca L. Stearns, Robert A. Huggins, Douglas J. Casa, FACSM.

**Purpose:** To understand the reliability of peak VO₂ testing for individuals with SCI in deep water and on land arm cycle ergometer; and to determine the relationship between these two testing conditions. **Methods:** Nineteen participants (15 men, 4 women) with SCI enrolled in a pilot study to assess peak VO₂ using a Cosmed metabolic cart and tubing connection unit (Aquatrainer) and an arm cycle ergometry (n=17, r=0.70, p=0.002). We hypothesized a priori lower extremity motor score (LEMS), age, gender, and weight could potentially impact peak VO₂ outcomes. For these participants only LEMS influenced supported deep water peak VO₂, r=14, B=0.66, p<0.008, and arm cycle ergometer peak VO₂, r=16, B=0.54, p=0.025.

**Conclusions:** Determining peak VO₂ for individuals with SCI is highly reproducible for arm cycle ergometry and in supported deep water with the metabolic cart Aquatrainer connection. Additionally, supported deep water peak VO₂ testing is reliable (r=0.93) and valid (r=0.70) compared to arm cycle ergometry (gold standard). Clinically it is important to assess peak VO₂ after an aquatic intervention using the same conditions as the treatment conditions, and both supported deep water and arm cycle ergometer provide reliable and valid peak VO₂ outcomes.

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**Board #8 June 2 3:15 PM - 5:15 PM**

**Reliability & validity of aquatic deep water peak VO2 testing for individuals with spinal cord injury**

William H. Scott¹, Anna Ogonowska-Slodownik², Peter H. Gorman³, Robert Slodownik¹, Paula R. Geigel¹. ¹University of Maryland School of Medicine, Baltimore, MD; ²Franz Josef Pisaudski University of Physical Education, Warsaw, Poland.

**Purpose:** To understand the reliability of peak VO₂ testing for individuals with SCI in deep water and on land arm cycle ergometer; and to determine the relationship between these two testing conditions. **Methods:** Nineteen participants (15 men, 4 women) with SCI enrolled in a pilot study to assess peak VO₂ using a Cosmed metabolic cart and tubing connection unit (Aquatrainer) and an arm cycle ergometry (n=17, r=0.70, p=0.002). We hypothesized a priori lower extremity motor score (LEMS), age, gender, and weight could potentially impact peak VO₂ outcomes. For these participants only LEMS influenced supported deep water peak VO₂, r=14, B=0.66, p<0.008, and arm cycle ergometer peak VO₂, r=16, B=0.54, p=0.025.

**Conclusions:** Determining peak VO₂ for individuals with SCI is highly reproducible for arm cycle ergometry and in supported deep water with the metabolic cart Aquatrainer connection. Additionally, supported deep water peak VO₂ testing is reliable (r=0.93) and valid (r=0.70) compared to arm cycle ergometry (gold standard). Clinically it is important to assess peak VO₂ after an aquatic intervention using the same conditions as the treatment conditions, and both supported deep water and arm cycle ergometer provide reliable and valid peak VO₂ outcomes.

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**Thematic Poster - Sports Injuries: Friend or Foe?**

Friday, June 2, 2017, 3:15 PM - 5:15 PM

Room: 505

**Chair:** Steven P. Broglio, FACSM. University of Michigan, Ann Arbor, MI.

**Board #1 June 2 3:30 PM - 5:15 PM**

**Epidemiology Of Sudden Death In American Youth Sports**

Brad D. Endres, Rebecca L. Stearns, Robert A. Huggins, Douglas J. Casa, FACSM. Korey Stringer Institute, Storrs, CT.

Little epidemiological data on the incidence of injury and sudden death in American youth sport exists. **Purpose:** Describe the epidemiology of sudden death (SD) in organized American youth sport. **Methods:** SD surveillance was conducted from 8/1/2011 to 10/27/2016 via LexinNexis and other publicly available news or media reports. A certified athletic trainer reviewed each case to confirm the official cause of SD and/or offer a speculated cause of SD if official cause was unknown. Cases of SD that occurred in youth athletes 17 years of age and younger in organized sports were included. Cases of athletes at the high school level or higher were excluded. Details of the athlete (age, gender, level of play), event (sport, event type, activity), and death (date of incident, date of death, location of death, official and speculated cause of death) were examined. **Results:** From 2007-2015, 45 SDs (average = 5 deaths/yr) were reported in American youth sports. The age range of SD was from 8-17 years old. The mean age of SD was 13 ± 2 years old. The overall incidence rate was 0.23 deaths/100,000 participants. The deadliest year was 2015 with 11 cases. When broken down into three-year segments, 6 SDs occurred from 2007-2009, 16 from 2010-2012, and 23 from 2013-2015. From 2007-2015, males experienced a greater number of SD compared to females (n=36, 80% of all deaths). Basketball had the highest number of SDs from 2007-2015, with a total of 16 occurrences. The most frequent cause of death was cardiac-related (n=34, 76% of all deaths). Furthermore, 15 of the 16 basketball deaths (94%) were cardiac related. **Conclusions:** From 2007-2015 45 youth athletes died while playing organized sport, with an increasing number of SDs in more recent years. Males experienced a greater number of SDs than females. The sport and condition with the greatest SDs were basketball and cardiac-related SDs, respectively. With an overall incidence of 0.23 SDs/100,000 participants, these rates are on par with reported high school SD rates from 2007-2014 school years as reported by the National Center for Catastrophic Sport Injury Research (average=0.24/100,000). This study sets a precedent for further examination into youth sport SD and supports the need for mandated health and safety guidelines in this population.
Concussion prevention strategies are of particular need at the youth level to prevent recovery, early medical disqualification from sport, and late life cognitive impairments. Of the 3,819 participants with a second model was developed to determine whether age at first concussion predicted regression to model developmental stage predicting risk of subsequent concussion. A purpose was to describe evidence for concussive injury. Over the four seasons 3505 athlete seasons of concussion in basketball were higher than Americans (Danesshvar DH, 2011 and Giza et al. 2012). Incidence are obtained to estimate the experience rate of three total cases (ascertain and uncertain). Incident rates of ascertained cases were estimated to be 0.013 person-year, rates of total cases be 0.020. Injury rate per 1000 Athletic-Exposures were 0.42 with Men's basketball, 0.22 with Men's concussion in basketball were higher than Americans (Danesshvar DH, 2011 and Giza CC, 2013). The rates in soccer were lower. Headache, Pressure in head, Dizziness were statistically increased the number from the result of SCAT2. Higher Incidence among sports are observed in Men's basketball and Men's Soccer. There were not significant different from annual practice time between concussion(CC) and non-concussion(NCC) cases, ballistic cases CC: 1364.0 hours/year. NCC: 1155.8 hours/year. Balance Error Scoring System at baseline were CC: 27.34, NCC: 27.38. Limitations: We could not evaluate the rate of Rugby, American-football and Judo because of a few recent literature has indicated that concussion increases musculoskeletal injury risk. Various studies have demonstrated post-concussion changes in gait and posture, but few studies for purposes. The purpose was to investigate the association between concussion and lower-body injury risk in the NHL players during 2012-2015 seasons. METHODS: Season statistics and injuries were compiled from hockey-reference.com. All head injuries were reviewed, using public news reports, to determine evidence for concussive injury. Over the four seasons 3505 athlete seasons of concussion in basketball were higher than Americans (Danesshvar DH, 2011 and Giza et al. 2012). Incidence are obtained to estimate the experience rate of three total cases (ascertain and uncertain). Incident rates of ascertained cases were estimated to be 0.013 person-year, rates of total cases be 0.020. Injury rate per 1000 Athletic-Exposures were 0.42 with Men’s basketball, 0.22 with Men’s concussion. RESULTS: Incident rates of concussion of Japanese high school students were estimated to be 0.013 person-year at least. Injury rate per 1000 Athletic-Exposures were 0.42 with Men’s basketball, 0.22 with Men’s concussion. CONCLUSIONS: Incident rates of concussion of Japanese high school students were estimated to be 0.013 person-year at least. Injury rate per 1000 Athletic-Exposures were 0.42 with Men’s basketball, 0.22 with Men’s concussion. Sustaining a single concussion increases the risk of sustaining a subsequent concussion. Individuals that sustain their first concussion during childhood may be at greater risk for sustaining multiple concussions throughout their lifetime, due to a longer window of vulnerability. PURPOSE: To determine whether developmental stage and age at first concussion influence risk of subsequent concussion. METHODS: A total of 23,582 collegiate athletes from 26 universities and military cadets from 3 military academies completed a concussion history questionnaire (15,232 males, 8,335 females, 15 missing; age: 19.9±1.4 years, mass: 77.4±17.2kg, height: 177.3±2.10cm). Participants were asked to self-report the number of concussions and age at time of each injury. Participants with concussion histories (n=3,819) were categorized as having sustained their first concussion during childhood (<10 yo) or adolescence (10 yo to ≤18 yo) based on World Health Organization criteria. We then determined the number of subsequent concussions sustained prior to age 18. We used a Poisson regression to model developmental stage predicting risk of subsequent concussion. A second model was developed to determine whether age at first concussion predicted subsequent concussion risk (α = 0.05). RESULTS: Of the 3,819 participants with a previous concussion, 251 (6.6%) sustained their first concussion during childhood and 3,568 (93.4%) during adolescence. Participants that sustained their first concussion during childhood had 81% higher risk of sustaining subsequent concussions (RR≈1.81, 95% CI: 1.49,2.21) compared to those that sustained their first concussion during adolescence. Subsequent concussion risk decreased by 10% for each additional year of age at the time of first concussion (RR≈0.90, 95% CI: 0.88,0.92). CONCLUSION: Sustaining a concussion at a young age seems to lengthen the window of vulnerability to sustaining subsequent concussions, resulting in higher risk of sustaining multiple concussions in a lifetime. Sustaining multiple concussions may cause prolonged recovery, early medical disqualification from sport, and late life cognitive impairments. Concussion prevention strategies are of particular need at the youth level to prevent children from sustaining their first concussion at a young age.
Injuries in dance are commonplace and distressing in terms of human and financial impact. It is the hope of dance medicine healthcare professionals and educators to detect risk for injury prospectively, often through screening efforts. It is known that screening has been very useful for rapport building, improving health literacy and facilitating entryways to local healthcare systems. However, screening, as we have been conducting it, has still not proven to be predictive of injury despite implementation of preventative interventions such as pre-season conditioning programs. PURPOSE: To test the predictive validity of four patient reported outcome measures (PRO) in addition to an array of motor control designed clinical performance-based outcome measures (CPBO) collected during pre-season screening in predicting subsequent season time loss injury. METHODS: 241 elite classical dancers (21.5±5.0 years; 69 men, 172 women) who received regular onsite care consented to participate in PRO and CPBO-based pre-season screenings and ongoing, healthcare practitioner documented injury surveillance. The PRO’s utilized in this study were the Discomfort Rating Scale (DRS); the World Health Organization Functional Scale (WHO); the Profile of Mood States total score (POMS) and the Eating Attitudes Test-26 (EAT). Data were analyzed with a multivariate logistic regression model for the outcome variables “injured in subsequent season” and “number of therapy visits in subsequent season”. RESULTS: All PRO variables were associated with the primary outcome variables (p=0.003, R2=0.492, R2 adj=0.420). CONCLUSION: Injury prevention screening for dancers should include PRO scores to predict those at greatest risk for time loss injury.

F-35 Free Communication/Slide  -  Physical Activity Intervention Trials

Friday, June 2, 2017  3:15 PM - 5:00 PM  Room: 402

Board #8  June 2 3:15 PM - 5:15 PM
The Injury and Illness Profile of 23055 Participants in a 94.7km Cycle Race - Cross-Sectional Study
Dina C. Janse van Rensburg, FACSJM, Mia Breedt, Lizelle Fletcher, Catharina C. Grant, Audrey Jansen van Rensburg, Martin P. Schwellnus, FACSJM. University of Pretoria, Pretoria, South Africa.
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INTRODUCTION: The momentum 94.7 Cycle Challenge is an annual recreational long distance cycling event in South Africa. Medical support at such an event is imperative, with little known regarding the risk of acute traumatic injuries and acute medical illness. PURPOSE: To describe the incidence and patterns of acute injury and medical illness and difference between sexes during a mass community cycling race. METHODS: A descriptive study of the 2014 Momentum 94.7 Cycle Challenge, documenting the incidence of acute traumatic injuries and acute non-traumatic medical illness in 23055 race starters (males=17520, females=5236, not specified=299) during the 94.7km distance. RESULTS: An incidence (per 1000 starters) of 38.69 (females=38.39, males=36.52) for all medical illness; with an incidence of 11.88 (females=16.42, males=10.73) for adverse medical events and of 1.3 (females=2.67, males=0.86) for serious adverse events, were reported. The incidence of non-traumatic medical complaints was 32.48 (females=31.32, males=33.39) and of traumatic injuries was 3.99 (females=7.07, males=3.14). Females had a higher risk of sustaining traumatic injuries (p=0.001), central nervous system (p=0.0062) and eye complaints (p=0.0107). The musculoskeletal system had the most complaints, 80.7%. Males 10-16yrs (p=0.0013) and females 23-39yrs (p=0.0336) and >50yrs (p=0.002), had a higher risk for traumatic injuries. CONCLUSIONS: A reported ratio of 1:26 (females=1:26, males=1:28) of all starters developed medical complaints; with 1:84 cyclists (females=1:61, males=1:93) that developed adverse events and did not finish the race; and 1:769 participants (females=1:374, males=1:116) developing serious adverse events that required hospitalisation. The majority of admissions for traumatic injuries were followed by cardiovascular complaints. A wide spectrum of medical complaints can be expected during mass recreational sport events, with a higher risk for females to sustain traumatic injuries, and encounter central nervous system and eye complaints. The majority of disorders involved the musculoskeletal system. Information regarding the pattern and type of medical encounters can prove useful during planning and management of similar future events.
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by the area covering and total length of the center of gravity sway (COG). Each measurement items were assessed before and after the intervention period. Student’s T-test and two-way repeated measures ANOVA were used to test the effectiveness. 

RESULTS: The class participation were 83±5% and 71±8% respectively. Sitting & standing time (HFG: 18:4:5.6 to 16:2:5.4 sec., LFG: 17:4:3.9 to 17:4:3.6 sec., F=3.205, P=0.085), zigzag walking time (HFG: 19:6:3.0 to 17:0:3.3 sec., LFG: 17:4:2.4 to 16:8:2.9 sec., F=12.18±0.002), one-legged standing time with eyes open (HFG: 6:1:3.1 ± 3.4 sec., LFG: 5:9:2.3 ± 4.0 sec., F=26.44, P=0.000), knee extension strength (HFG: 181.5±39.6 to 208.5±41.5 N, LFG: 192.0±15.5 to 196.5±14.5 N, F=4.775, P=0.040), and balance ability (area covering of COP, HFG: 15:3.5±10.8 to 17:6.7±1 cm², LFG: 14:6:4.1 to 17:2.8±9 cm², F=7.064, P=0.015, total length of COP, HFG: 148:3:31.9 to 100:7:27.4 cm, LFG: 141:0:30.2 to 135:7:37.2 cm, F=12.183,P=0.002) also improved significantly in HFG. Fear of falling score was not change in both genders.

CONCLUSIONS: Three-stage physical training program was effective on balance ability and functional fitness for Japanese old-old females.

3041 June 2 3:30 PM - 3:45 PM
Both MBSR and Aerobic Exercise Training can Affect Physical Activity Behavior in Sedentary Individuals
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(Relationships reported)

Mindfulness-Based Stress Reduction (MBSR) and aerobic exercise training (AET) have emerged as robust programs to improve health and wellbeing. Physical activity may be enhanced to a similar degree by MBSR and AET, although their relative effects on physical activity have not been objectively assessed.

PURPOSE: To compare the effects of 8-weeks of MBSR and AET on objectively measured physical activity.

METHODS: Participants underwent 7-days of physical activity monitoring (Actigraph GT3x+) and subjective-measured sleep parameters.

RESULTS: Sufficient data for analysis (≥3 week and ≥1 weekend day, >10 hours/day). Daily MVPA increased in HFG: 3041:400.8 ± 109.7 minutes/day, without statistically significant differences among the groups (all p's < .001). Exercisers significantly increased daily PoA (βΔ = 6.18, SE = 0.64, CI =4.93, 7.42) and decreased NeA (βΔ = - 3.54, p < .001) compared to baseline, whereas the control group increased in both subcomponents (all p's < .001). Exercisers significantly increased daily PoA (βΔ = 0.31, SE = 0.42, CI =0.47, 0.55) and decreased NeA (βΔ = -0.50, SE = 0.34, CI = -0.95, -0.05) compared to baseline, whereas the control group decreased in both PoA and NeA (PoA: βΔ = -0.38, SE = 0.39, CI = -0.66, -0.10; NeA: βΔ = -0.30, SE = 0.25, CI = -0.80, -0.05). These effects were consistent for PDA, NAA, NDA, and NDA with one exception: PAA did not increase significantly in waitlist control participants (p = .31).

CONCLUSIONS: All caregivers increased in daily PoA after 6 months, however, those who exercised increased significantly more. On the other hand, caregivers increased in daily NeA: exercisers decreased and control participants increased. These findings have implications for understanding the role of exercise training on daily affective states, especially in family caregivers of persons with a progressive disorder.

3042 June 2 3:45 PM - 4:00 PM
Effects of High-intensity Interval Training and Moderate-intensity Continuous Training on Sleep in Sedentary Obese Adults
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(Relationships reported)

Regular moderate-intensity physical activity has been shown to improve sleep duration and quality in individuals with mild to moderate sleep complaints. It is not known whether more vigorous exercise may have similar, more pronounced, or even detrimental effects on sleep. 

PURPOSE: To examine the effects of high-intensity interval training vs. moderate-intensity continuous training on objectively- and subjectively-measured sleep parameters.

METHODS: Fifteen volunteers (35.1 ± 8.1 y; BMI = 36.0 ± 5.0 kg/m²) completed 8 weeks (3 d/wk) of either high-intensity interval training (HIIT (n=8); 10, 1-min intervals at 90-95% of heart rate max (HRmax)) or moderate-intensity continuous training (MCT (n=7); 30 min at 70-75% of HRmax) on cycle ergometers. Subjects wore accelerometers (Actigraph GT3x+) on the non-dominant wrist during sleep periods for seven consecutive days at baseline, week 5, and week 8. Measures of total sleep time (TST, min), sleep onset latency (SOL, min), and sleep efficiency (SE, %) were derived. Participants also completed the Pittsburg Sleep Quality Index (PSQI) at baseline and after training.

RESULTS: For Actigraph-measured sleep, SOL was marginally improved in HIIT (-1.92 ± 3.9 min) compared to MCT (4.87 ± 8.1 min, p = 0.09, d= 0.61) or neither (no-treatment control group). TST was also marginally improved in HIIT (+2.5 ± 5.2%) compared to MCT (+3.8 ± 4.6, p = 0.06, d = 0.65).

Changes were observed for TST. For PSQI-measured sleep, MCT showed favorable improvements compared to HIIT for sleep latency (p=0.09, d = 0.51), sleep duration (p=0.06, d = 0.57), sleep efficiency (p=0.07, d = 0.55), and the global score (p=0.03, d = 0.67), but no differences were observed for sleep quality, disturbances, medication use, or daytime dysfunction. 

CONCLUSION: This study is the first to compare HIIT vs. MCT on sleep using both actigraphy and subjective measures. Our results suggest that in comparison to moderate-intensity continuous training, high-intensity interval training may lead to the perception of poorer sleep quality. Conversely, objectively measured sleep quality may respond more favorably to HIIT than MCT.

3043 June 2 4:00 PM - 4:15 PM
Six Months of Aerobic Fitness Training on Daily Affect in High-Stressed Family Caregivers
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(Relationships reported)

PURPOSE: Positive (PoA) and negative affect (NeA) independently contribute to psychological and physical health. Observational studies have shown that active adults have greater daily PoA than less active individuals, whereas there is inconsistent evidence for NeA. We report results of a randomized controlled trial on the effects of 24 weeks of aerobic training on daily PoA and NeA.

METHODS: Sixty-three high-stress family caregivers of persons with dementia were randomized into a waitlist control group (n=33) or a 24-week aerobic intervention group (n=30). Treatment group participants gradually increased weekly moderate-to-vigorous activity to 150 minutes per week by the 6th week in the study. Prior to randomization and again in the 24th week, participants completed 6 online ecoligical momentary assessments per day for 7 days. A visual analog scale of 0 to 100 was used to assess PoA and NeA. Based on the circumplex theory of emotion, we further divided PoA and NeA along their dimensions, valence and activation, leading to four types: Positive Deactivated (PDA), Positive Activated (PAA), Negative Deactivated (NDA), Negative Activated (NAA).

RESULTS: Mixed models revealed that change over time (Δ) between exercise and control group caregivers was significantly different for PoA, NeA, and the four subcomponents (all p's < .001). Exercisers significantly increased daily PoA (βΔ = 6.18, SE = 0.64, CI =4.93, 7.42) and decreased NeA (βΔ = - 3.54, p < .001) compared to baseline, whereas the control group increased in both PoA and NeA (PoA: βΔ = 1.74, SE = 0.56, CI =0.63, 2.84, p = 0.002; NeA: βΔ = 2.35, SE = 0.55, CI=1.28, 3.42, p < 0.001). These effects were consistent for PDA, NAA, NDA, with one exception: PAA did not increase significantly in waitlist control participants (p = .31).

CONCLUSIONS: All caregivers increased in daily PoA after 6 months, however, those who exercised increased significantly more. On the other hand, caregivers increased in daily NeA: exercisers decreased and control participants increased. These findings have implications for understanding the role of exercise training on daily affective states, especially in family caregivers of persons with a progressive disorder.

3044 June 2 4:15 PM - 4:30 PM
Health In Pregnancy and Postpartum (HIPP): Targeting Gestational Weight Gain and Postpartum Weight Loss
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(Relationships reported)

Interventions to prevent excessive weight gain and promote postpartum weight loss have modest results, particularly in overweight and obese women.

PURPOSE: To describe the rationale and design of the HIPP trial, discuss recruitment strategies, challenges, and yield to date; and present baseline demographic and physical activity (PA) data.
METHODS: HIPP is a randomized controlled trial enrolling women from SC who are <16 wks gestation, overweight or obese, white or African American, 18 to 44 yrs old, without exercise contraindications. Participants are randomized to a behavioral lifestyle intervention or usual care (target N=400) and assessed at baseline, 32 wks gestation, and 6- and 12-mos postpartum. Outcomes include gestational weight gain (primary) and PA (secondary) measured with the Sensewear Armband. The behavioral lifestyle intervention, grounded in Social Cognitive Theory, consists of two individual counseling sessions (early pregnancy and postpartum), weekly or biweekly pregnancy counseling calls, biweekly postpartum counseling calls, 10 pregnancy and 16 postpartum follow-up calls, and an optional private Facebook group (to 6-mos postpartum). The usual care group receives monthly mailings and a matched number of podcasts on non-weight related topics.

RESULTS: To date, 95 participants have enrolled, representing 16% of women who completed a screening form and were initially eligible. Eight (16%) have withdrawn, two due to medical ineligibility. Barriers to enrollment include failure to reach women for telephone screening, ineligibility, and no shows to baseline visits. These challenges led to increasing recruitment sites and replacing group intervention sessions with individual telephone counseling. At baseline, participants were 10.0 ± 2.1 wks gestation, 30.2 ± 5.6 yrs old, 44% nulliparous, 34% African American, 60% college graduates, and 48% obese. Baseline armband average wear-time was 23.5 ± 0.3 hrs/d. Participants accumulated 36 ± 22 total mins/d of MVPA and 5399 ± 2303 steps/d. 32-wk data show trends favoring the intervention group (40 vs. 26 mins/d MVPA, 5078 vs. 4620 steps/d).

CONCLUSION: HIPP is an innovative study that addresses gaps in the literature. Recruitment posed challenges necessitating study modifications. Primary outcome results are expected in 2019. Funded by NIH/NICHD.

3045 June 2 4:30 PM - 4:45 PM
Effects of a Long-Term Physical Activity Program on Activity Patterns in Mobility Impaired Older Adults
Amal A. Wanigatunga1, Robert S. Axtell, FACSM2, Roger A. Fielding3, Nancy W. Glynis4, Abby C. King, FACSM4, Mary M. McDermott4, Catrine Tudor-Locke, FACSM2, Marco Pahor2, Todd Manini, FACSM3. 1University of Florida, Gainesville, FL. 2Southern Connecticut State University, New Haven, CT. 3Tufts University, Boston, MA. 4University of Pittsburgh, Pittsburgh, PA. Stanford University, Stanford, CA. 4Northwestern University, Evanston, IL. 5University of Massachusetts Amherst, Amherst, MA. (Sponsor: Todd M. Manini, FACSM) Email: asrir@ufl.edu

(No relationships reported)

Purpose: To examine the effect of a long-term structured physical activity intervention on accelerometer-derived metrics of activity composition changes in older adults at high risk for mobility disability.

Methods: Participants were randomized to either a physical activity (PA) or health education (HE) program. The PA intervention included a walking regimen with strength, flexibility, and balance training. The HE program featured health-related discussions and a brief upper body stretching routine. Participants (n = 1,341) wore a hip-worn accelerometer for ≥10 h/day for ≥3 days at baseline and again at 6, 12 and 24 months post-randomization. Total physical activity (TPA)—defined as movements registering ≥100 counts/min—was segmented into the following intensities: low light (LLPA; 100-759 counts/min), high light (HLPA; 760-1,040 counts/min), low moderate (LMPA; 1,041-2,019 counts/min), and high moderate and greater (HMPA; 2,020-3,000 counts/min) physical activity. Patterns of activity were characterized as bouts (defined as the consecutive minutes within an intensity).

Results: Both groups decreased TPA (-10.5±1.0 minutes/day annually), but the PA intervention increased physical activity by shifting the distribution of physical activity. 2+ bouts: 2.8±0.4; 2+ bouts: 2.5±0.3; 5+ bouts: 2.1±0.3; 10+ bouts: 1.7±0.2 minutes). All three groups attended weekly in-person group intervention sessions for 12 weeks. SUP-PA also attended supervised activity sessions, whereas UNSUP-PA and STEP engaged in unsupervised physical activity.

Results: MVPA in bouts of ≥10 minutes significantly increased over the 12-week intervention by 11.5±3.2 min/day in STEP, 16.1±2.5 min/day in UNSUP-PA, and 21.6±2.4 min/day in SUP-PA (p<0.001) with no differences between groups (p=0.94) or group by time interaction (p=0.81). Weight significantly decreased (p=0.001) with no significant difference between groups (STEP±5.3±3.6 kg, UNSUP-PA±5.1±3.3 kg, SUP-PA±3.8±3.0 kg) (p=0.81). Fitness increased significantly greater in both SUP-PA (3.8±1.6 ml·kg·min⁻¹; p=0.02) and UNSUP-PA (3.8±3.2 ml·kg·min⁻¹; p=0.17) compared to STEP (1.3±2.4 ml·kg·min⁻¹; -0.04±0.19 L·min⁻¹) (p<0.05).

Conclusions: Unsupervised physical activity prescribed in min/week or steps/day may elicit a similar increase in MVPA and reduction in weight compared to supervised physical activity within a SBWI. However, physical activity prescribed in steps/day may elicit less favorable changes in fitness. Whether results are consistent across a longer intervention period warrants further investigation.

F-36 Free Communication/Slide - Weight Management
Friday, June 2, 2017, 3:15 PM - 4:45 PM
Room: 103

3047 June 2 3:15 PM - 3:30 PM
Effects of Supervised and Unsupervised Physical Activity Programs for Weight Loss
Seth A. Creasy1, Renee J. Rogers2, Kelliani K. Davis, FACSM2, Bethany Barone Gibbs3, Erin E. Kershaw2, Sara J. Kovacs3, Meghan R. Maher3, Robert J. Kowalsky3, Matthew O’Dell2, Katherine A. Collins3, Shawn D. Raybuck3, Marissa L. Marcini5, Patrick T. Donohue4, John M. Jakicie, FACSM3. 1University of Colorado Anschutz Medical Campus, Aurora, CO. University of Pittsburgh, Pittsburgh, PA. (Sponsor: John M. Jakicie, FACSM) Email: seth.creasy@ucdenver.edu

(No relationships reported)

Both supervised and unsupervised physical activity programs have included within a standard behavioral weight loss intervention (SBWI). However, few studies have directly compared supervised and unsupervised physical activity within the context of a SBWI.

Purpose: This study examined changes in moderate-to-vigorous physical activity (MVPA), fitness, and weight in response to a supervised physical activity program prescribed in minutes per week (SUP-PA), an unsupervised physical activity program prescribed in minutes per week (UNSUP-PA), and an unsupervised physical activity program prescribed in steps per day (STEP) during a SBWI.

Methods: Adults (N=52; age: 43.5±10.1 years, BMI: 31.5±3.5 kg/m²) participated in a SBWI and were randomized to STEP (n=18), UNSUP-PA (n=17), and SUP-PA (n=17). Subjects were prescribed a calorie-restricted diet (1,200-1,800 kcal/day) and to progressively increase physical activity (SUP-PA and UNSUP-PA: 150 min week⁻¹; STEP: 10,000 total steps day⁻¹ with 2,500 brisk steps day⁻¹). All three groups attended weekly in-person group intervention sessions for 12 weeks. SUP-PA also attended supervised activity sessions, whereas UNSUP-PA and STEP engaged in unsupervised physical activity.

Results: MVPA in bouts of ≥10 minutes significantly increased over the 12-week intervention by 11.5±3.2 min/day in STEP, 16.1±2.5 min/day in UNSUP-PA, and 21.6±2.4 min/day in SUP-PA (p<0.001) with no differences between groups (p=0.94) or group by time interaction (p=0.81). Weight significantly decreased (p=0.001) with no significant difference between groups (STEP±5.3±3.6 kg, UNSUP-PA±5.1±3.3 kg, SUP-PA±3.8±3.0 kg) (p=0.81). Fitness increased significantly greater in both SUP-PA (3.8±1.6 ml·kg·min⁻¹; p=0.02) and UNSUP-PA (3.8±3.2 ml·kg·min⁻¹; p=0.17) compared to STEP (1.3±2.4 ml·kg·min⁻¹; -0.04±0.19 L·min⁻¹) (p<0.05).

Conclusions: Unsupervised physical activity prescribed in min/week or steps/day may elicit a similar increase in MVPA and reduction in weight compared to supervised physical activity within a SBWI. However, physical activity prescribed in steps/day may elicit less favorable changes in fitness. Whether results are consistent across a longer intervention period warrants further investigation.
meals, an ad-libitum snack (2100 h) assessed compensation for EEE. A visual analog scale evaluated the appetite. Plasma glucose, FFAs, insulin and leptin were measured at 30 to 60-min intervals.

RESULTS: RESULTS: Meal intake (1350 vs 1473 Kcal) and mean EEE at two intensities during morning and mid-day postprandial periods (PPs) (1821 and 2202 Kcal) were similar in lean and obese women, respectively, as was EE during SED day (758 and 818 Kcal). This resulted in 529 and 380 Kcal positive energy balance on SED days and a 471 and 396 Kcal positive energy balance on exercise days in lean and obese women, respectively. Lean women ate an additional 256, and obese women 261 Kcal, of ad-libitum snack in SED trials. On LIIE and HIIE days, lean women increased snack intake by 24.6 and 37.9 %, respectively, but failed to compensate for 32 and 25% of exercise energy deficit. Corresponding increases of snack intake by obese women to LIIE and HIIE was 6 and 15%, and the compensation for EEE failed by 62 and 58%, respectively. Lean women were similarly suppressed during mid-day, but not morning. LIIE and HIIE in lean, but not the obese subjects, while obesity did not affect PP fullness. In LIIE and HIIE trials at mid-day, but not morning, exercise, a rise in FFAs was greater in lean than in the obese. In lean, but not the obese women, exercise suppressed PP insulin responses and led to a 5%, 12-h-sustained decline in plasma leptin.

CONCLUSIONS: EEE at intensities differing by a factor of two, suppresses hunger after the mid-day meal, PP insulin after morning and mid-day meals and leptin over 12-h period in lean, but not the obese women. Obesity blunts detection, hormonal responses, and dietary compensation to EEE.

3049 June 2 3:30 PM - 3:45 PM
Effects Of Steady-state And High-intensity Exercise On Compensatory Eating Behavior
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Obesity is a worldwide epidemic despite volumes of information while overwhelming evidence exists suggesting exercise and calorie restriction helps manage weight. Studies have shown significant differences in weight loss between high-intensity interval training and moderate continuous training potentially due to compensatory eating behaviors. PURPOSE: The aim of this study is to observe the differences in eating behaviors following high intensity intervals (HI) and continuous steady state (SS) running. METHODS: Nine lean (BMI=23.90±2.15 kg/m2) exercise trained college-aged (23.56±3.78 years) males (n=5) and females (n=6) participated in this study. Preliminary assessment included informed consent, medical history, body composition, and VO2max (Parvomedics, Sandy, UT). Subjects were randomized to one of three trials: control, HI, or SS. Subjects arrived fasted to the lab between food-related behaviors, and energy intake.

RESULTS: Caloric expenditure was higher during exercise than control (CON; 77.42±3.48kcal, HI: 321.06±24.16kcal, SS: 345.04±24.28kcal, p<0.001) but not different between HI and SS (p=0.49). Caloric intake was not different between trials (CON: 1557.11±172.48kcal, HI: 1849.78±149.8kcal, SS: 1683.11±142.74kcal, p=0.23). Carbohydrate intake was not different between trials (CON: 186.22±25.07g, HI: 224.89±24.28g, SS: 201.44±22.98g, p=0.41). Fat intake was not different between trials (CON: 55.44±8.31g, HI: 72.50±9.05g, SS: 63.44±4.66g, p=0.16). Protein intake was not different between trials (CON: 78.33±28.36g, HI: 69.33±10.18g, SS: 70.00±13.96g, p=0.64). CONCLUSION: Subjects did not differ in total energy or macronutrient intake after HI and SS exercise.

3050 June 2 3:45 PM - 4:00 PM
Aerobic Exercise Training Increases Dietary Restraint and Reduces Hunger and Energy Intake in Overweight/Obese Adults
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Exercise is associated with changes in energy intake, but findings are conflicting and mechanisms underlying responses are unclear. PURPOSE: To determine how aerobic exercise (AEx) training influences appetite, food-related behaviors, and energy intake.

METHODS: Previously sedentary, overweight/obese (OB/OW) adults (6F, 2M, 33±4 yr; BMI: 30.8±3 kg/m2) completed a 12-week supervised AEx program (5x/wk, energy expenditure =400 kcal/session). At baseline (PRE) and post-intervention (POST), participants consumed a test breakfast meal (25% of daily energy requirements). Hunger and satiety were evaluated every 30 minutes for 3 hours using visual analog scales. Dietary restraint and disinhibition were assessed via Three-Factor Eating Inventory questionnaire. Subsequently, ad libitum energy intake was measured for 3-days under free-living conditions and energy balance on exercise days in lean and obese women, respectively. Lean women ate an additional 256, and obese women 261 Kcal, of ad-libitum snack in SED trials. On LIIE and HIIE days, lean women increased snack intake by 24.6 and 37.9 %, respectively, but failed to compensate for 32 and 25% of exercise energy deficit. Corresponding increases of snack intake by obese women to LIIE and HIIE was 6 and 15%, and the compensation for EEE failed by 62 and 58%, respectively. Lean women were similarly suppressed during mid-day, but not morning. LIIE and HIIE in lean, but not the obese subjects, while obesity did not affect PP fullness. In LIIE and HIIE trials at mid-day, but not morning, exercise, a rise in FFAs was greater in lean than in the obese. In lean, but not the obese women, exercise suppressed PP insulin responses and led to a 5%, 12-h-sustained decline in plasma leptin.

CONCLUSIONS: EEE at intensities differing by a factor of two, suppresses hunger after the mid-day meal, PP insulin after morning and mid-day meals and leptin over 12-h period in lean, but not the obese women. Obesity blunts detection, hormonal responses, and dietary compensation to EEE.

3051 June 2 4:00 PM - 4:15 PM
Effect Of Employment Status On Physical Activity And Sedentary Behavior Long-term Post-bariatric Surgery
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No relationships reported

Chronic sedentarism and weight re-gain are both serious concerns following bariatric surgery. Pre-surgery, employment rates are lower compared to the normal weight population. Participation in daily activity is affected by multiple factors such as age, sex, socioeconomic status and white collar occupations, which are also inversely associated with obesity severity. PURPOSE: To explore the influence of employment status on the daytime sedentary and physical activity habits of bariatric patients long-term post-surgery. METHODS: 59 adults aged 51.19 ± 8.91 years, weighing 95.24 ± 25.0 kg with a BMI of 34.64 ± 10.11 kg/m2 having undergone bariatric surgery 9.98 ± 3.09 years earlier participated in this study. Participants were asked to wear an ActiPalTMtri-axis accelerometer attached to their mid-thigh for seven consecutive days, 24 hours/day. All participants wore the device for ≥ 4 days and ≥ 22 hours/day. Self-reported nighttime sleeping facilitated distinguishing this from day sitting time. Patients were collapsed into two groups: employed (N = 21), or unemployed (N = 38). Sedentary time and steps were divided by total day time monitored and expressed as steps/hr and percent of day spent in sedentary behavior. ANCOVA was performed comparing the two groups on their steps/hr and percent sedentary time controlling for age, sex, BMI, and percent weight regained post-surgery. RESULTS: Employment status did not influence steps/hr for Week (F(1, 54) = 2.78, p = .10) or Weekend day (F(1, 54) = 2.97, p = .091). Moreover, employment status did not influence percent sedentary time for Week (F(1, 54) = .36, p = .550) or Weekend days (F(1, 54) = 1.29, p = .260).

CONCLUSION: Employment status does not appear to affect the percentage of the day spent in sedentary behaviors or physical activity among patients long-term post-bariatric surgery. Future research should focus on tailoring both exercise and lifestyle programs to the needs of employed and unemployed patients.

3052 June 2 4:15 PM - 4:30 PM
Diet plus Varying Doses of Physical Activity on Weight Loss: The Heart Health Study
Renee J. Rogers, Meghan R. McGuire, John M. Jakicic, FACSM. University of Pittsburgh, Pittsburgh, PA. (Sponsor: John M. Jakicic, FACSM)
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No relationships reported

Raj J. Rogers: Contrasted Research - Including Principle Investigators, Weight Watchers but no choral, in.

PURPOSE: This study examined whether adding physical activity recommended for public health (150 min/wk) or weight control (250 min/wk) to a diet enhanced weight loss or selective cardiometabolic risk factors in obesity across 12 months.
METHODS: Participants (N=383; Age=44.7±8.2 years, BMI=32.4±4.3 kg/m²) were randomized to a reduced calorie diet (Diet, N=127), diet plus a moderate dose of physical activity (MOD-EX, N=129), or diet plus a high dose of physical activity (HIGH-EX, N=127). All groups received weekly in-person intervention sessions for months 1-6, with combined in-person and telephonic sessions for months 7-12. Diet was prescribed at 1200-1800 kcal/day. MOD-EX was prescribed physical activity that progressed to 150 min/wk with HIGH-EX progressed to 250 min/wk. Physical activity, weight, waist circumference, and resting blood pressure were assessed at 0 and 12 months.

RESULTS: Retention at 12 months was 86.6% in DFT, 80.6% in MOD-EX, and 83.5% in HIGH-EX. Physical activity at 0 and 12 months was 65.4±73.8 and 88.2±104.3 min/wk in DFT; 68.7±93.8 and 179.1±125.3 min/wk in MOD-EX; and 71.5±84.4 and 228.8±148.3 min/wk in HIGH-EX (Group X Time p<0.001). Weight decreased in at 12 months (DFT: -9.9±8.2 kg, MOD-EX: -10.3±8.3, HIGH-EX: -9.5±7.7 kg) (p<0.001), with no difference between groups. There were also significant and similar changes across groups in waist circumference at 12 months (DFT: -8.8±8.1 cm, MOD-EX: -10.4±8.8 cm, HIGH-EX: -9.3±7.4 cm) (p<0.001). Resting systolic and diastolic blood pressure decreased significantly (p<0.001) by 4.3±10.1 mmHg and 2.6±6.6 mmHg, respectively; however, there was no difference between groups.

CONCLUSIONS: MOD-EX and HIGH-EX engaged in physical activity that was consistent with the prescribed doses of physical activity; however, this did not improve weight loss, waist circumference or resting blood pressure compared to DFT at 12 months. It is likely that compensation in energy balance occurred in response to physical activity that limited additional weight loss or changes in physical activity (MOD-EX). However, this did not differ between groups.

2.6±6.6 mmHg, respectively; however, there was no difference between groups.

RESULTS: There were no significant differences in age between groups. T1 REE oxidation measurements were taken at 120 (T2) and 240 (T3) minutes post shake. Age=35.5±2.1 yrs; BMI=34.7±7.6) Caucasian women. Participants then consumed a high fat shake (975 kcal, 62% fat). Additional REE, lipid and carbohydrate oxidation measurements were taken at 120 (T2) and 240 (T3) minutes post shake.

RESULTS: There were no significant differences in age between groups. T1 REE was significantly higher (p<0.05) among obese (1930.2±179.3 kcal) women compared to lean (1607.7±120.0 kcal) women. There was a significant time effect on lipid and carbohydrate oxidation (p<0.05) and a significant BMI effect (p<0.05) on lipid oxidation. Lipid oxidation increased among both groups, but was significantly higher among obese (T1=0.12±0.01, T2=0.14±0.01, T3=0.13±0.01) women compared to lean (T1=0.08±0.01, T2=0.11±0.01, T3=0.10±0.01) at all three time points. Although not significant, there was a trend for the lean women to increase lipid oxidation to a greater extent from T1 to T2 (lean 38.3±13.8% increase vs. obese 16.7±0.0% increase; p=0.11). CONCLUSIONS: Current preliminary data suggest that lipid oxidation is higher among obese women compared to lean after consuming a single high fat meal. The obese women appear to respond similarly in terms of metabolic flexibility, compared to lean women. A single high fat meal may not be enough of a stimulus to elicit the metabolic inflexibility previously reported among obese women in response to a high fat diet. Supported by WKU Graduate School Research Grant.
**3059** June 2 3:35 PM - 3:55 PM  
**Chronic Dyspnea - Running**  
Jack Nickless, Anthony Romeo. Midwest Orthopaedics at Rush, Chicago, IL.  
(No relationships reported)

**History:** 63 year-old male presented to clinic with complaint of continued severe shortness of breath status-post left total shoulder arthroplasty. Surgery was performed under general anesthesia with interscalene nerve block for regional anesthesia. Previously, patient had been running 3 miles per day and golfing regularly without issues. Immediately after the surgery, he began to notice a significant decrease in his functional status due to SOB. He now has difficulty walking up one flight of stairs, cutting the grass, or golfing more than 9 holes because of the SOB he experiences with activity. Denies fevers, chills, cough, hemoptysis, chest pain, palpitations, and calf pain. He is otherwise very happy with the improvements in pain, ROM, and overall functionality of his left shoulder s/p left TSA.

**Physical Examination:** VS: BP 132/76, P 66, Temp 36.7 C, Resp 18, Sp02 96%. Gcn: Awake, alert, cooperative, NAD. Lungs: No increased work of breathing, good air exchange, CTAB, No rales or wheezing; CV: RRR, +S1S2, no S3 or S4, no murmurs noted; Neuro: A2x3, sensation to light touch intact throughout LUE, no focal deficits; Skin: Surgical incisions clean, dry, and intact


**Test and Results:** 1. CT Chest: significant pleural effusion, negative for PE; 2. CTA Chest: significant pleural effusion, negative for PE; 3. CT Abdomen and pelvis with contrast: splenic injury - football.

**Final Working Diagnosis:** Left diaphragmatic paralysis secondary to phrenic nerve injury associated with interscalene block

**Treatment and Outcomes:** 1. Patient initially on Aspirin and encouraged to ambulate for DVT prophylaxis 2. Provided with an incentive spirometer to prevent post-op atelectasis without findings of underlying medical condition to explain symptoms 4. Suspected phrenic nerve injury associated with pre-operative interscalene block 5. Pulmonary rehabilitation performed with minimal improvement symptoms 6. We have discussed the possibility of further pulmonary rehabilitation vs. neurosurgical consultation for possibility of phrenic nerve decompensation with possible nerve graft

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**3060** June 2 3:55 PM - 4:15 PM  
**Thirteen-year-old Female Football Player With Shortness Of Breath**  
Mark R. Johnson. SIU SOM, Springfield, IL.  
(No relationships reported)

**History:** Patient is a 13 y/o otherwise healthy female who complains of Shortness of Breath (SOB) and chest discomfort. Patient is a football player (tackle) in a community football program. SOB is described as a chest tightness in the mid chest starting 10 minutes into running. She denies throat tightens and reports expiratory wheezing. She has been kicked by a goalie in the abdomen, although she did not experience much pain with that incident. In the ED the patient denied chest pain or pressure, cough, congestion, shortness of breath, vomiting, diarrhea, constipation, black or bloody stools. PMH: allergic rhinitis. PSH: none. Allergies: NKDA. Meds: Flonase.

**Physical Examination:** Temp 98.4 deg, HR 85, BP 116/60, SaO2 100% on room air. Well-developed and well-nourished. Alert and oriented to person, place and time. Head normocephalic and atraumatic. Pupils equal, round, reactive to light and accommodation. Sclera anicteric. No conjunctiva injection. Extraocular movements intact. Trachea midline. Lungs clear to auscultation with normal breath sounds bilaterally. Abdomen soft with tenderness in the RUQ and voluntary guarding. No rigidity, rebound, abrasions, Grey-Turner sign, or Cullen’s sign. No masses or hepatosplenomegaly. No CVA tenderness. No focal or neurological deficits.


**Tests and Results:** WBC count of 14.6, Hgb and hematocrit of 13.7 and 41. Urine preg. negative, BUN and Cr 21 and 1.03, alk phos 109, ALT 304, AST 346, Total Bilirubin 0.6, Lipase 76, CRP <0.29, lactate acid 0.9, monosopet neg, UA positive for trace ketones. CT abdomen and pelvis with contrast: - Three hepatic contusions without laceration or hemoperitoneum

**Final Working Diagnosis:** Liver contusions

**Treatment and Outcomes:** 1. Liver enzymes and WBCs trended to normal. 2. Cleared for light stationary biking at one month. 3. Patient has not been cleared for full sport participation. She will avoid contact sports participation for three months from the time of injury. May consider a repeat CT scan at that time to verify resolution of the contusions.

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**3062** June 2 4:35 PM - 4:55 PM  
**Splenial Injury - Football**  

**Email:** jennyskimmd@gmail.com

(No relationships reported)

**History:** A 21-year-old football wide receiver sustained a hit to his left ribs by an opposing player’s helmet during the last quarter of a mid-season game. After being tackled, the athlete was able to get up and walk off the field.

**Examination:** Athlete was assessed on the sidelines shortly after injury and found to have localized tenderness along the lower left ribs. He reported mild nausea but no dizziness or shortness of breath. Pain was made worse by twisting movements of the torso and deep inspiration. He was given a bag of ice to place on his ribs. At the end of the game his exam and symptoms had not changed. A few hours later he noticed the pain was worse with supine position. Pain did not improve with Tylenol. Late in the evening, the intensity of pain did not subside and began to radiate to his left shoulder.

**Differential Diagnosis:** 1. Rib contusion 2. Lower rib fracture(s) 3. Splenic injury

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TEST AND RESULTS: On the advice of his trainer, the athlete went to ED that night. X-rays of the ribs were negative for fracture. No further studies were done. He was diagnosed with rib contusion and discharged home with pain medication. The following morning, his pain had worsened and he developed emesis with attempts to eat. Again on the advice of his trainer he returned to Urgent Care. The examining physician noted abdominal bloating and left upper quadrant tenderness. He was then sent to the ED where a CBC drawn was notable for anemia. Ultrasound and CT abdomen confirmed diagnosis of splenic laceration.

FINAL/WORKING DIAGNOSIS: Splenic laceration, grade IV

TREATMENT AND OUTCOMES: 1. After reviewing the CT scan, it was determined that immediate surgical intervention was not needed 2. Athlete was admitted to ICU where serial Hb/Hct was monitored for the next 48 hours. Hct stabilized and athlete remained hemodynamically stable 3. Athlete was discharged from hospital with restrictions on return to play until 3 months post injury. He is feeling well but unable to return to football before the end of this season.

**History:** 17 year old male wide receiver came to the sideline with severe 7/10 sharp, stabbing, mid abdominal pain at a high school scrimmage after he had caught a pass and was tackled. He was unaware if a body part or a helmet struck him in the abdomen. Another teammate came over and said he was sandwiched by two players. He denied any radiation of his pain. He noted associated difficulty breathing and numbness in his fingers bilaterally. He also noticed for baseline pregame activities of playing with his hands. The history and physical examination of the abdomen showed a soft, non-distended, thin abdomen with normal bowel sounds and normal tenderness in the left upper quadrant. He also displayed guarding. Patient was mentating well but was tachycardic with normal lung sounds. His skin was cool in the distal extremities. After 5 mins of rehydration and monitoring, he was evaluated again with similar findings of 7/10 abdominal pain. The abdominal exam was repeated and no significant improvements were noted. The decision was made to transfer him to the local emergency department by EMS for imaging of his abdomen and closer monitoring.


**Tests and Results:** CT Abdomen and Pelvis with IV Contrast shows an extensive irregular mid splenic fracture at the level of the hilum measuring from 3.5 to 5.5 cm. There is hypodense intrahepatic fluid extending across the upper abdomen and down both flanks in the cul-de-sac. Left renal upper pole laceration with contained intracapsular hematoma.

**Final/Working Diagnosis:** CT Abdomen and Pelvis with IV Contrast shows an extensive irregular mid splenic fracture at the level of the hilum measuring from 3.5 to 5.5 cm. There is hypodense intrahepatic fluid extending across the upper abdomen and down both flanks in the cul-de-sac. Left renal upper pole laceration with contained intracapsular hematoma.

**Treatment and Outcomes:** 1. After reviewing the CT scan, it was determined that immediate surgical intervention was not needed 2. Athlete was admitted to ICU where serial Hb/Hct was monitored for the next 48 hours. Hct stabilized and athlete remained hemodynamically stable 3. Athlete was discharged from hospital with restrictions on return to play until 3 months post injury. He is feeling well but unable to return to football before the end of this season.

**History:** 16 year old male football player presented to the office with left shoulder weakness 5 days after he was clipped and landed on his left shoulder. At time of injury, he experienced a dull 6/10 ache in the lateral shoulder, but was able to continue playing for the last few minutes of the game. The following morning, he developed difficulty moving his arm, including reaching across his body and tying his shoes. His shoulder pain was gradually improved at the time of the visit, but weakness persisted.

**Physical Examination:** He has full painless active cervical ROM, Spurling’s Negative. Left shoulder exam reveals a diminished painless ROM with forward flexion to 20 degrees and abduction to 20 degrees. He has external rotation to 70 degrees and internal rotation to T10 bilaterally. He has 4/5 strength with internal rotation, 5/5 with external rotation, 3/5 with abduction and forward flexion. He has mild tenderness to palpation over the anterior shoulder. He has no tenderness over the SC, AC, or the supraspinatus. He has a negative scap test and resisted adduction. He has a drop arm with lowering from abduction.

**Differential Diagnosis:** Supraspinatus tear; Labral Tear; Axillary nerve palsy, shoulder dislocation, Cervical radiculopathy, Cervical disc herniation. Humerus fracture

**Tests and Results:** X-ray of the shoulder revealed no evidence of fracture, dislocation or other abnormality. MRI of the shoulder revealed normal contour of the greater tuberosity, mild subchondral subchondral bursitis and no rotator cuff or labral tear appreciated.

**Final Working Diagnosis:** Transient axillary nerve palsy with osseous contusion of humerus.

**Treatment and Outcomes:** Over the following two weeks, he regained full strength and motion. Axillary nerve palsy, commonly associated with shoulder dislocations, is rare following a simple fall to the ground.

**History:** A 63 year-old male presented with a 2-week history of left upper extremity pain after being hit by a car on his left side while riding his bicycle. He sustained fractured ribs, an extrarticular fracture-dislocation of the left medial clavicle, a minimally displaced oblique fractured left scapular body, and a displaced, comminuted fractured left distal radius for which he underwent ORIF. While hospitalized, he was informed there were no surgical options to treat his left clavicle fracture-dislocation.

**Physical Examination:** Examination revealed a male with his left arm in a sling. He had a prominent anterior sternoclavicular joint and deformity of his medial clavicle. His range of motion was limited due to pain and guarding. He had 2+ radial pulses, intact sensation to light touch, and no obvious motor dysfunction of his upper extremities.

**Differential Diagnosis:** 1. Anterior sternoclavicular joint dislocation 2. Medial clavicular fracture-dislocation

**Tests and Results:** Left shoulder CT scan: 1. Comminuted, anteriorly angulated fracture of the medial aspect of the left clavicle with severe shortening and subluxation of sternoclavicular joint. 2. Minimally displaced oblique fracture through scapular body. 3. Multiple anterior and posterior ribs. No pneumothorax. No pneumothorax.

**Final Diagnosis:** 1. Medial clavicular fracture with significant shortening and fracture-dislocation of sternoclavicular joint. 2. Minimally displaced scapular body fracture. 3. Anterior and posterior rib fractures.

**Treatment and Outcomes:** He underwent an ORIF of his medial clavicle fracture-dislocation using a 7-hole 15-mm hook plate. The plate was placed under the inferior border of the medial head of the clavicle and superior to the first rib to push the lateral clavicle fragment posteriorly to reduce the fracture. Screws were placed in the hook plate to stabilize the fracture and maintain the clavicle out to length as much as possible. The arm was ranged with mild motion of the hook plate under the sternum and the fracture stable. His scapular and rib fractures were treated nonoperatively. A hook plate is designed for fixation of a lateral clavicle fracture, but its use in medial clavicle fractures has not been well established. We offer this case as an example of a successful outcome using this novel operative approach.
A 22 year-old male professional ballet dancer presented with a 1 year history of right shoulder/neck pain, worse with abduction. Outside facility workup included normal x-rays, C Spine MRI with a small annular posterior disc bulge at C6-7, Shoulder MRI with mild increased T2 signals at insertional sites of supraspinatus and long head biceps tendons. NCS of median/ulnar nerves were normal and needle EMG of deltoid, infraspinatus, serratus anterior and rhomboid major also normal. She was treated with a subacromial corticosteroid injection and therapy with minimal improvement, and is now presenting with unresolved chronic symptoms impacting her ADLs.

PHYSICAL EXAMINATION:
On inspection decreased muscle bulk in right trapezius on shoulder shrugged and scapular retraction. No tenderness to palpation. Passive range of motion full in all planes, and notable for right scapular hump with abduction greater than 60 degrees and loss of abduction control of scapula, as it rides into anterior/superior supracavicular region. Active shoulder abduction limited to 54 degrees when standing due to weakness, but able to obtain full 170 degrees when supine. Strength of right trapezius is 4/5, remaining muscles 5/5 with scapula stabilized. Sensation intact to light touch and shoulder impingement maneuvers are negative.

TEST AND RESULTS:
Our repeat NCS done personally was significant for an abnormal right spinal accessory nerve SNAP to the trapezius with significantly decreased amplitude and onset latency comparable to the left side. Needle EMG was evident for normal right deltoid, infraspinatus, serratus anterior, rhomboid major but markedly abnormal right upper and middle trapezius findings with increased insertional activity, fibrillation potentials, positive sharp waves, polyphasic MUAPs and reduced recruitment.

DIFFERENTIAL DIAGNOSIS:
1. Type 1 SLAP tear
2. Supraspinatus/Infraspinatus tendinosis
3. Glenoid osteoarthritis
4. Intra-articular bodies
5. Adhesive capsulitis

TEST & RESULTS: X-ray: mineralization at medial surgical neck, possible IGHL injury. MR arthrogram: anterosuperior labral tear from 12 o’clock; extensive chondral delamination anterior glenoid, focal high-grade chondral loss central glenoid; intra-articular bodies in posterior recess; supraspinatus/ infraspinatus tendinosis.

FINAL WORKING DIAGNOSIS:
Right incomplete spinal accessory neuropathy - mostly affecting upper fibers.

TREATMENT AND OUTCOMES:
1. Collaboration with sports medicine orthotist for molding of a customized scapular stabilizer/retraining brace.
2. Physical Therapy Rx for shoulder girdle complex strengthening and range of motion exercises.
3. Patient with significant improvement in pain, range of motion, and general function with brace.
DIFFERENTIAL DIAGNOSIS:
First rib stress fracture
Rotator cuff tear
Cervical sprain

TEST AND RESULTS: A left sided rib series was performed which demonstrated an incomplete fracture of the first rib. No significant displacement was seen although slight elevation of the distal clavicle was noted which appeared to be chronic.

FINAL WORKING DIAGNOSIS: Stress fracture of the first rib

TREATMENT AND OUTCOMES:
Refrain from participating in ballet practice for 4-6 weeks with gradual return to dance
Arm immobilization with a sling
Vitamin D/Calcium supplementation
Repeat isolated rib radiographs at 2 and 6 weeks
Patient was re-evaluated at 2 and 6 weeks post-injury. At 2 weeks the patient was instructed to participate in graded physical therapy but due to insurance issues he was unable to start until 6 weeks post-injury.

At 6 weeks, he displayed full shoulder elevation and abduction and there was no significant pain to palpation over the first rib. He endorsed some mild discomfort over the trapezius and scalene muscles and his shoulder strength was graded 4/5.
Repeat plain films demonstrated proper rib alignment and some early bridging callus formation. He was instructed to follow-up in 1 month and to begin physical therapy

F-51  Basic Science World Congress/Poster - Stress and Behavior
Friday, June 2, 2017, 1:00 PM - 6:00 PM
Room: Hall F

3096  Board #1  June 2 2:00 PM - 3:30 PM
Anxiety Level Moderates the Acute Impact of Light and Moderate Intensity Aerobic Exercise on Working Memory
Olga G. Berwid1, Sarah C. O’Neill1, Nacima Chen1. 1York College, City University of New York, Jamaica, NY. 2The City College of New York, New York, NY.
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PURPOSE: Accruing evidence suggests that there is an improvement in working memory immediately after a single bout of moderate-intensity aerobic exercise with smaller and more variable effect sizes in healthy young adults than in other groups (Ludyga et al., 2016). Individual differences in the impact of exercise on cognition mediated by a variety of different factors may account for some of this variability.

The aim of the current study was to determine whether the impact of both light- and moderate-intensity aerobic exercise on verbal and nonverbal working memory differs in individuals who report higher versus lower levels of trait anxiety.

METHODS: 125 young adults were administered Operation Span (O-SPAN) and Symmetry Span (S-SPAN) tasks twice; once after spending approximately 40 minutes completing questionnaires including the State-Trait Anxiety Inventory (STAI-T); and once after 40 minutes of either moderate-intensity (>60% of age-predicted maximum HR) or light-intensity (~55% of age-predicted maximum HR) aerobic exercise. Session order was counterbalanced across participants and participants were randomly assigned to exercise intensity. A median split on the STAI-T was used to separate participants into lower and higher anxiety groups. The impact of exercise and anxiety on WM was examined in 2 (Intensity) x 2 (Anxiety Level) x 2 (Session) mixed-factorial analyses of variance.

RESULTS: For S-SPAN performance, there was a significant Anxiety x Session interaction (F = 4.04; p = .047; partial eta-squared = .05) indicating that those reporting higher levels of trait anxiety may benefit slightly more from exercise than those with lower levels of anxiety. For O-SPAN performance, there was a significant 3-way Intensity x Anxiety x Session interaction (F = 6.27; p = .014; partial eta-squared = .05) revealing differing patterns of moderate- and low-intensity exercise for the higher and lower anxiety groups. There were no other significant effects.

CONCLUSIONS: The data suggest that light- and moderate-intensity aerobic exercise may exert different impacts on working memory in individuals reporting lower versus higher levels of trait anxiety; however, effect sizes are small.
PURPOSE: Our previous findings have shown a significant relationship between the severity of exercise-related menstrual disturbance and an increase in perceived stress. In this analysis, we examined underlying factors that contribute to changes in psychological stress with the induction of exercise-related menstrual disturbances in a 3-month exercise and caloric restriction intervention in sedentary, regularly menstruating women (n=36). METHODS: Women (age 18-24 yrs, BMI 18-28 kg/m²) were randomized to either an exercise only group or one of four groups designed to induce an energy deficit through varying combinations of caloric restriction and exercise over 3 menstrual cycles preceded by a Baseline cycle. The intervention included exercise (5/d, 50-85% VO2max, 20-75 min) and controlled diet. Menstrual function and reproductive hormones were characterized using daily urinary estrone-1-glucuronide (E1G), pregnanediol glucuronide (PDG), luteinizing hormone, and menstrual calendars. Depressive symptoms were assessed with the Beck Depression Inventory (BDI). Presence of eating disorders was assessed using the Eating Disorder Inventory (EDI). Psychological stress was assessed with the Perceived Stress Scale. Other factors investigated were anthropometrics, fitness, age, and reproductive factors. RESULTS: The intervention caused moderate weight loss (2.59 ± 0.35 kg), increases in fitness, declines in body fat and declines in E1G and PDG (p<0.006). Perceived stress increased significantly across the intervention (p<0.001). Changes in perceived stress were associated with baseline luteal phase PDG AUC (r = 0.387, p = 0.024), change in body weight (p = 0.017, R = 0.401), change in fat free mass (p = 0.20, r = 0.391), and the change in BMI (r = 0.419, p = 0.012) such that higher baseline PDG concentrations and greater reductions in BMI and body weight were associated with lower increases in perceived stress. Baseline scores of BDI and EDI were not significantly related. Age, fitness, body composition, luteal phase length, and follicular phase E1G were also not significantly predictive of PSS. CONCLUSION: Stress sensitivity as defined by changes in perceived stress and related menstrual disorders may depend on baseline ovarian status and changes intervention induced changes in anthropometrics.
Acute aerobic exercise has been shown to reduce craving for various addictive substances like cigarettes and alcohol. A similar effect has been seen in children when examining brain MRI responses to fatty foods. PURPOSE: The purpose of this investigation is to examine the impact of acute aerobic exercise on cue reactivity to fatty and healthy foods in typical college-aged women. METHODS: Six women (Age=24.7±0.9 years, BMI=26.6±2.5, VO2peak=35.3±4.1 ml.kg⁻¹.min⁻¹) completed 2 experimental sessions. During one session subjects rested for 30 minutes and during the other session subjects exercised for 30 minutes at a moderate exercise intensity (77±1% of Peak HR) on a semi-recumbent bike. Treatments were applied in a counter-balanced fashion and subjects fasted for 4 hours prior to each session. Prior to and immediately following each session, EEG data were collected using a 64-channel EGI Geodesic EEG System (10/20 electrode system and 300 series while subjects were exposed to 280 images (40 Distractor (DIS), 120 Fatty Foods (FAT), 120 Healthy Foods (HEALTHY)). Images were presented in a random order and proceeded by a fixation stimulus using a variable time span (0.5 to 1.5 sec). After collection, data were processed to calculate the mean and peak voltage associated with the P300 (200-500 ms post stimulus) in all electrodes. For this investigation, only the electrodes associated with the parietal lobe of the brain were used for comparison and average EEG responses in these electrodes are presented here. RESULTS: Reaction time to distractor stimuli was reduced following exercise (Pre=513±8 ms, Post=483±10 ms, p=0.004) as compared to resting (Pre=530±17 ms, Post=522±15 ms, p=0.22) Acute aerobic exercise had no impact on the EEG response to FAT (Mean Response: Pre=0.35±1.42 μV, Post=0.42±1.66 μV; Peak Response: Pre=1.71±1.41 μV, Post=2.08±1.68 μV) or HEALTHY (Mean Response: Pre=−0.39±0.76 μV, Post=−0.42±1.28 μV; Peak Response: Pre=1.74±0.82 μV, Post=2.63±1.52 μV) images. CONCLUSION: These findings suggest that acute aerobic exercise of moderate intensity does not influence cue reactivity to images of fatty and healthy foods in normal college-aged women. PURPOSE: Sedentary behavior and obesity increase the risk of endometrial cancer (EC), particularly Type I forms, which are increasing in the U.S. Further, although death rates from most cancers are decreasing, overall mortality rates for EC are increasing; and, obese EC patients have significantly poorer survival compared to normal weight EC patients. No prior studies have examined neural activation to fatty and healthy foods in typical college-aged women. METHODS: Six women (Age=24.7±0.9 years, BMI=26.6±2.5, VO2peak=35.3±4.1 ml.kg⁻¹.min⁻¹) completed 2 experimental sessions. During one session subjects rested for 30 minutes and during the other session subjects exercised for 30 minutes at a moderate exercise intensity (77±1% of Peak HR) on a semi-recumbent bike. Treatments were applied in a counter-balanced fashion and subjects fasted for 4 hours prior to each session. Prior to and immediately following each session, EEG data were collected using a 64-channel EGI Geodesic EEG System (10/20 electrode system and 300 series while subjects were exposed to 280 images (40 Distractor (DIS), 120 Fatty Foods (FAT), 120 Healthy Foods (HEALTHY)). Images were presented in a random order and proceeded by a fixation stimulus using a variable time span (0.5 to 1.5 sec). After collection, data were processed to calculate the mean and peak voltage associated with the P300 (200-500 ms post stimulus) in all electrodes. For this investigation, only the electrodes associated with the parietal lobe of the brain were used for comparison and average EEG responses in these electrodes are presented here. RESULTS: Reaction time to distractor stimuli was reduced following exercise (Pre=513±8 ms, Post=483±10 ms, p=0.004) as compared to resting (Pre=530±17 ms, Post=522±15 ms, p=0.22) Acute aerobic exercise had no impact on the EEG response to FAT (Mean Response: Pre=0.35±1.42 μV, Post=0.42±1.66 μV; Peak Response: Pre=1.71±1.41 μV, Post=2.08±1.68 μV) or HEALTHY (Mean Response: Pre=−0.39±0.76 μV, Post=−0.42±1.28 μV; Peak Response: Pre=1.74±0.82 μV, Post=2.63±1.52 μV) images. CONCLUSION: These findings suggest that acute aerobic exercise of moderate intensity does not influence cue reactivity to images of fatty and healthy foods in normal college-aged women.

PURPOSE: Neurocognitive Improvements Following a 12-Month Diet and Physical Activity Intervention


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No relationships reported

PURPOSE: Obesity is associated with decreases in cognitive function, including changes in working memory and executive control. Yet, we know very little about whether weight loss through an energy-restricted diet and increased physical activity (PA) improves cognitive function. The aim of this study was to evaluate whether weight loss following a 12-month dietary and physical activity intervention was associated with improved cognitive performance.

METHODS: 115 overweight and obese adults (89 female) participated in a 12-month diet and PA intervention. Participants were middle-aged (mean at baseline=44.7±8.5 years) and well educated (mean=16.5±2.5 years). Participants were assigned to one of three groups: One group engaged in dietary restriction alone, while the other two groups engaged in either 150 minutes per week or 250 minutes per week of moderate intensity exercise, in addition to an energy-restricted diet. All participants completed neuropsychological tests measuring decision-making (Iowa Gambling Task; IGT), inhibitory control (color-word Stroop), working memory (N-Back), and processing speed/ set shifting (Task Switch), paired samples t-tests compared baseline with post-intervention cognitive performance. The results reported below are collapsed across group, as the investigators remain blind to group assignment.

RESULTS: Following the intervention, participants’ BMI decreased by 2.4±3.3 kg/m², p<.001. Participants performed significantly better post-intervention on the IGT [(t(114)=-2.42, p=.016), N-Back [t(2-Back RT [(t(114)=-2.68, p=.008), and Task Switch [RT [(t(113)=1.79, p=.046)] compared to baseline. There were no significant changes in Stroop Task performance from baseline to follow-up. The changes in cognitive task performance were not significantly associated with change in BMI.

CONCLUSIONS: A 12-month diet and physical activity intervention in overweight and obese adults is associated with improved cognitive performance across multiple cognitive domains.

FUNDING: This research was supported by funding from NIH/ NIDDK grants R01095172 (PI: Erickson) and R01HL103646 (PI: Jakicic).

No relationships reported

PURPOSE: Benefits of Acute Aerobic Exercise on Neuroplastic Potential in Depression

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No relationships reported

PURPOSE: To examine the efficacy of acute AE as a neuro-modulatory intervention in non-depressed controls. METHODS: Thirteen non-depressed subjects (8 female; 34.5 ± 8.7 years old) completed three experimental sessions that included assessment of corticospinal excitability (CE), AE (15 minutes) and paired associative stimulation (PAS) to determine neuroplastic potential. CE was assessed using transcranial magnetic stimulation and surface electromyography of the abductor pollicis brevis muscle before and after exercise, and for one hour after PAS.

AE was performed on a stationary cycle ergometer at low intensity (LO), 35% heart rate reserve (HRR); high intensity (HI), 70% HRR; or a non-exercise control condition (CON). The primary outcome was change in peak-to-peak motor evoked potential amplitude relative to baseline assessment. RESULTS: Mean post-exercise CE across all time points was increased 26.2% in the LO condition, and 2.9% in the CON condition while the HI condition reduced CE 6.5%. Immediately following exercise, the LO condition produced a rapid 27.1% increase in CE while the HI condition produced a rapid 16.3% decrease in CE. Both the LO and HI conditions demonstrated a homeostatic response immediately post-PAS with a 15.0% reduction and 27.8% increase in CE, respectively. CONCLUSION: Lower exercise intensity appears to have a greater influence on increasing CE. Interestingly, the rapid effects of exercise appeared to be reversed by PAS suggesting the presence of homeostatic meta-plasticity during these conditions. Modulation of CE via exercise in depression has yet to be established but may underlie the anti-depressant effects of AE. Work examining the influence of AE on CE in depression is currently in progress.
Fitness Professionals

FREE COMMUNICATION/POSTER - ACTIVITY INTERVENTIONS AND PROGRAMMING IN YOUTH

Board #12
Friday, June 2, 2017, 1:00 PM - 6:00 PM
Room: Hall F

3107
June 2 3:30 PM - 5:00 PM
Improvements in Family Nutrition and Physical Activity during FitKids360: Associations with Adiposity Changes
Kim Delafuente1, Jared Tucker2, Kathy Howard1, Jill Graybill1, Gregory Welk, FACSM1, Spectrum Health, Grand Rapids, MI. 2Helen DeVos Children’s Hospital, Grand Rapids, MI. 3Forest Hills Pediatrics, Grand Rapids, MI. 4Iowa State University, Ames, IA. (Sponsor: Gregory Welk, FACSM)
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Purpose
The Family Nutrition and Physical Activity survey (FNPA) is a validated health behavior survey for assessing childhood obesity risk, but it has not been evaluated as a tool to track behavior change over time. The current study assessed FNPA in youth who completed a pediatric weight management program, and compared associations between FNPA and adiposity changes.

Methods
Youth 5-16 years old with a BMI>85th percentile participated in FitKids360, a 6-week, multidisciplinary, family-based intervention aimed at improving physical activity, nutrition, and sedentary behaviors. The FNPA was parent-reported pre and post intervention, and height and weight were assessed via trained program staff. Total FNPA and subscale scores were calculated, including screen time, physical activity, family meals, food and beverage choices, parental food restrictions and rewards, and sleep routines. Participants were grouped based on BMI percentile (BMI%) changes during treatment, after which FNPA scores were compared across genders, age groups, and BMI-change categories.

Results
A total of 1102 youth (10.7±3.0 years) initiated treatment, and 790 completed the program (72% retention). Mean FNPA scores significantly increased 5.6±7.4 points (p=0.001) while BMI% decreased -0.43±2.12 percentile points (p=0.001). After adjusting for baseline FNPA, youth <11 years of age had higher post FNPA scores than older youth (p=0.001), but FNPA did not differ between genders. When grouped by high (≥80%), moderate (4.0 to 79.9%) and low (<4.0%) BMI% changes, youth with high reductions had healthier FNPA scores (63.2±7.8) than those with low BMI% changes (59.6±8.1) (p=0.005), and a trend towards higher scores than those with moderate reductions (61.7±7.3) (p=0.080). FNPA subscales also differed between BMI% groups, such that greater adiposity reductions were associated with healthier beverage choices (p=0.034) and lower screen time (p=0.005).

Conclusions
FitKids360 completers improved FNPA scores and reduced age- and sex-adjusted BMI. After adjusting for baseline differences, youth with the highest post-treatment FNPA scores had the greatest improvements in adiposity. The FNPA appears to be a useful tool for tracking progress in obesity-related health behavior changes during family-based pediatric weight management.

3108
Board #13
June 2 3:30 PM - 5:00 PM
The Experimental Effect Of Parental Attentiveness On Children's Physical Activity
Michael J. Rebold1, Cody Croll1, Emily Cumberledge2, Melanie Hall1, Lindsey Raukimatis1. 1Hiram College, Hiram, OH. 2Bloomsburg University of Pennsylvania, Bloomsburg, PA.
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Purpose
To assess the amount, intensity, enjoyment (i.e., liking), and activity.

Methods
Ten children (age 5 to 12 years) actively attentive it is positively associated with their children’s physical activity, and sedentary behaviors. One potential factor may be parent attentiveness. While evidence from non-experimental studies provides support that when parents are actively attentive their children’s physical activity increased by 99.82% and reduced sedentary behavior by 85.64%. Parental attentiveness during bouts of physical activity may be an important component to consider when children are engaging in physical activity.

More than half of preschool-aged U.S. children spend their time in a structured preschool setting largely engaged in sedentary behaviors. Given the low levels- yet important of physical activity (PA) for prevention of obesity, preschools may be an ideal environment to house a large number of children at an early age. The purpose of this study is to examine whether a teacher-led PA intervention increased moderate-to-vigorous physical activity (MVPA) in preschool-aged children. METHODS: An evidence-based PA curriculum was implemented in a local preschool over 12-weeks, 3 times per week by classroom teachers with assistance provided by UVM students enrolled in a service-learning course. Main outcomes were objectively measured, MVPA by accelerometer. Measures were performed at baseline, 2 intervention points, and 1-week post-intervention. A total of 35 children (4.5 years, 12 females, 23 males) who had at least 3 days of valid data were included in the analyses. RESULTS: Significant (p<0.05) changes were observed in minutes of MVPA/day, sedentary minutes/hour and MVPA/hour. Minutes of MVPA/day significantly increased from pre- to post-intervention (56.5±3.3 vs. 72.6±3.9). Significant increases were observed from baseline to both intervention point 1 and post-intervention (8.45±0.4 vs. 10.8±0.6 and 10.9±0.4, respectively). Sedentary time also significantly decreased from 43.42±0.6 min/hr at baseline to 40.61±0.5 min/hr at post-intervention. CONCLUSIONS: The findings from this study support a teacher-led intervention to increase MVPA in preschool-aged children. These findings are promising as teacher-led PA interventions may be a potentially viable and cost-effective means to accomplish a myriad of health-related goals. Further evaluation of the PA curriculum in a larger cohort and over a longer period of time is warranted.

3110
Board #15
June 2 3:30 PM - 5:00 PM
Effectiveness Of A Low-cost Exercise Intervention For Pediatric Obesity
Email: jacobo.andrea@gmail.com

Purpose
Regular physical activity improves health profiles and quality of life in youth with obesity (YWO), and participation in sport-specific events reportedly improves self-efficacy among youth with little athletic experience. This project retrospectively evaluated the feasibility and efficacy of an ongoing low-cost physical activity intervention to prepare YWO for an athletic event (5K run/walk).

METHODS: The Healthy Lifestyle Clinic (HLC), a multidisciplinary weight management clinic at La Bonheur Children’s Hospital, hosted a race team for a 5K run/walk event. HLC patients were offered a training program designed to be engaging, minimally burdensome for clinical staff, and focused on preparing exerciseresistant YWO to complete a 5K. Training included 3 week training sessions (20-45 minutes) with duration and intensity increased based on rating of perceived exertion. Participants completed workout logs and were invited to workouts in the community with HLC staff members. Weekly phone calls were made to monitor progress, engagement, and individualize the program. On average, phone calls lasted <10 minutes. Retrospective review of medical records and patient communications, was IRB approved.

RESULTS: Initially 28 YWO expressed interest in the training program. Twelve YWO (11.4±2.6 yrs, 151.3±43.13 cm tall, 88.2±24.5 kg, BMI 31.0±7.6 BMI %) actively engaged (reporting >70% adherence) with the training, and 6 participants completed
the 5K race (all 1st time racers). Almost 60% of participants attended all community workouts and those who completed the 5K had greater parent engagement than those who did not. Similarly, those who engaged in more frequent phone contact were more engaged in the training program. More than 80% of families who participated requested the program become a recurring HLC offering, indicating a desire for more engagement in the training program. More than 80% of families who participated expressed interest in another race. CONCLUSIONS: This program was feasible, minimally burdensome, and cost-effective. It had a positive effect on self-reported motivation, physical fitness, and self-efficacy. Parental involvement was a driving factor for program adherence and race completion.

Effects Of 5-week Summer School Program On Inflammatory Markers And Oxidative Stress In Female Adolescents

Miyung Dong Choi1, Kyung Shin Park2. Oakland University, Rochester MI. Texas A&M International University, Laredo, TX.

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Results: Participants had mean VO2peak of 33.0ml/min/kg at baseline survey. After adjustment for baseline values and within-group differences were tested using analysis of variance (P<0.05).

3111 Board #16 June 2 3:30 PM - 5:00 PM
Effects Of 5-week Summer School Program On Inflammatory Markers And Oxidative Stress In Female Adolescents

Myung Dong Choi1, Kyung Shin Park2. Oakland University, Rochester MI. Texas A&M International University, Laredo, TX.

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PURPOSE: To study the effects of different dose of exercise training on cardiorespiratory fitness, body fat percentage and inhibition control of adolescents.

METHODS: Thirty high school female students were recruited and 15 students were assigned to the summer school attendant group (SA) and completed summer school programs with 2-hour exercise daily for 5 weeks and 15 students were in non-summer school attendant group (NSA). Plasma tumor necrosis factor alpha (TNF-α), C-reactive protein (CRP), and total antioxidants were measured immediately before and after summer vacation. One-way ANCOVA was used to determine differences in TNF-α, CRP, and total antioxidant changes between the groups.

RESULTS: Plasma TNF-α was reduced in SA group after summer vacation, compared with the NSA (7.79±2.8 pg/ml vs. 8.33±2.2 pg/ml, respectively, P=0.001). CRP level was increased in the SA group after summer vacation, compared with the NSA (7.7±0.7 mg/L vs. 8.2±0.7 mg/L, respectively, P<0.005). Total antioxidant concentrations were elevated in the SA group after summer vacation, compared with the NSA (1.96±0.4 mL/L vs. 1.80±0.2 mL/L, respectively P=0.018).

CONCLUSION: Five weeks of exercise programs in summer school may ameliorate systemic inflammation and decrease oxidative stress in female adolescents. Thus, these findings may support that school-aged adolescents, while attending at summer school programs, have beneficial outcomes on the cardiovascular health, especially in low socio-economic status communities.

Different Exercise Doses On Fitness , Fatness And Inhibition Control Of Adolescents.

Xin Li1, Xiaotong Li2, Zhengheng Wang, FACSM1, Yan Wang2. Chengdu Sport Institute, Chengdu, China. Beijing Sport University, Beijing, China.

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Purpose: To study the effects of different dose of exercise training on cardiorespiratory fitness, body fat percentage and inhibition control of adolescents.

Methods: A physical activity intervention program was conducted among 12-14 years’ adolescents. 78 students (38 boys) were recruited into the plan after the approval of parents and teachers. According to the classes, we divided the participants into 3 groups. They were low-dose(30min/d, n=20) or high-dose(60min/d, n=23) aerobic training (2wk, 5d/wk), or control condition (usual physical activity, 24) rate of attendance was 55%. Training intensity was the 50%~70% heart rate reserve. We used the breath-by-breath technich to test the VO2. The Bioelectrical Impedance analysis was used to measure the body fat percentage. Inhibition control was measured by a modified Eriksen flanker task. Between-group differences were tested using analysis of covariance(ANCOVA) with adjustment for baseline values and within-group differences were tested using t tests. For statistically significant analyses of variance (P<0.05).

Results: Participants had mean VO2peak of 33.0ml/min/kg at baseline survey. 12 weeks later, after adjustment for the baseline value, compared with control group, the exercise groups increased VO2peak greater (P<0.37, P<0.03). The mean(SE) VO2peak was 38.7±8.10 in low-dose and 38.4±(0.14) in high-dose. But the VO2peak in control group was 34.9±1.03. There was no significant difference between low-dose and high-dose groups. For girls, the decrease in body fat percentage in the high-dose physical training group, but not in the low-dose group, was significantly greater than that in the control group (F=3.94, P=0.03). But there were no significant changes in fatness values of boys from baseline to 3 months. After adjustment for the baseline value, there were no significant changes in inhibition control values from baseline to 3 months in any of the exercise groups vs the control group. Conclusion: Three months of 30 or 60 min/d aerobic training improved fitness, and demonstrated dose-response benefits on general adiposity for girls. However, the effects of exercise intervention on inhibition control for 12-14 aged students should do further research.

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Effect Of A Physical Activity Intervention On Letter And Number Recognition In Preschoolers

Christine W. St Laurent, Sarah Burkart, Sofiya Alhassan, FACSM, University of Massachusetts Amherst, Amherst, MA.

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PURPOSE: The purpose of this study was to examine the effects of a 12-week PA intervention on letter and number recognition in preschool children.

METHODS: Two preschool centers (n=41 children; 53% male) were randomized to a 12-week preschool-based PA intervention (N=22 children) that incorporated short bout PA sessions embedded into the Massachusetts Early Learning Standards or a health-tracking control group (CON; n=22). There were no significant differences between groups. Mean change scores for letter recognition (INT 3.5±4.66, CON 5.5±4.9) and number recognition (INT 0.9±4.3, CON 1.7±2.3) were higher in the CON group compared to the INT group. There was not a significant effect of the intervention on pre- to post-scores. CONCLUSION: The 12-week PA intervention utilized in this study did not elicit a significant improvement in the letter and number recognition of preschoolers. Further research may be valuable.

There is considerable evidence that physical activity (PA) may improve some components of cognition and academic performance in preschool-aged children. PA is an effective strategy to enhance learning in preschoolers who may be at risk for future obesity.

FRIDAY, JUNE 2, 2017

3114 Board #19 June 2 3:30 PM - 5:00 PM
Effect Of A Physical Activity Intervention On Letter And Number Recognition In Preschoolers

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No (relationships reported)

No.  5  Supplement  S657
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to examine the benefits of a preschool PA intervention by utilizing longer intervention periods, additional bouts of academically-tailored PA, and more comprehensive measures of preschool cognitive skills.

Few studies have examined the impact of physical activity (PA) programs during the preschool day, within two different community curriculums. PA has been shown to improve components of classroom behavior in preschoolers. Poor classroom behavior can be indicative of early attention-deficit/hyperactivity disorder (ADHD) symptomology, which is seen in children as young as three years old. However, no studies have examined curriculum-based PA to improve classroom behavior. PURPOSE: To examine the impact of a curriculum-based PA intervention on classroom behavior variables in preschoolers. METHODS: Children (n=52, mean±SD: age=3.6±0.8 years, BMI percentile=50.1±27.1) attending two preschools were randomized to the PA Intervention, or the sleep training (CON) group. PADS consisted of integrating PA lessons into Massachusetts Early Learning Standards. The Strengths and Difficulties Questionnaire (SDQ) behavioral screening tool was used to assess classroom behavior which includes a total difficulties score and subscales encompassing hyperactivity/inattention, emotional problems, conduct problems, peer problems, and prosocial behavior. The SDQ was completed by classroom teachers for each child at baseline, 6 weeks, and 12 weeks. A repeated measures ANOVA was utilized to examine intervention effects on children’s classroom behavior variables. RESULTS: Children at the CON school exhibited greater hyperactivity/inattention (SDQ=2.3±2.9, CON=4.1±3.5), emotional problems (SDQ=3.0±3.6, CON=2.6±2.4), conduct problems (SDQ=0.8±1.3, CON=2.9±3.2), peer problems (SDQ=0.3±1.0, CON=1.2±1.4), and total difficulties (PADS=4.0±3.8, CON=9.0±8.0) at baseline compared to the SDQ. There were no statistically significant effects of time or intervention by time for classroom behavior variables. CONCLUSION: These data suggest a curriculum-based PA intervention did not lead to change in teacher-reported classroom behavior variables. Lack of intervention effect in this population could be due to lack of specificity of intervention components targeting classroom behavior. Future studies should incorporate cognitive skills linked to early ADHD symptomology in PA lessons, include objective behavior measures, and utilize a larger sample size.

A number of healthy eating determinants such as area deprivation, family involvement, knowledge, and attitudes are associated with obesity prevention in children. School-based interventions improved weight status, health knowledge, attitudes, and behaviors. PURPOSE: Therefore, the purpose of this study was to determine immediate and long-term changes in body mass index and psychosocial variables following a 10-week school-based lifestyle intervention designed to improve weight status in children. METHODS: One hundred and thirty eight participants (86.7 ± 51.1 years of age, 64 boys and 74 girls) took part in the study. All participants had height, weight, and psychosocial variables assessed at pre-intervention, post-intervention, and 6-months post-intervention. The Pupil Questionnaire which measured healthy eating attitudes, knowledge, and behaviors was used. A repeated measures analysis design was employed such that participants served as their own control and then completed a 10-week intervention consisting of healthy eating and physical activity education, physical activity, parental involvement, and behavior change. Changes in outcome measures within the group across time was assessed using a one-way repeated measures analysis of variance (RMANOVA) with adjustment for covariates where appropriate. RESULTS: Results from the RMANOVA revealed no significant within-subject main effect for time. Subsequent analysis of the data indicated a significant within group effect of the intervention at different time points such that from pre-intervention to post-intervention, fruit attitudes (CI = -0.22 to 0.02, ES = -0.29, p = 0.006) improved. From post-intervention to 6-months, vegetable attitudes approached a significant decrease (CI = -2.53E-5 to 0.07, ES = 0.13, p = 0.05) and HE attitudes decreased (CI = -0.005 to 0.19, ES = 0.26, p = 0.03). CONCLUSION: Fit for School may be an effective means for improving healthy eating attitudes and behaviors in primary school children in the short-term if the duration of the intervention is increased, but these changes may not be sustained without on-going support.

Positive classroom behavior can be indicative of early ADHD symptomology. Therefore, the purpose of this study was to determine whether a curriculum-based PA intervention had an effect on children’s classroom behavior variables. PURPOSE: To examine the impact of a curriculum-based PA intervention on classroom behavior variables in preschool-age children. METHODS: Children (n=52, mean±SD: age=3-6±0.8 years, BMI percentile=50±1±27.1) attending two preschools were randomized to the PA Intervention, or the sleep training (CON) group. PADS consisted of integrating PA lessons into Massachusetts Early Learning Standards. The Strengths and Difficulties Questionnaire (SDQ) behavioral screening tool was used to assess classroom behavior which includes a total difficulties score and subscales encompassing hyperactivity/inattention, emotional problems, conduct problems, peer problems, and prosocial behavior. The SDQ was completed by classroom teachers for each child at baseline, 6 weeks, and 12 weeks. A repeated measures ANOVA was utilized to examine intervention effects on children’s classroom behavior variables. RESULTS: Children at the CON school exhibited greater hyperactivity/inattention (SDQ=2.3±2.5, CON=4.1±3.5), emotional problems (SDQ=3.0±3.6, CON=2.6±2.4), conduct problems (SDQ=0.8±1.3, CON=2.9±3.2), peer problems (SDQ=0.3±1.0, CON=1.2±1.4), and total difficulties (PADS=4.0±3.8, CON=9.0±8.0) at baseline compared to the SDQ. There were no statistically significant effects of time or intervention by time for classroom behavior variables. CONCLUSION: These data suggest a curriculum-based PA intervention did not lead to change in teacher-reported classroom behavior variables. Lack of intervention effect in this population could be due to lack of specificity of intervention components targeting classroom behavior. Future studies should incorporate cognitive skills linked to early ADHD symptomology in PA lessons, include objective behavior measures, and utilize a larger sample size.

PURPOSE: Increased exposure to Western Civilization has led to an increased incidence of obesity in Alaskan Native villages. Physical activity and sleep patterns may be altered in these rural settings as well. The purpose of this study was to examine the impact of a novel cross country skiing program (ie., Skiku) on the levels of physical activity and sleep quality of Alaskan Native children. METHODS: After a year of exposure to the Skiku program that included bi-annual instruction from high school- to Olympic-level coaches, we worked with the tribal elders to design a culturally appropriate program of assessment, education, and intervention. In order to gauge a longitudinal understanding of the program’s efficacy, we visited the village during early April of 2014 and 2016. RESULTS: The implementation of this program has significantly increased the activity levels of children involved. The World Health Organization recommends that children between the ages of 5-17 perform a minimum of 60 minutes of moderate vigorous physical activity per day to maintain optimal metabolic health and psychological resilience. This program has demonstrated its long term efficacy in promoting healthy lifestyle changes by increasing moderate-vigorous activity in children.

Levels of sedentariness and stress are at historical highs among college students. These occurrences are not mutually exclusive; a negative correlation exists between physical activity (PA) and mental health. This correlation, paired with evidence linking PA to increased brain activation and memory function gives cause for a PA intervention nearing final exams. Accordingly, UNLV implemented Fitness4Finals (F4F). PURPOSE: To determine the effect of F4F on end-of-semester physiological stress (PS), perceived academic stress (PAS) and academic self-efficacy (ASE) in college students, and examine the relationship between PS and PAS. METHODS: 24 participants were grouped by intent to participate in F4F (F4F, n=9) or not participate (Non F4F, n=15). PS (salivary amylase) and PAS were measured at three time-points: the Friday prior to study week (Base), the Friday prior to exam week (Post F4F) and prior to student’s first final exam (Pre-Exam). Data were analyzed using a mixed-model ANOVA at the p<0.05 significance level. RESULTS: A significant group difference was found for PAS at Post F4F (F(1,22) = 4.403, p = 0.049). Though not significant, mean scores revealed lower salivary amylase and PAS for the F4F group across time points. F4F group showed lower ASE at baseline, surpassing the Non F4F group at Post F4F and Pre-Exam time points, while Non F4F stayed unchanged (Table 1). Salivary amylase and PAS trended toward significant correlation at Base (r = .388, p = 0.091) but not Post F4F or Pre-Exam. CONCLUSION: Participation in F4F eases academic stress, albeit temporarily. F4F participants display lower physiological and psychological stress overall and increase academic self-efficacy as they near exams. Acute physiological stress markers do not appear to correlate with reported academic stress. Overall, an end-of-semester, university-driven exercise program such as F4F is beneficial in combating climatic stress through increases in PA.
Purpose: Active Video Game (AVG) has potential in increasing children’s physical activity participation. However, it is not clear whether AVG can help improve individuals’ health-related physical fitness. The purpose of this study was to examine the effectiveness of Sports, Play, and Active Recreation for Kids (SPARK) and AVG on children’s health-related fitness.

Methods: A total of 63 third and fourth graders participated in the study. The third graders (n = 29, 10 for boys) experienced the SPARK curriculum taught by a student teacher while the fourth graders (n = 34, 14 for boys) engaged in the AVG group practicing XBOX Kinect™ dance games. All participants completed three, 50-minute exercise sessions per week for six weeks. Health-related fitness was measured using FitnessGram including 15-meter PACER test, curl-ups, and push-ups tests prior to and immediately after the intervention. A one-way MANOVA with repeated measures by controlling for BMI and gender was conducted to assess the effects of time and interventions on fitness variables.

Results: No group difference in the pre-tests was found. There is a significant effect of time (F = 14.2, p < .001, η² = .20) and the interaction between time and intervention groups on the performance of the PACER test (F = 72.2, p < .001, η² = .56). The participants in both groups increased their PACER test scores with the AVG group demonstrating significantly higher improvement than the SPARK group. No time or intervention effects were found on the muscular strength and endurance tests.

Conclusion: AVG using XBOX Kinect™ seems to be effective in improving children’s aerobic fitness performance. Schools can use AVG as an alternative way to traditional physical activities for children to receive health benefits.

One predictor of lifelong activity participation is increased self-efficacy toward physical activity (PA) (Weiss, O’Loughlin, & Piatt, 2007). Many colleges and universities require PA but little emphasis is placed on whether students experience physiological change. If measurable changes were identified, it could improve self-efficacy and potentially lead to lifelong activity participation. PURPOSE: The purpose of this study was to see if a statistical change could be identified in a variety of physiological variables among a group of college age women enrolled in a PA course. METHODS: Thirty one women with an average age of 20.53 (±1.11) years participated. Participants were enrolled in either a 13-week aerobic dance fitness (FIT) course (n = 19) or a non-fitness course, which served as the control group (n = 12). Pre-test assessments were completed during the first week of the semester. The assessment included anthropometric measurements, resting systolic blood pressure (rSBP) and heart rate, a submaximal treadmill test, ACSM abdominal curl (ABcurl) and push up tests, ACSM Sit and Reach (SR), and bioelectric impedance for body fat assessment. Post-test assessments were completed during the final week of class. To be included in the study, participants must not have been absent for more than two days during the semester. RESULTS: Paired sample t-test statistics were conducted to determine significant changes in each group (p < .05). A significant decrease in rSBP (-4.63 9.11 mm/hg) was observed in the FIT group (t = 2.22, p = .041). Significant increases in SR (0.83 1.51 inches) as well as A Bcurl (9.05 14.50) performance (t = .

| Table1. Physiological stress, psychological stress and self efficacy across time |
|-----------------|-----------------|-----------------|
| **BASE**        | **POST4F**      | **PRE-EXAM**    |
| Salivary Amylase| 155.4±159       | 226.2±239.2     | 219.2±188       |
| Academic Stress | 77±15.4         | 67.3±18.2       | 68.6±9.8        |
| Self Efficacy   | 68.29±12.9      | 74.14±18.9      | 78.14±14.4      |
| **Non4F**       |                 |                 |                 |
| Salivary Amylase| 219.2±188       | 242.3±232.6     | 233.8±288.5     |
| Academic Stress | 81.2±14.8       | 82.6±14.5       | 75.4±16.8       |
| Self Efficacy   | 69.93±14.6      | 70.29±17.3      | 69.93±19.8      |

The cut-points were 50.0% between low and moderate levels and 64.8% between moderate and high levels. The proportion of children in high, moderate and low levels were 20.9%, 41.9% and 37.2% respectively at pretest and 46.6%, 33.6% and 19.8% respectively at posttest.

CONCLUSION. The knowledge classification was found to be empirically sound. The obesity prevention intervention showed preliminary efficacy in knowledge increase, with more children placed in the high knowledge group and less children in the low knowledge group. This study was supported by the Society of Health and Physical Educators, United States of Agriculture, and Iowa State University College of Human Sciences.

Outdoor time is mandated by most states in early childhood education settings. Most facilities have a playground for children to engage in physical activity (PA) during their outdoor time. However, garden programs are increasing in popularity for children, providing educational opportunities while contributing to children’s daily PA.

PURPOSE: To determine the differences in time spent in PA between two outdoor environments (playground and garden) in preschool children.

METHODS: Ten children (4.7 ± 0.6 years) enrolled in a university laboratory preschool participated in this study. PA was assessed using an ActiGraph GT3X+ accelerometer that was worn on the right hip. Each child completed four randomly ordered free living conditions (30 min each), which included two bouts of unstructured PA on the playground and two bouts of semi-structured PA in the garden. Accelerometer data were classified in minutes in sedentary behavior and combined PA of varying intensities (light, moderate, and vigorous) using the Pate cut point data. Data were combined to make one 60 min bout for each environment. Sessions were combined in order to determine the number of minutes per hour spent in sedentary and PA. This variable is consistent with the Institute of Medicine (IOM) recommendation of 15 minutes of PA per hour in order to determine whether these types of outdoor activity are supportive of meeting PA goals. Paired samples T-Tests were conducted to look at differences in PA (min/hour) between the playground and garden. RESULTS: On average, the children spent 35.8 min/hour in PA on the playground and 29.0 min/hour in PA on the garden. The children spent less time in sedentary behaviors (24.2±6.8 vs. 31.0±8.4 min/hour; p=0.025) and more time in moderate PA (15.3±5.1 vs. 10.8±6.1 min/hour; p=0.034) on the playground than in the garden. There were no differences in light (18.0±2.4 vs. 17.0±3.4 min/hour; p=0.365) or vigorous PA (2.6±2.1 vs. 1.2±2.1 min/hour; p=0.131) between the playground and the garden. CONCLUSIONS: Children spent less time being sedentary and more time in moderate PA on the playground than the garden. However, the children exceeded IOM activity guidelines in both environments. These results suggest that gardens may be a conducive environment to provide an opportunity for children to meet PA recommendations.
3.29, p = .028; r = 2.72, p = .014) respectively. No significant change was seen in the control group. However, when a Repeated Measures ANOVA analysis was conducted, all significant differences disappeared. This was likely due to the large standard deviations and non-normal distribution of the sample data. CONCLUSION: During a 13-week aerobic dance course, this study was unable to find statistically significant differences in a variety of physiological variables among a group of college age women when compared to a control group. More research is needed to determine if a larger sample size might uncover significant changes and whether these changes are sustained among this group. IRB# 1415-0009

3123  Board #28  June 2 3:30 PM - 5:00 PM  Effects of Hypoxic/Altitude Training on Bone Health in Obese Adolescents under Weight Loss Lianshi Feng, Huan Gao, Li Zhang, Jianfang Xu, Yingli Lu. China Institute of Sport Science, Beijing, China. (Sponsor: Tongjian You, FACSIM) Email: fengls98@126.com (No relationships reported)

PURPOSE: To explore the effects of short-term stimulated hypoxic training or altitude training on body weight, bone mineral content (BMC), bone mineral density (BMD) and bone area (BA) in obese adolescents undergoing dietary weight loss. METHODS: Forty seven healthy obese adolescents (BMI=30.8±35.93 kg/m²) were included in this study. The interventions lasted for four weeks. The plain group (PG, n=13) lived in Shanghai, China and trained 5 hours every day. The altitude group (AG, n=11) lived in real altitude (Duoba, Qinghai, China; 2360m) and trained 5 hours per day. The hypoxic group (HG, n=18) slept in simulated 2300m nomobaric hypoxia 8–10 hours every night and trained 2 hours in hypoxia and 3 hours in normoxia every day. All groups underwent dietary restriction and the energy intake ranged from 1322 to 2081 kcal/day. Heart rate was monitored every ten minutes during exercise to ensure the intensity was in the target range, which was 40% of the heart rate reserve and determined by the Karvonen equation. BMC, BMD and BA were measured by dual x-ray absorptiometry before and after intervention. A three (PG, AG and HG) by two (Pre and Post) analysis of variance (ANOVA) was used for statistical analysis. RESULTS: Body weight decreased significantly after four weeks in all three groups (all p<.05). There were significantly more weight reductions in the HG and PG groups than in the AG group (10.18% and 9.34% vs. 7.56%, both p<.05). There was no significant group difference between the HG and PG groups. Total BMC increased significantly in the PG group (p<.05) but not in the HG and AG groups. There were no significant group differences in changes of BMC. Total BMD increased significantly in all 3 groups (all p<.05), but no significant group differences were seen on the BMD changes. Total BA did not change over the 4-week intervention in all groups. CONCLUSIONS: Four weeks of diet plus plain training, diet plus stimulated hypoxic training and diet plus altitude training resulted in weight loss and significant improvements in BMC. Future studies are needed to identify the health benefits of hypoxic/altitude training for this population. (Supported by NSF 31471139 and CISMERP 16-18)

3124  Board #29  June 2 3:30 PM - 5:00 PM  A New Racket Sport That Provokes Similar Heart Rate As Soccer And Basketball In Children Juan C. Colodol1, Alvaro Juesas1, Fatima Campaña1, Faccio Giulia1, Alejandro Bruño2, Juan F. Lisoín2, Rosa M. Baños1,2, Victor Tell1, Michael E. Rogers, FACSIM1, ‘University of Valencia, Valencia, Spain. ‘Cardenal Herrera University, Valencia, Spain. ‘Wichita State University, Wichita, KS. (Sponsor: Michael E. Rogers, FACSIM) Email: Juan.Colodol@arco.es (No relationships reported)

Physical inactivity often increases during childhood as does the risk for early-onset of lifestyle-related diseases. The development of new sports, if deemed to be of sufficient intensity, may add diversity to the more traditional options in order to promote healthy lifestyles. PURPOSE: To compare children’s average and maximum heart rate percentage (HRP) while playing a new racket sport with heart rate while playing two traditional sports. METHODS: 22 girls and 32 boys (age=10.40±1.0y; body fat=23.2±1.5%; ht=147.4±0.9cm) played three sports for 25 minutes in a randomized order on different days: Soccer (SC), Basketball (BK) and Spiritol (SP). SP is played inside a 7m-diameter circle separated into two playing areas. A tennis ball attached to 2m of rope is suspended from a 2.2m-high pole in the middle of the circle. The goal of the game is to hit the ball with a racket and be the first to role the rope up the pole. Four SP familiarization sessions were performed prior to the study due to its novelty. Average and maximum HRP was measured with a Polar H7-Bluetooth 4.0. Body fat was measured with bioelectric impedance. A repeated measures ANOVA was used for analysis. RESULTS: Average HRP of the three sports were: 73.8±1.3% for Soccer (SC), 78.3±2.1% for Basketball (BK) and 83.6±2% for Spiritol (SP). However, average HRP in girls was not different between SC and BK (83.4±1.5 and BK (84.4±1.6) was not different but both were higher than SP (73.1±1.5). Maximum HRP was similar for SC and BK (93.5±1.1 and 94.7±1.5) and both were higher than SP (85.3±1.2). Similar significant differences where observed when maximum HRP was differentiated by gender. CONCLUSION: SC and BK both elicited slightly higher HRP compared to SP. However, SP is a new sport that appears to provide heart rate responses within the healthy threshold of intensity for children so it could be a good alternative to traditional sports. In addition, SP is a sport played in a smaller area that makes it more practical when space is limited. Further research is needed to determine enjoyment and satisfaction levels when playing SP, as well as if more familiarization results in higher average and maximum HRP.

3125  Board #30  June 2 3:30 PM - 5:00 PM  Can a Parental Modeling Physical Activity Intervention Improve Physical Activity and Body Composition in Adults and Young Children Katrina D. DuBose, FACSIM, Deirdre Dlugonski, Kelli Soos. East Carolina University, Greenville, NC. Email: dubosek@ecu.edu (No relationships reported)

PURPOSE: This study examined the impact of an 8-week parental modeling physical activity (PA) intervention on parent and child PA and body composition. METHODS: Twenty-six parents participated in an 8-week PA intervention with their 1-5 year old child. The adults were randomly placed into an intervention (n=19) or control (n=7) group. The intervention group received weekly phone calls with a coach. The coach discussed strategies to change parent and child PA. PA (activity monitor) and body composition (height, weight, and circumferences) were assessed before and after the intervention. Body mass index (BMI) and BMI z-scores were calculated. Time spent in sedentary behavior, light, moderate, and vigorous PA was determined using cut points by, Freedson et al. (adult), Trost et al. (1-2 year old children), and Butte et al. (3-5 year old children). Data analyses were conducted using the intention-to-treat method. A series of 2 group (control/intervention) X 2 time (pre/post) ANCOVAs were run to examine the effect of the intervention on PA levels in the parents and children adjusting for wear time. A series of 2 group (control/intervention) X 2 time (pre/post) ANCOVAs were run to examine the effect of the intervention on body composition (weight, BMI, waist circumference) in the parents and children (BMI z-score). Effect sizes (ES) were calculated and significance was set at p<.05. RESULTS: Among the parents, group, time, and interaction effects were non-significant for PA levels, weight, BMI, and waist circumference (p>.05). ES indicated the intervention group had medium reductions in sedentary behavior (-.57) and increases in vigorous PA (.65), whereas controls had small reductions in sedentary behavior (-.14) and medium reductions in vigorous PA (-.76). Regarding the children’s data, the PA levels and BMI z-scores were similar by group and time (p>.05). Small decreases in sedentary behavior (.18), light (.21), and mod (.11) PA were observed in the intervention group whereas, control children did not show changes in sedentary behavior (.24), and large decreases in light (-.92) and moderate (-.90) PA. CONCLUSIONS: A parental modeling PA intervention may have positive effects on parent’s and children’s PA levels. Supported by: Research/ Creative Activity Award, East Carolina University

3126  Board #31  June 2 3:30 PM - 5:00 PM  The Effects of Different Exercise on Chronic Inflammatory Markers in Obese Youth XU JIANGFANG, ZHANG LI, FENG LIANSHI, LU YINGLI. CHINA INSTITUTE OF SPORT SCIENCE, BEIJING, China. Email: xujiangfang@ciss.cn (No relationships reported)

PURPOSE: With the increasing number of overweight and obese individuals around the world, it is not only a mental stress to the one who is overweight or obese, but also economic and social burden to the society. It is known to us that the obesity is a chronic inflammatory status. The aim of this research is aimed to discuss the effects of aerobic and resistance exercise on chronic inflammatory in obese youth by testing some key chronic inflammatory markers. METHODS: With the diet controlling, 37 volunteers (male-18, female-19) were divided into 2 groups, such as the aerobic exercise (AE, with the intensity of 30%-40% heart rate reserve for 1 hour per day for 4 weeks, 6 days/week) and an aerobic (AE) group (male-10, female-10, 21±1.2±0.6 years, BMI=30.28±2.17) and resistance exercise (RE, with intensity of 80%-90% heart rate for 1 hour per day for 4 weeks, 6 days/week by resistance exercise) group (male-8, female-9, 21±1.1±0.6 years, BMI=30.10±1.23). The exercise lasted for 4 weeks and there had three times to take the venous blood samples of the volunteers to test the contents of TNF-α and IL-6 by using ELISA AE the beginning, 4 weeks later and 8 weeks later (the last 4 weeks without diet controlling and exercise). RESULTS: The body weight of AE and RE groups decreased significantly after 4 weeks, and it maintained AE a low level after 8 weeks (AE: 92.13±13.68 kg to
4.08±11.90 kg, then to 83.86±11.59 kg, RE: 86.68±13.91 kg to 79.79±11.82 kg (p<0.01) then to 79.72±12.6 kg). In addition, the body fat rate of the subjects also had the same tendency as the body weight (AE: 38.71±5.79% to 34.21±6.91% (p<0.01), then to 33.09±7.42%; RE: 38.84±5.54% to 34.65±6.51%, p<0.01, then to 33.99±7.33%). The level of TNF-α decreased significantly after 8 weeks in both groups (AE: 16.29±2.55 mg/ml to 14.93±2.48 mg/ml, RE: 16.60±2.22 mg/ml to 14.13±1.82 mg/ml, p=0.05). The contents of IL-6 decreased significantly after 4 weeks, but increased after 8 weeks.

CONCLUSIONS: Both aerobic and resistance exercise are helpful to lose weight by reducing the body fat. And the chronic inflammatory of the body is inhibited after 4 weeks aerobic and resistance exercise by decreasing the level of TNF-α and IL-6.

3127 Board #32 June 2 3:30 PM - 5:00 PM
School Based Pedometer Intervention: Are Standard Reporting Protocols Masking Potential Benefits in Previously Inactive Subpopulations?
Jade L. Morris1, Andy Daly-Smith2, Margaret A. Defeyter3, Jim McKenna4, Steven Zwiolsinsky5, Melissa Forthergill6, Pamela L. Graham7, Scott Lloyd8. 1Leeds Beckett University, Leeds, United Kingdom. 2Northumbria University, Newcastle upon Tyne, United Kingdom. 3Redcar & Cleveland Borough Council, Redcar, United Kingdom. Email: jade.morris@leedsbeckett.ac.uk (No relationships reported)

Intervention outcomes, expressed by mean changes, often overlook variable responsiveness. This may mask some intervention successes. PURPOSE: To explore individual variability in children completing a pedometor intervention. METHODS: Six schools (n=152) were ranked and paired by socio-economic status, with one per pair randomly allocated to a six-week teacher-led pedometer intervention (PI, n=81) or control (C, n=71). Actigraph GT1M accelerometers assessed physical activity (PA) for 7 days. Elevation cut points identified total daily sedentary (SED), light PA (LPA) and moderate-to-vigorous PA (MVPA) expressed as percentage (%) of total daily wear time. For analysis, a PA return of 480+ mins/d, ≥3 school days for pre and post-tests was needed. Mean pre daily MVPA mins were categorised to subgroups; Non-Achievers <30 (NA1), NA 31-44 (NA2), NA 45-59 (NA3), Achievers >60 (ACH). RESULTS: From 84 included participants (p=0.00, 9.9±0.5%), no significant differences were found between PI (n=52) and C (n=39) for increases in % time in MVPA (0.30±1.67 vs. 0.13±2.39, LPA (2.03±4.63 ± 0.05±4.25) and reducing % of SED time (2.33±5.89 vs. 0.01±5.52). More PI (17 to 27%) than C (16 to 19%) pupils met 60mins/d guidelines. Versus C, two PI groups improved MVPA. The greatest increases were in NA1 (1.52% above C) and ≥205±23.4% from pre-test. PI-ACR decreased % time in MVPA from pre to post (2.75±2.85%). All PI subgroups increased % time spent in LPA versus C, with NA2 improving 3.54% above C and PI-NA1 having the greatest improvement (+31% vs. 24%). All PI groups had more favourable SED results; three reducing SED time. The greatest reduction versus C was NA3 (39.5%). The greatest total reduction was in PI-NA1 (5.65±7.80%). Greater proportions of participants met the 60mins/d guidelines in three PI groups versus C. The largest increase was seen in NA1 (33%); both ACH groups showed a decline (PI 100 to 67%; C 100 to 40%). CONCLUSIONS: Despite no significant overall PI effects versus C, a greater % of participants met the 60mins/d guidelines. PI found clusters of responsiveness. Pre-PI NA1 identified most demonstrating positive changes in eight of nine activity outcomes compared to C, maybe at the expense of the most active. While participant numbers are small, they justify examining sub-population variability in subsequent research.

3128 Board #33 June 2 3:30 PM - 5:00 PM
High-Intensity Circuit-training Improves Physical Capacity and Cardiometabolic Risk Markers in Overweight Adolescents
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Introduction: Despite the well-known benefits of exercise training of moderate intensity for improving cardiometabolic health in overweight adolescents, it remains to be determined the extent of benefits provided by high intensity exercise. PURPOSE: to evaluate how much a high-intensity circuit-training (HICT) program would change health related fitness and cardiometabolic risk factors in overweight adolescents.
Material and Methods: 18 students (age 16±0.9 years and BMI 28.2±0.26) were submitted to HICT program (3 days/week, 1 hour/session, for 9 weeks in their school facilities). Before and after the HICT program, anthropometrics and body composition [body weight (BW), waist circumference (WC), and fat mass (FM) and free fat mass (FFM)], physical fitness (Fitnessgram), blood pressure and fasting biochemical analysis (Glucose (Gluc), low density lipoprotein-cholesterol (LDL-C), triglycerides (TG), alanine aminotransferase (ALT) and aspartate transaminase (AST)) were assessed.
RESULTS: HICT induced significant reductions in BW (77.15±1.03 vs. 75.6±12.5 Kg), WC (93.10±10.43 vs. 90.5±11.66 cm), FM (27.80±6.61 vs. 24.6±6.29 Kg) and an increase in FFM (49.37±9.33 vs. 51.33±9.29 Kg) (P<0.001). Both systolic (128±12.7 vs. 117±7.2 mmHg) and diastolic (66±7.8 vs. 62±4.4 mmHg) blood pressure were also significantly reduced (P<0.001). Regarding physical fitness, the HICT resulted in a significant improvement in the curl-up (35.36±2.0 vs. 35.52±2.9 rep), push-up (9.7±6.9 vs. 15.6±6.4 rep), horizontal jump (131.3±25.8 vs. 141.8±23.9 cm) and 20m shuttle run test (29.1±11.9 vs. 39.9±6.4 laps) (P<0.001). Finally, Gluc (85.9±12.4 vs. 76.8±12.3 mg/dL), LDL-C (151.7±25.8 vs. 93.9±27.8 mg/dL), TG (66.5±21.4 vs. 62.3±25.3 mg/dL), ALT (18.1±5.5 vs. 12.0±4.1 U/L) and AST (18.0±0.6 vs. 13.9±3.1 U/L) were all significantly reduced (P<0.001) after the HICT program.
CONCLUSION: Our results support the idea that a short-term high-intensity circuit-training program improves physical fitness and modulate positively physiological health markers in overweight adolescents.

3130 Board #35 June 6 3:30 PM - 5:00 PM
The Influence Of Contextual Factors On Recess Physical Activity Among Elementary School Children
Gabriella M. McCoughlin, Alicia Covello, Caitlyn Edwards, Nicholas Baumgartner, Morgan Curran, Toni Burkharter, Kim Graber, Amelia M. Woods, Naiman Khan. University of Illinois, Urbana, IL. Email: gmcough2@illinois.edu (No relationships reported)

PURPOSE: Childhood obesity remains a major public health concern in the United States. Physical activity (PA) opportunities, particularly within the school day, can prove particularly potent in attenuating childhood obesity etiology. Given the rapid decline in physical education in elementary schools, school recess has increasingly become a vital unstructured time during the school day that may facilitate positive behavior change and maximize opportunities for PA. However, the child characteristics and contextual/environmental factors that may influence engagement in PA during recess are unclear. Therefore, the aims of the present study were: (1) assess the
relationship between sex, weight status, and PA during recess; and (2) determine the influence of recess duration (15min vs. 30min) and timing (i.e., before lunch vs. after lunch) on receiving PAs, following adjustment of individual factors.

METHODS: Children in fourth and fifth grade (N=151, 91 females) were recruited from two public suburban schools in the Midwest. PA during recess was measured using accelerometry (ActiGraph GT3X+) over five days. Height and weight measurements were used to determine BMI (kg/m²). Recess was offered either prior to or immediately following lunch in each school. The average MVPA (minutes) during recess for male children was 8.18 ± 0.51 and for female children was 8.83 ± 1.59.

RESULTS: A negative association was found between BMI and vigorous PA (r = 0.20, p = 0.02), as well as step count (r = -0.18, p = 0.05). Further, sex was negatively correlated with MVPA (r = -0.315, p = 0.00, male = 0, female = 1). Significant interaction effects for PA were found between recess time and recess duration (F = 11.68, p = 0.00) where for children who had a longer recess duration, scheduling recess after lunch yielded the greatest MVPA. In contrast, for children in the shorter recess group, MVPA was significantly lower when recess was scheduled after lunch rather than beforehand. These interactions persisted even after adjusting for sex and BMI.

CONCLUSION: These findings reveal that individual and contextual factors such as recess time and duration may influence the level of activity during recess; longer recess periods may yield greater MVPA outcomes when scheduled after lunch. Future experimental research is warranted to determine whether modification of these variables improves children’s PA in the school setting.

3131 Board #36 June 2 3:30 PM - 5:00 PM
Geographic Variations In Achieved Moderate-to-Vigorous Physical Activity Within a Structured Afterschool Program
Marlo Dell’Aquila, Ryan McVann, Zi Yan, Kevin Finn, Kyle McNiss, FACSM. Merrimack College, North Andover, MA.

(No relationships reported)

PURPOSE: The afterschool time has been identified as an important opportunity for achieving moderate-to-vigorous physical activity (MVPA) for children. For children’s health, afterschool physical activity programs should be structured to yield maximal MVPA minutes. The purpose of this study was to examine the differences in the average MVPA during 30-minute period using a structured program design among children who participated at four different geographic locations.

METHODS: Data was collected from a total of 2963 children who participated in a 30-minute after-school physical activity program (i.e., Active Science) in multiple YMCAs in the following regions: New England (n=868, male=285, age M=9.73 ± 0.63), Mid-Atlantic (n=758, male=432, age M=9.04 ± 0.98), Midwest (n=711, male=339, age M=8.18 ± 0.51) and Southeast (n=806, male=432, age M=8.83 ± 1.59). Children wore accelerometers to track their MVPA during the program time.

RESULT: The average time and standard deviation of MVPA for New England, Mid-Atlantic, Midwest, and Southeast were M=12.97 ± 3.39, M=10.60 ± 5.58, M=13.58 ± 7.2, and M=8.35 ± 6.00 respectively. ANOVA showed that there were significant differences between the regions (F = 115.68, p < 0.001). Post hoc Test showed that New England and Midwest were significantly higher in MVPA than the Southeast (p < 0.001) and Mid Atlantic < .01. There was no significant difference between New England and the Midwest.

CONCLUSION: Children participating in a standardized afterschool program at different geographic locations can obtain significantly different MVPA. While further research is needed to determine geographic differences, the findings emphasize that the quality of program implementation (e.g., program strategies) should be considered in addition to the quantity of the program (e.g., program time). Regardless, afterschool physical activity programs should continue to focus on improving MVPA.

3132 Board #37 June 2 3:30 PM - 5:00 PM
The Correlation of Parental Support in Primary School Children Obesity and Physical Activity
Chiuang Yao Chang1, Ming Fen Hu2, Ssu Hsien Yu2, Hsueh I Lin2, Shih Chang Chen2. 1University of Taipei, Taipei, Taiwan, 2National Ilan University, Ilan, Taiwan.

(No relationships reported)

PURPOSE: The aim of this study was to determine the correlation of parental support between obesity and physical activity in primary school children.

METHODS: All data was collected from 2009 Taipei City School Children Physical and Mental Health Study. We extracted the data from sixth grade students as analyze sample. The grouping criterion of parental support to exercise is whether the parents take their children to exercise outside every week. The differences between two groups are analyzed by age-adjusted ANCOVA, Chi-square test and multivariate logistic regression analysis. Age-adjusted ANCOVA was used to determine the differences of anthropometric data, including weight, height, body mass index (BMI), waist circumference, hip circumference and waist-to-hip ratio (WHR). Chi-square test and age-adjust multivariate logistic regression analysis were used to analyze the proportion differences in children obesity, exercise partner choice preference. The statistical significant level was defined as p < 0.05.

RESULTS: Children in the parent-support group had significantly lower height, weight, BMI, waist circumference, WHR and screen time compared to parent-non-support group (p < 0.05). Compared to the children in parent-non-support group, the children in parent-support group had higher proportion of obesity (p=0.6), proportion of finding exercise partner was 11.8% lower (p<0.05). The proportion of children won’t do exercise without partner was also 11.3% higher than those children in parent-support group (p=0.5). Furthermore, the proportion of accumulating exercise time below 210 minutes per week was 2% higher in parent-non-support group (p=0.5). Moreover, the proportion of the obese parents was also noticeably higher in parent-non-support group.

CONCLUSIONS: Parental support is an important factor which affects children obesity status and physical activity. More importantly, the parents’ obesity prevalence will affect whether they support their children to exercise or not. Our results suggest that parental participation and parental weight management may be included in the strategy of children obesity prevention.

3133 Board #38 June 2 3:30 PM - 5:00 PM
Association between Physical Activity Self-efficacy and Physical Activity Engagement in Chinese College Students
Ying Tian, Zifei Wang, Yunqiu Liang, Bangli Peng, Xiaolín Cui. Shenyang Normal University, Shenyang, China.

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(No relationships reported)

Physical activity self-efficacy has been considered as an important correlate of physical activity behaviors. However, evidence on association between physical activity-related self-efficacy with different domains and physical activity engagement is still limited.

PURPOSE: To investigate the association between physical activity self-efficacy for learning efficiency, physical fitness, psychological functioning, and overall health status and physical activity engagement in college students.

METHODS: This cross-sectional study was comprised of 1,836 college students (1,138 males, 698 females) in China. Physical activity engagement and physical activity self-efficacy were assessed by a self-administered questionnaire. For physical activity engagement assessment, the duration of physical activity in each physical activity participation was divided into four categories as follows: <20, 20–40, 40–60, and >60 minutes; and the frequency of physical activity was divided into six categories as follows: 0, 1, 2, 3, 4, and >5 times/week. Furthermore, physical activity self-efficacy for learning efficiency, physical fitness, psychological functioning, and overall health status was evaluated by five scales (1–5) from “not effective” to “effective”. Higher scores indicate higher levels of physical activity self-efficacy. The association between physical activity self-efficacy and physical activity engagement was examined using chi-squared test.

RESULTS: In male students, participants with higher physical activity self-efficacy for learning efficiency (P for trend = 0.006), physical fitness (P for trend = 0.006), psychological functioning (P for trend < 0.001), and overall health status (P for trend = 0.023) tended to have higher levels of physical activity self-efficacy. The association between physical activity self-efficacy and physical activity engagement was confirmed using chi-squared test. These findings were also observed in association between physical activity self-efficacy and duration of physical activity engagement (P for trend < 0.05 for all). Similarly, physical activity self-efficacy was also significantly associated with physical activity engagement in female students. CONCLUSION: This study indicates that higher physical activity self-efficacy is associated with higher physical activity engagement in Chinese college students. Prospective studies are warranted to confirm these findings.

3134 Board #39 June 2 3:30 PM - 5:00 PM
The Differentiation Effect of College Students’ Status on Physical Activity and Psychosocial Perception
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(No relationships reported)

An increasing number of young adults with physically vulnerable conditions are entering college each year (Masten et al., 2011). Since only 50.4% of college students meet the physical activity (PA) recommendation, it is essential to find out the differences of these college students who are healthy and who are vulnerable.

PURPOSE: This study is to examine the difference of PA behaviors (i.e., intensity, frequency, and time) and psychosocial perceptions (i.e. attitude, subjective norm, perceived behavioral control, and intention) among college students (healthy group vs. vulnerable group).

METHODS: A cross-sectional design was used and total 684 college students were recruited from five universities in Shanghai, China. There were 451 students in healthy group (67% were female, M_age = 19.3 ± 1.0) and 234 students were in vulnerable group (71% were female, M_age = 19.47 ± 1.0). Students were identified as vulnerable by certified physicians (i.e., specific diseases (49.6%), short-term injury (29.9%), physical weaknesses (18.8%), and disabilities (1.7%)). All participants completed a validated questionnaire assessing their attitude, subjective norm, perceived behavioral control and intention (Hagger et al., 2007), and PA behaviors including intensive, time, frequency and overall PA (Yu et al., 2013).
RESULTS: A descriptive discriminant analysis (Hubery, 1994) revealed that the four subgroups (gender x group) differences accounted for 19% of the variance among the eight variables, and the variable groups were significantly different from the other three subgroups. Among these, intensity (88.9%) and time (27%) in PA behaviors, and intention (15.4%) and attitude (4.7%) in psychosocial perceptions emerged as the promising dominant contributors to the group differences.

CONCLUSIONS: Consistently with previous studies, males in healthy group more likely participate in intensive PA and persist longer than other subgroups, and they have more positive attitude and intention to engage in PA. Colleges need to focus on PA interventions among females on both conditions and males with vulnerable conditions.

3135 Board #40 June 2 3:30 PM - 5:00 PM Using Theory of Planned Behavior to Examine Chinese Adolescents’ Moderate and Vigorous Physical Activities Hongxin Li¹, Tao Zhang², Tsz Lun Chu³, Gene Lee Farren¹, Zhendong Zhang². ¹University of North Texas, Denton, TX; ²Zhengzhou University, Zhengzhou, China. Email: Hongxin.Li@unt.edu (No relationships reported)

In China, academic excellence is often considered the most important indicator of success in adolescents, while physical activity (PA) is often discouraged because it drains energy and gear time away from academic study (Yu et al., 2006). However, recent research has indicated vigorous PA (VPA) rather than moderate PA (MPA), emerges as the significant predictor of cardiovascular health, as well as a protective factor against mental health complaints (Gerber et al., 2014). The theory of planned behavior (TPB, Ajzen, 1985) is a prominent theoretical model that examines the antecedents (i.e., attitude, subjective norm, perceived behavioral control, and behavioral intention) of planned behaviors such as PA. As such, research has indicated higher VPA demonstrated higher behavioral intention, while higher MPA demonstrated lower behavioral intention in Western cultures (Rhodes & de Bruijn, 2010).

PURPOSE: To test the measurement and structural parameters of the TPB among a sample of Chinese adolescents in a MPA and a VPA context. METHODS: Participants were 219 ninth grade students (53% female, Mₐge = 16.33 ± .55) from three high schools in Zhengzhou, China. Participants completed validated questionnaires that assessed their attitudes, subjective norms, perceived behavioral control, behavioral intention, and self-reported MPA and VPA behaviors. RESULTS: Correlation analyses revealed a pattern of positive relationships among the study variables. Confirmatory factor analyses and structural equation models revealed good-fitting models within both the MPA model (χ² [84] = 180.77, p < 0.01, CFI = .94, RMSEA = .07, SRMR = .06) and VPA model (χ² [84] = 189.37, p < 0.01, CFI = .93, RMSEA = .08, SRMR = .06). Standardized path coefficients indicated attitude (γ = .15), subjective norm (γ = .18), and perceived behavioral control (γ = .46) were significantly positively associated with behavioral intention (β = .23, p < .01), but not MPA (β = .04, p = .55). CONCLUSION: This study further supported the heightened relationship between behavioral intention and VPA in Chinese adolescents. Thus, the findings highlighted the importance of enhancing TPB constructs to foster VPA in Chinese adolescents.

3136 Board #41 June 2 3:30 PM - 5:00 PM The Effects of Resistance Training Programs on the Physical Self-Perceptions of College Females Kelsey L. Zachman, James Whitehead, FACSM, John Fitzgerald, Jesse Rhoades. University of North Dakota, Grand Forks, ND. (Sponsor: James Whitehead, FACSM) (No relationships reported)

While it is generally accepted that exercise enhances physical self-perceptions (PSPs), the impact of resistance training programs on females’ self-perceptions is unclear. Because exercise is an important public health behavior, and because PSPs have motivational associations, research on this topic may have important implications for exercise promotion. PURPOSE: To investigate the effects of two different types of resistance training programs on the PSPs of college age females. METHODS: College students with no background in resistance training (n = 20) were randomized to a moderate strength training group (MSTR; n = 10), or a muscular endurance (MEND; n = 10) resistance training group. A comparison (COM) group (n = 10) was recruited from inactive college students. The resistance training groups followed strength- or endurance-oriented progressive resistance training programs for nine weeks. Participants completed the Physical Self-Perception Profile (PSPP) pre- and post-intervention. Height, weight, skinfolds and circumference measurements were also taken pre and post. RESULTS: Analyses utilized ANCOVAs followed by Bonferroni-adjusted (p set at < .017) pairwise comparisons. The only physical change was a significant reduction in the sum of skinfolds in the MSTR group (p = 0.013). Analyses of PSPP changes showed significant effects for MSTR on the physical condition subscale (p = 0.004), and on the strength competence subscale (p = 0.015) and a near-significant effect on the attractive body adequacy subscale (p = 0.018) that may be practically significant. CONCLUSION: Strength-oriented resistance training produced improvements in some aspects of college females’ physical self-perceptions.

3137 Board #42 June 2 3:30 PM - 5:00 PM Family Factors Associated with Physical Activity and Sedentary Time in Children Living in Puerto Rico Mario A. Muñoz1, Scott E. Crouter, FACSM. ¹University of Massachusetts Boston, Boston, MA. 2The University of Tennessee, Knoxville, TN. Email: mario.munoz@umb.edu (No relationships reported)

PURPOSE: The purpose of this study was to examine associations among parental perceptions of their children’s skills and participation in physical activity (PA) and parental intentions of changing health behaviors with objectively measured PA in Puerto Rican children. METHODS: Seventy-three children (mean±SD; age, 8.9±1.3 yrs; BMI 33.1±10.4 kg/m²) wore an ActiGraph GT3X accelerometer on their right hip for seven days to estimate time spent in sedentary behaviors (SB), light (LPA) and moderate-to-vigorous (MVPA) PA, and total activity counts for the vertical axis (TACᵥ) and vector magnitude (TACᵥm). Children also completed a motor proficiency test (MPT), a sit-up test (SUT), and sum of skinfolds (SOS) from two sites (triceps and sub-scapular) was obtained. Parents completed questions on their perceptions (PP) of their child’s abilities and parental intentions (PI) to modify family health related behaviors. Partial correlations, controlling for accelerometer wear time, were used to examine relationships between PP, PI, MPT, SOS and SUT, with time spent in SB, LPA, MVPA, and TACᵥm and TACᵥ. RESULTS: Significant differences were found between boys and girls for time spent in SB (239.3±74.6 vs. 296.2±128.4, respectively, p = 0.024), and MVPA (126.4±40.7 vs. 85.7±42.3, respectively, p = 0.001). In girls, PP of child’s speed while running was associated with TACᵥ (r = 0.43) and TACᵥm (r = 0.39, p < 0.05). PP of how eating behaviors of the family influence eating habits of their children was correlated with SB (r = 0.43), MVPA (r = 0.41), TACᵥ (r = 0.50), and TACᵥm (r = 0.52; all p < 0.01). IM of limiting the amount of sweetened beverages was correlated with SB(r = 0.47) and TACᵥ (r = 0.37, all p < 0.05). In boys, MVPA and TACᵥ were negatively correlated with SOS (r = 0.38 and 0.43, respectively, p < 0.01). MPT was positively correlated with PI to engage in 30-min of PA at least 5 d/wk. (r = 0.36, p < 0.05). TACᵥm was positively correlated with parental report of age that their child first walked without support (r = 0.36, p < 0.05). CONCLUSIONS: Several modifiable factors related to PP and PI are related to time spent in SB and PA in Puerto Rican children. Parents with intentions to positively make changes in behaviors could affect positively impact time spent in PA.

3138 Board #43 June 2 3:30 PM - 5:00 PM Physical Activity Level Increases Follow Up Health Educational Program In Overweight And Obese Children: Pilot Study Sulpiane B. Rauber1, Henrique Lima Ribeiro1, Alciane Marinho2, Bibiano Madrid3, Joyce Bomfim Vicente1, Carmen Silvia Grubert Campbell2. ¹Universidade Católica de Brasília, Águas Claras, Brazil. 2Universidade do Estado de Santa Catarina (UDESC), Santa Catarina, Brazil. ³Universidade Paulista (UNIP, Brasilia, Brazil. (No relationships reported)

PURPOSE: This study aimed to investigate the impact of a Health Educational Program for Children at 5 days of Camp and 12 weeks follow up on the physical activity level (PAL) and sedentary behaviour (SB) in overweight and obesity children. METHODS: The health educational program (HEP)child designed for children who are overweight or obese and was divided into two phases: The first phase (PHASE 1) consisted of pre assessments and five-day camp (CAMP); and PHASE 2 corresponded to the 3 months follow-up, and a post follow-up assessments. Thus, the sample that attended the PHASE 1 was 20 children (9.4 ± 1.1 years; 9 boys; 10.2 ± 0.9 years; 11 girls; 9.2 ± 1.3 years), 5-days summer camp on a farmhouse to develop educational, with interdisciplinary team (Physical Educator, Endocrinologist, Psychologist, Educator and Nutritionist). The Phase 2 children and family’s were followed for 3 months (a weekly meeting for two hours in a total of 12 meetings). The end of the study comprised by 12 children (8 girls and 4 boys, 9.4 ± 0.96 years), who completed 75% of the meetings. To check the PAL and the SB was applied the questionnaire proposed by Milito et al. (2013) and analyzed physical activity level at sports, in leisure time during the week, level in leisure time during weekend, moving to and at school, sedentary behavior during the week and weekend. RESULTS: After FO 25% of children remained more active (> 1500 and <3000METs per week) in comparison to before CAMP. In contrast the amount of sedentary children (<600METs week) decreased by 15% and the insufficiently active (600 at 1500METs per week) increased by 15%. No child was classified as very active (>3000METs per week) in any time. The PAL leisure time during the week and during the weekend significant

Abstracts were prepared by the authors and printed as submitted.
increase, 26.06% and 14.1%, respectively, when comparing to pre CAMP and 12 weeks of follow-up. SB during the week and the weekend showed a significant mean reduction of 17.14 ± 3.2 and 23.12 ± 3.9, respectively.

CONCLUSIONS: The Health Educational Program for Children contributed to the increase in physical activity level and reduced sedentary behaviour in overweight and obese children.

3139 Board #44 June 2 3:30 PM - 5:00 PM Feasibility and Acceptability of Implementing Physical Activity Programs at a Residential Center for High-Risk Youth Kari J. Hyslop (Hilgendorf), Judy Knuth, Western Washington University, Bellingham, WA; Washington State University, Spokane, WA. (No relationships reported)

With increased health concerns among youth, establishing a healthy lifestyle at young ages is prudent. Even more, youth exposed to adverse experiences face compounded risks for health concerns; it is essential to equip caregivers and youth with tools to reduce risks. Well-established physical activity (PA) programs may be such a tool.

PURPOSE: To determine feasibility and acceptability of implementing a group PA program at a care facility for high-risk youth, and success of reaching ACSM’s moderate-vigorous physical activity (MVPA) guidelines. METHODS: Group exercise programs were implemented at a high-risk care facility for two summers. Activities of appropriate METs from Addendum of PA for Children were employed 3 days/week, 60 min/day, and aimed to keep all youth engaged throughout program duration. MVPA-momentary time sampling, 20-m dash tests for VO2max estimation, and staff interviews were conducted. RESULTS: MVPA assessments indicated program success in engaging 34 of 37 children in ACSM’s recommended PA guidelines throughout the duration of the program. Estimated maximal exercise capacity increased from pre- to post-program (7.7 ± 0.5 vs 11.0 ± 0.5 MET, p = 0.047). Qualitative interviews with staff indicated 100% acceptance rate and desirability of program return, and 80% of staff stated non-elicited, agreed-upon program outcomes for participants: reduced bickering, aggravation of peers, and sedentary time; and increased positive behaviors, state of calm, sleep patterns, desirability of participation in activities, and appetites. Identify key components of program success were group- and individual-based mindsets, full participation of staff, and structure and consistency. CONCLUSION: Findings endorse feasibility and acceptability of establishing structured group MVPA programs in care facilities for youth, in addition to enhancing well-being outcomes for participants. Rigorous involvement in determining benefit of PA programs among this population is needed to justify work in providing refined, structured exercise programs to residential settings; doing so may provide an impactful tool for the care and well-being of these individuals.

Note: informed assent and consent forms were obtained for each participant. Supported by Washington State University.

3140 Board #45 June 2 3:30 PM - 5:00 PM Examining The Relationship Between High School Physical Education With Current Fitness Outcomes In College Students Melissa Bopp, FACSM, Zack Papalia, Christopher M. Bopp, Allison Burner, Alison Weimer, Pennsylvania State University; University Park, PA. Email: mb73@psu.edu. (No relationships reported)

Physical education during K-12 can positively impact fitness outcomes, though the transition to college often leads to a decline in regular physical activity (PA) participation. The purpose of this study was to determine how PE on fitness outcomes and PE participation in college is unclear. PURPOSE: To examine how PE experience in high school was associated with health and behavior outcomes in later life stages and has implications for lifelong wellness. METHODS: A sample of college students (N=574; 10.4±1.0 y; 53% males; 56.2% black, 30.1% multi-racial/other, 13.7% white; 44.0% of life (QoL) in low-income youth. Youth sports participation is positively associated with several psychosocial variables.

CONCLUSION: PE experience in high school was positively associated with VO2max (p=0.04) and push-ups (p=0.03). Females who took PE when it wasn’t required had a higher VO2max (p=0.04) and vigorous physical activity (p=0.03) compared with those who did not.

3141 Board #46 June 2 3:30 PM - 5:00 PM Sport And Physical Activity Lesson Participation And Health-related Variables In Low-income Youth Jeannette Ricci1, Karin A. Pfeiffer, FACSM1, Kimberly A. Clevenger1, James M. Pivarnik, FACSM2, Sara Spellman3, Kari J. Hyslop (Hilgendorf)1, 2Michigan State University, East Lansing, MI; 1Crim Fitness Foundation, Flint, MI. (No relationships reported)

Purpose: To explore the relationship between PA participation and physical activity, diet, and health-related quality of life (QoL) in low-income youth. METHODS: A sample of students (N=754; 10.4±1.0 y; 53% males; 66.2% black, 18.1% multi-racial/other, 14.0% white) completed a survey including the Physical Activity Questionnaire for Children (PAQ-C; 9 items, max, 5); KidsScreen-27 (psychological, peer-, and parent-related dimensions, max 100); and School Physical Activity and Nutrition Survey (SPAN; 25 items, max 3 per item). Single items described fruit and vegetable intake, and a junk food index was calculated (6 items, max 18). Participants self-reported S/PA participation (sports teams and/or dance/martial arts class) during the last year. Height and weight were measured to determine body mass index. One-way ANOVA was used to determine if physical activity, diet, or health-related QoL differed among S/PA participants and non-participants. RESULTS: Approximately 59% of youth participated in at least one S/PA. Physical activity (F(2,751)=15.011, p<0.05), fruit intake (F(2,746)=4.933, p<0.05), parent-related QoL (F(2,749)=10.413, p<0.05), and peer-related QoL (F(2,747)=6.170, p<0.05) were higher in S/PA participants compared to non-participants. However, junk food intake was higher in S/PA participants compared to non-participants (F(2,746)=6.490, p<0.05). CONCLUSIONS: In this sample, S/PA participation was associated with higher physical activity, fruit intake, and peer- and parent-related QoL. Our findings support previous research in a similar population of youth sport participants who had healthier dietary behaviors than non-participants. Our finding that junk food intake was higher in S/PA participants could be explained by time constraints and/or the belief that junk food consumption is acceptable as a result of being physically active. Funded by Crim Fitness Foundation.

3142 Board #47 June 2 3:30 PM - 5:00 PM The Effects of Different Types of Exercise on Chinese College Students' Energy Expenditure Nan Zeng1, Xianxiang Li, Huimin Yang2, Wenfeng Liu1, Hui Xiong1, Yanting Chen2, Jiao Li2, Wei He3, Zan Gao, FACSM1, 2University of Minnesota, Minneapolis, MN; 3Hunan Normal University, Changsha, China. (No relationships reported)

Purpose: To examine the effect of light physical activity (LPA), moderate PA (MPA), vigorous PA (VPA), and active video games (AVGs) on college students’ energy expenditure (EE). Gender differences in EE were also investigated.

Methods: Twenty-four college students (12 males; M_age= 23.5, SD ± 1.06) completed four separate 10-minute exercise sessions on LPA (treadmill walking at 3.0 kph), MPA (treadmill walking at 5.0 kph), VPA (treadmill running at 7.0 kph), and AVGS (Xbox 360 Kinect Just Dance play) in a highly controlled laboratory. EE (total calories) was objectively measured by ActiGraph accelerometers.

Results: Repeated-measures ANOVA revealed significant differences in EE across different exercise sessions ([F(1, 23) = 160.1, p < 0.01, n2= 0.88]. In detail, VPA (M_EE = 75.25, SD ± 35.12) yielded significantly higher EE than LPA and AVGS (p < 0.01). Similarly, MPA (M_EE = 70.74, SD = 28.77) triggered significantly greater EE than LPA and AVGS (p < 0.01). LPA (M_EE = 30.04, SD = 13.38) generated significantly higher EE than AVGS (M_EE = 21.16, SD = 18.59, p < 0.01). Notably, significant EE difference emerged between VPA and MPA (p > 0.05). In addition, independent t-tests indicated that males burned more calories than females in LPA (M_EE = 21.42, p < 0.01), MPA (M_EE = 84.49 vs. 57.00, p < 0.01), and VPA (M_EE = 100.74 vs. 49.67, p < 0.01). No significant gender difference in EE during AVGS play (M_EE = 23.58 vs. 18.74, p > 0.05).

Conclusion: Findings suggest that a 10-minute exercise session in treadmill running at 7.0 kph has the highest EE, followed by treadmill walking at 5.0 kph, 3.0 kph, and...
AVGs in college students. Additionally, calories burned during treadmill walking at 5.0 kph is roughly equivalent to the energy cost of treadmill running at 7.0 kph. Notably, calories burned during AVG play has not yet reached the light-intensity physical activity level of slow treadmill walking. It is plausible that the novelty of AVGs led to the low intensity of AVGs play. Lastly, males tend to expend more calories than females during treadmill walking/running but no significant EE difference was observed between genders during AVG play. Future study may offer AVGs training tutorial prior to experiments to elicit greater EE.

Few studies have examined characteristics associated with physical activity levels in university students seeking weight loss treatment, though it has been shown that physical activity is associated with weight loss in interventions with general adult populations. Understanding the characteristics predicting university students’ achievement of moderate-to-vigorous physical activity (MVPA) could better inform interventions designed to increase physical activity. PURPOSE: To identify predictors of meeting MVPA guidelines among university students enrolled in an intervention aimed at attaining or maintaining a healthy body weight. METHODS: At 2 campuses, 128 university students (66% female; mean age=21.6, SD=3.1; mean BMI=31.6 kg/m²; SD=3.7) completed demographic questions, the International Physical Activity Questionnaire (IPAQ), and physical activity self-efficacy at baseline. MVPA was calculated for each participant based on the days and minutes of self-reported activity, with meeting guidelines defined as 150 minutes/week of combined MVPA. RESULTS: A higher percentage of males met the MVPA guidelines (73%) compared to females (58%) and published national averages (49%). Logistic regressions revealed that PA-SE (p=0.05) was a significant predictor of meeting MVPA guidelines, while BMI, gender and race/ethnicity were not significant. No significant male/female differences in PA-SE were found. However, physical activity self-efficacy was a moderately strong predictor of achieving MVPA for both males (OR=2.2, p=0.05) and females (OR=3.99, p=0.15), although not statistically significant for females. CONCLUSION: Higher levels of physical activity self-efficacy appear to be substantially associated with the likelihood of whether or not female university students achieved MVPA guidelines, while no other demographic variables usually associated with MVPA levels were significant. Further examination is needed to determine if the effects of physical activity self-efficacy on meeting MVPA guidelines that were found here are causal and could therefore suggest different behavioral treatment strategies for the promotion of MVPA in male and female university students.

Supported by: NIH Grant R01DK100916

Fewer than half of children are currently meeting recommended physical activity (PA) guidelines of at least 60 minutes of moderate-to-vigorous physical activity (MVPA) per day, with fewer girls than boys meeting guidelines. Girl Scouts (GS) is a potential target setting for increasing PA in girls, though little is known about the time-segmented patterns of PA. PURPOSE: To identify time-segmented patterns of PA in the systemic drivers of these patterns during troop meetings. METHODS: To determine the microsystem influences on GS troop meeting time-segmented patterns of PA. Method: Girl Scout leaders (troop n=7) were randomized to receive an intervention training on implementing policies to promote physical activity and healthy eating or a standard control. Meetings (7 meetings/troop) were observed and girls in attendance (n=76, 9–13 years old, mean ± SD = 10.51± 1.19 years) wore GT1M accelerometers. Two observers attended each meeting and recorded the start and stop point of time segments based on task (i.e., opening-closing, snack, active recreation [AR], Girl Scout curriculum [GSC]). The time-segmented episode accelerometer data were analyzed using Evison cut-points. RESULTS: A total of 182 time segments were observed (mean/day=SD=1.77±1.24) with 24 AR (0.47±0.58), 63 GSC (1.31±0.80), 54 opening-closing (1.13±0.94), and 41 snack (0.85±0.58) segments. Mixed random effect models indicated interaction of sex and time was significantly more AR segments per day (mean/day=SD=0.89±0.12) than control groups (0.18±0.10). A significantly greater (p<0.01) percentage of time was spent in MVPA during AR (mean=SD=17.19±1.11%) compared to GSC (0.39±0.81%), opening-closing (3.22±1.06%), and snack (0.61±0.87%). A significantly greater percentage of time (p<0.01) was spent in MVPA during opening-closing segments compared to GSC and snack. A significantly greater (p<0.01) percentage of time was spent sedentary/inactive in GSC (67.9±4.3%) compared to AR (132.26±4.1%) and opening-closing (55.28±3.6%) and during snack (72.2±6.1%) compared to opening-closing and AR. CONCLUSION: Troop meeting time-segmented patterns of physical activity were influenced by task. Intervention leaders devoted more time segments to AR than control leaders. Adding time segments conducive to PA to troop meeting could increase the percentage of time spent in MVPA.

Physical activity is essential for the development of children and adolescents. Among different social and environmental factors, parental support plays important role on influencing young people’s physical activity. However, the associations between different kinds of parental support and physical activity among Chinese children and adolescents have not been explored thoroughly with a large size of sample. PURPOSE: To explore the roles of different kinds of parental support (encouragement, accompany, physical support and model) on influencing moderate-to-vigorous physical activity (MVPA) and sedentary behavior (SED) among Chinese schoolchildren. METHODS: A total of 6149 participants (girl 49.3%, mean age 11.7 years). Descriptive statistics and logistic regression were used to examine the associations between MVPA, SED and various kinds of parental support by gender. RESULTS: Compared to the low parental support groups, young people in high encouragement, accompany, financial support, and model (the highest among four factors) (boy: OR=1.60, 95% CI: 1.52-1.69; girl: OR=1.63,95% CI: 1.57-1.70). The data used in analyses derived from the Chinese Health and Physical Activity of Children and Adolescents Survey 2015 in Shanghai, China. 78516 students (grade 1-12) from all 17 districts of Shanghai, representing 5% of the population of schoolchildren, were randomly selected to participate in the self-report questionnaire survey. Finally, the present study contains 61492 participants (girl 49.3%, mean age 11.7 years). Descriptive statistics and logistic regression were used to examine the associations between MVPA, SED and various kinds of parental support by gender. RESULTS: Compared to the low parental support groups, young people in high encouragement, accompany, financial support, and model (the highest among four factors) (boy: OR=1.60, 95% CI: 1.52-1.69; girl: OR=1.63,95% CI: 1.57-1.70).
CONCLUSIONS: The change in the levels of leptin and ghrelin suggests a possible change in the metabolic behavior, showing a need for intervention to promote young people’s physical activity. Supported by Shanghai Shuguang Program (14SG64), Shanghai Pujiang Program (16PJ075), and Science and Technology Commission of Shanghai Municipality (1608053040).

6:00 PM

3149 Board #54
June 2 3:30 PM - 5:00 PM
Effects Of A School-based Exercising And Nutrition Counseling Intervention On Sleep Parameters (Sleep Time, Sleep Latency And Number Of Awakenings) And Time In MVPA In School-aged Obese Adolescents From Monterrey, México.

Osvaldo Ceballos-Gurrola, Marco A. Enríquez Martínez, Raúl Lomas-Acosta, Armando Cocca, José Valadez-Lira. UANL, Monterrey, Mexico.
Email: osceguero@gmail.com
(No relationships reported)

Oblesity has positioned itself as a public health problem worldwide with multifactorial characteristics. Different studies define sleep time as obesogenic factor while others found a correlation with the levels of moderate to vigorous physical activity (MVPA) PURPOSE: To assess the effect of a School-based Exercising and Nutrition Counseling Intervention On sleep parameters (sleep time, sleep latency and number of awakenings) and time in MVPA In School-aged Obese Adolescents from Monterrey, México. METHODS: An experimental study with a sample of 51 adolescents (13±2 yrs) randomly distributed in two groups: Control (CG) and experimental (EG). CG had 4 weekly sessions of 60 minutes of PA and one weekly session of nutritional counseling. EG engaged in regular school activities. Sleep variables and levels of MVPA were monitored by triaxial accelerometer (ActiGraph wGT3X-BT) for at least 7 consecutive days. RESULTS: Pre-post test comparison showed into de EG significative changes on sleep latency when MPVA increased (P<0.006), other differences were observed on the decrease in awakenings on sleep (P=0.001). CONCLUSIONS: The practice of physical shows a significant relationship with sleep parameters which seems to be a favoruable factor in the treatment of obesity in adolescents. We suggest further studies to modify the duration of the intervention and use other indirect instruments for analyzing the quality of sleep.

6:30 PM

3150 Board #55
June 2 3:30 PM - 5:00 PM
The Effect of Physical Activity on Attention in Elementary School Students

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(No relationships reported)

Schools have always incorporated physical activity (PA) into the school day, but of late opportunities for PA have come under pressure. Research suggests that PA, particularly bilateral and coordinated PA, has a positive effect on attention in adolescent children, offering support for the continued inclusion of PA during the school day. PURPOSE: The purpose of this investigation is to compare the effects of bilateral and coordinated exercise, typical recess activities, and quiet reading on attention in elementary school children. The d2 test measures processing speed, rule compliance, and quality of performance. Performance on the test is determined by evaluating the total number (TN) of items processed, the number of errors made during the test, and by calculating concentration performance (CP). METHODS: 14 fifth grade students (6 girls and 8 boys, Age= 10.6±1.1 years) and 12 fourth grade students (8 girls and 4 boys, Age 8.7±1.1 years) were included in this investigation. Students completed 3 sessions, separated by 7 days. In the first session students completed the d2 attention test after a regular academic class period to act as a control (CON). Subsequently, students were randomly assigned to a sequence of experimental conditions to be completed over the next 2 weeks. Fifth graders completed either 30 minutes of quiet reading (QR), or coordinated exercise (CE), while 4th graders completed either 30 minutes of typical recess (REC) activities or CE. Coordinated exercise consisted of a sequence of bilateral activities requiring gross and fine motor movement using various balls. Ten minutes following the activities, students completed the d2 test again in a quiet classroom. RESULTS: TN increased from baseline in each condition in 5th (CON=323±10, QR=416±16, CE=414±20, p<0.001) and 4th graders (CON=287±17, REC=381±19, CE=374±20, p<0.001). CP similarly increased from baseline in each condition in 5th (CON=138±3, QR=177±7, CE=178±10, p<0.001) and 4th graders (CON=131±9, REC=160±6, CE=157±8, p<0.001). CONCLUSION: It appears that a break from the concentration required in class is most beneficial to attention. However, the additive positive impact of PA on the reduction of risk for chronic disease supports the continued opportunity for PA during school as a more beneficial strategy to improve attention.
Increased amount of daily sitting time has been linked to increased risk of disease, independent of the amount of daily physical activity. A number of devices have been developed to address prolonged sitting in work and educational settings (e.g., sit-stand desks, treadmill-desks, cycle-desks, stepping desks). However, very little research has investigated the effect of a sit-stand desk on cognitive mood and performance in the college classroom.

**PURPOSE:** To determine the effect of using adjustable-height (sit-stand) desks in a college class on attention (AT), stress (ST), musculoskeletal discomfort (MD), anxiety (AN), and academic performance (EXAM).

**METHODS:** A total of 18 subjects (12 intervention, mean age 22.1, mean credits 13.9) completed the 13 week intervention (week 3-15 of the semester). Adjustable-height sit-stand desks were placed in the back and one side of the classroom for students to use as they desired. Participants completed a weekly visual analogue scale (VAS) for AT, ST, MD, AN, and AN, and were given space to provide optional comments on why they answered the way they did. Class sessions were video recorded to allow for direct observation of attention (OAT) in weeks 9, 12, and 13. Exams were taken at week 4, 6, 8, 10, 12, 14, and 15. **RESULTS:** The main findings indicated a significant interaction effect for AT (F[12, 166] = 2.79, p = 0.002) and ST (F[12, 166] = 2.15, p = 0.017), and significantly (p = 0.002) lower overall MD for the intervention (12.81±3.45) vs. control (35.12±4.80) group. Exam scores were not different between groups. There was no difference in direct observation of attention (OAT) between groups (total n=15; control=6) at week 9, 12, or 13. Age was correlated with overall observation of attention scores (r=0.54, p=0.03), and ST with AN scores all weeks except 8 and 11 (r range = 0.61-95, p<0.05).

**CONCLUSION:** A strength of this study is the week to week data collection on various measures of cognitive mood and performance, and overall discomfort levels. Use of a sit-stand desk was associated with lower MD scores and more on various measures of cognitive mood and performance, and overall discomfort

### Comparison of Accelerometer Step Counts and Total Physical Activity in 2-year-old Child-Parent Dyads

**PURPOSE:** To compare daily step counts with accelerometer measured time spent in physical activity in 2-year-olds, and to examine the interrelationships between parents’ and children’s steps. **METHODS:** Physical activity (PA) and step counts were recorded for one week using hip-worn accelerometers in 2-year-old children and one parent dyads attending an urban Early Head Start program. Data reduction was conducted in MATLAB, and estimates of total physical activity time (TPA) and steps/day were calculated. 

**RESULTS:** Seventeen child-parent dyads meeting inclusion criteria used accelerometer measured time spent in physical activity in 2-year-olds, and to examine the interrelationships between parents’ and children’s steps. **METHODS:** Physical activity (PA) and step counts were recorded for one week using hip-worn accelerometers in 2-year-old children and one parent dyads attending an urban Early Head Start program. Data reduction was conducted in MATLAB, and estimates of total physical activity time (TPA) and steps/day were calculated. 

**RESULTS:** Seventeen child-parent dyads meeting inclusion criteria used accelerometer measured time spent in physical activity in 2-year-olds. **CONCLUSION:** Step counts were highly correlated with TPA time in both 2-year-olds and their parents, suggesting step counts can be used interchangeably with PA counts in 2-year-old children and parents. Parent and child steps were not correlated and, thus, their PA does not appear to be interdependent.

**Abstracts were prepared by the authors and printed as submitted.**
Table 1. Demographic and physical activity characteristics.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Child</th>
<th>Parent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>31(3) mo.</td>
<td>30(4) yr.</td>
</tr>
<tr>
<td>Female n(%)</td>
<td>11(64.7)</td>
<td>17(100)</td>
</tr>
<tr>
<td>Median Steps/day</td>
<td>5331(2365)</td>
<td>6491(2418)</td>
</tr>
<tr>
<td>Wear Time (hrs/day)</td>
<td>10(2)</td>
<td>14(2)</td>
</tr>
<tr>
<td>Wear Days</td>
<td>6(2)</td>
<td>7(1)</td>
</tr>
<tr>
<td>Meeting Target Recommendation for PA n(%)</td>
<td>14(82.4)</td>
<td>3(17.7)</td>
</tr>
</tbody>
</table>

RESULTS: 215 children between 5 and 12 years of age (mean 8.2) were assessed between 2012 and 2015. Significant changes included consistent improvements in CR over all years. Increases in CR ranged from 13-30% with observed mean ranges from .006-.028. Significant increases in HG ranging from 6.25-11% (p value ranges = 0.027-0.045) were observed in 2013 and 2014. Significant increases in PASE ranging from 5.3-6.4% (p value ranges = .006-.035) were observed in 2014. The most compelling changes relative to the number of variables were observed in 2015 including an increase of HG by 9% (p = .006), PASE by 25% (p = .000), and CR by 14.5% (p = .006). BMI and BMI percentiles did not change significantly over all years; however observed mean ranges for BMI between 17.3 and 21.00 and BMI percentile ranges between 55 and 63 were within normal limits. VJ did not increase significantly.

CONCLUSION: Compelling and consistent improvements in CR among children in addition to increases in PASE and CR support continuing a collaborative effort and commitment to the health of children.

Purpose: Early childhood years (ages 4-6 years) are deemed a critical period to develop a physically active lifestyle to curb obesity epidemic. Evidence has shown that physical activity (PA) and cardiiorespiratory fitness are linked to enhanced cognition in children. However, favorable results toward this linkage are still inconsistent in preschool children. Therefore, this study examined the associations among preschool children’s objectively-determined PA, cardiorespiratory fitness and cognitive functioning across time.

Methods: Thirty-two preschoolers (16 boys; 59.4% Asian; M-age = 4.72, SD = 1.73) participated in this study. Children’s cognitive function, cardiorespiratory fitness, 5-day moderate-to-vigorous PA (MVPA) was assessed at baseline (Time 1) and 6 months (Time 2) later. Their cognitive function was assessed with the Executive Function Scale for Early Childhood. A modified YMCA 3-Minute Step Test and ActiGraph accelerometers were used for assessing children’s cardiorespiratory fitness and MVPA, respectively.

Results: Pearson’s correlation analyses showed different relation patterns among variables across time. In detail, there was a small positive relationship between MVPA and cognitive function at Time 1 (r = 0.14, p = 0.23), but negative relationship emerged between these two variables at Time 2 (r = 0.27, p = 0.08). A small yet positive correlation was seen between 10-year old PA variables at least one chronological and cognitive function can over time (Time 1, r = 0.40, p = 0.46; Time 2, r = 0.12, p = 0.27). Yet, regression results indicated that MVPA (Time 1, β = 0.14, p = 0.47; Time 2, β = 0.29, p = 0.14) and cardiorespiratory fitness (Time 1, β = 0.05, p = 0.98; Time 2, β = 0.16, p = 0.39) failed to significantly predict children’s cognitive function at both times (Time 1, R² = 0.02, p = 0.77; Time 2, R² = 0.10, p = 0.27). Conclusions: Findings suggest that the associations among preschool children’s cognitive function, MVPA, and cardiorespiratory fitness may still be inconsistent. Based upon the regression analysis, many other factors other than PA and cardiorespiratory fitness would explain children’s cognitive function. Future studies with a larger sample size and more reliable cognitive function assessment are warranted.
CONCLUSIONS: A 6-week Wu Qn Xi exercise program significantly improved balance function in college students. Future, larger studies are needed to explore the effect of Wu Qn Xi exercise on fall risk in this population.

3159 Board #64 
June 2 3:30 PM - 5:00 PM 
Parental Support for Moderate and Vigorous Physical Activity In Children and Adiposity as a Mediator.
Maria João Lagoa1, Michael Duncan2, Gustavo Silva3, Jorge Mata4, Luisa Aires5. 1Faculty of sport - University of Porto, Porto, Portugal. 2Covetown University, Coventry, United Kingdom. Email: mariajoaloagoa@gmail.com  
(NO relationships reported)

PURPOSE: To determine whether the associations between different types of parental support and children’s MVPA is mediated by their adiposity. METHODS: The sample comprised 138 Portuguese children (mean age 8.08±1.32 years; 29.9% were overweight and 37.2% obese. MVPA was objectively assessed during 7 days using accelerometers ActiGraph GT3X, Body Mass Index (BMI), and percentage of body fat (%BF) through DEXA (dual energy X-ray absorptiometry - model Explorer-Hologic). Parents self-reported their weight and height, and intangible/tangible parental support were assessed by questionnaire. Linear regressions and mediation (Sobel test) analysis were used. RESULTS: Children with lower %BF had higher MVPA levels (β=1.91, p<0.05) and were more supported by parents with intangible type (β=1.11, p<0.05). There was no association between tangible parental support and children’s MVPA. Additionally, children with higher levels of intangible support showed higher levels of MVPA (β=-0.21, p<0.05), however, significant differences disappeared after controlling for %BF (β=-0.19, p<0.05). The Sobel test showed that the positive association between intangible parental support and children’s MVPA was full mediated by %BF (z=2.09, p<0.05), with a percentage of indirect effect of 40.5%. CONCLUSION: Intangible parental support is an important predictor of children’s MVPA, however, this influence is mediated by children’s adiposity. Supported by the FCT under grand number SFRH/BD/101410/2014 and UID/DTP/00617/2013

3160 Board #65 
June 2 3:30 PM - 5:00 PM 
Association Between Active Commuting To School And Sleep Duration In Ecuadorian Youth
Emilio Villa-González1, Palma Chillón2, Francisco Javier Huertas-Delgado3, Manuel Herrador-Colmenero4, Carlos Rodríguez-López5, Yara Barranco-Ruiz6. 1National University of Chimborazo, Riobamba, Ecuador. 2University of Granada, Granada, Spain. 3Centro de Magisterio y Docencia de Ciencias de la Actividad Física y el Deporte. Universidad de Granada, Granada, Spain. 4Facultad de Educación. Universidad de Almería, Almeria, Spain. 5Centro de Magisterio La Inmaculada. Universidad de Granada, Granada, Spain.  
(NO relationships reported)

PURPOSE: Active commuting has been associated to longer sleep duration in adolescents, however, the literature is still limited. Thus, the aim of this study was to investigate the association between the mode of commuting to and from school and sleep duration in Ecuadorian youth. METHODS: A total of 106 classrooms were recruited from five low-income schools from a school district located in the Mountain West Region of the U.S. The classrooms were recruited from the 1st through 6th grades and class sizes ranged from 16 to 28 students. On-task classroom behavior was assessed at the beginning of the 2015-2016 academic school year using momentary time sampling methods for an observation duration time of 15-minutes. Classrooms were stratified into those that achieved 80% on-task behavior and those that did not. Physical activity was assessed at the student level using Yamax pedometers and Actigraph accelerometers that were worn for the entire school day for one school week. Step counts and time in MVPA were averaged at the classroom level to account for clustering of observations within classrooms. A multivariate analysis of variance (MANOVA) test was used to examine the relationship between a categorical classroom behavior variable and classroom-level physical activity. RESULTS: Classes that achieved at least 80% classroom behavior displayed higher school day step counts (Δ~449 steps, p<0.001, Cohen’s d = 0.26) and time in MVPA (Δ~3.6 minutes, p<0.001, Cohen’s d = 0.28) compared to classrooms that displayed lower classroom behavior. CONCLUSION: Classrooms that display higher levels of on-task behavior tend to record higher levels of average school day physical activity. The results provide further evidence of the relationships between favorable classroom behavior and physical activity. Future research needs to examine this relationship for potential causation and bi-directionality so that effective interventions can be employed.

3161 Board #66 
June 2 3:30 PM - 5:00 PM 
School Day Physical Activity and Classroom Behavior in Disadvantaged Children
Timothy A. Brusseau, Ryan D. Burns. University of Utah, Salt Lake City, UT. Email: Tim.brusseau@utah.edu  
(NO relationships reported)

Increased physical activity has been shown to improve classroom behavior in children. No study has examined the relationship between classroom level behavior and school day physical activity in disadvantaged children from low-income schools. PURPOSE: The purpose of this study was to examine the cross-sectional relationship between classroom level on-task behavior and average school day physical activity throughout one school week. METHODS: A total of 106 classrooms were recruited from five low-income schools from a school district located in the Mountain West Region of the U.S. The classrooms were recruited from the 1st through 6th grades and class sizes ranged from 16 to 28 students. On-task classroom behavior was assessed at the beginning of the 2015-2016 academic school year using momentary time sampling methods for an observation duration time of 15-minutes. Classrooms were stratified into those that achieved 80% on-task behavior and those that did not. Physical activity was assessed at the student level using Yamax pedometers and Actigraph accelerometers that were worn for the entire school day for one school week. Step counts and time in MVPA were averaged at the classroom level to account for clustering of observations within classrooms. A multivariate analysis of variance (MANOVA) test was used to examine the relationship between a categorical classroom behavior variable and classroom-level physical activity. RESULTS: Classes that achieved at least 80% classroom behavior displayed higher school day step counts (Δ~449 steps, p<0.001, Cohen’s d = 0.26) and time in MVPA (Δ~3.6 minutes, p<0.001, Cohen’s d = 0.28) compared to classrooms that displayed lower classroom behavior. CONCLUSION: Classrooms that display higher levels of on-task behavior tend to record higher levels of average school day physical activity. The results provide further evidence of the relationships between favorable classroom behavior and physical activity. Future research needs to examine this relationship for potential causation and bi-directionality so that effective interventions can be employed.
Abstract:
Purpose: The present study aimed to compare the effect of recreational programs in the overall value of resilience and each of its dimensions, according to measurement, group and sex of the population.

Methods: The intervention was carried out by performing 14 sessions of two types of recreational programs based on physical recreation and another on artistic recreation. Each treatment lasted 32 hours in total, with one session per week. The research design was quasi-experimental. Eighty-six (86) sixth grade students, ages 11 to 14, from a primary school in social vulnerability participated in the study. The sampling was non-probabilistic. School Resilience Scale (E.R.E) for children between 9 and 14 years old was used. A three-way analysis of variance 2x3x2 (ANOVA) for repeated measures in a factor (measurements * group * sex) was performed.

Results: There was significant interaction (p < 0.01) between measurements * group in the overall value of resilience. Bonferroni Post hoc analysis showed that physical recreation and artistic recreation treatment significantly improved (p < 0.05) the value of the overall resilience. In addition, the effect on resilience did not differ significantly by type of program, in the post-test measurement.

Conclusions: The findings support the use of recreational programs as a useful and effective way to build resilience in pre-adolescent students in areas of social vulnerability context.

**Purpose:** Understanding parental barriers is crucial to promote active commuting to school (ACS). This study examines parental barriers for ACS among Spanish youths (aged 9-16) and their association with gender and usual mode of commuting of their children. METHODS: Parents of children (n=628) and parents of adolescents (n=151) from Granada (Spain) completed a paper-based questionnaire about perceived parental barriers for ACS and their children’s mode of commuting to school. Data were analyzed using the Chi-square test. RESULTS: The most common barriers reported by parents of children were traffic volume (48.7%) and dangerous intersection (45.0%), whereas the most frequent barriers reported by parents of adolescents were distance to school (50.3%) and dangerous intersections (39.6%). Compared to parents of children, a greater proportion of parents of adolescents reported distance to school (children 37.1%; adolescents 50.3%; p=0.003) and crime (children 28.6%; adolescents 36.9%; p=0.047) and smaller proportion reported traffic volume (children 48.7%; adolescents 32.9%; p=0.000) as barriers to ACS. Among parents of children, crime was more reported as a barrier by parents of girls than parents of boys (girls 33.2%; boys 24.2%; p=0.013). In children, parents of non-active commuters to school more frequently reported absence of a policeman on crosswalks (passive 20.8%; active 9.1%; p=0.023) as barriers for ACS compared to parents of active commuters. In adolescents, parents of active commuters reported less importance to absence of a policeman on crosswalks (passive 30.1%; active 16.0%; p=0.041) and distance to school (passive 64.4%; active 37.3%; p=0.001) than their counterparts. CONCLUSION: The main parental barriers for ACS in children were traffic volume and intersection safety whereas for adolescents were distance and intersection safety. Among Spanish parents, parental barriers for ACS were influenced by children’s age, gender and usual mode of commuting to school.
Previous research has shown that patients with low fitness level prior to stem cell transplant have higher incidence of post-transplant complications. PURPOSE: To examine the feasibility of a home-based walking intervention in Brazilian patients with hematological cancers prior to undergoing a stem cell transplant in the Unico de Saude (SUS). Pre to post intervention physical function and patient reported outcomes (PROs) were also evaluated. METHODS: This single arm study enrolled 11 patients who scored >50 on the Karnofsky performance status scale, presented no contra-indication for participating in light to moderate regular walking, and were cleared by their oncologist to participate in the study. The home-based walking intervention initiated with patients undergoing 20 minutes of moderate intensity (10-12 on the Original Borg Scale) per week, progressing up to 150 minutes by week 7. After week 7, patients were asked to maintain the 150 minutes of walking at moderate intensity until transplant day. Feasibility was determined by the number of patients approached to participate in the study (>90%) and the number of patients (>60%) that were able to achieve at least 70% of the planned intervention. Physical function (6 minutes walk test (6MWT) and Timed Up and Go (TUG) tests), fatigue (Piper Fatigue Scale), and quality of life (QOL) (SF-36) were assessed prior and after the walking intervention. RESULTS: All (100%) eligible patients enrolled in the study. Of the 11 patients, 1 patient was excluded because stopped chemotherapy treatment. Out of 10 patients, only 1 was not able to adhere to the interventions completion. All patients completed at least 70% of the planned walking intervention with some (66%) engaged in more than 150 minutes per week. Significant improvements from pre to post intervention in the 6MWT (544.4 ± 117.8 and 490.6 ± 112.2 meters, p = 0.001) and PROs (Depression, 12.11 ± 7.08 and 7.89 ± 4.65, p = 0.006; Fatigue, 62.00 ± 25.98 and 26.22 ± 10, p = 0.002; overall QOL, 23.11 ± 4.34 and 26.33 ± 2.45) were observed. CONCLUSION: Brazilian patients enrolled in the SUS not only were able to participate in the home-based walking intervention, but improvements in physical function and PROs were observed.

Mobile technology has become an increasingly essential instrument for those who are responsible for healthcare and facilitating the interactions between health professionals and patients. PURPOSE: the purpose of this study is to design a smartphone application to self-monitoring resistance and exercise prescription, health knowledge, daily physical activity and compare this application to traditional intervention on psychological wellbeing (PW) and physical functioning (PF) in breast cancer survivor groups. METHODS: Thirty patients with breast cancer (age ~46.7 ± 10.1 years) were randomly assigned into control (CON) or intervention (INT) groups with 15 patients in each group. INT was provided a smartphone equipped with a mobile health application for self-monitoring of biometrics and performed a resistance and aerobic exercise prescription 5 times/week and 30 minutes/time. PW and PF measures were taken at baseline and 12th week. Fourteen patients in each group completed the study. Data were analyzed by means of independent t test. RESULTS: Result indicated that the INT had significant improvements than the CON on PW outcomes: anxiety (t = 2.93, p < 0.05) and depression (t = 3.34, p < 0.05) and on PF measures: 6 min walking test (t = 3.57, p < 0.05), arm curl (t = 2.45, p < 0.05) in both tests at 12 weeks (t = 2.75, p < 0.05). The body composition (t = 0.89, p = 0.45), weight (t = 1.06, p = 0.14), BMI (t = 0.99, p = 0.74), blood pressure (t = 0.61, p = 0.87) were not significantly different between groups, but the pain (t = 3.64, p < 0.05), fatigue (t = 3.98, p < 0.05) and sleep disturbance (t = 4.57, p < 0.05) decreased significantly between CON and INT during twelve weeks excises. CONCLUSIONS: This study suggested that the smartphone application significantly improve PB and may be the effective way to decrease depression and anxiety and enhance PF in breast cancer survivors. Future study should determine whether home-base smartphone system can promote them to maintain long-term exercise effect. The work presented in this article was supported by grant from the Ministry of Science and Technology of China (2015FY116000).
MEDICINE & SCIENCE IN SPORTS & EXERCISE®

3171

June 2 2:00 PM - 3:30 PM

Does Supervised Exercise Programming At Diagnosis Impact Future Physical Activity Levels In Breast Cancer Survivors?


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(No relationships reported)

Purpose: Low physical activity levels are associated with increased risk of breast cancer recurrence and reduced survival. Only 32% of breast cancer survivors engage in ACSM’s 150 mins of moderate to vigorous activity per week recommended guidelines. Women who engaged in regular physical activity post diagnosis had a 20-50% lower mortality risk from breast cancer than those who did not. The purpose of this analysis is to identify whether breast cancer survivors participating in the Nutrition and Exercise during adjuvant Treatment (NEXT) trial had changes in their physical activity levels during and 1-year post treatment.

Methods: Stage I-III female breast cancer survivors (51 ± 11 yrs.), participated in the NEXT trial. Six-month physical activity recall measured at baseline, end of study (EOS) (average length= 45 weeks) and one year follow up via Minnesota Leisure Time Physical Activity Questionnaire, scored as average weekly minutes of moderate to vigorous physical activity (MVPA). Due to non-normal distribution of physical activity, a generalized estimating equation with a gamma log link, with pairwise contrasts to determine changes in individual levels of activity between time points. Data are reported as mean ± standard error.

Results: 73 women were assessed at baseline, 59 at end of study and 35 at one year follow up. MVPA did not statistically change from baseline to EOS (176 ± 23 to 192.3 ± 12.6 mins). There were statistically significant differences in MVPA between EOS and one year follow up (268 ± 50 mins, p < 0.04), and between baseline and one year follow up, (p < 0.01). At baseline, 43% of participants did not meet the ACSM recommended 150 mins/week of MVPA, however this improved to 63% of participants at both end of study and one year follow up.

Conclusion: Breast cancer survivors enrolled in a supervised exercise program concurrent to and immediately after adjuvant treatment maintained MVPA levels. Furthermore, there was an increase in those meeting the current physical activity guidelines at both end of study and one year follow up.

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June 2 2:00 PM - 3:30 PM

Hydration Status In Cancer Patients: Exercise Is Not A Palliative Care

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(No relationships reported)

Purpose: Hydration is a controversial area in cancer, associated to a cancer diagnosis, and suggests that lifetime physical activity levels is associated with lower risks of many types of cancer. As part of an ongoing study of rural cancer survivors in West Central Pennsylvania we sampled subjects regarding their levels of leisure time physical activity and compared those levels to ACSM recommendations.

Methods: A sample of 39 rural cancer survivors completed questionnaires which included a modified Historical Leisure Activity Questionnaire. Grouped by age (13-17, 18-22, 23-34, 35-50, 51-65, and 66-80), Total MET Hours were calculated and compared to ACSM recommendations of 2.5 hours of moderate intensity exercise per week. The comparator of a 5 MET activity was used in the calculation of the benchmark Total MET Hours value. This study was approved by the Saint Francis University IRB. Results: Thirty-three (33) questionnaires were returned and 27 were analyzed. Participants were predominantly white, non-Hispanic, with a mean age of 60 years (27 to 77 years). The mean age of Cancer diagnosis was 51 years, (9 to 70 years). Breast Cancer (n=11) and Prostate (n=4) were primary Cancers reported. Significant differences (p<0.05) from actual to expected Total MET hours were found for each age group, except for the 13-17 group. The following groups demonstrated significantly lower Total MET Hours than expected: 18-22 (p<0.017), 23-34, (p<0.005), 35-50, (p<0.001), 51-65 (p<.001), and 66-80 (p<.043). Average percent difference ages 13-50 is 63% actual to expected MET Hours. Conclusion: This pilot data supports the evidence that reduced physical activity is associated with a cancer diagnosis, and suggests that lifetime physical activity levels may play a role in the incidence of Cancer in a rural population. Support was provided in part, by the Department of Physical Therapy.

MEDICINE & SCIENCE IN SPORTS & EXERCISE®

3173

June 2 2:00 PM - 3:30 PM

Strength Training Following Hematopoietic Stem Cell Transplantation: Designing Interventions for Eventual Translation into Clinical Practice


(No relationships reported)

Purpose: Intensive cancer therapy followed by hematopoietic stem cell transplantation (HCT) results in highly distressing symptoms, impaired functional ability and diminished quality of life. These problems are amenable to exercise interventions but dependent upon participant uptake for eventual translation into clinical practice. This study reports subject attrition, compliance, adherence, and progression from the strength training arm (n = 37) of our intervention study, Strength Training to Enhance Early Recovery (STEER) after HCT.

Methods: This single-blinded study randomized subjects to STEER versus usual care plus attention control with health education. STEER consisted of a progressive resistance program using elastic resistance bands tailored to the individual’s capabilities and integrated seamlessly into existing clinical practice, Subjects received instruction and began active range of motion two times per week while hospitalized for HCT but followed a six-week moderate intensity program (three sessions per week/18 sessions total) post hospital discharge. STEER employed a combined supervised/unsupervised approach.

Results: Four subjects died during the course of the study, unrelated to the STEER intervention (attrition rate 10%). Post-hospitalization, subject compliance with STEER was high (83%, SD = 22) as well as adherence to the exercise prescription (89%, SD = 25). Most subjects (90%) were able to progressively increase their prescription by adding repetitions, sets, number of exercises or band resistance.

Conclusions: STEER was tested in a challenging group of patients during a period of complexity, frequently changing needs. Our study took advantage of common clinical situations following HCT, as six-week moderate-intensity program (three sessions per week/18 sessions total) post hospital discharge. STEER employed a combined supervised/unsupervised approach.

3174

June 2 2:00 PM - 3:30 PM

Self-reported Ltpa Versus Expected Ltpa In Rural Cancer Survivors: Missing The Mark

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(No relationships reported)

The evidence of the benefits of exercise for those diagnosed with Cancer has grown significantly indicating that leisure time physical activity is associated with lower risks of many types of cancer. As part of an ongoing study of rural cancer survivors in West Central Pennsylvania we sampled subjects regarding their levels of leisure time physical activity and compared those levels to ACSM recommendations.

Purpose: To describe the levels of self-reported total lifetime leisure time physical activity hours vs ACSM recommended expected hours. Methods: A sample of 39 rural cancer survivors completed questionnaires which included a modified Historical Leisure Activity Questionnaire. Grouped by age (13-17, 18-22, 23-34, 35-50, 51-65, and 66-80), Total MET Hours were calculated and compared to ACSM recommendations of 2.5 hours of moderate intensity exercise per week. The comparator of a 5 MET activity was used in the calculation of the benchmark Total MET Hours value. This study was approved by the Saint Francis University IRB. Results: Thirty-three (33) questionnaires were returned and 27 were analyzed. Participants were predominantly white, non-Hispanic, with a mean age of 60 years (27 to 77 years). The mean age of Cancer diagnosis was 51 years, (9 to 70 years). Breast Cancer (n=11) and Prostate (n=4) were primary Cancers reported. Significant differences (p<0.05) from actual to expected Total MET hours were found for each age group, except for the 13-17 group. The following groups demonstrated significantly lower Total MET Hours than expected: 18-22 (p<0.017), 23-34, (p<0.005), 35-50 (p<0.001), 51-65 (p<0.001), and 66-80 (p<.043). Average percent difference ages 13-50 is 63% actual to expected MET Hours. Conclusion: This pilot data supports the evidence that reduced physical activity is associated with a cancer diagnosis, and suggests that lifetime physical activity levels may play a role in the incidence of Cancer in a rural population. Support was provided in part, by the Department of Physical Therapy.
Motivations for Breast Cancer Survivors (BCS) to exercise after cancer treatment are not well understood and many BCS do not exercise at recommended levels. Goal-oriented team exercise training, such as triathlon training and dragon boating, may improve exercise activity. **PURPOSE.** The overall objective of this study was to determine the motivations to participate in goal-oriented team triathlon training among a group of BCS dragon boat racers. **METHODS:** Female breast cancer survivors (age=63.5 (SD 4.1)) yr, BMI =25.8 (SD 4.4) who were members of a BCS dragon boat team (membership length=6(SD 4.1) seasons) were recruited to participate in a focus group after completing a 14 wk individualized triathlon training program. Training comprised two supervised group sessions and three home-based sessions per week. The training program culminated in participation in a sprint triathlon (Athleta Iron Girl, 0.5 mi swim, 12 mi bike, 3.1 mi run). Dragon boat training occurred twice weekly during triathlon training. Common themes related to dragon boat and triathlon training participation were analyzed. **RESULTS:** Four women participated in the focus group from which the following themes emerged: (1) Champion for Exercise from personal contacts, (2) Team motivation to join another team, (3) Sharing Life Experiences while not focusing on cancer helped in supporting each other, (4) Having Fun and not focusing on cancer was important, and (5) Integrating New and Renewed types of exercise into daily lives. Overall, survivors recognized their improved activity levels during triathlon training. They also expressed a desire for future volunteer participation to encourage others in the program. **CONCLUSIONS:** Goal-oriented team triathlon training for BCS dragon boat racers can improve exercise activity. Structured exercise as a part of a team with a common goal may have facilitated successful participation. Thus, goal-oriented team training could lead to better health for BCS. **FUNDING:** cones.

**CONCLUSIONS:** This study demonstrated the potential efficacy of combined training to decrease total and trunk fat mass, an indicator of central adiposity, in breast cancer survivors on aromatase inhibitor therapy, in which fat mass is considered a risk factor for recurrence of cancer, metastasis and other chronic diseases. A combined modality program did not slow bone loss in this population, thus modifications to the program to include specific osteogenic training may need to be considered to target this health outcome.

**Exercise may mitigate a cluster of related symptoms in Breast Cancer Survivors (BCS). This cluster includes fatigue, sleep disturbances, pain, depression, and cognitive changes. In addition, Cortisol Awakening Response (CAR), a function of stress, Heart Rate Variability (HRv), an indication of cardiac autonomic balance, and quality of life (QOL) may relate to this symptom cluster.**

**METHODS:** Female BCS (N = 26; age = 49 (8) yr) participated in a 14 wk. sprint triathlon training program. Training consisted of 2 supervised and 3 unsupervised sessions per week. Pre- and Post-training measures included CAR, HRv, and QOL (FACT-B), along with fatigue (FACT-T1), and PROMIS questionnaires for cognition (Applied Cognition-General Concerns-Short Form), depression (Emotional Distress-Depression), pain (Pain Interference-SF), and sleep (Sleep Disturbance-SF). Except for QOL and FACT-B, higher questionnaire scores represent worse function.

**RESULTS:** Data are mean (SD). After training, CAR decreased, (pre= 12.8 (6.8), post= 8.5 (7.3) nmol/L, p= 0.03) and HRv increased, (pre= 44.8 (28.2), post= 68.6 (55.4) ms, p= 0.04). Further, QOL (pre= 117.4 (14), post= 125.1 (11), p= 0.01), fatigue, (pre= 41.0 (9.1), post= 47.2 (4.1), p= 0.01), cognition (pre= 16.4 (8.4), post= 13.1 (5.8), p= 0.02), depression, (pre= 10.7 (4.6), post= 9.2 (2.5), p= 0.04), and pain improved (pre=10.6 (3.9), post= 8.9 (2.2), p= 0.03). Sleep did not change. No training variables were associated with CAR or HRv. Before training, QOL correlated with depression (rs= 0.70), cognition (rs= 0.64) and fatigue (rs= 0.80). Further, sleep correlated with pain (rs= 0.37) and depression correlated with cognition (rs= 0.54). Similar correlations were observed after training.

**CONCLUSIONS:** Triathlon training for BCS improved all symptoms in a cluster except sleep. QOL was related to cognition, depression and fatigue. CAR and HRv were not related to any of the symptoms studied. However, the decreased CAR and increased HRv from exercise in BCS could have positive health implications. Funding was provided by Vincen Lombardi Cancer Research Foundation/Aurora Health Care.
Methods: CCS (aged≥16) and parents (survivors aged<16) from 11 hospitals in Australia and New Zealand participated in this study. Participants self-reported their moderate–vigorous physical activity (MVPA). This was compared to American Cancer Society’s physical activity guidelines (150 min/week for adults, 30 min/week for children). A systematic review and meta-analysis were conducted to determine the feasibility (adherence, retention and recruitment) and effect of distance-delivered interventions on physical activity levels, physical and psychological function after intensive treatment. Results: 329 CCS (age=27.7±7.2 years, 20.3±8.3 years since diagnosis) and 254 parents of CCS (age=14.0±2.8 years, 10.9±2.9 years since diagnosis) participated. Adult CCS reported mean MVPA of 115.9±129.8 min/week and children had MVPA of 231.3±227.8 min/week, which was in both cases lower than recommended guidelines (both p<0.001). Only 31.3% of adults and 29.1% of children achieved recommended MVPA guidelines. Our systematic review included 13 studies (n=279 participants), while 4 (n=102 participants) were included in the meta-analysis. Distance-delivered physical activity interventions were feasible in CCS (mean recruitment rate=64%, retention rate=85%, adherence rate=88%), but did not increase physical activity levels from baseline to post intervention (p=0.09). Participation in physical activity interventions displayed a positive effect on physical function (p=0.002) and psychological outcomes (p=0.001). Conclusion: Over two-thirds of child and adult CCS are not achieving recommended physical activity levels. Strategies including education and early monitoring are needed to increase MVPA levels to lower the risk of cardiovascular and metabolic co-morbidity. CCS may experience barriers including fatigue, access to facilities or lack of guidance, but our investigation into distance-delivered interventions to increase physical activity levels suggests that such interventions could represent a viable option to tackle this important issue.

The TrueNTH Lifestyle Management program is an international program aimed to improve the survivorship and wellness of men with prostate cancer. As part of the national network, an initial 12-week exercise program, 3 days per week, was carried out at a university-based location in Edmonton Canada.

PURPOSE: To better understand the motivation, facilitators and barriers to exercise following participation in the TrueNTH exercise program.

METHODS: An optional post-program satisfaction questionnaire was administered and a focus group session conducted with 16 of the 22 program participants (mean age: 65.5 years). Quantitative data from the participant satisfaction questionnaire were analyzed descriptively and qualitative data from the focus group were used to clarify and further describe quantitative results.

RESULTS: Main findings included high satisfaction with the program (100%) and mean improvements in 8 repetition maximum strength of 8.5 lbs for bench press and 31.6 lbs for the leg press. Results from the Behavioral Regulation in Exercise Questionnaire (Version 3) showed high scores for intrinsic (3.28) and identified integration (3.25), and low scores for amotivation (0.083) and external regulation (3.25), and low scores for amotivation (0.083) and external regulation (3.25). Quantitative data from the participant satisfaction questionnaire were analyzed descriptively and qualitative data from the focus group were used to clarify and further describe quantitative results.

CONCLUSION: Prostate survivors taking part in the TrueNTH program were highly motivated, enjoyed, and valued the benefits of the exercise program. This examination of site-specific exercise facilitators and barriers allows for adaptation of programming to the local context.

The increased parasympathetic tone achieved with endurance training may provide important cardioprotection after menopause. Inability to restore autonomic balance postexercise is a risk factor for sudden cardiac death as sympathetic stimulation has an arrhythmic effect. Until recently, most of the studies on recovery heart rate variability (HRV) have focused on young men. PURPOSE: The purpose of this study was to compare the HRV response from rest through maximal exercise and recovery in postmenopausal women (PNW) who trained at moderate (MOD) or vigorous (VIG) intensities.

METHODS: Thirty-nine breast cancer survivors showed higher levels of serum sclerostin compared to age-matched healthy women at baseline (115.6 ± 58.9 vs. 86.5 ± 53.2 pg/mL, p=0.016). Exercise training over 12 weeks markedly improved muscle strength, endurance and flexibility, and reduced body fat percentage, waist circumference and visceral fat area in breast cancer survivors. The exercise training reduced the serum levels of insulin, leptin and interleukin-8 as well (p<0.05). Moreover, circulating sclerostin levels were significantly decreased by the exercise training (124.4 ± 17.0 vs. 106.3 ± 42.6 pg/mL, p=0.021), but there were no differences observed in control group during this clinical trial period (116.3 ± 42.6 vs 114.2 ± 66.9 pg/mL, p=0.295). CONCLUSION: These findings suggest that sclerostin may be a notable serological parameter reflecting the beneficial effects of exercise training in breast cancer survivors.
training enhance HRV recovery in the immediate postexercise period following one bout of maximal exercise in older women. These data further document the benefits of regular aerobic exercise in the improvement of cardiac electrical stability. PURPOSE: To determine if a single bout of submaximal downhill running will elicit a change in expression of specific circulating cytokines. METHODS: Healthy endurance-trained men (n=5) and women (n=3) aged 18-35 were screened for exercise contraindications using a health history questionnaire, blood chemistry, and body composition. A VO2max test and downhill running familiarization were completed to determine experimental running speed at 70% VO2max. After abstaining from exercise, caffeine, alcohol, NSAIDs, and other drugs for 48 hours, subjects ran on a 15% decline for 1 hour. Plasma was immediately separated, aliquoted, and stored at -80°C. At each time point, plasma cytokine concentrations were measured using ELISA kits specific to each cytokine were used to measure cytokine levels at each time point. Samples were run in duplicate. RESULTS: There were no significant changes in IL-15 or Myostatin at any time point. Compared to baseline, IL-1ra showed an increase of 46.9% (p=0.009), 60.9% (p=0.001), and 38.8% pg/ml (p=0.028) at 0 minutes, 60 minutes, and 24 hours after exercise, respectively. For IL-10, there was an increase of 19.6% (p=0.01), 28% (p=0.003), and 37.1% (p=0.0003) at 30 minutes, 60 minutes, and 24 hours after exercise, compared to baseline. CONCLUSION: In endurance trained subjects, a 30 minute submaximal bout of downhill running caused an increase in the anti-inflammatory cytokines IL-1ra and IL-10 for up to one day, and no significant change in the inflammatory cytokines IL-15 or myostatin. IL-1ra exhibited the greatest increase 60 minutes after exercise, while IL-10 was increased significantly at 30 minutes, 60 minutes, and 24 hours, with the greatest effect seen the day after exercise. This increase in systemic anti-inflammatory cytokines is consistent with literature investigating cytokine levels immediately after eccentric exercise. Further, IL-15 levels were highly variable, and divided subjects into two groups that were not explained by any demographics studied. This result has not been previously reported and deserves further study.

Strenuous exercise has been shown to dramatically alter levels of anti- and proinflammatory cytokines; proteins involved in regulation of systemic inflammation.

Prior studies have demonstrated that sitting on a stability ball during arm ergometry elevates oxygen consumption about 10%; however, the influence that the characteristics of the stability ball has on this response has not been examined.

**PURPOSE:** To examine energy expenditure as well as objective (i.e., %VO2max) and subjective (i.e., RPE) measures of exercise intensity during identical yoga sessions performed in a hot and thermo-neutral environment in healthy adults.** METHODS:** Using a cross-over, randomized order design, 14 participants completed two identical 20-minute yoga sessions in a hot (33°C ± 0.8°C; humidity: 20.5 ± 1.4%) and thermo-neutral (“TN”): 22.1 ± 0.2°C; humidity: 27.8 ± 1.6%) environment performed one week apart. Oxygen consumption (VO2) was measured during steady-state yoga to determine exercise intensity (%VO2max) and to determine energy expenditure (kcal/min). Heart rate and rate of perceived exertion (RPE) were also collected during steady-state yoga to determine exercise intensity (%HRmax) and participant perception of intensity using the Borg Scale (6-20). **RESULTS:** There were no differences in exercise intensity based on %VO2max during hot vs. thermo-neutral yoga (39.0 ± 2.3 vs. 39.5 ± 1.8%, p=0.68) or energy expenditure (5.12 ± 0.50 vs. 4.97 ± 0.39 kcal/min, p=0.42). However, exercise intensity was significantly higher during hot vs. thermo-neutral yoga based on %HRmax (67.0 ± 0.2 vs. 60.8 ± 1.9%, p=0.01) and RPE (11.6 ± 0.9 vs. 10.7 ± 0.8, p=0.04). Furthermore, hot yoga would be classified as “light” intensity exercise based on %VO2max, but “moderate” intensity exercise based on %HRmax and RPE while thermo-neutral yoga would be classified as “light” intensity exercise based on %VO2max, %HRmax, and RPE (according to established ACSM guidelines).

**CONCLUSION:** Despite the added hemodynamic stress and perception that exercise in a hot environment is more difficult than in a thermo-neutral room, we observed parallel responses in oxygen consumption during hot vs. thermo-neutral yoga resulting in relatively modest but equal objective measures of exercise intensity and energy expenditure.
Sedentary behavior, particularly prolonged sitting, is common in modern society and is associated with numerous cardiovascular disease (CVD) risk factors, including impaired glucose metabolism and higher blood triglycerides. PURPOSE: The purpose of this study was to determine the effects of a single bout of aerobic exercise performed prior to a prolonged sitting challenge on postprandial plasma glucose and triglyceride responses. METHODS: Ten healthy men (21.2±0.6 y; maximal oxygen consumption (VO_2max) = 49.6±1.7 ml/kg/min (mean±SE)) participated in a randomized, cross-over study in which they completed a single bout of continuous treadmill exercise (45 min at 65% VO_2max) or 45 min of seated rest. A carbohydrate-rich snack (190 kca; 29:7:3 g (carb:fat:protein)) was ingested by participants 30 min before and 30 min following exercise (or seated rest). Plasma glucose and triglyceride responses were measured after an overnight fast (Pre), 1 hr following exercise (or seated rest) (Post), and at 1 hr intervals during a 3 hr prolonged sitting challenge. Study personnel monitored participants during the sitting challenge to ensure minimal lower extremity movement. Repeated-measures ANOVA and Bonferroni post-hoc tests were used to evaluate differences within and between trials. RESULTS: Treadmill exercise was completed at 65.4±1.3% VO_2max (range = 60.9-72.6%). A main effect due to time (P<0.001) was observed for plasma glucose. Relative to Pre, plasma glucose concentrations in the exercise trial increased at Post by 12.1% (P=0.03) and were 8.6% and 14.5% lower (P=0.02) at 1 and 3 hr of prolonged sitting, respectively. Plasma glucose concentrations in the seated rest trial increased at Post by 15.0% (P=0.01) and returned to levels no different than Pre by 1 hr of prolonged sitting. Plasma triglycerides showed no time or treatment effects. CONCLUSION: These preliminary findings suggest that acute aerobic exercise performed prior to 3 hr of prolonged sitting lowers postprandial plasma glucose responses induced by a carbohydrate-rich snack in healthy men. Future studies should investigate individuals at increased CVD risk and utilize a larger postprandial challenge to further elucidate potential deleterious effects of prolonged sitting.

Supported by Miami University Undergraduate Summer Scholars Program.

Conflicting evidence suggests insufficient vitamin D (ViD) levels are associated with high resting blood pressure (BP). However the relationship between ViD and the peak systolic BP (SBP) response to exercise, a predictor of future hypertension, has yet to be investigated. PURPOSE: We sought to examine the relationship among serum 25-hydroxy ViD (25(OH)ViD), resting BP, and the peak SBP response to a graded exercise stress test among a large sample (n=417) of healthy men (49%) and women (51%) over a broad age range (20-76 yr; mean age 44.1±0.8y). We hypothesized that individuals with clinically sub-optimal ViD would have higher resting BP and a peak SBP response to a graded exercise stress test compared to individuals with optimal ViD levels. METHODS: Fasting serum ViD, anthropometrics, resting BP, and peak exercise SBP were obtained at the baseline visit of a larger clinical trial (STOMP; NCT01140308). RESULTS: Mean ViD levels were 36.1±0.7 ng/ml, with 41.2% of individuals classified as sub-optimal (<32 ng/ml). Average resting BP was 118.9±0.6/75.3±0.5 mmHg, with 41% of individuals having high BP (n=174) consisting of those with pre-hypertension (32.5%) and established hypertension (15.5%). Individuals with optimal ViD had higher resting SBP (120.6±13.4 mmHg vs. 116.6±12.7 mmHg; P=0.002) and DBP (76.0±9.9 mmHg vs. 74.1±1.1 mmHg; P=0.048) than individuals with sub-optimal ViD, respectively. Similarly, individuals with optimal ViD tended to have a greater peak exercise SBP response than individuals with sub-optimal ViD (P=0.114). CONCLUSION: In contrast to our hypothesis, ViD was positively associated with resting BP levels, but was not associated with peak SBP under maximal exercise conditions. Additional studies are needed to confirm our findings and to provide insight into mechanisms underlying these associations among individuals with high BP. TRIAL REGISTRATION: NCT01140308

3186 Board #91 June 2:00 PM - 3:30 PM
The Relationship Between Changes In rmRSSD And Rectus Femoris Cross-sectional Area Following Exercise
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(NO relationships reported)

PURPOSE: The natural log transformation of the root mean square of successive R-R differences (lnrmRSSD) is a parasympathetic measure of heart rate variability.

The extent to which the relationship between lnrmRSSD and localized muscle damage following exercise is unknown. The purpose of this study was to examine the relationship between lnrmRSSD and Rectus femoris CSA (CSA-RF) following an exhaustive bout of exercise over 72 hours. METHODS: Twelve participants were measured for pre-exercise lnrmRSSD for five minutes in a seated position, followed by a CSA-RF measurement with musculoskeletal ultrasound 15 cm above the superior pole of the participant’s right patella. Next participants completed an exhaustive exercise protocol. Finally, participants repeated the lnrmRSSD and CSA-RF measurements immediately following exercise termination with follow-up testing at 24-hours, 48-hours, and 72-hours. RESULTS: Repeated measures ANOVA revealed significant decreases in lnrmRSSD between pre-exercise and post-exercise measures (P < .002, Table 1), but no other significant differences. Likewise, there were significant differences in CSA-RF from pre-exercise to post-exercise (P < .001, Table 1), but no other differences were noted. There was a large near-significant correlation between the changes in lnrmRSSD and CSA-RF from pre-exercise measures to 24-hour follow-up (r = -.64, P = .025). CONCLUSIONS: In this study lnrmRSSD declined as CSA-RF increased immediately following exercise up to 24 hours. This inverse relationship is likely the result of vagal tone suppression and increased sympathetic outflow in cardiac control during and immediately following exercise. Tracking lnrmRSSD following exercise may give practitioners further insight to the mechanisms of recovery.

3188 Board #93 June 2:00 PM - 3:30 PM
Effects of Prior Aerobic Exercise and Prolonged Sitting on Postprandial Plasma Glucose and Triglyceride Responses
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(NO relationships reported)
Skeletal Muscle Force Production and Bioenergetics During All-out Exercise: Influence of Group II/IV Muscle Afferents

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PURPOSE: To investigate the influence of group II/IV muscle afferent feedback on skeletal muscle force production and bioenergetics during all-out exercise.

METHODS: Phosphorescent magnetic resonance spectroscopy was performed during a 5-min all-out intermittent isometric single-leg knee-extensor exercise, consisting of 60 maximal voluntary contractions (MVC), with intrathecal fentanyl (FENT), to attenuate group II/IV leg muscle afferents, and control (CTRL) conditions in 8 healthy men (age: 28 ± 5 yrs, stature: 178 ± 4 cm, and body mass: 77 ± 8 kg). Peak, integrated, and mean forces were determined per MVC and critical force (CF) was determined as the mean force of the final 6 MVCs. The intramuscular metabolic perturbation and adenosine triphosphate (ATP) synthesis rates were determined from intramuscular concentrations of phosphocreatine (PCr), inorganic phosphate (Pi), diprotonated phosphate (H2PO4−), ATP, and pH. RESULTS: Peak force (FENT: 595 ± 113 vs. CTRL: 568 ± 126 N) and end-test force (FENT: 224 ± 50 vs. CTRL: 209 ± 52) were not significantly different between conditions. The cumulative integrated force was significantly greater for FENT than CTRL over the 1st min (17557 ± 2581 vs. 16154 ± 2825 N), but not thereafter (Figure 1). End-exercise [PCr] was not significantly different between conditions, while [Pi] and [H+] were significantly greater for FENT. The estimated total ATP synthesis rate was significantly greater for FENT than CTRL over the 1st min (66 ± 16 vs. 57 ± 13 mM), but not thereafter (Figure 1). The estimated total ATP synthesis rate at CF arose from a significantly greater oxidative ATP synthesis (FENT: 77 ± 15 vs. CTRL: 83 ± 13 %) than anaerobic ATP synthesis (FENT: 23 ± 15 vs. CTRL: 17 ± 13 %). CONCLUSION: Attenuation of group II/IV muscle afferent feedback augmented force production during the 1st min of all-out exercise, for which the increased energy demand was met, en masse, by the creatine kinase reaction, glycolysis, and oxidative metabolism.

Mechanisms By Which Isometric Handgrip Training May Improve Endothelial Dilator Function In Young Healthy Men.

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Isometric (IHG) handgrip training can reduce arterial blood pressure (ABP), especially in hypertensives, but the mechanisms remain unclear (1). We recently showed that IHG for 4-sweats in healthy young White European (WE) and South Asian (SA) men augmented peak exercise hyperaemia and reactive hyperaemia in the contralateral arm by ~30% in WE, but only ~15% in SA (2,3). This suggested that IHG training of one arm improves endothelial dilator function systemically even in young men, but the effects are greater in WE. PURPOSE: To determine the changes induced in forearm blood flow (FBF) in the contralateral arm (CA) during a single bout of IHG training, which might serve as a stimulus for improving endothelial function, and to test whether endothelium-dependent cyclooxygenase (COX) products contribute.

METHODS: In 10 WE and 10 SA males (19-23 yrs), FBF was recorded by venous occlusion plethysmography in the CA during IHG contractions of the dominant arm at 30% maximum voluntary contraction (5 s x 3 min at 5 min intervals) on 2 different days in the absence or presence of the COX inhibitor aspirin (600mg p.o.).

RESULTS: Mean arterial pressure (MABP), recorded by finger

CONCLUSIONS: We propose that increased FBF and increased shear stress in the CA during IHG training may act as a stimulus to improve endothelium-dependent dilator function in young WE and SA men. Further, we found that COX products contribute to the increased FBF in WE, whereas vasoconstrictor COX products limit the increased FBF in SAs, thereby limiting the effectiveness of IHG training on endothelial function. Supported by Alexander S. Onassis Public Foundation

Blood Pressure Responses To Wearing An Abdominal Belt When Performing Differing Static Exercises

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Many people wear abdominal belts when exercising to aid in stabilization of their core. Static exercise has been shown to raise blood pressure; however minimal is known about how wearing an abdominal belt impacts blood pressure during static exercise.

PURPOSE: The purpose of this study was to investigate the impact of wearing an abdominal belt on blood pressure when subjects performed 3 static exercise positions. METHODS: 30 adults (n = 16, 13 males and 7 females; age=21 ± 1.5 yrs, ht=179±2.6 cm, wt=79.3±12.6 kg) served as subjects. Resting blood pressure was initially measured in a seated position. Subjects then participated in three static exercises including a Wall-Sit, Side Plank, and Static Back Extension. Subjects completed each exercise position once with an abdominal belt and once without. Test order of belt/no belt and exercise positions was randomized. Blood pressure was measured at the 45 second point for each exercise. Subjects were given recovery time between exercises for blood pressure to return to normal. A 2 x 3 Factorial ANOVA was performed on systolic (SBP) and diastolic blood pressure (DBP) data. It was determined apriori that appropriate post-hoc follow up tests would be performed as needed. RESULTS: Results for SBP are presented in table below. For SBP a significant interaction (p<0.05) was found with the 2 x 3 ANOVA. When main results were investigated no significant difference (p>0.05) was found between positions. A significant difference (p<0.01) was found for the main effect of With Belt vs. No Belt. No significant (p>0.05) results were found with all testing of DBP.

<table>
<thead>
<tr>
<th>Condition</th>
<th>SBP (mmHg)</th>
<th>DBP (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Belt</td>
<td>146.7±7.0</td>
<td>144.8±5.6</td>
</tr>
<tr>
<td>W/ Belt</td>
<td>151.7±9.4</td>
<td>150.3±6.6</td>
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<tr>
<td>Combined</td>
<td>149.2±8.5</td>
<td>147.5±6.6</td>
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*p<0.01

CONCLUSIONS: The results indicate that wearing an abdominal belt when performing static exercises has minimal impact on DBP between wearing a belt and not. However, wearing an abdominal belt while performing static exercises appears to increase SBP irrelevant of body position compared to no abdominal belt. Subjects should be conscious/aware of this response when performing static exercises.
PURPOSE: The objective of this study was to investigate the effect of acute exercise on coagulation factors and fibrin fiber properties in both younger healthy subjects and older subjects with cardiovascular disease (CVD). In addition, it was of interest to examine relationships between coagulation factors and fibrin fiber properties during acute exercise. METHODS: 5 male subjects were recruited to the younger, healthy (YH) group and 5 male subjects were recruited to the older group with CVD (OD). Each participant performed a single session of an acute exercise protocol, having drawn blood pre-exercise and post-exercise. Paired repeated measures ANOVA and Pearson’s correlations were used to analyze the results. Effect sizes (ɲ²) were used to combat the small sample size and avoid type II errors. RESULTS: YH showed a 25-30% reduction in maximum power (Young: 244±9 W, Old: 182±16 W, P<0.05). Interestingly, there was a significant main effect of time present (P<0.05), indicating that the nFMD changed over time. CONCLUSION: These results suggest that repetition training might be useful for the prevention of cardiovascular disease.
PURPOSE: Burn trauma causes a hypermetabolic-cardiac stress response that impairs resting cardiac function. It is currently unknown how burn trauma affects cardiovascular responses to submaximal exercise in children. We tested the hypothesis that burn children have reduced cardiac output and stroke volume during submaximal exercise at 6-12 months post-burn.

METHODS: Values are expressed as means ±SD with significance set at P<0.05. Five children with 49±4% total body surface area (TBSA) burned (2 female, 11.7±1y, 40.4±18kg, 141.1±9cm) and nine similar (P=0.05) non-burned controls (6 female, 12.5±2y, 59.0±16kg, 150.1±12cm) with comparable exercise capacity (VO2peak: 31.8±11 vs 37.7±6 mlo2 kg⁻¹ min⁻¹, P=0.27) participated. Burn children had a reduced growth BMI-for-age percentile compared to non-burn (54.6±36 vs 93.2±6 %tile; P<0.05) at 9.4±3 mo post-burn injury. Oxygen consumption (VO2), heart rate (HR), cardiac output (Q), and stroke volume (SV) were measured during a submaximal exercise protocol that entailed a pre-exercise (PRE) rest period followed by 3-min exercise stages at 50% and 75% of their peak VO2.

RESULTS: There were no significant differences in pre-exercise VTI and NO between groups but HR differences (G x EX interaction, P=0.02) were observed at submaximal intensities of 90% and 70% HRpeak (40 minutes at 60-75% of maximal HR). Five children with 49±4% TBSA burned (2 female, 11.7±1y, 40.4±18kg, 141.1±9cm) with comparable exercise capacity (VO2peak: 31.8±11 vs 37.7±6 mlo2 kg⁻¹ min⁻¹, P=0.27) participated. Burn children had a reduced growth BMI-for-age percentile compared to non-burn (54.6±36 vs 93.2±6 %tile; P<0.05) at 9.4±3 mo post-burn injury. Oxygen consumption (VO2), heart rate (HR), cardiac output (Q), and stroke volume (SV) were measured during a submaximal exercise protocol that entailed a pre-exercise (PRE) rest period followed by 3-min exercise stages at 50% and 75% of their peak VO2.

CONCLUSIONS: There were no significant differences in pre-exercise VTI and NO between groups but HR differences (G x EX interaction, P=0.02) were observed at submaximal intensities of 90% and 70% HRpeak (40 minutes at 60-75% of maximal HR).

3199 Board #104
June 2 2:00 PM - 3:30 PM
Microvascular and Nitric Oxide Responses to Acute Exercise with Resveratrol or Estradiol in Postmenopausal Women
Cemal Ozemek, K Joseph Hurt, Rachael Bok, Teresa Witten, Kerry L. Hildreth, Kerrie L. Moreau. University of Colorado Anschutz Medical Campus, Denver, CO.

Email: ozemek@uc.edu

(No relationships reported)

PURPOSE: Microvascular function measured via the reactive hyperemic velocity time integral (VTI) has been shown to be more closely related to cardiovascular disease risk factors than macrovascular endothelial function, and is an independent predictor of cardiovascular events. Estrogen (E2)-deficient postmenopausal women have diminished endothelial adaptations to exercise training compared to age-matched men and E2-treated postmenopausal women. The polyphenol resveratrol, is an E2 receptor agonist that has been shown in animal models to enhance exercise training effects on cardiovascular function. No study has examined the effects of acute aerobic exercise with E2 or resveratrol treatment on microvascular function or circulating NO. Accordingly, the purpose of this study was to determine whether pre-treatment with acute E2 or resveratrol modulates microvascular function and NO responses to an acute bout of moderate intensity treadmill exercise.

METHODS: VTI and circulating NO (via Griess assay) were examined before and following (120 minute) acute treadmill exercise (40 minutes at 60-75% of maximal heart rate) in 13 sedentary E2-deficient postmenopausal women (56±3 years; mean;SD) randomized, to either E2 (transdermal patch 0.05 mg/d starting 2 days prior to aerobic activity) or resveratrol (one 250 mg oral tablet 45 minutes before exercise) or placebo (inactive patch and tablet).

RESULTS: There were no significant differences in pre-exercise VTI and NO between placebo and resveratrol conditions or with E2 conditions. There were no significant differences in post exercise between group changes in VTI and NO.

CONCLUSIONS: Acute E2 or resveratrol did not significantly alter basal microvascular function or circulating NO, nor did they modulate the response to an acute bout of moderate intensity treadmill exercise. Whether resveratrol would modulate vascular adaptations to chronic exercise training needs future exploration.

3200 Board #105
June 2 2:00 PM - 3:30 PM
Performance Related Hemodynamic Responses to an Aerobic Exercise Across Different Stages of the Menstrual Cycle
Patrick G. Murphy, 78520, Danny Dominguez, Brittany Esparrza, Murat Karabulut. University of Texas at Rio Grande Valley, Brownsville, TX.

(No relationships reported)

PURPOSE: To examine the physiological changes, especially body water and hemodynamic measures that occur in females across their respective menstrual cycles in response to aerobic performance. METHODS: Eleven females (age = 21.2± 1.4 y) performed four sessions of aerobic activity at 75% of their calculated VO2 max as determined by the Bruce Protocol. The speed for each subject’s aerobic activity was then calculated using the ACSM metabolic running equation. The four sessions of aerobic activity were identical in format and performed on days 1, 7, 14, and 21 of each subject’s menstrual cycle. Sessions began between major menstrual events of body weight, body fat, heart rate (HR), and blood pressure (BP). Extracellular fluid (ECF), intracellular fluid (ICF), and fat-free mass (FFM) was also recorded via single-frequency and multiple-frequency bio-electrical impedance analysis (BIA) prior to aerobic activity. Subjects then completed 30 minutes of aerobic exercise at the calculated speed to yield an intensity of 75% VO2 max. Following the aerobic event, all measures taken pre-exercise, as well as RPE, were measured again at three separate time points post-exercise (post-0min, post-15min, and post-30min) while HR was monitored continuously. RESULTS: Day one systolic BP significantly correlated with day one ΔECF at multiple time points (r = -0.619 to -0.680, p< 0.05). HR also had significant correlations on day one with ΔECF and ΔICF (r = -0.610 to -0.672, p< 0.05) at multiple time points. CONCLUSIONS: The results showed that hemodynamic variables had notable correlations throughout most performance-related measures and across the different days of the menstrual cycle. From Day 1 to 7 there is an observable shift in correlation from BP and ECF to BP and ICF. This apparent shift in fluid may be due to the physiological responses associated with progressing through one’s cycle from the menstrual to luteal phase in which a significant amount of body water is lost. These results demonstrate that there may be different responses to aerobic performance throughout the different phases of the menstrual cycle, but further investigation is required to make any kind of recommendations.

3201 Board #106
June 2 2:00 PM - 3:30 PM
Sex Differences in Acute Effect of Exercise on Endothelial Function in Older Adults
Demetra D. Christou, Jeung-Ki Yoo, Michelle M. Pinto, Han-Kyul Kim, Cheue-Lung Hwang, Jisok Lim, Eileen M. Handberg. University of Florida, Gainesville, FL.

(No relationships reported)

There is growing evidence of sex differences in the chronic effect of aerobic exercise on endothelial function (flow-mediated dilation; FMD) in older adults. However, whether sex differences also exist in the acute effect of aerobic exercise on FMD in older adults is unknown. PURPOSE: To test the hypothesis that the FMD response to acute aerobic exercise will be different in older men compared with postmenopausal women and that exercise intensity will influence the FMD response. METHODS: Thirty older men and fifteen postmenopausal women, free of major clinical disease, participated in this randomized crossover study (67±1 vs. 65±2 yrs, mean±SE, P=0.4). Thirteen older men and fifteen postmenopausal women, free of major clinical disease, participated in this randomized crossover study (67±1 vs. 65±2 yrs, mean±SE, P=0.4). Subjects completed a single bout of low-intensity continuous training (LICT; 47 min 50% peak heart rate (HRpeak)), moderate-intensity continuous training (MICT; 47 min 70% HRpeak) and high-intensity interval training (HIIT; 40 min: alternating intensities of 90% and 70% HRpeak) on the treadmill in a counterbalanced order. Brachial artery FMD was assessed at rest, prior to aerobic activity. Subjects then completed 30 minutes of aerobic exercise at the calculated speed to yield an intensity of 75% VO2 max. Following the aerobic event, all measures taken pre-exercise, as well as RPE, were measured again at three separate time points post-exercise (post-0min, post-15min, and post-30min) while HR was monitored continuously. RESULTS: Day one systolic BP significantly correlated with day one ΔECF at multiple time points (r = -0.619 to -0.680, p< 0.05). HR also had significant correlations on day one with ΔECF and ΔICF (r = -0.610 to -0.672, p< 0.05) at multiple time points. CONCLUSIONS: The results showed that hemodynamic variables had notable correlations throughout most performance-related measures and across the different days of the menstrual cycle. From Day 1 to 7 there is an observable shift in correlation from BP and ECF to BP and ICF. This apparent shift in fluid may be due to the physiological responses associated with progressing through one’s cycle from the menstrual to luteal phase in which a significant amount of body water is lost. These results demonstrate that there may be different responses to aerobic performance throughout the different phases of the menstrual cycle, but further investigation is required to make any kind of recommendations.

(No relationships reported)
significantly change in response to HITT (4.93±0.55 vs. 6.31±0.57%, P=0.14) and MICT (5.32±0.62 vs. 5.60±0.68%, P=0.99). In response to LICT, FMD did not change in postmenopausal women nor older men (5.21±0.64 vs. 6.02±0.73%, P=0.7 and 5.70±0.80 vs. 5.55±0.67%, P=0.99). CONCLUSIONS: Sex and exercise intensity significantly impact the FMD response to acute aerobic exercise in older adults. In older men, FMD is attenuated following acute HITT and MICT but not LICT, whereas in postmenopausal women FMD is unaffected.

CONCLUSIONS: Although there was an improvement in HRV after LEx, 24-h, daytime and nighttime systolic ABP reduced only after HEx. This result suggest that HEx may be superior than LEx to manage BP hypertension in long-term treated elderly hypertensive patients.

There is an emerging body of evidence in animals indicating that elevated oxidative stress impairs baroreflex sensitivity (BRS) function, however studies in healthy humans have yielded equivocal results. One potential reason for this discrepancy is that previous studies have used individual antioxidant treatments (e.g., Vitamin C only) to investigate the effect of oxidative stress on BRS. Recent studies in healthy humans have demonstrated significant reductions in reactive oxygen species using an antioxidant cocktail (AOC; Vitamin C, Vitamin E, and Co-enzyme Q10) suggesting the effectiveness of this treatment. Whether this AOC induced reduction in oxidative species affects BRS in young, healthy adults remains unknown. PURPOSE: We tested the hypothesis that AOC will improve cardiac BRS in young healthy adults.

METHODS: Five young men participated in two separate days placebo (sugar pills) and AOC (2000 mg Vitamin C, 150 IU Vitamin E and 100 mg Co-enzyme Q10) performed in random order. Resting heart rate (ECG) and arterial blood pressure (automated sphygmomanometer and finger photoplethysmography) were measured 90 minutes after AOC or placebo (a time period this AOC has been shown to have peak effects on oxidative stress). Spontaneous cardiac BRS was determined for all sequences combined (overall BRS), and also separately for up (increase systolic blood pressure: increase R-R interval) and down (decrease systolic blood pressure: decrease R-R interval) sequences. RESULTS: Systolic blood pressure on AOC day tended to be lower relative to the placebo day (127 ± 4 vs. 131 ± 5; p=0.098). However, no differences in overall cardiac BRS were found between placebo and AOC (18.0 ± 2.7 vs. 17.3 ± 2.6 ms/mmHg; p=0.98). Likewise, up sequences (17.02 ± 2.9 vs 14.04 ± 4.0 ms/mmHg; p=0.51) and down sequences (18.0 ± 2.7 placebo vs. 18.0 ± 2.6 ms/mmHg AOC; p=0.98) were not different between conditions. Equal number of sequences were found between the placebo and AOC days. CONCLUSION: These preliminary data suggest that antioxidant treatment does not affect resting cardiac BRS in young, healthy men. Supported by UTA College of Nursing and Health Innovation.
Purpose: Cardiovascular autonomic nervous system function can be assessed by recording arterial wave reflection responses to an orthostatic challenge. Using pulse wave analysis, arterial wave reflection can be estimated using pulse wave separation analysis, whereby a triangular or a physiologic flow waveform is assumed and the aortic wave is separated into its forward and time-independent reflected (Ref) components. This study sought to determine the measurement precision (between-day reliability) of Pb responses to an modified tilt-table test. Methods: Twenty healthy adults (26.4 ± 2.7 years, 24.7 ± 4.5 kg/m² (SD 3.8)) were tested on three different mornings in the fasted state, separated by a maximum of seven days. Oscillometric pressure waveforms were recorded on the left upper arm, and aortic waveforms were generated using a generalized transfer function. The criterion for acceptable reliability was an intra-class correlation coefficient (ICC) of 0.75. To express the percentage change that must occur at a group and individual level, the standard error of measurement (%SEM) and smallest detectable change (%SDC) were calculated.

Results: The criterion ICC (0.75) was exceeded at baseline (0.79), following 5 min tilt (0.75), and following 5 min recovery from tilt (0.75). The %SEM and %SDC for the 5 min tilt response were 7% and 19%, respectively. Conclusion: Arterial wave reflection responses to an orthostatic challenge can be assessed with acceptable between-day reliability using oscillometric pulse wave analysis.

RESULTS: SDNN changes were 3.4 (8.9) ms in the MCT group, 29.1 (7.6) ms in the HIT group (difference between groups 25.7 [95% CI, 24.9 to 40.4 (P = 0.01)]. LF/HF, ratio changed in the MCT group 0.13 (0.01) ms and in the HIT group 0.13 (0.01) ms (P between groups = 0.16). No significant group differences were observed in MSSD, HF, and LF parameters. Finally, we observed stronger correlation between Ln MSSD and to-R-R interval in HIT group (r = 0.83; p = 0.001) Figure 1A, and not significant correlation between Ln MSSD and to-R-R interval in MCT group (r = 0.396; p = 0.260). CONCLUSION: In inactive adults, this study shows that a 12-week HIT training program can increase short-term HRV, mostly in vagal mediated indices such as SDNN and HF/LF ratio power. Trial registration. ClinicalTrials.gov NCT02733835

Purpose: Blood pressure (BP) is one of the most commonly measured vital signs. Historically, tremendous focus has been dedicated to increasing the reliability of BP measurement by standardizing protocols and reducing error to the smallest possible increment. Errors in BP measurement may result in misdiagnosis, cardiovascular complications during exercise, and improper prescription of antihypertensives. ‘Miscuffing’ is a common and significant source of error in BP measurement. The ‘80% rule’ (i.e. cuff ≥80% of an individual’s arm circumference) is the gold standard method for BP cuff size selection as recommended by the American Heart Association. Interestingly, BP cuff manufacturers routinely print their own cuff size recommendation, based on an arm circumference range, on their products and this product dimension is not always the suggested cuff size from the ‘80% rule’. PURPOSE: The current study examined the occurrence of ‘miscuffing’ and the outcome of BP measurement using the ‘80% rule’ cuff size selection method versus the manufacturer’s recommendations. METHODS: Forty-four individuals had their upper arm circumference measured, and appropriate cuff sizes selected using the two sizing methods. An automated oscillometric device was used to measure BP in duplicate with a 1-minute interval between measurements, and 2-minute interval between cuffs if necessary. If different cuffs were selected, the order of measurement was randomized. A dependent t-test was used to ascertain potential BP measurement differences between sizing methods. RESULTS: ‘Miscuffing’ as the result of method discrepancies between the ‘80% rule’ and the manufacturer’s recommendation, occurred in over two-thirds (70%, n=31) of the sample. In these individuals, there was a significant difference in systolic BP between recommended cuffs (7.9 mmHg; p<0.05). Approximately 1 in 3 individuals, with two cuffs recommended (35%, n=11), had a smaller cuff suggested by the manufacturer, and were misclassified with a significantly elevated systolic BP (average increase 12.5 mmHg; p<0.05). CONCLUSIONS: BP cuff selection methods are not universal and contribute to reliability concerns. ‘Miscuffing’ was a common observation when utilizing the manufacturer’s method for cuff selection and resulted in BP measurement error and misclassification.

Purpose: Decreased heart rate variability (HRV) is associated with a higher risk of mortality and exercise training is effective to increase in inactive adults. We investigated the effect of moderate versus high intensity interval exercise training on HRV indices in physically inactive adults. We investigated the effect of moderate versus high intensity interval exercise training on HRV indices in physically inactive adults.

Methods: Twenty healthy adults were randomly allocated to receive either moderate intensity training (MCT group) or high intensity training (HIT group). The MCT group performed aerobic training at an intensity of 55-75% of the walking on a treadmill at 60-80% heart rate (HRmax) until expenditure of 300 kcal until the end of training. The HIT group performed running on a treadmill for 4 minutes at 85-95% peak HRmax and had a recovery of 4 minutes at 65% peak HRmax until expenditure of 300 kcal until the end of training. Supine resting HRV indices (time domain: SDNN, standard deviation of normal-to-normal intervals; MSSD, Root mean square successive difference of RR intervals and frequency domain: HF, high frequency spectral power; LF, low frequency spectral power; and HF/LF ratio) were measured at baseline and 12-weeks thereafter.

Results: As published in Sports Medicine, Vol. 49, No. 5 Supplement S681.

At least 44 percent of adult Americans will be obese by 2030. When young adults go off to college and leave the structured environment of a household, they often adopt unhealthy behaviors, such as unhealthy eating and getting less exercise, leading to the risk of weight gain, popularly referred to as the “Freshman Fifteen”. Unless interrupted, this pattern of weight gain in early adulthood can lead to obesity in later adulthood. Whole-body vibration training (WBVT) is a novel alternative approach to structured exercise for improving body composition for physically limited, time constrained, and/or unmotivated persons, but has not been studied yet in college students. PURPOSE: To determine if WBVT is a feasible and effective method of preventing weight gain in physically inactive students enrolled in undergraduate nursing or other 4-year programs. METHODS: Male (n=5) and female (n=28) undergraduate students were randomized to control (n=14, age 28 ± 7, BMI=28.1 ± 5.3) or WBVT groups (n=19, age 28.5 ± 9.0, BMI=27.5 ± 3.8). The WBVT group completed three training sessions per week, progressing from low to high frequencies (30-50 Hz) and amplitudes (2-4mm), for six months. Control subjects were asked to maintain their usual diet and exercise habits. A 2 x 3 RM-ANOVA was used to detect
significant group x time interactions for weight and waist circumference measured at baseline, 3 and 6 months. RESULTS: Retention in the study was 75% and adherence to training was 60%. Weight differed significantly over time between groups at 6-months (p<0.02, mean difference=4.4lbs, SE=1.27), but not so for WC (p=0.13, mean difference=2.1cm, SE=1.75). CONCLUSION: Our preliminary findings suggest that WBVT may be both a feasible and effective method for preventing weight gain among inactive undergraduate students. Future studies should assess the effectiveness of self-monitored WBVT in the college recreation center setting.

**PURPOSE:** The present study was aimed at determining the effect of two different types of exercise (elite athletes (EA) playing football and ultramarathon runners (UR)) on iron metabolism, and especially the role of hepcidin in iron homeostasis.

**METHODS:** In our study two different groups of athletes were investigated. The first group consisted of 19 male elite football athletes and the second group of 41 ultramarathon runners. In both cases, blood samples were taken pre-race (t1), immediately post-race (t2), and 24 hours post-race for EA athletes and 36-48 hours post-race for UR athletes (t3). **RESULTS:** The iron levels in time t3 were found to have statistically significant decreases compared with the iron levels in pre-race and post-race period. Moreover, in both cases, ferritin levels were increased significantly in time t2 and t3. Hepcidin levels increased in time t2 after the race, in football players (from 27.4±12.98 to 37.42±13.74 ng/mL) and in time t3 decreased again. However, in ultramarathon runners, hepcidin levels significantly increased in time t2 (from 29.16±10.92 to 58.81±16.97 ng/mL) and remained increased in time t3 as well (37.69±16.38 ng/mL), despite a trend for its decrease. In football players, sTfR levels did not change, contrary to ultramarathon runners where sTfR levels were found decreased after the race and in time t3. **CONCLUSIONS:** Iron metabolism in athletes can be impacted by the type of exercise. Ferritin is not a reliable marker for iron balance, because in the present study, it is more likely an acute phase protein. The main regulator of iron homeostasis, hepcidin increases, showing the body’s response to inflammation, by trapping iron in the macrophages and by altering iron absorption. Finally, a strenuous and prolonged exercise can lead to sports’ anaemia.

**Methods:** Sedentary HIV+ men 50+ years of age were randomized to AEX +RT or delayed entry control groups. AEX+RT group received 16-weeks (48 sessions) of evidence demonstrates that HIIT can serve as an effective alternative to AEX. Physical activity (PA) is associated with better autonomic function in healthy and cardiometabolic disease populations. However, there are few data on the resting and autonomic responses to exercise in PLWHA. **PURPOSE:** To determine whether physically active (Act) PLWHA have better autonomic responses compared with insufficiently active (IA) PLWHA.

**RESULTS:** 23 participants (15 Active PLWHA and 10 age and gender matched IA PLWHA) were recruited. Active PLWHA performed ≥50 of moderate to vigorous aerobic PA, while IA PLWHA performed ≤30 minutes on ≤2 days per week of aerobic PA. Resting heart rate variability (HRV) was measured for 10 minutes before exercise from which high frequency power in normalized units (HFnu.), low frequency power in normalized units (LFnu.) and low-frequency/high-frequency (LF/HF) ratio were determined. Participants performed a maximal cardiopulmonary exercise test on a cycle ergometer. Heart rate recovery (HRR) was measured at 30, 60 and 120 seconds (sec.) after exercise. Parasympathetic reactivation was measured as Root Mean Square of Successive Differences (RMSSD) at 30 sec. and 10 minutes (min.) after the test. **RESULTS:** Active PLWHA showed significant parasympathetic reactivation (RMSSD) from 30 sec. to 10 min. after peak exercise while this did not occur in IA PLWHA. HRR over 120 sec. after exercise was not different between the study groups. Measures of parasympathetic modulation (HFnu. and LF/HF ratio) and sympathetic modulation (LFnu.) were enhanced in Active PLWHA, compared with IA PLWHA. **CONCLUSIONS:** Regular aerobic exercise is associated with enhanced autonomic function at rest and during the 10 minutes of recovery after exercise in PLWHA. These findings suggest a possible mechanism to support lower risk of CVD with exercise in PLWHA.

**Results:** Data were collected at baseline and 6-months. **RESTING HRV MEASURE:** HFnu. (41.0±15.6* vs. 25.2±9.7), LFnu. (55.6±15.8* vs. 79.3±17.5), LF/HF ratio (1.6±0.9* vs. 3.4±1.8). **Heart Rate Recovery:** HRR 30 sec. (bpm) 20.2±6.29 vs. 23.2±6.9, HRR 60 sec. (bpm) 33.9±11.95 vs. 35.3±9.26, HRR 120 sec. (bpm) 44.89±13.06 vs. 44.89±14.08. Significant (p < 0.05) differences between HIV+ Act and IA PLWHA. **Significant (p < 0.05)** differences from 30 sec to 10 min.

**Table 1: Results**

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<tr>
<td>Resting HRV</td>
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<tr>
<td>HF (nu.)</td>
<td>41.0±15.6*</td>
<td>25.2±9.7</td>
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<tr>
<td>LF (nu.)</td>
<td>55.6±15.8*</td>
<td>79.3±17.5</td>
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<tr>
<td>LF/HF ratio</td>
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<td>3.4±1.8</td>
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<td>HRR 30 sec. (bpm)</td>
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<td>HRR 60 sec. (bpm)</td>
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<td>HRR 120 sec. (bpm)</td>
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**Introduction:** Significant visual impairment is estimated to occur in 3% of participants in 161-km ultramarathons. Initial research indicates this is most often due to a transient corneal edema. The normal physiological changes of the eye in response to prolonged exercise have not been previously reported.
Purpose: To determine the effect of prolonged exercise (14 to 30 hours) on intraocular pressure and corneal thickness.

Methods: Entries of the 2013 161-km Western States Endurance Run were invited to participate in our study via pre-race email. During the 2 days prior to the race, informed consent was obtained and pre-race testing was performed. Pre- and immediate post-race, binocular and monocular visual acuity was measured using an illuminated Snellen eye chart and intraocular pressure was measured in both eyes with TonoPen XL (Reichert Technologies, Depew, NY). Pre- and immediate post-race corneal thickness was measured three times in rapid succession using an ultrasonic pachymeter (Corneo-Gage Plus, Sonogage, Cleveland, OH) after corneal anesthetization with 0.5% proparacaine hydrochloride.

Results: Eight entrants completed the study among which, six reported a prior history of ultramarathon-associated visual impairment. Three had a history of bilateral refractive surgery. One participant reported a period of “tunnel vision” during the race. Beyond this, there were no reports of visual impairment during this race which had a temperature range of 5.0 to 39.0°C. Pre- and post-race visual acuity measurements were essentially unchanged. Pre- and post-race corneal thickness did not change (p=0.3) with a mean (±SD) of 661 (±82) mm pre-race and 667 (±84) mm post-race. Post-race intraocular pressure decreased from pre-race values in 10 of 16 eyes, increased in 2 and higher in 4, with mean (±SD) pressure being 12.3 (±3.6) and 11.4 (±3.5) pre-race and post-race, respectively (p=0.5).

Conclusions: Within this small sample, visual acuity, corneal thickness and intraocular pressure were not significantly altered by completion of a 161-km foot race. These findings offer some reassurance to athletes who might have concern about elevating intraocular pressure from ultramarathon running.

3214 Board #119 June 2 3:30 PM - 5:00 PM Strength Testing In Athletes Post ACL (Anterior Cruciate Ligament) Reconstruction: Does Graft Type Matter?

Dr. Brenda E. Castillo1, Dr. Juan C. Galloza-Otero1, Dr. William Micheo, FACSM1,1. 1VA Caribbean Healthcare System, San Juan, PR. 2University of Texas Health and Science Center, Houston, TX. 3University of Puerto Rico- Medical Sciences Campus, San Juan, PR.

Email: brendi000@yahoo.com

(No relationships reported)

PURPOSE: To evaluate hamstring and quadriceps strength after ACL (Anterior Cruciate Ligament) reconstructive surgery depending on type of graft used by determining if there is any deficit in knee extension with the use of a patellar tendon graft and knee flexion deficit with the use of a hamstring graft.

METHODS: Chart review of athletes from 2010-2016 who met the following inclusion criteria’s: age of subjects 15-55 yrs., isokinetic testing (CYBEX) performed ≤ 1 yr. after surgery, completion of a structured rehabilitation program before the CYBEX test, no clinical signs of instability on evaluation, and having full painless knee range of motion. Graft type (Patellar Tendon and Hamstring) and CYBEX results (extension and flexion at 60°/sec and 180°/sec at peak torque) were compared for each athlete.

RESULTS: A total of 40 subjects met inclusion criteria’s, of which 31 had hamstring graft and 9 had patellar tendon graft. 35% of subjects with hamstring graft had weakness in the extensor mechanism of the knee, 13 had weakness in flexors and extendors (29% greater in extendors and 13% greater in flexors), 13% demonstrated weakness in both extendors and flexors (greater in extendors).

CONCLUSIONS: Overall, our subject’s demonstrated increased weakness in the extensor mechanism of the knee in both patellar tendon and hamstring groups.

3215 Board #120 June 2 3:30 PM - 5:00 PM Diminished Ventilatory Responses During Post-Exertional Malaise Contributes to Exercise Intolerance in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome

Chris Chuang1, Staci Stevens2, Todd Davenport1, Christopher R. Snell1, Jared Stevens1, J. Mark VanNess1,1. University of the Pacific, Stockton, CA. 2Workwell Foundation, Ripon, CA.

(No relationships reported)

Reduced functional capacity and post-exertional malaise following physical activity are hallmark symptoms of Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS). The mechanisms producing exercise intolerance in the post-exertional state have not been adequately described. PURPOSE: To compare the ventilatory response to repeated exercise stress in control and ME/CFS subjects. METHODS: 40 female subjects were recruited for the study, 20 ME/CFS patients and 20 age and weight matched controls. All underwent two maximal exercise tests 24 hours apart. Oxygen consumption, minute ventilation (Ve), tidal volume (TV), respiratory rate (RR), end-tidal oxygen and carbon dioxide (ETo2,ETCO2) were measured at rest, at the anaerobic threshold, and at maximal exercise. Multivariate analyses were performed for group (ME/CFS vs control), test (exercise test 1 vs test 2), and condition (rest vs anaerobic threshold vs maximal exertion) with univariate follow up. RESULTS: 15 ME/CFS subjects and 18 control subject reached criteria for maximal effort. The overall multivariate analysis was significant for group and condition. Follow-up univariate and post-hoc showed VO2, Ve and TV were lower in the ME/CFS group only on exercise test 2. Post hoc for condition was significant for ventilation at maximal exercise only. Respiratory rate, ETo2, and ETCO2, were not different between tests or groups. CONCLUSION: In the absence of a second exercise test, the lack of any significant differences for the first test would appear to suggest no exercise intolerance in ME/CFS patients. However, the results from the second test indicate the presence of exercise intolerance and post-exertional malaise. Diminished ventilatory responses accompany reductions in work output and oxygen consumption during post exertional malaise in ME/CFS patients.

3216 Board #121 June 2 3:30 PM - 5:00 PM Leg Blood Flow and Fatigability In People With Type 2 Diabetes

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(No relationships reported)

We have previously demonstrated that people with type 2 diabetes mellitus (T2D) have greater fatigability of the knee extensor muscles during a dynamic fatigue contraction due to impairments within the skeletal muscle; however, the precise mechanism(s) are unknown. PURPOSE: To determine if impairments in leg blood flow are associated with greater fatigability of the knee extensor muscles during a dynamic fatigue contraction in men and women with T2D.

METHODS: 5 individuals with non-insulin dependent T2D (60 - 70 years; 3 women) with no signs of diabetic neuropathy were matched based on age, BMI and physical activity with four non-diabetic controls (CON) (60 - 68 years; 2 women). Physical activity was assessed over four days with a tri-axial accelerometer. To assess fatigability, participants performed a 6-minute single-limb dynamic fatigue contractions with the knee extensors while seated at 90° of hip and knee flexion. 120 maximal voluntary concentric contractions (MVCCs) were performed with a load equivalent to 20% maximal voluntary isometric contraction torque through a 90° range of motion. Doppler ultrasonography was used to assess femoral artery diameter and pulse wave blood velocity before and immediately after the dynamic fatigue contraction.

RESULTS: The reduction in MVCC power was greater for T2D (40.5 ± 17.6%) compared with CON (31.3 ± 20.8%, P = 0.05) as assessed at the end of exercise. T2D and CON both demonstrated similar increases in leg blood flow after the dynamic fatiguing contraction (71.7 ± 41.1% vs. 69.0 ± 37.3%, respectively; P = 0.05). However, greater reductions in MVCC power (i.e. greater fatigability) was associated with lower blood flow following dynamic fatiguing contractions (r = 0.034, r = 0.633).

CONCLUSIONS: Greater fatigability of the knee extensor muscles during dynamic fatigating contractions was associated with lower blood flow. Impaired blood flow responses to exercise may limit exercise performance among T2D, and this work highlights the need for future studies that examine skeletal muscle perfusion during dynamic exercise in people with T2D.

Supported by Marquette University Way Klingler Research Fellowship to SKH

3217 Board #122 June 2 3:30 PM - 5:00 PM Prolonged Bouts Of Sedentary Behavior Are Associated With Cardiometabolic Disease Risk Factors In Young Adults

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(No relationships reported)

Research indicates sedentary behavior is associated with obesity and cardiometabolic disease (CMD) risk factors. Less understood is the effect of prolonged bouts of sedentary time on CMD risk factors, particularly in young adults. PURPOSE: To determine the associations among prolonged bouts of sedentary behavior and CMD risk factors in young adults. METHODS: 125 men (n=29) and women (n=96) participated in the study (mean ± SD: age 22.8 ± 4.8 yr; BMI 26.4 ± 4.7 kg/m², body fat 29.1 ± 9.4%; and VO2peak 40.9±8.3 mL/kg/min). Sedentary behavior (=<150 counts/ min) and moderate-to-vigorous physical activity (MVPA, >2689 counts/min) were measured by an accelerometer worn during waking hours for 7 consecutive days.

Abstracts were prepared by the authors and printed as submitted.
Sedentary bouts were defined as greater than or equal to 20, 30 and 60 min. Body composition, waist circumference, blood pressure, glucose, insulin, triglycerides (TG), high-density lipoprotein, and low density lipoprotein (LDL) cholesterol were measured. Multiple regression analyses were used to assess associations among variables, while controlling for age, sex, race/ethnicity, accelerometer wear time and MVPA. RESULTS: Total time spent in sedentary behaviors averaged 8.7 ± 1.5 h/day. Sedentary bouts greater than or equal to 20, 30 and 60 min accounted for 36%, 23%, and 6% of total sedentary time, respectively. The average length for bouts of greater than or equal to 20, 30, and 60 min was 33.7 ± 4.1 min, 45.6 ± 6.6 min and 63.7 ± 40.5 min, respectively. Sedentary bouts of 20 min or more had the strongest relationships with CMD risk factors, compared to bouts of 30 and 60 min or more. Time spent in sedentary bouts of 20 min or more was independently associated with BMI (R² = 0.13, β = 0.24, p = 0.01), waist circumference (R² = 0.15, β = 0.25, p = 0.01), LDL (R² = 0.28, β = 0.27, p = 0.01), TG (R² = 0.11, β = 0.25, p = 0.02), insulin (R² = 0.25, β = 0.25, p = 0.01), and fat mass (R² = 0.13, β = 0.17, p = 0.01), after adjusting for all covariates. CONCLUSIONS: Our novel findings suggest that sedentary behavior, in bouts of 20 min or more, is significantly and independently associated with markers of CMD in young adults. These findings have important implications for CVD prevention programs for young adults and suggest that public health guidelines with regards to minimizing prolonged sedentary behaviors are warranted. Funded by NIH 1 U54GM104944

**Purpose**: High-intensity interval training (HIIT) is a time-efficient intervention for moderate-to-vigorous physical activity and how yoga compares in intensity to other forms of physical activity.

**Purpose**: This study compared energy expenditure during acute bouts of Vinyasa yoga (YOGA) and two treadmill walking protocols. METHODS: Data from were available on 28 participants (15 males, 13 females) who performed three 60-minute activity bouts on separate days that included: 1) YOGA, 2) treadmill walking at a self-selected brisk pace (SELF), 3) treadmill walking at a pace that matched their HR to that of their yoga session (HR-MATCH). Energy expenditure (kcal and metabolic equivalent of task [MET]) was measured with indirect calorimetry. RESULTS: When examining the entire 60 minute period of activity, energy expenditure was significantly lower in YOGA (278.3 ± 46.6 kcal, 4.7 ± 0.7 MET/min) compared to both HR-MATCH (277.6 ± 50.5 kcal, 4.7 ± 0.9 MET/min) and SELF (282.7 ± 52.4 kcal, 5.0 ± 0.8 MET/min). The differences between MODERATE and SELF for MET were not significant. The final 15 minutes of the YOGA session was restorative in nature, data analysis was repeated using only the initial 45 minutes of each activity session. For these analyses, energy expenditure was significantly lower in YOGA (234.0 ± 57.8 kcal, 4.1 ± 0.6 MET/min) compared to HR-MATCH (306.0 ± 77.6 kcal, p < 0.001; 5.4 ± 0.9 MET/min, p < 0.001) but not SELF (242.8 ± 60.7 kcal, p = 0.393; 4.3 ± 0.7 MET/min, p = 0.650), and in HR-MATCH compared to SELF (p-value for kcal < 0.01; p-value for MET < 0.01). Because the final 15 minutes of the YOGA session was restorative in nature, data analysis was repeated using only the initial 45 minutes of each activity session. For these analyses, energy expenditure was significantly lower in YOGA (234.0 ± 57.8 kcal, 4.1 ± 0.6 MET/min) compared to HR-MATCH (306.0 ± 77.6 kcal, p < 0.001; 5.4 ± 0.9 MET/min, p < 0.001) but not SELF (242.8 ± 60.7 kcal, p = 0.393; 4.3 ± 0.7 MET/min, p = 0.650), and in HR-MATCH compared to SELF (p-value for kcal < 0.01; p-value for MET < 0.01). Gender did not significantly influence the pattern of the results observed. CONCLUSIONS: Across a 60-min period, energy expenditure in YOGA is significantly lower than both SELF and HR-Match. When the restorative component of YOGA was removed from the analysis, energy expenditure in YOGA was comparable to SELF. Moreover, YOGA met the energy expenditure requirement (>3 METs) for moderate-intensity physical activity, and therefore is likely to elicit health benefits similar to walking performed at a self-selected brisk walking pace. Interventions to directly compare YOGA to other forms of physical activity are warranted.

**Purpose**: To examine the levels of PA and sedentariness in persons with DS, and whether these are associated with measures of physical functioning.

**Purpose**: Persons with Down syndrome (DS) are generally considered to be less active than the general population. However, limited objective accelerometer data exist on their levels of physical activity (PA) and sedentariness. Furthermore, PA and sedentariness may be associated with low levels of physical functioning in persons with DS. PURPOSE: To examine the levels of PA and sedentariness in persons with DS, and whether these are associated with measures of physical functioning.

**Methods**: Seventeen persons with DS (9 women and 8 men; age 28 ± 14 y) participated in this study. They wore accelerometers for 7 days in a random order (3 to 7 days between intervention). Physical functioning variables included performance during the timed-up-and-go (TUG) test, as well as the distance covered and the energetic cost (oxygen uptake per meter measured with portable spirometry) during the 6 min walk (6MW) test.

**Results**: Participants accumulated an average of 83 ± 164 min per week of moderate-to-vigorous PA in bouts at least 10 min in duration. Only two participants with DS (12% of the sample) met the energy expenditure requirement (>3 METs) for moderate-intensity physical activity, and therefore is likely to elicit health benefits similar to walking performed at a self-selected brisk walking pace. Interventions to directly compare YOGA to other forms of physical activity are warranted.

**Conclusions:** HIIT was superior to CME to acutely reduce capillary glucose and was significantly lower in YOGA (234.0 ± 57.8 kcal, 4.1 ± 0.6 MET/min) compared to HR-MATCH (306.0 ± 77.6 kcal, p < 0.001; 5.4 ± 0.9 MET/min, p < 0.001) but not SELF (242.8 ± 60.7 kcal, p = 0.393; 4.3 ± 0.7 MET/min, p = 0.650), and in HR-MATCH compared to SELF (p-value for kcal < 0.01; p-value for MET < 0.01). Gender did not significantly influence the pattern of the results observed.**
non-significant correlations were found between measures of physical functioning and other PA variables. CONCLUSION: Persons with DS have low levels of PA and high levels of sedentariness. Most persons with DS do not meet the PA Guidelines for Americans. They also have low levels of physical functioning. Lower levels of physical functioning are associated with greater participation in light PA among persons with DS.

F-56 Free Communication/Poster - Descriptive Epidemiology and Surveillance

Friday, June 2, 2017, 1:00 PM - 6:00 PM
Room: Hall F

3221 Board #126 June 2 2:00 PM - 3:30 PM
Screen Time, Physical Activity, And BMI Among Hispanic Children In Puerto Rico
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(No relationships reported)

Screen time (ScT) represents a behavior usually, but not always, associated with reduced physical activity, and increased sedentary time and BMI among children. Childhood obesity is a major health problem, particularly among Hispanic children in Puerto Rico. The objective of this study was to determine the percentage of Hispanic children and young adults participating in a variety of physical activities and the ScT spent viewing favorite video games and using a mobile device. Two hundred and forty children and young adults (ages 6-18 years) were contacted at a local city park and were randomly assigned to either a PVG or A VG group. Methods: A convenience sample of 100 children (54 boys and 46 girls) were asked to wear an accelerometer attached to an elastic band over the right hip area for 7-days, and their parents completed a physical activity questionnaire including information regarding their children’s screen time. T-tests were conducted to detect sex differences, and correlation analyses to detect associations between variables. RESULTS: Total screen time (2.1±1.5 hrs/day), including PVG (0.4±0.6 hrs/day) and AVG (0.1±0.4 hrs/day), and MVPA (4.0±2.3 hrs/day) were not significantly different between boys and girls. An inverse correlation was observed between ScT and BMI (r= -0.20, P= 0.04). No other significant correlations were detected between ScT and BMI. CONCLUSION: ScT in the group of Hispanic children evaluated was in the recommended limit, and appear not to affect their level of MVPA, which exceeded current recommendations. They appear to spend more time using AVG than AVG, and those that spent more time in AVG also spent less time in MVPA. These results support other studies suggesting that ScT does not influence MVPA or BMI in young children.

3222 Board #127 June 2 2:00 PM - 3:30 PM
Comparison Of Step Count During A Bout Of Pokémon Go Vs Traditional Aerobic Exercise
Katie M. Smith, Sadie Timms, Casey Reisen, Calvin A. Busby, Nicole L. Whalen, Simpson College, Indianola, IA.
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(No relationships reported)

Traditional video game use employs sedentary behavior but exergames allow for such games to involve physical activity (PA). Pokémon Go is a live, real-time version of a popular video game involving the use of a mobile device’s GPS capability to locate, capture, battle, and evolve virtual creatures. Users transport to physical locations to advance in the game, meanwhile potentially using a mode of PA during play. Purpose: To compare the number of steps taken when playing Pokémon Go to a traditional bout of aerobic exercise, walking at a self-selected pace. Methods: Seventeen regular Pokémon Go users ages 18-65 years old wore a pedometer on their waist while playing the popular reality game for 30-minutes and walking for 30-minutes at a self-selected pace. The order of events were randomized and the game was played either as an individual or in a group depending upon the participant’s normal type of play. Regular PA patterns and distance traveled (km) during habitual play were self-reported. A paired-sample t-test compared the number of steps taken during each activity; Pearson’s correlations evaluated potential relationships between step count, type of play, distance traveled, and regular PA patterns. Results: Users were primarily intermediate or advanced players of the game (94%) and average level of play was 21 ± 5 (range 8-30). Mean step count while playing Pokémon Go was 2992 ± 548 vs 3379 ± 206 when walking at a self-selected pace for an equivocal amount of time (P = 0.009). Users accumulated an average of 388 fewer steps during 30-minutes of Pokémon Go than with traditional walking outdoors. Steps taken during the 30-min walk were significantly associated with regular PA patterns (r=0.594, P = 0.012). No associations were noted between type of play and distance traveled in habitual play or step count of the study session. Conclusion: Significantly less steps were taken during a 30-minute bout of Pokémon Go than participating in a traditional walk. However, the practical implications of the data imply a relatively small difference in overall PA in 388 steps. Playing the exergame as an individual or in a group did not influence steps taken during the study or km traveled during habitual play.

3232 Board #128 June 2 2:00 PM - 3:30 PM
Patterns of Objectively-assessed Sedentary Behavior in Community-dwelling Japanese Older Adults
Shiho Amagasa, Noritoshi Fukushima, Hiroyuki Kikuchi, Tomoko Takamiya, Shigeru Inoue. Tokyo Medical University, Tokyo, Japan.
(No relationships reported)

Accumulated evidence suggests greater time spent in sitting is associated with adverse health outcomes. However, limited data on how sedentary behavior (SB) is patterned in older adults. PURPOSE: To examine patterns of objectively-assessed SB classified by duration of bout in community-dwelling Japanese older men and women. METHODS: This cross-sectional study included 450 Japanese older adults (255 men, 70-79 years) who were randomly selected from resident registries and provided valid data (wearing at least four days of ≥10 hours/day) of accelerometer (HJA-350IT, Omron Healthcare, Japan). Descriptive analyses of the duration (min/day) and number of bouts (times/day) of SB ≤(1.5 METs) were conducted, stratified by gender. Total SB time was further divided into five types according to the duration of SB: 1-9 min, 10-19 min, 20-29 min, 30-59 min, and ≥60 min. Gender differences in patterns of SB were assessed using analysis of covariance (ANCOVA) after adjusting for age and wear time.

RESULTS: The adjusted mean SB time (min/day) in men and women was 561.8 and 469.3, respectively (P=0.001), and number of SB bouts (times/day) was 57.0 in men and 61.3 in women (P=0.001). The number of SB bouts of less than 10 min was 42.9 in men and 49.4 in women (P=0.001). On the other hand, the number of SB bouts of lasting 20-29 min was 2.9 and 2.3 in women, that of 30-59 min was 3.5 in men and 2.5 in women, and that of at least 60 min was 1.6 in men and 1.1 in women (all P=0.001). Time accumulated by short-bout (1-9 min) SB in women was significantly longer than men (men:114.7, women:128.3), whereas time accumulated by long-bout SB in women was significantly shorter than men (men:29-29 min SB; men:70.4, women:55.6, 30- 59 min SB; men:143.4, women:103.1, and ≥60 min SB; men:148.4, women:100.2). CONCLUSIONS: Older women were less likely to be prolonged sedentary with more frequent interruption compared to older men. Effect of patterns of SB on health outcomes may differ by gender.

3224 Board #129 June 2 2:00 PM - 3:30 PM
Exploring Associations Between Greenspace, Physical Activity, And Health Outcomes: Results From The 2011-2015 Illinois BRFSS
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(No relationships reported)

PURPOSE: 1) To examine spatial effects of green space on health outcomes at various levels of geography; 2) To examine the potential mediating effect of physical activity on the relationship between green space and health outcomes. METHODS: Socio-demographic (e.g., sex, race, poverty, age) and health outcome variables (e.g., obesity, diabetes, heart disease, and mental health) were derived from the 2010-2015 Illinois Behavioral Risk Factor Surveillance System (BRFSS). Measures of green-space were created using tree canopy data from the 2011 National Land Cover Dataset (NLCD). Residential area was defined using measures of urban density by counting dwellings per 10 hectares. Green space was calculated for three levels of buffers, specifically 300m, 500m, and 1km for each residential unit and the entire county where the residential unit was located. ArcGIS 10.3 (ESRI, CA), was used to geoprocessing all data. Residential green space was used as the primary independent variable while accounting for socio-demographic variables in regression analysis. RESULTS: Due to missing data, only 78 of 102 Illinois counties (76.47 %) were included in the analysis. The amount of green space, regardless of buffer level, has no association with health outcomes. Physical activity explained a significant proportion of variance only for diabetes all measures of green space: 300m, 500m, and 1000m for residential units (β=−0.12, p<0.03; R²=0.30, p<0.001); county level (β=−0.14, p<0.02; R²=3.1, p<0.001). CONCLUSIONS: Although county level green space was negatively associated with physical activity, residual green space showed no association. This difference supports the importance of appropriately defining geographical units used for large-scale population-based. Further studies clarifying geographic units of analysis are required.
Background: Only 21% of the U.S. adults meet the recommended level of physical activity: 150 minutes of moderate intensity of physical activity per week, or 75 minutes of vigorous intensity of physical activity per week. Transportation is recognized as one of the most influential domains determining people’s daily physical activity level. There are a few studies looked at the walking level of public transit users as well as socio-demographic traits. This study examined walking time difference between public transit users and non-public transit users to articulate how much walking time is derived from transit related walking more clearly, and how demographic characteristics differ among the two groups. Purpose: To investigate and articulate the impact of public transit on the walking activity level within the U.S. population in order to advocate the ongoing public transit improvement projects and policy changes toward walkable communities. Methods: The National Household Travel Survey conducted from March 2008 to May 2009 by the U.S. Department of Transportation was used to examine the association between public transit use and walking trip time for an assigned travel day. Multivariate linear regression model was applied to estimate the difference of walking time in minutes per day between public transit users (n=2,835) and non-public transit users (n=165,960). Results: People who used any forms of public transit walked 35.2 minutes more than people who did not use public transit during one travel day (p<0.01). 27.0 minutes of the 35.2 minutes difference was gained exclusively from transit related walking which includes access from or to public transit. In addition, people in low income group, minority population groups such as African American and Hispanic, people residing in bigger cities, and people perceiving the lack of access or availability of public transit as a big issue had longer daily walking time compared to the other groups (p<0.01). Conclusion: There is a significant association between public transit use and daily walking time. The results of this study will add on to the evidence of the positive impact of public transit on physical activity level, and support ongoing project of public transit improvement, such as railway extension, as well as policy enactments with respect to public transit system.

Physical activity has numerous benefits in both primary and secondary prevention of chronic diseases. Current estimates suggest that most adults are not meeting the minimum recommended levels (PA-R) of leisure time physical activity (LT-PA) and these levels of adherence can vary by sociodemographic factors. Individuals’ social networks may impact their health behavior choices through interpersonal support mechanisms. Many LT-PA intervention studies have utilized “buddy systems” or social network engagement (SNE), as a method of promoting adherence. Thus far, there have been no large-scale, population based examinations of the relationship between SNE and adherence to PA-R. PURPOSE: The current study used nationally representative data from the American Time Use Survey dataset to test the relationship between Social Network Engagement (SNE) and participants’ adherence to minimum recommendations (PA-R) during leisure-time physical activity (LT-PA), and the impact of socio-demographic factors.

METHODS: Data were collected from each cross sectional year (2003-2014) of the American Time Use Survey dataset. Leisure Time-Social Network Engagement (SNE) was conceptualized as the participation of LT-PA with a member of an individual’s social network. Adherence to PA Recommendations (PA-R) was determined using the PA compendium MET values and corresponding activity codes. MET-weighted minutes of LT-PA were dichotomized into a PA-R adherence estimation.

CONCLUSIONS: In general, the prevalence of walkable destinations among adults was lower with increasing age, and most consistently among adults aged ≥45 years. Community-scale design, including locating residences and other destinations within walking distance, can help promote physical activity across all ages. Addressing differences in the prevalence of walkable destinations between older and younger adults may be a community design priority.

The Effect of Ramadan Month on Changes in Objectively Assessed Physical Activity in Adults
Abdulaziz Farooq, Fuad Almuadaka, Abdulla Al-Mohannadi. ASPETAR, Qatar Orthopaedic and Sports Medicine Hospital, Doha, Qatar, Doha, Qatar. Email: mohammed.farooq@aspetar.com (No relationships reported)

Ramadan is the Islamic month, when Muslims around the world participate in an intermittent fast for 29 to 30 days as a part of their religious obligation. During this period, Muslims abstain from eating and drinking during daylight hours. Studies have shown that Ramadan fasting has negative influence on sleep, physical performance and attention. However, the effects of Ramadan fasting on physical activity are not clear.

PURPOSE: To determine the impact of Ramadan month on objectively assessed physical activity among Muslim adults.

METHODS: Around 802 Muslim adults (Males 51.7%) ages ranging from 18 to 60 years, were sampled from a national community health program in Qatar representing two consecutive years. Physical activity was assessed daily using a pedometer (Omron HJ-720 ITC). Daily average step count and aerobic step count during the days of Ramadan month was compared during non-Ramadan months (one month prior and one month after Ramadan). For this longitudinal study design, a linear mixed model statistical procedure was adopted to adjust for demographic and environmental factors to test the study hypothesis.

The Guide to Community Preventive Services recommends community-scale design strategies as a way to increase physical activity. One example of this strategy is locating residences within walking distance of other destinations. Physical activity participation declines with increasing age. It is unclear if the prevalence of near-home walkable destinations also declines with age.

PURPOSE: To describe the prevalence of four types of walkable destinations across age groups in a representative sample of US adults aged ≥18 years.

METHODS: Respondents to the 2015 National Health Interview Survey reported the presence of four walkable destination types near their home: shops, stores, or markets; bus or transit stops; movies, libraries, or churches; and places that help one relax, clear one’s mind, and reduce stress. The proportion reporting each was calculated and stratified by age group. Differences between age groups were assessed with Wald tests corrected for multiple comparisons; trends were tested with orthogonal contrasts.

RESULTS: Overall, 71.8% reported walkable relaxing destinations, followed by shops (58.0%); transit (53.2%); and movies, libraries, or churches (47.5%). For shops; transit; and movies, libraries, or churches, adults aged 18–34 years reported similar values, beyond which the prevalence was progressively lower with increasing age (all p<0.05 for trend, Table). For relaxing destinations, the prevalence was similar among adults aged 18–44 years, and lower among those aged 45–64 and ≥65 years.

CONCLUSIONS: In general, the prevalence of walkable destinations among adults was lower with increasing age, and most consistently among adults aged ≥45 years. Community-scale design, including locating residences and other destinations within walking distance, can help promote physical activity across all ages. Addressing differences in the prevalence of walkable destinations between older and younger adults may be a community design priority.

% Reporting Walkable Destinations

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Shoppers, stores, markets</th>
<th>Bus or transit stops</th>
<th>Movies, libraries, churches</th>
<th>Places to relax, clear stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24</td>
<td>71.5a</td>
<td>68.7-74.1</td>
<td>62.7a</td>
<td>59.7-65.6</td>
</tr>
<tr>
<td>25-34</td>
<td>67.8a</td>
<td>65.6-69.9</td>
<td>62.1a</td>
<td>59.7-64.5</td>
</tr>
<tr>
<td>34-44</td>
<td>60.5</td>
<td>58.3-62.6</td>
<td>56.0</td>
<td>55.8-59.3</td>
</tr>
<tr>
<td>45-64</td>
<td>54.3</td>
<td>52.5-56.0</td>
<td>49.6</td>
<td>47.6-51.7</td>
</tr>
<tr>
<td>≥65</td>
<td>44.7</td>
<td>42.8-46.6</td>
<td>42.8</td>
<td>40.8-44.7</td>
</tr>
</tbody>
</table>

Within columns, values with the same letter are not significantly different (p>0.05)
RESULTS: Objectively assessed physical activity, i.e. daily average step counts per day, declined during the month of Ramadan compared to non-Ramadan months in this population. The average daily steps per day during Ramadan month was 7,267 (95% CI, 7,180 to 7,354) steps. When compared to one month prior Ramadan there was an average reduction of 619 steps (95% CI, 483 to 755) per day p<0.001. The decline in physical activity during Ramadan was higher men (-729±74) steps compared to women (-490±81). However, one month post Ramadan the physical activity levels declined by daily average step counts increased by average 548 steps (95% CI, 407 to 688) compared to Ramadan (p=0.001) and were similar to pre-Ramadan month (p=0.692).

CONCLUSIONS: This study confirmed that in this population, due to the shift in time of activity as well as calorie intake from daylight to evening hours during Ramadan there was substantial decline in objectively assessed daily physical activity among Muslim adults. Interventions are needed to promote physical activity during this period.

Purpose: To compare body height and weight of 5-19 years old children and adolescents between 1943 and 2014 in China, and to determine the change in morphological development in Chinese children and adolescents over 71 years.

Methods: Based on the Student Physical Standard (made by the Physical Education Committee of the Ministry of Education of China, with unknown sample size) in 1943 and the National Physical Fitness Surveillance Report (from the General Administration of Sport of China, with sample size of 358725) in 2014, we compared the body weight and height average of children and adolescents in each age, and the growth of each age were calculated. And contrast chart were generated. Due to the sample size of girls and boys in China’s sample and differences in age the sample could not be compared when the Student Physique Standard was established, in this study we could’t test the mean difference. Therefore this study used simple statistical description to reflect the growth trend of children and adolescents.

Results: The average height and weight in each age for boys between 5-19yr and girls between 5-17yr in 2014 was significantly higher than in 1943, the differences were 4.6(19yr)-20.4(13yr) cm for boys and 3.4(17yr)-14.7(11yr) cm for girls. The average weight in each age for boys between 5-19yr and girls between 5-17yr in 2014 was significantly higher than in 1943, the differences were 2.4(5yr)-14.8(15yr) kg for boys and 1.2(5yr)-11.6(11yr) kg for girls. In 1943, boys between 5-14yr were at a lower physical development level than girls, but boys after 14yr were at a higher physical development level than girls. However, in 2014, boys between 10-11yr were at a similar physical development level compared to girls, in each of the other ages boys were at a higher level than girls. In 1943, the height growth spurt periods were from 12-13yr in girls and from 15yr in boys, and the weight growth spurt periods were from 12-15yr in girls, and from 14-15yr in boys. In 2014, the growth spurt periods for both height and weight were 11yr in girls and 13yr in boys.

Conclusion: Compared to the data collected in 1943, Chinese children in 2014 were taller and heavier. In the year one, a 1-2cm growth gap was also observed in terms of the growth spurt age. Supported by the Sports Medicine key laboratory of General Administration of Sport of China (A2015C06).

Purpose: Physical literacy is defined as the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engaging in physical activities for life. The purpose of the present study was to assess the physical literacy of children and youth living in Prince Edward Island, Canada, using preliminary results from the RBC Canadian Assessment of Physical Literacy (CAPL).

Methods: The CAPL includes tests in 4 domains: Motivation and Confidence (CSAPPA Questionnaire), Knowledge and Understanding (CAPL Physical Activity Questionnaire), Physical Competence (BMI, waist circumference, grip strength, PACER test, plank, sit and reach, and obstacle course), and Daily Behaviour (objectively measured steps/day and self-reported physical activity and sedentary behaviour). The scoring categories for each domain were: Beginning, Progressing, Achieving, or Excelling, with Achieving considered the minimum recommended score.

Results: Data were collected on 205 boys and 202 girls aged 8-12 years (mean: 10.7±1.1 years). The proportion of participants identified as Achieving or Excelling in each domain was as follows: Motivation and Confidence: 40%; Knowledge and Understanding: 66%; Daily Behaviour: 64%; Physical Competence: 39%; Overall Physical Literacy: 63%.

Conclusions: Although two-thirds of participants were considered to have met the minimum recommended level of Knowledge, Daily Behaviour, and overall Physical Literacy, only a minority of children met the minimum recommended levels of Physical Competence and Motivation and Confidence.

Funding: Research funding was provided by the Children’s Hospital of Eastern Ontario Research Institute through the RBC Learn to Play project, delivered in partnership with ParticipACTION and the Public Health Agency of Canada.

Purpose: The negative gradient between socio-economic status and prevalence of non-communicable disease in adulthood has prompted investigation of potential foundations based in childhood. The objective of the present study is to examine the influence of socio-geographical variations and socioeconomic status on health-related physical fitness in adolescents from a large population-based sample of Colombian ninth graders.

Methods: During the 2014-2015 school year, we examined a cross-sectional component of the SER Study is a cross-sectional Body mass, height, muscular fitness (standing broad jump and handgrip tests) and cardiorespiratory fitness (20 m shuttle-run) were measured in n=52,204 14-16-year-olds. Area-level socioeconomic status was categorized from 1 to 6. A model was built by means of a step-by-step process and gradient maps were created to show physical fitness in the quartiles and the trend of physical fitness across disaggregated in Zonal Planning Units (in Spanish UPZ) in Bogotá, for each of the five health-related physical fitness variables.

Results: Socioeconomic status was used as the only group-level variable and this had a significant effect on the models for all health-related physical fitness parameters except for handgrip. Cardiorespiratory fitness, standing broad jump, and body mass index increased 6.31, 2.69, and 1.45 times, respectively, on average with the maximum increase in socioeconomic status categories, when we compared two random individuals in each stratum.

Conclusions: Our results suggest a significant association between health-related physical fitness variables and socio-geographical location in ninth grade adolescents from Bogotá, using a multilevel methodological approach.

Purpose: Physical activity confers considerable health benefits, but only half of U.S. adults report achieving levels of aerobic physical activity consistent with current guidelines. Walking is an excellent way for most people to increase their physical activity. The prevalence of walking among adults increased by 6 percentage points from 2005 to 2010, but it is unknown whether this increase has been sustained.

Methods: Objectively assessed physical activity, i.e. daily average step counts per day. Results: The prevalence of walking among adults increased by 6 percentage points from 2005 to 2010, but it is unknown whether this increase has been sustained.
to estimate the age-adjusted prevalence of self-reported walking among adults ≥ 18 years. Walking was defined as engaging in at least one 10-minute bout of transportation or leisure walking in the past seven days. Estimates are reported for the total sample and stratified by sex. Linear and quadratic trends in walking prevalence from 2005 to 2015 were tested using logistic regression.

**RESULTS:** The overall prevalence of self-reported walking increased significantly from 2005 to 2015, although a leveling off was observed between 2010 and 2015 (2005: 55.7%, 2010: 62.1%, 2015: 63.9%; p-value for linear and quadratic trends &lt; 0.05). A similar trend was observed among men, with no significant difference in prevalence between 2010 and 2015 (2005: 54.3%, 2010: 61.8%, 2015: 62.8%; p-value for linear and quadratic trends &lt; 0.05). Among women, the prevalence of walking demonstrated a significant linear increase from 2005 to 2015 with no significant quadratic trend; the increase in prevalence between 2010 and 2015 was significant (2005: 57.5%, 2010: 62.5%, 2015: 65.1%; p-value for linear trend only &lt; 0.05).

**CONCLUSION:** Overall, the proportion of U.S. adults who reported walking significantly increased from 2005 to 2015; however, the results suggest that this increase has slowed in recent years, especially among men. This finding highlights the importance of implementing effective programs and policies that promote walking and improve the walkability of communities, as described in Step It Up! The Surgeon General’s Call to Action to Promote Walking and Walkable Communities.

**3233 Board #138 June 2 2:00 PM - 3:30 PM**

**Findings from the 2016 Active Healthy Kids Scotland Report Card**

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(No relationships reported)

The Active Healthy Kids Scotland Report Card provides a comprehensive assessment on the physical activity and health of Scottish children and adolescents. **PURPOSE:** To summarize the report card grades; to identify changes in report card grades since the previous report card published in 2013; to critique Scottish surveillance of physical activity and health in children and young people.

**METHODS:** Report card grades were assigned to 10 indicators related to physical activity and health (7 behavioral indicators and 3 policy and environment indicators). Grades were based on Scottish data which were: recent (published after the 2013 card), derived from nationally representative samples and affected by minimal bias, and determined by the percentage of Scottish children and adolescents meeting an evidence-based benchmark: A is 81% to 100%; B is 61% to 80%; C is 41% to 60%; D is 21% to 40%; F is 0% to 20%; INC is Incomplete data combined with lack of an evidence-based benchmark. Grades were assigned a ‘+’ if trends had improved since the last report card and a ‘−’ if there was a marked socio-economic inequality in the indicator. **RESULTS:** Overall Physical Activity, Sedentary Behavior and Obesity received F or F+ grades. Active Outdoor Play and Organised Sport Participation were graded as INC. Active Transportation to School/Nursery was graded C, and Diet D−. Active Transportation was graded as INC. Community and the Built Environment, graded as INC. Active Transportation to School/Nursery was graded C, and Diet D−. Active Outdoor Play and Organised Sport Participation were graded as INC.

**CONCLUSIONS:** Grades were similar to those in 2013. Scotland has a favorable environment for physical activity, but children and adolescents have low physical activity and high screen-based sedentary behavior. Better surveillance of physical activity and health in Scottish children and adolescents is required and would encourage more evidence-informed physical activity and health policy in Scotland in future.

**3243 Board #139 June 2 2:00 PM - 3:30 PM**

**Running Profiles And Their Associated Behaviors: A Proposal For Chilean Runners**

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Email: nbesomini@udd.cl

(No relationships reported)

**Purpose:** Identifying different runner profiles may improve running-related injuries (RRIs) prevention, education, and management. The aim of this study was to determine Chilean runner’s profiles according to socio-demographic characteristics, motivations, training factors and behaviors associated with running during 2015-2016. **Methods:** An email and web-based online cross-sectional survey were conducted. Runners from six different competitions and other running circuits were recruited. The survey collected information on 6 dimensions: (1) socio-demographics; (2) health; (3) motivations; (4) training factors; (5) behaviors associated with running; and (6) beliefs and perceptions. Profiles’ construction was performed through a two-step cluster analysis using Bayesian Information Criterion and linear discriminant analysis to correctly assess subject classification. All statistical analyses were performed using SPSS22 with a significance level set at 5%. **Results:** A total of 821 runners (46% females), aged 36.6 (±10.0) years were analyzed. Cluster analysis allowed the generation of 4 groups (n=752) according to years-of-running-experience, volume (km/week) and hours of training (hrs/week). Main variable for runners’ classification was years-of-running-experience: “Beginner”(n=163); “Basic”(n=164); “Intermediate”(n=160); and “Advanced”(n=265). Statistically significant (p<0.05) and clinically relevant variables among the 4 groups were: sex, age, years-of-running-experience, training factors, previous injury(PI) and technological implements used for running practice. Beginners were mainly females (65.2%), aged 28.5 (±8.4) years, having less than 1 year-of-running-experience. 32.5% reported PI, and accumulated a training volume of 18.3 (±12.7) km/week. Advanced runners were mainly males (65.3%), aged 37.4 (±10.9) years, 63.4% with more than 7 years-of-running-experience, 44.2% reported to have PI and accumulated a training volume of 38.2 (±20.8) km/week. **Conclusion:** Advanced runners accumulate greater training load per week, were older, and with higher PI proportions when compared with Beginners. Future work should include a differentiated classification of runners, in order to identify clinically specific risk factors related to running injuries.

**3235 Board #140 June 2 2:00 PM - 3:30 PM**

**The Relationship Among The Built Environment, Transportation Behavior, And Population Health: Comparison Of Two Cities >**

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Email: largo.wight@unf.edu

(No relationships reported)

**PURPOSE:** Active commuting and transportation behavior impacts obesity rates, wellbeing, and environmental health and quality. This study was designed to assess the relationship between active transportation, the built environment, and population perceived health in two comparable cities in the southeastern U.S.A.

**METHODS:** From 2006-2010, Charlotte, NC (city1) improved the built environment (e.g., shifting a motor vehicle lane to designated bicycle lane) and transportation policies (e.g., bicycle safety) to facilitate active commuting in the downtown area. Jacksonville, FL (city2) did not implement any changes to the built environment to foster active commuting. Data from the Behavioral Risk Factor Surveillance System (BRFSS) from 2006 (pre intervention) to 2012 (post intervention) were analyzed for both cities.

**RESULTS:** There were no significant differences between city1 and city2 in sample size and demographic make-up (age, race, gender, sex). Over the period 2006 to 2012, the annual difference between the percentage of Charlotte respondents rating physical health as good and those in Jacksonville rating physical health good increased at a rate of 13% per year based on an exponential growth regression model ($p = 0.0213$). That is, over time the difference between the two cities grew in favor of Charlotte.

**CONCLUSIONS:** Supportive urban and transportation policies aimed at facilitating healthy behaviors are associated with healthier communities in this convenience sample of two cities This study’s findings were consistent with past findings that highlight the importance of the built environment and transportation policies on population health. Future research is needed to assess rates of active commuting and examine the populations and outcomes longitudinally.
The 2008 Physical Activity Guidelines recommends that all adults avoid inactivity and engage in activities based on their abilities. Mobility disability is the most prevalent disability type among US working-age adults and is related to poor health outcomes. Understanding physical activity (PA) patterns among this group can aid development of inclusive interventions to increase PA participation in ways that meet their needs and abilities. **PURPOSE:** To assess prevalence of PA levels among adults aged 18-64 years with mobility disability and determine the most common PA types by activity level. **METHODS:** Using the 2015 Behavioral Risk Factor Surveillance System (n=269,486), we classified respondents reporting serious difficulty walking or climbing stairs as having mobility disability (n=35,140). We calculated moderate-intensity-equivalent minutes/week (2*vigorous min/wk + moderate min/wk) from self-reported type, frequency, and duration of PA in the past month. Three PA levels were: active adults, walking was the most commonly reported activity (61.3%); insufficiently active, walking was the most commonly reported activity [19.1% (95% CI: 18.3, 20.0)] or active [29.9% (95% CI: 29.0, 30.9)]. Among those who were insufficiently active, walking was the most commonly reported activity (78.1%), followed by gardening/yard work (3.8%), and bicycling (3.3%). Among active adults, walking was the most commonly reported activity (61.3%) followed by gardening/yard work (9.4%) and bicycling (6.2%). **CONCLUSION:** Nearly 5 in 10 working-age adults with mobility disability avoid inactivity, primarily through walking. However, the other half of this group are inactive and missing the opportunity to protect or improve their health by regularly engaging in PA. These results highlight the need for PA promotion strategies in which all adults have opportunities to participate according to their abilities and the need to evaluate how specific activities, such as walking or wheelchair rolling, may increase PA among adults with mobility disabilities.

**TABLE.** Prevalence of built environment features among audited street length, US Virgin Islands, 2016

<table>
<thead>
<tr>
<th>Features</th>
<th>Overall (N=1456 Km)</th>
<th>Residential land use</th>
<th>Commercial land use</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of destinations</td>
<td>85.3 (76.0-91.4)</td>
<td>82.6 (80.8-90.8)</td>
<td>70.3 (10.2-36.3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Traffic calming features</td>
<td>9.0 (5.9-13.4)</td>
<td>2.3 (0.6-8.1)</td>
<td>3.3 (0.8-7.3)</td>
<td>0.866</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>72.1 (60.4-81.4)</td>
</tr>
<tr>
<td>Any</td>
<td>27.9 (18.6-59.6)</td>
</tr>
<tr>
<td>Street lighting</td>
<td>72.6 (58.8-82.8)</td>
</tr>
<tr>
<td>Sidewalks</td>
<td>70.4 (47.3-86.2)</td>
</tr>
<tr>
<td>Ample</td>
<td>29.6 (13.8-52.7)</td>
</tr>
<tr>
<td>Not present or continuous</td>
<td>50.4 (42.3-58.5)</td>
</tr>
<tr>
<td>Present</td>
<td>26.9 (19.2-36.3)</td>
</tr>
</tbody>
</table>

a. Pearson’s chi-square test for differences in distributions by type of land use. Note: Percentages may not add to 100% due to rounding.

**PURPOSE:** Streets can be designed to provide safe and easy places that encourage walking by providing street-scale supports such as destinations, sidewalks, lighting, and traffic calming features. The prevalence of street-scale supports for walking across the US Virgin Islands (USVI) was assessed and differences determined by residential or commercial land use type.

**METHODS:** A two-stage sampling method was used to select representative street segments: (1) Estates (census subdivisions in the USVI) were selected using stratified random sampling (n=46 selected of 336) and (2) street segments were then randomly selected from within Estates (n=1550). The Microscale Audit of Pedestrian Streetscape Abbreviated Tool was locally adapted and used by trained auditors to conduct objective assessments of several key elements of street-scale design, including destinations, traffic calming features, street lighting, and sidewalks. Descriptive statistics were weighted to be representative of the total street length within the sampling frame. Audits were conducted on 1114 street segments (unweighted: 94.6 km of street length; weighted: 1456 km).

**RESULTS:** Overall, 22.1% of street length had at least one destination, 27.9% had at least one traffic calming feature, 53.0% had at least some street lighting, and 11.2% had sidewalks (TABLE). Significant differences were found by type of land use for the presence of several features, including number of destinations, the degree of street lighting, and sidewalks (Pearson’s chi-square test, P<0.001).

**CONCLUSION:** Across the USVI, street-scale features that support walking were uncommon and were less prevalent on residential streets than on commercial streets. Implementing policies and projects relating to street-scale design in the USVI could improve walkability, particularly those that focus on residential areas.

**PURPOSE:** To study the fitness and the BMI levels of children from Barcelona (Spain), related to their socio-economic level.

**METHODS:** 3279 children (1634 boys) of 7-10 yr. were recruited from schools of three different socio-economic levels: low (n=343), medium (n=850) and high (n=1808), and participated in the study after the approval of the Clinical Ethics Committee research CEIC- Parc Salut Mar. The participants’ families gave informed consent for their children to participate. Height, weight and BMI of all of them were obtained. A battery of fitness tests was performed: vertical jump, ball throwing, long jump, zig-zag running test, 20 m running velocity test and 20m shuttle run test (EUFIT, 1993; Welk & Meredith, 2008). Descriptive for all variables were obtained, ANOVA and Bonferroni were applied to compare the three groups.

**RESULTS:** Significant differences appeared between the three groups, with worse values in the low socio-economic level for all the fitness tests, except for vertical jump test.

**CONCLUSIONS:** As, low socio-economic group showed worse fitness levels than medium and high groups. Mespexedeterioration, their overweight/obesity levels could have conditioned the fitness levels. The study was partially funded by the “Fondo de Investigación Sanitaria (FIS)” (PI0902259), of the Carlos III Health Institute (Ministry of Economy and Competitiveness, Spanish Government. Authors declare no conflict of interest. 

Abstracts were prepared by the authors and printed as submitted.
### Characteristics and Fitness test values compared between socio-economical levels

<table>
<thead>
<tr>
<th>Variables</th>
<th>Socio-economic level</th>
<th>Descriptive</th>
<th>Weigth (kg)</th>
<th>Height (cm)</th>
<th>BMI</th>
<th>Fitness test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HighMean (SD)</td>
<td>MediumMean (SD)</td>
<td>31.7 (6.4)</td>
<td>134.3 (6.0)</td>
<td>17.4 (2.6)</td>
<td>415.7 (102.7)</td>
</tr>
<tr>
<td></td>
<td>LowMean (SD)</td>
<td>P1</td>
<td>32.0 (6.7)</td>
<td>134.1 (5.9)</td>
<td>17.6 (2.9)</td>
<td>407.7 (109.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P2</td>
<td>32.6 (7.7)</td>
<td>134.0 (6.5)</td>
<td>18.0 (3.2)</td>
<td>390.4 (104.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P3</td>
<td>1.9</td>
<td>1.0</td>
<td>0.276</td>
<td>223.7 (7.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>0.08</td>
<td>22.7 (7.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>0.008</td>
<td>12.0 (5.3)</td>
</tr>
<tr>
<td></td>
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<td>1.0</td>
<td>1.0</td>
<td>0.008</td>
<td>4.6 (0.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.0</td>
<td>1.0</td>
<td>0.008</td>
<td>12.3 (3.7)</td>
</tr>
</tbody>
</table>

Abbreviations:
P1: group differences between High and Medium levelP2: group differences between Medium and Low levelP3: group differences between High and Low level

### Table 1

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 m running (sec)</td>
<td>12.0 (5.3)</td>
</tr>
<tr>
<td>Vertical jump (cm)</td>
<td>22.3 (7.1)</td>
</tr>
<tr>
<td>Zig-zag running (sec)</td>
<td>12.0 (5.3)</td>
</tr>
<tr>
<td>Long jump (cm)</td>
<td>12.7 (5.3)</td>
</tr>
<tr>
<td>20 m running velocity (sec)</td>
<td>4.7 (0.7)</td>
</tr>
<tr>
<td>20m shuttle run</td>
<td>11.3 (3.9)</td>
</tr>
</tbody>
</table>

### Table 2

<table>
<thead>
<tr>
<th>Economic level</th>
<th>Mean</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>32.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Medium</td>
<td>32.6</td>
<td>7.7</td>
</tr>
<tr>
<td>Low</td>
<td>32.6</td>
<td>6.4</td>
</tr>
</tbody>
</table>

### Table 3

<table>
<thead>
<tr>
<th>Economic level</th>
<th>Mean</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>53.6</td>
<td>9.5</td>
</tr>
<tr>
<td>Medium</td>
<td>54.3</td>
<td>12.5</td>
</tr>
<tr>
<td>Low</td>
<td>54.7</td>
<td>14.2</td>
</tr>
</tbody>
</table>

### Table 4

<table>
<thead>
<tr>
<th>Economic level</th>
<th>Mean</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>31.7</td>
<td>6.4</td>
</tr>
<tr>
<td>Medium</td>
<td>32.0</td>
<td>6.7</td>
</tr>
<tr>
<td>Low</td>
<td>32.6</td>
<td>7.7</td>
</tr>
</tbody>
</table>

### Purpose

Walking and bicycling are popular forms of active transportation that help individuals engage in physical activity. College campuses present unique opportunities for all members to engage in physical activity as they are moving around and connecting the campus and roadways and how they support walking and biking. METHODS: Mixed methods were used to obtain data: selected segments of WSU campus were objectively measured using a modified CDC Walkability Audit tool; the results of the audits were compared to results from an online survey distributed to WSU students and faculty/staff about their perceptions of ease of walking and biking on and around the campus. Two open-ended response questions were given to each group to propose recommendations to facilitate walking and biking.

RESULTS: Selected path segments (n=26) on and connecting the WSU pathways and roadways were audited for their objective walkability/bikability. The segments received a mean score of 6.29±18.4, giving WSU a grade C. Only 31% of audited segments got older, they participated in more PA, but the PA participation decreased after 12yr.

CONCLUSIONS: Running is the most popular PA for the US children and youth, and in all age groups is running (33.30%), followed by bike riding (27.86%), and backyard games (21.71%). The most popular PA is for boys are running (35.18%), basketball (30.31%), and bike riding (29.90%), and for girls are running (31.33%), bike riding (25.73%), and walking (21.55%). About 16.9% of children/youth participated in no activity, but about 18.7% took part in at least one activity and about 64.4% took part in more than one activities; on average, children/youth took part in 2.59 ±2.18 (M±SD) activities and boys (2.81±2.31) participated in more activities than girls (2.36±2.02; t=758.544, p<0.00, effect size = .10). From 3 to 11 yr., as the children got older, they participated in more PA, but the PA participation decreased after 12yr.

### Conclusion

Regular participation in physical activity (PA) has overwhelming positive implications on long-term health and on disease prevention. Despite established government guidelines to improve health through PA, over half of New Zealand women reportedly fail to achieve these criteria. Barriers to achieving minimum physical activity levels may include demographic characteristics (i.e. age, ethnicity), but the contribution of each factor is unclear.

PURPOSE: To understand how age and ethnicity affect a New Zealand woman’s ability to meet PA guidelines. METHODOGS: Healthy NZ Woman (n = 350) of three ethnicities (Māori, Pacific, European) aged 16-45y (stratified as 16-25y, 26-35y, 36-45y) were triaxial accelerometers for 7 days. Levels of moderate-vigorous PA (MVPA, ≥2020 counts.mnt·day−1) were assessed. Participants were categorised as achieving or not achieving PA guidelines. PA guidelines are commonly reported as either ≥150 min.wk−1 MVPA (Basic) or ≥150 min.wk−1 MPVA in bouts of 10 min (Basic10). Therefore both of these classifications were considered. RESULTS: Basic10+ guidelines were met by only 32% of New Zealand women; a further 34% of women (66% in total) met Basic guidelines. There were no significant differences between the three age groups when ethnicity was not also considered. Achievement of Basic guidelines was lower in Pacific women (37%) than Maori (65%; p<0.001) or European (75%; p<0.001) women. Specifically, fewer Pacific women in the 16-25y and 36-45y age groups achieved Basic PA guidelines than women of the same age but different ethnicity. More European women (38%) met Basic10+ guidelines than Maori (22%; p=0.011) or Pacific (22%; p=0.012) women. These differences between ethnicity were not specific to any age group. CONCLUSION: Although only two-thirds of New Zealand women achieved Basic PA guidelines, the prevalence was substantially higher than overall national statistics (48%). Given the extremely low rates of PA for periods of 10 or more minutes, a strategy is needed to increase the length of time women spend in bouts of MVPA. The findings further suggest that ethnicity, more so than age, is a contributing factor to achieving PA guidelines.
The dominance of the U.S based LPGA/PGA tour by Korean-born golfers over the past decade has been well recognized. The sheer volume of quality golfers being produced by this relatively small golfing nation has certainly caught the attention of the field of golf, however, the level of physical activity in Korean professional golfers has never been systematically examined. PURPOSE: The present study was to describe the baseline characteristics of the participant and to compare the physical activity level between weekdays and weekends in Korean professional golfers using objective physical assessment tools (i.e., Accelerometer). METHODS: Fourteen (male=7; female=8) young Korean professional golfers (23 ± 2.4 yrs; height = 171.7 ± 5 cm; weight = 73.7 ± 7.5 kg; experience = 6.6 yrs) consented to participate in the study. Participants were asked to wear the accelerometer (i.e., Actigraph) on their right wrist for 24 hours/day, 7 consecutive days to provide data on time in moderate and vigorous physical activity (MVPA). ActiLife software (version 6.11.2) was used to download all data. Raw data were processed with the R package GGIR and associated Hilderband milling (mg) cut points. Descriptive for all variables was calculated and Pearson product moment correlations were used to test for relationships between weekdays and weekends. A paired sample t-test was used to evaluate differences between weekday and weekend physical activity level. RESULTS: The accelerometer wear compliance was excellent 6.8 days, 98% of the time. Time in MVPA was 99.5 ± 35.79 mins/day and 136.4 ± 35.2 mins/day for weekdays, weekends, respectively. There is no significant difference on physical activity levels on weekdays (t(12) = -0.378, p = 0.711) and weekends (t(12) = -0.004, p = 0.990) in male and female golfers. No correlation was observed between weekdays MVPA and years of experience. However, weekends MVPA were inversely correlated with years of experience (r = -0.215, p = 0.48). Similar correlations were found between weekdays MVPA (r = -0.320, p = 0.141) and weekends MVPA (r = -0.348, p = 0.093) with golfer’s age. DISCUSSIONS: Our data demonstrates that Korean professional golfers are highly active during weekdays compared to weekends. Experienced golfers were associated with little time spent in MVPA regardless of the days of the week.
During the golf tournament, the device overestimated males and underestimated the female caucasians expended showing a possible golf tournament wearable lcal gender measurement tracking bias.

3246  Board #151  June 2 3:30 PM - 5:00 PM  Muscle Oxygen Extraction is a Key Performance Adaptation in Sprint Canoe-Kayak

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(No relationships reported)

Background The aerobic contribution to sprint canoe-kayak performance ranges from ~37% to ~85% of total energy expenditure from shortest (200m) to longest (1000m) events. While systemic VO2 max is a strong predictor of performance in 500m and 1000m races, the respective role of central and peripheral adaptations is poorly understood.

Purpose The purpose of this study was therefore to characterize the changes in oxygenation derived from portable near-infrared spectroscopy (NIRS) in various muscles during a VO2 max test and two on-water time trials (TT: 200m and 500m or 1000m), and to examine the link between muscle oxygenation, cardiac output and performance.

Methods Twenty one well-trained sprint canoe-kayak athletes (12 men: 8 kayakers (MK) and 4 canoeists (MC) and 9 women: 4 kayakers (WK) and 5 canoeists (WC)) participated in three testing sessions: 1) an incremental VO2 max test on a canoe or kayak ergometer; 2) a 200m TT; and 3) a 500m (MK) and 1000m (MK and MC) TT. NIRS monitors were placed on the vl + bilaterals (VL) during the 3 testing sessions to assess changes in muscle oxygen saturation (SmO2) (% from baseline). Cardiac output was measured by impedance during the VO2 max test in a subset of athletes.

Results Performance in the 200m time trial correlated with both LDL final SmO2 (R=0.700, p=0.01) and VL final SmO2 (R=0.568, p=0.02). Performance during the 500-1000m time trials correlated with LDL final SmO2 obtained during the VO2 max test (R=0.519, p=0.033) and with VO2 max (L/min: R=-0.560, p=0.03). Maximal cardiac output was low (men: 26.2 ± 4.7L/min, women: 24.0 ± 2.6 L/min) and did not correlate with 200m (R=0.253) or 500-1000m (R=0.028) performance.

Conclusion These results confirm that systemic VO2 max is related to performance in the longer canoe-kayak events, and suggest that peripheral adaptations (i.e., the muscle ability to extract oxygen during the effort) rather than central factors better contribute to success in this sport. The ability to extract oxygen during the effort appears to be a predictor of performance for both short and long events. These results indicate that training for sprint canoe-kayak athletes should emphasize the development of the peripheral component of oxygen consumption.

3247  Board #152  June 2 3:30 PM - 5:00 PM  Gender Differences In Resting Energy Expenditure In Athletic Populations

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(No relationships reported)

Gender differences in energy expenditure and fuel utilization have been observed during exercise. However, less is known about whether or not these differences are also evident at rest, particularly in athletic populations, and it is currently unknown whether these differences remain when adjusted for body mass and fat-free mass (FFM).

METHODS: Twelve men: 8 kayakers (MK) and 4 canoeists (MC) and 9 women: 4 kayakers (WK) and 5 canoeists (WC) underwent an incremental VO2 max test on a canoe or kayak ergometer; 2) a 200m TT; and 3) a 500m TT. NIRS monitors were placed on the left arex dorsi (LD), biceps brachii (BB), and vastus lateralis (VL) during the 3 testing sessions to assess changes in muscle oxygen saturation (SmO2) (% from baseline). Cardiac output was measured by impedance during the VO2 max test in a subset of athletes.

RESULTS: Absolute REE was significantly higher in men (M: 2480.8 ± 208.6 vs. W: 1583.1 ± 192.8 kcaL per 24h; p < 0.001). When expressed relative to BM and FM there were no differences in REE observed between men and women athletes (M: 25.8 ± 3.5 vs. W: 24.6 ± 1.9 kcaL/kg of BM, p = 0.183), (M: 31.2 ± 3.1 vs. W: 32.1 ± 3.1 kcaL/kg of FM; p = 0.357 respectively). CONCLUSIONS: Based upon the results of the current study it appears as though the greater energy observed in men athletes are likely attributable to their increased BM and FM.

3248  Board #153  June 2 3:30 PM - 5:00 PM  Exercise-induced Changes In Plasma Adenosine Triphosphate Concentration In Highly-trained Sprinters And Triathletes

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PURPOSE: It is known that plasma adenosine triphosphate (ATP) concentration increases during exercise and depends on its intensity. There are no reports about the effect of specific long-term training adaptation on plasma ATP levels during exercise. The aim of our study was to compare the exercise-induced plasma ATP release in athletes specialized in speed-power vs endurance disciplines.

METHODS: Nine sprinters, 9 triathletes at national/international level, and 9 amateur runners (controls), aged 23.8±2.8 y, 23.1±4.3 y, and 25.2±2.7 y, respectively, were studied. They underwent an incremental exercise test until exhaustion on a motorized treadmill. Venous blood samples were drawn at rest, at exhaustion (maximum intensity), and after 10 and 30 min of recovery. Blood samples were immediately centrifuged for 30 s at 14,000 rpm and ºC, frozen in liquid nitrogen, stored at -86ºC, and then analyzed using high-performance liquid chromatography. Comparisons between groups and exercise phases were made using two-way ANOVA with repeated measures and Scheffe post-hoc test. RESULTS: In all three groups, a significant increase in plasma ATP was observed between rest and exhaustion, as well as after 30 min of recovery (controls). A significantly greater plasma ATP concentration was observed in sprinters than in triathletes and controls at exhaustion and after 10 min of recovery. No significant between-group differences were observed at rest and 30 min after exercise.

CONCLUSION: Plasma ATP response to incremental exercise until exhaustion is different depending on specific training adaptation. Training based on speed-power exercise brings about much greater plasma ATP release than endurance training. Underlying mechanisms, connected with exercise-induced vasodilation and its mediators, erythrocyte function, skeletal muscle activity, and other factors, need further research. Supported by National Science Center Poland Grant 2013/09/B/NZ7/02556

3249  Board #154  June 2 3:30 PM - 5:00 PM  Energetics of Semi-contact Karate in Trained Young Athletes

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(No relationships reported)

PURPOSE: Karate will have its debut in the 2020 Olympic Games. Understanding the energetics in karate as a contact sport event may provide information for performance training. However, the existing studies on karate have limited mainly on non-contact fighting. The aim of this study is to determine the energetics of semi-contact karate in trained young athletes.

METHODS: Nine females (18.3 ± 1.7 yrs, 166.4 ± 4.7 cm, 57.2 ± 4.5 kg, 2.1 ± 1.7 yrs training experience) and nine males (16.7 ± 2.0 yrs, 176.8 ± 8.2 cm, 61.1 ± 9.4 kg, 2.4 ± 1.7 yrs training experience) from the Chinese national youth team participated in one round of semi-contact karate, with the duration of 3 min and 30 s, respectively. A portable spirometric system (MetaMax 3B, Cortex, Germany) was utilized to measure the inspired oxygen uptake. Capillary blood was taken from the earlobe prior to and post the karate, and analyzed by blood lactate analyzer (Biosen C-line, EKF, Germany). Athletes were encouraged to fight as in real matches, but without touching the spirometric system. The energy contributions were calculated based on the accumulated oxygen uptake and blood lactate during karate, as well as the fast component of oxygen debt during the recovery.

RESULTS: The peak blood lactate values after karate were 3.36 ± 1.15 and 5.14 ± 1.70 mM for females and males. The averaged oxygen uptakes during karate were 30.6 ± 9.8 (females) and 33.1 ± 6.3 (males) L/min/kg for females and males. The energy contributions from anaerobic lactic, anaerobic lactic, and aerobic pathways were 27.3 ± 11.8 (27.7 ± 8.1 %), 7.5 ± 4.4 (7.4 ± 3.3 %), and 61.6 ± 10.7 (64.9 ± 9.3 %) kJ for females, and 31.1 ± 10.8 (17.7 ± 5.3 %), 13.0 ± 5.9 (7.1 ± 2.7 %), and 132.7 ± 22.5 (72.3 ± 5.2 %) kJ for males.
CONCLUSIONS: Karate is an aerobic-dominant sport event, while the anaerobic energy system may play an important role in high-intensity fighting. These findings are consistent with existing studies on non-contact karate.

Non-motorized, arced treadmills are becoming more popular in fitness settings and are thought to require greater effort than walking or running on a traditional motorized treadmill. However, little research has been conducted to evaluate this type of exercise equipment.

PURPOSE: The purpose of this study was to compare the energy expenditure (EE) required to complete one mile on a non-motorized, arced treadmill (AT) and a motorized treadmill (TM).

METHODS: Nine recreationally trained healthy participants (4 male, 5 female) aged 26±1.9 years walked or ran 1-mile at a self-selected speed on a motorized treadmill (TM) and a non-motorized arced treadmill (AT) while VO₂, EE, and heart rate (HR) were measured. The EE in kcal•min⁻¹ and kcal•mile⁻¹ was calculated from VO₂ measured after subjects achieved steady-state. The tests were counterbalanced so half of the subjects completed the TM trial first and half completed the AT trial first.

RESULTS: Nine participants completed the 1-mile test at an average speed of 125.1±32.6 m•min⁻¹ (range: 88.4–160.8 m•min⁻¹). The mean VO₂, EE, and HR were significantly higher during the TF trial compared to the TM trial:

<table>
<thead>
<tr>
<th></th>
<th>TM</th>
<th>AT</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>VO₂ (L•min⁻¹)</td>
<td>1.61±0.9</td>
<td>2.2±1.1</td>
<td>0.0006</td>
</tr>
<tr>
<td>EE (kcal•min⁻¹)</td>
<td>7.9±4.6</td>
<td>10.9±5.4</td>
<td>0.0005</td>
</tr>
<tr>
<td>EE (kcal•mile⁻¹)</td>
<td>98.4±35.4</td>
<td>144.8±32.2</td>
<td>0.0001</td>
</tr>
<tr>
<td>HR (beats•min⁻¹)</td>
<td>152.0±29.3</td>
<td>164.9±23.3</td>
<td>0.005</td>
</tr>
</tbody>
</table>

Values expressed as mean±SD

CONCLUSION: Use of a non-motorized arced treadmill resulted in a significantly higher VO₂, EE, and HR compared to a traditional treadmill at the same speed. This could be due to the unique design of the arced treadmill that requires a different movement pattern and additional effort to propel the non-motorized belt. This may have implications for fitness applications in which EE is of interest.
Impact of Alternative Footwear on Human Energy Expenditure

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PURPOSE: Use of alternative footwear options such as flip-flop style sandals and minimalist athletic shoes are becoming increasingly popular footwear choices. The purpose of the investigation was to analyze the energy expenditure and oxygen consumption requirements of walking at preferred pace while wearing flip-flops, slip-on style shoes, and minimalist athletic shoes.

METHODS: Eighteen healthy male adults participated in this study. In addition to an initial familiarization session, participants were tested in three different footwear conditions [thong-style flip-flops (FF), slip on shoes (CROC), and minimalist shoes (MIN)]. Then after a brief warm-up, participants walked a one-mile distance at their preferred pace. Immediately following completion of the one-mile walk, participants stood quietly on the treadmill for an additional period to assess excess post-exercise oxygen consumption (EPOC).

RESULTS: A repeated-measures ANOVA showed that the following variables did not show evidence of a significant difference across conditions: preferred pace (p = 0.392), average oxygen consumption (p = 0.804), energy expenditure per mile (p = 0.306), or EPOC (p = 0.088). There was shown to be a significantly higher RER during exercise in CROC compared to MIN (p = 0.031) with no significant differences observed when comparing CROC to FF (p = 0.106) or FF to MIN (p = 0.827).

CONCLUSIONS: Based on the results of the current study, it appears that the alternative footwear selected for evaluation do not lead to a substantial alteration of walking pace or overall EE. However, the significant difference in RER suggesting a slightly elevated exercise intensity while wearing the CROC could perhaps be related to the softer sole, influencing overall mechanical efficiency.

Energy Expenditure of College Students

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A great deal of research has made it evident that an increase in physical activity (PA) leads to a decrease in risk for developing health issues such as cardiovascular disease (CVD). While persons of all ages and skill levels can increase their PA, often have the ability to focus on decreasing their risk of CVD early in life through regular physical activity (PA). The 2008 PA Guidelines suggest that a 70 kg person expends approximately 1198.75 kcals/week, which equates to 0.12 kg of fat per week (~5% of body fat loss). While persons of all ages and skill levels can increase their PA, young adults often have the ability to focus on decreasing their risk of CVD early in life through regular physical activity (PA). The 2008 PA Guidelines suggest that a 70 kg person expends approximately 1198.75 kcals/week, which equates to 0.12 kg of fat per week (~5% of body fat loss).

The CVw and CVa for Hb and Hct were both ~2% and 4% body mass) achieved using two distinct types of dehydration.

Two trials of controlled dehydration via sweating (HYP) and diuretic administration (EUH) from which the within-subject biological variation (CVw) and analytical variation (CVa) were used to estimate a meaningful change (unidirectional 95% level). Two trials of controlled dehydration via sweating (HYP) and diuretic administration (DIUR) followed. RESULTS: The Cwv and Cva for Hb and Hct were both ~2% and 0.5%, respectively. When properly summed [RCE = 2 x 1.65 x (Cva/Cwv)] they explain a relative increase of ~5% (0.7 Hb units and 2.0 Hct units) between any two successive values measured 24 hours apart. Participants achieved body mass losses of 3.13 ± 0.44% (HYP) and 3.70 ± 0.54% (DIUR). The change in Hb was 0.6 units (HYP) and 1.4 units (DIUR) (P<0.05) vs EUH. The change in Hct was 2.1 units (HYP) and 4.2 units (DIUR) (P<0.05) vs EUH. Only with the diuretic was the change in Hb and Hct (~4.2) well beyond expected changes due to biological variation (~2%).

CONCLUSION: Dehydration by ~3%-4% of body mass produced changes in Hb and Hct beyond day-to-day variation (~ unidirectional 95% level) only when achieved using a diuretic. These findings have important implications for claims made against dehydration as a bias factor in the ABP and also provide important insight related to hydration testing in general. Funded by USAMRMC, authors view not official US Army or DOD policy.
PURPOSE: Overexpression to reactive oxygen species has been implicated in the pathogenesis of a wide range of chronic conditions, including cardiovascular disease, cancer, and the aging process (e.g., “free radical theory of aging”). While some early studies have shown the benefits of “direct” antioxidants (e.g., vitamins A, C, E) in reducing oxidative cellular damage, more recent evidence suggests that mega-doses of antioxidants (e.g., vitamin E, resveratrol) may interfere with internal cellular protection pathways, disrupt redox balance, and suppress several important exercise-induced adaptations. In contrast, up-regulation of endogenous “indirect” antioxidant pathways has been proposed as a mechanism for optimizing redox balance. Activation of nuclear factor (erythroid-derived 2)-like 2 (Nrf2), a transcriptional regulator of phase II antioxidant enzymes, has been suggested as an important step in attenuating oxidative stress. A number of natural phytomolecules have been shown to activate Nrf2, including turmeric and green tea. Palm Fruit Bioactives (PFB), a standardized 5-polyphenol blend, has been shown to exhibit anti-hypertensive, anti-atherogenic, anti-diabetic, and chemopreventive effects in animal models. The purpose of this study was to evaluate the effect of palm fruit bioactives (PFB) on activation of the Nrf2 pathway in cell culture as one potential mechanism of action for PFB’s health effects.

METHODS: AREc32 cells (MCF-7 cell line stably transfected with a AREc32 reporter) were treated with different concentrations of PFB increased cell viability at 6h (0.125% and 3.3%) and 24h (2% and 3.3%). At both time points, PFB concentrations from 0.125% to 20% for 6-24h.

CONCLUSIONS: These data demonstrate potent Nrf2-activation by PFB which may provide a potential mechanism of attenuating oxidative stress and explaining previously observed cardiovascular, metabolic, and cell-protection effects.
intensity running. Future studies should address whether there is an effect of long-duration intake of Matcha green tea on metabolic and physiological responses and exercise performance. Matcha capsules were provided by OMGTEA Ltd, United Kingdom.

3262 Board #167

Beyond Ginseng And Echinacea: A Meta-analysis Of Herbal Supplement Use By Athletes

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Herbal supplements are noteworthy components of athletes’ nutritional supplement regimens. Recent reviews have characterized use of herbal supplements vaguely, or ginseng and echinacea specifically, but neglected less common supplements such as ginkgo, spirulina, St. John’s Wort, and others. PURPOSE: To determine the frequency of athletes’ use of specific herbal supplements beyond ginseng and echinacea through a meta-analysis of previously published surveys. METHODS: Thirty-two studies (published between 1985 and 2016) that reported specific herbal supplement data were identified through a combination of systematic database searching and citations from previous works. Usage rates for specific herbs were tabulated and overall prevalence calculated. When available, demographic information including age, sex, sport, and athlete country-of-origin were also tabulated. RESULTS: 11,855 athletes were in the final data set. All-supplement usage averaged 58.7%. Average individual herbal supplement usage were: ginseng (9.6%), echinacea (9.6%), ephedra (3.8%), ginkgo (3.0%), garlic (2.8%), St. John’s Wort (0.6%), and spirulina or blue-green algae (0.4%); others (<0.3%) included chamomile, ciwujia, yohimbe, flaxseed, green tea, arnica, evening primrose, guarana, kava kava, tribulus, goldenseal, kola nut, and peppermint. Several additional studies reported that athletes consumed various lesser-known herbal supplements including these and others (such as tea tree oil), but did not provide usage statistics. Multi- or poly-herbal supplements (2.0%) and “other” unspecified herbal supplements (4.9%) usage averages were also reported. Surveyed athletes were predominantly male (61.6%), from North America (40.3%), and college-aged (38.9%); most surveys sampled athletes from multiple sports. CONCLUSION: While ginseng and echinacea are (unsurprisingly) the herbal supplements most frequently consumed by athletes, over a dozen other herbal supplements are also consumed and warrant better attention in both athlete nutrition surveys and research. Certain athlete populations are underrepresented in the current literature, including females, those hailing from the southern hemisphere, non-college-aged athletes, and athletes with impairments.

3263 Board #168

Seaweed Supplement Harmed The Exercise Effect In Ovariectomy Rats

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Purpose

This study aimed to find out the effect on blood glucose regulation after 10 weeks resistance exercise of ovariectomized rats with seaweed supplementation.

Method

12-month-old Sprague Dawley female rats were subjected to bilateral ovariectomy and then were randomly divided into 3 groups: Control (C), Exercise (E), Exercise-Seaweed (ES). Resistance exercise started 2 weeks after the surgery and operated 5 days/week in E and ES group. In ES group, 50 mg/kg of seaweed gavage was given immediately after exercise. In C and E group, rats also receive the same volume of water gavage after exercise. Oral glucose tolerance test (OGTT) and serum insulin level was evaluated after 10 weeks of resistance training

Result

After 10 weeks of resistance training, ES had higher fasting and 60 min blood glucose compared to E. (Fasting glucose: E 96.9 ± 3.12 < C 105.0 ± 3.32 mg/dl;60min glucose: E 141.4 ± 6.39 < ES 161.7 ± 9.51 mg/dl; p <0.05). E had lower fasting blood insulin level than C and ES. (E 0.4 ± 0.1 < C 0.8 ± 0.2;ES 0.9 ± 0.2 ug/dl;p<0.05 )

Conclusion

10 weeks of resistance exercise significantly improve the ability of blood sugar regulation on ovariectomized rats. However, if combined with seaweed supplementation, the benefits of exercise were eliminated.
Chronic chlorella intake enhances aerobic exercise capacities, i.e. exercise tolerance. High intensity intermittent exercise (HIEE) training enhances aerobic and anaerobic exercise capacities via elevation of muscle glycolytic and oxidative metabolism. However, the additive effects of combination of HIEE training and chlorella intake on exercise performance and muscle glycolytic and oxidative metabolism remain unclear.

**PURPOSE:** The purpose of this study was to investigate the effect of chronic chlorella intake alone or in combination with HIEE training on exercise performance and muscle glycolytic and oxidative metabolism in rats. **METHODS:** Male 12-week-old Sprague-Dawley rats were randomly assigned to the four groups; sedentary control, chlorella intake (0.5% chlorella powder in normal feed), HIEE training, and combination of HIEE training and chlorella intake for 6 weeks (n = 10 each group). HIEE training comprised 14 repeats of a 20-s swimming session with a 10-s pause between sessions, while bearing a weight equivalent to 16% of body weight, 4 days/week. Exercise performance was tested after the interventions by measuring the maximal number of HIEE sessions that could be completed. **RESULTS:** Chlorella intake and HIEE training significantly increased the maximal number of HIEE, and enhanced the expression of monocarboxylate transporter (MCTi), MCT4, and peroxisome proliferator-activated receptor γ coactivator-1α concomitantly with the activities of lactate dehydrogenase (LDH), phosphofructokinase, citrate synthase (CS), and cytochrome oxidase (COX) in the red region of the gastrocnemius muscle (p<0.05). Furthermore, the combination further augmented the increased exercise performance and the enhanced expressions and activities (p<0.05). By contrast, in the white region of the gastrocnemius muscle, MCTi expression and LDH, CS, and COX activities did not change. **CONCLUSIONS:** These results showed that compared to only chlorella intake and only HIEE training, chlorella intake combined with HIEE training has a more pronounced effect on exercise performance and muscle glycolytic and oxidative metabolism, in particular lactate metabolism.

Supported by Grants-in-Aid for Scientific Research (#26282199, M. Iemitsu)

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**PURPOSE:** Intermittent sports are characterized by intermittent bursts of high-intensity exercise and are dependent upon a combination of anaerobic and aerobic energy systems, both of which rely on carbohydrate as an important fuel source. A potential reason for athletes to use energy drinks is due to the conception the energy drinks would promote improvement of performance and this practice has been common among athletes in recent history. This study examined the effects of energy drink on metabolic parameters and exercise performance following basketball game simulation (BGS).

**METHODS:** Six female college basketball players, aged 21.5±1.9 yrs, volunteered for this study which was designed by a randomized counterbalanced experimental design with repeated measures under two different trials: energy drink (ED), extrication glucose 20 g from corn, citrus juice 2% from pure Calamansi fruit, branched chain amino acid 600 mg and taurine 600 mg) and placebo (PO, aspartame) with a double-blind experiment. The drink, either ED or PO is provided for the participants right after each day of color-matched wheat flour as placebo for 28 days. A graded maximal cycle ergometer test (peak power) at least 24 hrs later. The treatment group (T, n=23, mean ± standard deviation, Age = 23.5 ± 5.2 yrs, Height = 172.9 ± 8.8 cm, Body Mass = 72.4 ± 12.1 kg) consumed 12.0 g/day of mushroom blend (PeakO2) along with 12.0 g of Gatorade powder for one week. The control group (C, n=17, Age = 22.5 ± 4.6 yrs, Height = 172.4 ± 8.4 cm, Body Mass = 72.3 ± 11.8 kg) consumed placebo (whole whey and Gatorade powder in identical fashion).

**RESULTS:** There were no differences between groups in any variables at baseline. Analysis was conducted stratifying each group by VO2max at baseline, in which the top 50% of each group was compared to the bottom 50% (Treatment top, TT, Treatment bottom, TB, Control top, CT, Control bottom, CB). TB increased VO2max significantly (1.95 ± 2.6 ml·kg⁻¹·min⁻¹, p = 0.02) while TT, CT, and CB did not change significantly. PPO did not change significantly in any group, however, a trend (p = 0.059) for increased PPO in TB by was observed. Submaximum HR was lower (3.5±18.5 bpm, p<0.017) in TT, but these changes were not different from changes in TB, CT, CB. TTF increased significantly (p < 0.05) in both TT and CT but changes between groups were not significant.

**CONCLUSIONS:** Seven days of supplementation with 12.0 g/day of PeakO2 may improve aerobic and anaerobic power output in less aerobically fit, healthy individuals. Those higher fit, apparently healthy individuals may see an improvement (e.g lower HR) in economy during submaximal aerobic exercise.

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**PURPOSE:** There is evidence to suggest a commercially available, Cordyceps militaris-containing mushroom blend supplement (Peak O2, Compound Solutions, USA) on maximal oxygen uptake, peak power output, time to fatigue, and submaximal aerobic economy in apparently healthy young adults.

**METHODS:** Forty recreationally active men and women volunteered to participate, were randomized into one of two groups, and completed the testing protocol. At baseline each participant completed a maximal oxygen consumption (VO2max) test, which included a 5 minute economy state from minutes 3-8 along with a Wingate cycle ergometer test (peak power) at least 24 hrs later. The treatment group (T, n=23, mean ± standard deviation, Age = 23.5 ± 5.2 yrs, Height = 172.9 ± 8.8 cm, Body Mass = 72.4 ± 12.1 kg) consumed 12.0 g/day of mushroom blend (PeakO2) along with 12.0 g of Gatorade powder for one week. The control group (C, n=17, Age = 22.5 ± 4.6 yrs, Height = 172.4 ± 8.4 cm, Body Mass = 72.3 ± 11.8 kg) consumed placebo (whole whey and Gatorade powder in identical fashion).

**RESULTS:** Dependent measures t-tests were used to evaluate changes within groups. **CONCLUSIONS:** Seven days of supplementation with 12.0 g/day of PeakO2 may improve aerobic and anaerobic power output in less aerobically fit, healthy individuals. Those higher fit, apparently healthy individuals may see an improvement (e.g lower HR) in economy during submaximal aerobic exercise.
Strategies that enable athletes to tolerate a higher training load may be advantageous for athletic health and performance. PURPOSE: To examine the effects of New Zealand blackcurrants polyphenols (NZBK) on recovery and physical performance in elite athletes during a period of intensified training. METHODS: Nine male modern pentathletes were tested at baseline (T1), after 7 days of receiving a placebo (P; T2) and after 7 days of receiving a blackcurrant supplement (NZBK; T3). Training volume was 30% higher during the second week. The test battery included a counter movement jump (CMJ) a running test (4 x 800 m), a mood state questionnaire (Recovery-Cue), and an extensive panel of blood tests including haematology and biochemistry. CMJ, lactate, a biomarker of oxidative damage (FORT) and anti-oxidant defense (FORD) were measured at rest and immediately before and after the 4 x 800 m run. A general linear model, with Tukey’s post-hoc test for pairwise comparisons was used to determine differences between conditions, with Cohen’s effect sizes (d) to calculate the magnitude of the standardised difference in means where significant; reported as 0.2 (small), 0.5 (moderate), 0.8 (large), and 1.3 (very large). Data are presented as mean ± SD. RESULTS: No effects were seen for P or NZBK on hormonal, haematological and biochemical markers, mood state, or running performance (p>0.05). NZBK reduced inflammation in comparison to P (HS-CRP 0.8±0.3 mg/L at T3 vs. 1.3±0.4 mg/L at T2, p=0.024, d=1.41), despite the increased training volume. There was a trend and effect for NZBK on reducing FORT (1.7±0.31 mmol/L at T1 vs. 1.62±0.23 mmol/L at T2 vs. 1.50±0.25 mmol/L at T3, p=0.036) and FORD (1.53±0.11 mmol/L at T1 vs. 1.54±0.16 mmol/L at T2 vs. 1.43±0.18 mmol/L at T3; p=0.015, d=1.17). Of interest, oxidative damage (FORT) correlated with testosterone, cortisol, CMJ and mood state (p<0.05). CONCLUSIONS: NZBK reduces inflammation and oxidative stress in the presence of an increased training volume, with no effects on performance. Furthermore, the monitoring of oxidative damage in endurance athletes may be effective for tracking fatigue and well-being given the relationship with measures of recovery (e.g. hormones, CMJ and mood state).

The elderly's health issues are often complex and tend to lead to chronic diseases; such issues can be due to a fitness decline resulting from a lack of physical activities. PURPOSE: The present study aims to determine the effects of aquarobotic exercise and burdock extract on blood lipid profiles and vascular compliance in elderly women, by implementing the 16-week program. METHODS: Thirty eight healthy elderly female volunteer subjects aged 75.27 ± 4.32 years comprised the control group (n=8), aquarobic exercise group (n=10), aquarobic exercise and burdock extract combination group (n=10), and burdock extract group (n=10). This intervention trial was designed to compare pre-and post-exercise intervention variables. Changes from baseline to the end of the study were determined by a paired t-test and one-way analysis of variance (ANOVA). The variables of body composition, serum blood lipids, and vascular elasticity were measured in all participants before and after the 16-week study. RESULTS: TC (176.45 ± 20.61 vs. 189.18 ± 24.28 mg/dl), TG (112.45 ± 38.73 vs. 127.27 ± 48.19 mg/dl), LDL-C (145.83 ± 30.03 vs. 152.32 ± 30.04 mg/dl), glucose(94.00 ± 16.25 vs. 93.18 ± 12.18 mg/dl), and insulin(7.77 ± 3.77 vs. 7.03 ± 5.09 mg/dl) increased significantly in the aquarobic exercise group and aquarobic exercise and burdock extract combination group(p<0.05). However, no statistically significant changes were found within or between groups in high-density lipoprotein cholesterol and HDMA-IR. No statistically significant changes were found within or between groups in pulse wave velocity before and after participation in the 16-week aquarobic exercise program and/or burdock extract program. CONCLUSIONS: The findings of the present study discussed so far suggest that aquarobic exercise and burdock extract

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PURPOSE: We aimed to determine the effects of a betalain-rich concentrate (BRC) of beetroots, containing no sugars or nitrates, on exercise performance and recovery.

METHODS: Twenty-two (9 men and 13 women) triathletes (38 ± 11 yrs) completed two double-blind, cross-over, randomized trials (BRC and placebo) starting 7 days apart. Each trial was preceded by 6 days of supplementation with 100 mg·d⁻¹ of BRC or placebo. On the 7th day of supplementation, exercise trials commenced 120 min after ingestion of 50mg BRC or placebo and consisted of 40·5 km running TT to assess recovery. RESULTS: 10·km TT duration (49.5±8.9 vs. 50.8±10.3 min, p=0.03) was faster with the BRC treatment. Despite running faster, average heart rate and ratings of perceived exertion were not different between treatments. 5·km TT duration (23.2±4.4 vs. 23.9±4.7 min, p=0.003), 24·h after the 10·km TT, was faster in 17 of the 22 subjects with the BRC treatment. Creatine phosphate, a muscle high-energy phosphate store, increased less (40·5; 22·2 5 vs. 49·7; 21·5 U·L⁻¹, p=0·02) from baseline to after the 10·km TT and subjective fatigue could be responsible for part of the ergogenic effects of beetroot during exercise.

CONCLUSIONS: Findings indicate that a commercially available supplement marketed to boost energy and reduce fatigue can deliver the purported benefits at least in part. Related findings that supplementation for a 4-week period can allow for equal work at a lower rating of perceived exertion provides further, though limited support that this product may have efficacy.

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Effects of Korean Wild Ginseng Drink on Recovery from Acute Strenuous Exercise

Nan Hee Lee1, Hyun Chul Jung2, Gina Ok1, Soeun Jeon1, Minsoo Kang, FACSM1, Sukho Lee1. Texas A&M University San Antonio, San Antonio, TX. 1University of Louisiana at Monroe, Monroe, LA. 2Middle Tennessee State University, Murfreesboro, TN. (Sponsor: Minsoo Kang, FACSM) (No relationships reported)

Korean Wild Ginseng (KWG) has been known to have efficacy not only in physical stamina but also in anti-oxidative and anti-inflammatory properties. However, its effect on performance recovery by acute strenuous exercise is not well known. **PURPOSE:** To investigate the effects of KWG Drink on performance recovery from acute strenuous exercise (ASE). **METHODS:** This study was conducted in double-blind, counterbalanced, placebo-controlled design with 14 days washout periods. Ten healthy male volunteers (27 ± 4.33 years old) were randomly assigned to one of two parallel trials. KWG (2g of KWG; 16.8 mg of ginsenosides/package) or placebo supplementation were consumed right after ASE and following 4 days (2 packs/day). The ASE program consisted of downhill running and jumping exercise. Subjects performed downhill running (-10 %) for 20 minutes at 60 % of VO2 max. After downhill running, subjects performed jumping exercise that consisted of five sets of 20 maximal jump drops from height of 60 cm with a 10 seconds interval between jumps and 2 minutes rest between each set. Peak and mean power, isometric muscle strength, electromyography activity, cognitive function, cortisol, interleukin-6 (IL-6), myoglobin, total antioxidant capacity (TAC), and muscle soreness were assessed at each time points: baseline, 24, 48, and 96 hours after ASE. A series of 2 x 4 repeated measures ANOVA, and MANOVA were used to determine differences according to the supplementation. **RESULTS:** There were no statistical differences in performance (F=0.368, p=0.970), cognitive function (F=0.366, p=0.983), blood variables (cortisol: F=0.590, p=0.584; IL-6: F=1.166, p=0.206; myoglobin: F=0.574, p=0.544; TAC: F=1.508, p=0.241), and muscle soreness (F=0.760, p=0.462) according to the supplementation. **CONCLUSION:** Supplementation of KWG extract has no efficacy for performance recovery from acute strenuous exercise in healthy male subjects. Dosage and short duration of KWG application may produce non-significance results. Further studies are needed to investigate the different dosage and duration of KWG supplementation on performance recovery.

Effects of Ursolic Acid Supplementation on Early Strength Gains and Body Composition

Ashton Roman, Chi-An W. Emhoff. Saint Mary’s College of California, Moraga, CA. (No relationships reported)

**PURPOSE:** Ursolic Acid (UA) is a compound commonly found in apple peels and other fruit skins. Previous studies in animal models have shown that UA may inhibit skeletal muscle atrophy, as well as increase the size and strength of skeletal muscle. In humans, one study last year showed significant effects of combined UA supplementation and resistance training on increased muscle strength and decreased body fat percentage, but the mechanisms are unclear. Another study found acute effects of UA supplementation during incremental exercise. We hypothesized that oral consumption of 150 mg of Ursolic Acid three times a day in combination with resistance training would lead to increased muscle strength gain but no effect on body composition at four weeks compared to equivalent training with Placebo. **METHODS:** Twelve untrained adults (six in each group of Placebo or UA) were recruited to participate in our four-week training study. Subjects ingested either a Placebo or 150 mg of UA three times a day with each meal, for a total of 450 mg per day for four weeks. A 1 Repetition Maximum (1RM) bench press test was used to assess muscular strength pre and post resistance training. Resistance training consisted of two supervised sessions per week of three sets of 10 repetitions of flat bench press, incline bench press, and flat dumbbell flies at 60-80% of 1RM. Pre and post resistance training body fat percentage was measured via hydrostatic weighing. **RESULTS:** After four weeks of resistance training, subjects experienced a significant increase in muscular strength as measured by a 1RM bench press test and no change in body fat percentage. There were no significant differences in muscle strength gain between the Placebo and UA supplementation groups. **CONCLUSION:** We conclude that any potential ergogenic effects of UA supplementation are unlikely to involve neuromuscular adaptations in the early strength gains of a resistance training program.

Effects of Peppermint Oil Supplementation on the Ventilatory Threshold in Young Women

Juliana M. Oates, Chi-An W. Emhoff. Saint Mary’s College of California, Moraga, CA. (No relationships reported)

**PURPOSE:** Peppermint oil (mentha piperita) has been shown to have cooling effects in animals and humans, as well as beneficial influences on pulmonary function tests possibly due to bronchodilatory mechanisms. In a previous study in our lab, we found that a single supplementation of one milliliter of peppermint oil mixed in one cup of water significantly raised the ventilatory threshold measured as %VO2max, with no effect on VO2max in the female population. **METHODS:** Ten female participants (age 20 ± 0.6 yr) performed two maximum oxygen consumption (VO2max) tests on a cycle ergometer under randomized, single-blind trials of peppermint oil and placebo. For each exercise test, ventilatory threshold was determined by detecting the onset of hyperventilation in the ventilation vs. time curve. **RESULTS:** In the recreationally active female population, peppermint oil supplementation had no effect on the ventilatory threshold measured as a percentage of VO2max compared to placebo (peppermint 61.5 ± 4.1 % of VO2max vs. placebo 63.5 ± 2.5 % of VO2max). Additionally, VO2max values were not different between the two conditions (peppermint: 36.6 ± 2.1 ml/kg/min vs. placebo: 35.8 ± 1.8 ml/kg/min). **CONCLUSION:** Our findings suggest that peppermint oil supplementation may not play a significant role in the ventilatory threshold of recreationally active women, despite a significant effect having been observed in age-matched men. The ventilatory threshold phenomenon is complex, and sex differences may explain the inconsistent responses between men and women in peppermint oil supplementation during incremental exercise.
A transient augmentation in the energy efficiency of working skeletal muscle is the purported basis for dietary nitrate (NO₃⁻) supplementation amongst competitive and recreational athletes alike. Previous studies support the ergogenic benefits of NO₃⁻ as results indicated improved microvascular blood flow, skeletal muscle oxygenation, and exercise performance with relatively short-term supplementation. As with most ergogenic aids, the optimum duration of supplementation prior to performance or competition, i.e. loading phase, is a critical determinant for efficacy. Purpose: Therefore, the purpose of this study was to investigate the effects of long-term vs. single dosing NO₃⁻ supplementation on skeletal muscle oxygenation and cycling performance. Methods: In a randomized, placebo controlled, double blind, parallel design study, healthy, recreationally active male (n=15) and female (n=14) subjects (age= 18-29 yrs.) completed a 5-mi simulated cycling time trial before and after a 14-day supplementation period with either a NO₃⁻ supplement (pre-nitrate loading; PRE) (n=14) or placebo (single nitrate dosing; SGL) (n=15). Both groups consumed a single dose of the NO₃⁻ supplement 2 hours prior to the post-treatment time trial. In addition, skeletal muscle oxygenation was measured via near-infrared spectroscopy during each time trial. Results: Fourteen days of NO₃⁻ supplementation (i.e. PRE) significantly decreased time to completion (Tlim) (p<0.01) and increased average power (PWRave) (p<0.04) and speed (SPEEDavg) (p<0.02) from pre- to post-treatment while a single dosing (i.e. SGL) produced no significant changes to these measures. There were no significant differences over time and across treatments for any other measures including muscle oxygenation variables. Conclusion: Overall, long-term NO₃⁻ supplementation appears to have slight benefits over a single pre-exercise dosing in terms of cycling performance. However, this ergogenic response cannot be explained by changes to skeletal muscle oxygenation, thus contradicting previously purported mechanisms of action.

ABSTRACT Muscle oxidative capacity and recovery time of muscle oxygenation following maximal exercise decline with the aging. Although dietary nitrate supplementation has been shown to improve muscle oxygenation in health subjects, these effects in elderly has not been addressed. Purpose: To evaluate the effect of a beetroot-based nutritional gel (BG) on forearm muscle oxygenation, blood volume and handgrip strength in elderly with cardiovascular risk factors. Methods: 12 elderly participated in a randomized, double-blind and crossover study. Maximal voluntary contraction (MVC) was collected for baseline, immediately and 20 min after exercise in both BG (100 g of beetroot-based gel containing approx. 12 mmol nitrate) or PLA (100 g of nitrate-depleted gel nitrate-depleted) were provided. After 150 min of ingestion of each intervention, elderly performed a rhythmic handgrip exercise which consisted of one 1-min set at 30% of the MVC of each subject following 1 min of quiet recovery after exercise. Muscle deoxygenation (SmO₂)max, muscle reoxygenation (SmO₂min), muscle deoxygenation time (SmO₂max), muscle reoxygenation time (SmO₂min) and blood volume (VBV) were continuously monitored using an NIRS device. Results: Significant reduction in SmO₂max and SmO₂min was observed during exercise and SmO₂min during recovery, as it was in the AMVC (BG: -18.56±13.8 vs. PLA: -26.18±14.6 N; P=0.05) only 20 min after handgrip exercise. Significant increase in VBV during and after exercise was observed in BG. There was no significant difference in SmO₂min determinations between interventions. Conclusion: Single dose of BG improve microvascular hemodynamic which may accelerate the muscle recovery after short exercise in elderly with cardiovascular risk factors.

TABLE 1. Values of near-infrared spectroscopy (NIRS) during exercise and recovery period of exercise.

<table>
<thead>
<tr>
<th>Variable</th>
<th>PLA</th>
<th>BET</th>
</tr>
</thead>
<tbody>
<tr>
<td>SmO₂max (%)</td>
<td>59±2.6</td>
<td>55.7±8.2**</td>
</tr>
<tr>
<td>SmO₂min (%)</td>
<td>71.4±3.8</td>
<td>71.3±3.2</td>
</tr>
<tr>
<td>SmO₂max (s)</td>
<td>24.2±10.8</td>
<td>19.5±9.5*</td>
</tr>
<tr>
<td>SmO₂min (s)</td>
<td>14.2±8.3</td>
<td>8.1±7.7*</td>
</tr>
<tr>
<td>ΔtHb (A.U.)</td>
<td>24.1±15.8</td>
<td>31.4±16.6*</td>
</tr>
<tr>
<td>ΔtHb (A.U.)</td>
<td>7.5±4.9</td>
<td>11.2±7.3*</td>
</tr>
</tbody>
</table>

The values are mean±SD. * (P<0.05) vs. PLA.

Purpose The present study examined whether consuming an antioxidant-rich beetroot juice (BTJ) would attenuate markers of inflammation and muscle damage following a marathon. Methods: Using a double blind, independent groups design, 34 marathon runners (~16 previous marathons completed) consumed either BTJ (~350mL/L Troles equivalent antioxidant capacity; polyphenol content: ~405 mg of Gallic Acid Equivalents) or an isocaloric placebo (PLA) for 3 days following a marathon race (3 x 250 ml per day). Maximal isometric voluntary contractions (MVC), countermovement jumps (CMJ), muscle soreness, serum cytokines, leucocytes, creatine kinase (CK), high sensitivity C-reactive protein (hs-CRP) and aspartate aminotransferase (AST) were measured pre, post, and on the 2 days after the marathon. Results: Muscle function (CMJ and MVC) was significantly reduced after the marathon (P<0.05) but no group differences were observed at any time point (P>0.05). At 48 h post-marathon, CMJ was similarly depressed in the BTJ and PLA groups (95±6 vs. 95±9 % of baseline values, respectively), with MVC returning to baseline levels in both groups (100±13 vs. 99±10 %, respectively). Muscle soreness was increased in both groups in the day after the marathon (BTJ: 45 ± 48 vs. PLA: 46 ± 39 mm) and had returned to baseline by day 2, irrespective of supplementation (P>0.05). Cytokines (Interleukin-6; IL-6, Interleukin-8, tumour necrosis factor-α) were increased immediately post-marathon but apart from IL-6 (~0.9 fold change in BTJ and ~0.5 in PLA) had returned to baseline.
baseline values by day 1 post. No group differences were evident (P>0.05). Leucocytes increased 1.7-fold immediately after the race and remained elevated 2 days post, irrespective of supplement. CK, AST and hs-CRP were all still elevated 2 days after the marathon (P<0.05), but no group differences were present. **Conclusions:** Beetroot juice supplementation was no more effective than a PLA for attenuating inflammation and functional markers of muscle-damage following a marathon race.

3267 Board #192 June 2:00 PM - 3:30 PM Dietary Nitrate Supplementation Improves Sprint and High-Intensity Intermittent Running Performance
Christopher Thompson1, Anni Vanhatalo, FACSIM1, Harry Jell1, Jonathan Fulford1, Lara Nyman1, Stephen J. Bailey1, Andrew M. Jones, FACSIM1. 1University of Exeter, Exeter, United Kingdom. 2University of Gotoh, Science Institute, Barrington, IL.

**Purpose:** The influence of dietary nitrate (NO3⁻) supplementation on indices of maximal sprint and intermittent exercise performance is unclear. **Purpose:** To investigate the effects of NO3⁻ supplementation on sprint running performance, and cognitive function and exercise performance during the sport-specific Yo-Yo Intermittent Recovery level 1 test (IR1). **Methods:** In a double-blind, randomised, crossover study, 36 male team-sport players received NO3⁻-rich (BR: 70 mL·day⁻¹); 6.4 mmol of NO3⁻), and NO3⁻-depleted (PL: 70 mL·day⁻¹; 0.04 mmol NO3⁻) beetroot juice for 5 days. On day 5 of supplementation, subjects completed a series of maximal 20-m sprints followed by the Yo-Yo IR1. Cognitive tasks were completed prior to, during and immediately following the Yo-Yo IR1 to define lactate handling profiles. Each participant performed 2.5 hours after ingestion of a commercially available BRE beet juice (Beet-It Sport Shot, Ipswich, UK) and blackcurrant juice placebo (R.W. Knudsen Just Black Currant, Chico, CA). Capillary lactate concentrations were measured at the completion of each testing stage to develop lactate handling curves.

**Results:** Participants (n = 12, 50% men, age: 24 ± 5 years, peak VO2 = 47 ± 7 ml·kg⁻¹·min⁻¹) with 24 ± 12 years of rowing experience completed all aspects of this protocol. Heart rate, oxygen consumption, respiratory exchange ratio, and perceived effort were similar at all exercise intensities during testing following ingestion of BRE and placebo. Similarly, parameters of lactate handling including absolute lactate concentrations at each exercise intensity, workload at onset of blood lactate accumulation, and workload at 4 mmol lactate concentration were similar following ingestion of the active BRE compound and placebo (Figure). **Conclusion:** Ingestion of a single dose of commercially available BRE does not appear to have a significant impact on lactate handling. Performance during activities that depend on lactate handling may be unresponsive to BRE ingestion.

**Figure:** Capillary lactate concentrations during stepwise rowing ergometer exercise testing following ingestion of beetroot extract (BRE) and placebo.

3288 Board #193 June 2:00 PM - 3:30 PM Acute Nitrate Supplementation Improves Ischemic Exercise Tolerance in Post-Menopausal Women
Swapan Mookerjee1, Jin-Kwang Kim1, Susan Bous1, Megan A. Barrett1, David J. Moore2, Yasima Somani1, Michael P. Flanagan3, Daniel B. Kim-Shapiro2, Swati Basu2, David N. Proctor, FACSM1. 1Bloomsburg University, Bloomsburg, PA. 2Penn State University, State College, PA. 3Wake Forest University, Winston-Salem, NC.

**Purpose:** Inorganic nitrate supplementation elicits its most consistent ergogenic benefits during conditions of low muscle oxygen availability. In the present study we tested the ability of acute dietary nitrate supplementation to attenuate perceived effort and increase time to volitional fatigue during blood flow-restricted exercise in post-menopausal women. **Methods:** Eleven post-menopausal women (57 to 64 yr) performed intermittent isometric handgrip squeezes (10% of MVC, 30 per min) during progressive upper arm cuff inflation (+20 mmHg per min) on 3 study visits, with visits to 10 days between visits. Approximately one week following visit 1, participants randomly consumed 140 mL of nitrate-concentrated (0.8 g·nitrate·L⁻¹) or nitrate-depleted (Br⁻½·L⁻¹) beet juice (James White Beets-It Sport; INR®9119978), with handgrip exercise beginning two hours post-consumption. Ratings of perceived exertion (Borg RPE) were assessed each minute. Venous blood was collected (before, 90 min post, 180 min post consumption) on both Br⁻³ visits for measurement of plasma nitrate (NO3⁻) and nitrite (NO2⁻) concentrations. RESULTS: Compared to responses observed during the Br⁻³ consumption visit, Br⁻³ consumption raised plasma [NO₃⁻] (13-fold) and [NO₂⁻] ([4-fold], delayed the initial rise in RPE (+50 sec), and increased time to volitional fatigue (526:46 vs. 567:50 sec) all (p<0.05).

**Conclusions:** These findings provide further support for the ergogenic potential of nitrate supplementation under conditions of restricted muscle blood flow/oxygen availability.Funding: Penn State Hershey Family & Community Medicine (JAFEE Endowment)

3290 Board #195 June 2:00 PM - 3:30 PM Dietary Nitrate Supplementation Reduces The Oxygen Cost Of Submaximal Arm Crank Exercise
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**Purpose:** There is evidence to suggest that the ingestion of > 5 mmol inorganic nitrate (NO₃⁻) can enhance exercise economy [lower pulmonary oxygen uptake (VO₂)] and performance during cycling and running exercise. However, the effect of dietary NO₃⁻ supplementation on economy and performance during isolated upper-body exercise is less clear. **Purpose:** To test the hypothesis that dietary NO₃⁻ supplementation would improve economy and performance during arm cranking exercise. **Methods:** Eight recreationally-active males were assigned in a randomized, double-blind, crossover design to receive NO₃⁻-rich beetroot juice (BR: 12.2 mmol NO₃⁻·day⁻¹) and NO₃⁻-depleted beetroot juice (PL: 0.01 mmol NO₃⁻·day⁻¹) for 7 days. On days 5 and 7 of supplementation, subjects completed two bouts of moderate-intensity exercise and one bout of severe-intensity exercise that was continued until exhaustion on an arm-crank ergometer. Resting venous blood samples were obtained, for later determination of plasma nitrite concentration ([NO₂⁻]) and breath-by-breath VO₂ were measured during all exercise tests.

**Results:** Plasma [NO₂⁻] was higher following BR, compared to PL (86 ± 51 nM vs. BR: 542 ± 285 nM; P<0.05). BR supplementation lowered steady-state VO₂ during moderate-intensity exercise by 3% (3%: 0.93 ± 0.24 L·min⁻¹ vs. BR: 0.90 ± 0.23 L·min⁻¹; P<0.05). Exercise economy and time-to-exhaustion (PL: 459 ± 102 vs. BR: 474 ± 135 s; P<0.05) were not impacted by BR supplementation during severe-intensity arm cranking.

**Conclusions:** Short-term dietary NO₃⁻ supplementation improved moderate-intensity exercise economy, but not severe-intensity exercise economy or tolerance, during arm-cranking exercise in recreationally-active subjects.
PURPOSE: Beet juice is a potential source of inorganic nitrates in the diet. Inorganic nitrates have been shown to improve exercise performance. Increased levels of nitrates may reduce the ATP cost of force production and may influence mitochondrial efficiency leading to a reduction in the energy cost of exercise. Most studies to date assessed high intensity endurance performance with time trials lasting 15 - 138 min. However, there is a lack of research on the effect of nitrates on intermittent exercise similar to that performed in soccer. The purpose of this project was to examine the effects of acute beet juice supplementation on performance during a simulated soccer match.

METHODS: 8 female college soccer players (VO2max: 52.3 ± 8.5 ml/kg/min, mean ± SD) each completed two trials in a randomized, double-blind design. Participants ingested one nitrate rich beet juice shot (BR; ~6.5 mmol of nitrate per 70 ml) or one nitrate depleted beet juice shot (PL; ~0.04 mmol nitrate per 70 ml) 3 h before performing a modified Loughborough Intermittent Shuttle Test (LIST), separated by 7 days. Participants performed a Yo-Yo intermittent shuttle test to estimate maximum aerobic speed used in the modified LIST. The LIST consists of six 15 min periods of walking, running, sprinting and shooting. Each 15 min period is separated by a 3 min break. O2 consumption and heart rate were measured continuously using a portable metabolic system. Average lactate and RPE values were measured over the last 5 min of each 15 min period. 

RESULTS: There was no significant difference at any time point in any of the measured variables between PL and BR trials. The average VO2 between the PL and BR trial was 33.8 ± 4.4 vs 34.2 ± 4.1 ml/kg/min. In both trials the VO2 was significantly higher in the first 15 min compared to all other time points (p<0.05). The average heart rate between the PL and the BR trial was 172 ± 18 vs 175 ± 6 b/min. The average lactate value between the PL and the BR trial was 3.8 ± 2.0 vs 3.2 ± 1.5 mmol/L. RPE values between the PL and the BR were 15.4 ± 1.2 vs 15.8 ± 1.6. In both trials the RPE was significantly lower in the first 15 min compared to all other time points (p<0.05).

CONCLUSIONS: Acute ingestion of nitrate rich beet juice did not improve simulated soccer performance.

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Effects of Fermented Drink Intake on Post-exercise Glycogen Restoration in Rat Skeletal Muscle and Liver

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PURPOSE: Recent studies have demonstrated that non-pharmacological glycogen restoration strategies may be effective for enhancing recovery after exhaustive exercise in humans. This study aimed to examine the effect of fermented drink intake on post-exercise glycogen restoration in rat skeletal muscle and liver.

METHODS: Male Wistar rats (10-weeks-old) were randomly divided into two main groups: sedentary control (Con) and exercise. Following 12 h fasting, rats in the exercise group swam for 2.5 h in five 30-min bouts separated by 5 min of rest in order to deplete skeletal muscle and liver glycogen. The rats were orally ingested either water, glucose solution, or FD 0.5, 1, and 1.5 g/kg after the swimming. Immediately and/or 4 h after the exercise, soleus and deep portion of gastrocnemius (GaSD) muscles and liver were dissected and analyzed.

RESULTS: Swimming exercise resulted in an approximate 20-60% reduction of glycogen concentration in all collected tissues compared with the value of fasted Con animals. Thereafter, the glycogen level in both skeletal muscles and liver increased significantly above the fasted Con level at 4 h after the swimming, but only when either glucose or FD ingestion were performed during the recovery period (p<0.05). The degree of this increase was significantly greater in FD-treated than in glucose-treated animals, particularly in the liver (p<0.05). A similar trend was also observed in the GaSD, but not in the soleus muscles.

CONCLUSIONS: These results suggest that FD supplementation will be an effective method for enhancing post-exercise glycogen restoration in both skeletal muscle and liver.
Non-steroidal anti-inflammatory drugs are often perceived as performance enhancing due to their anti-inflammatory and analgesic effects. However, these drugs are known to cause gastrointestinal (GI) damage and alter cardiovascular function, which could be detrimental to the initial adaptive responses following heavy exercise. PURPOSE: To determine what factors contribute to college students’ perceptions related to their own use of OPKs and how perceptions are influenced by a brief education intervention. METHODS: 234 college students (213.3 ± 70.7 years old; 70% female) completed three separate questionnaires. After responding to demographic questions, participants replied to Likert-style statements regarding responsible use of prescription opioids after being asked to imagine themselves in a situation where they had become injured and prescribed OPKs. The questionnaire was completed a second time after hearing an educational intervention regarding the costs, overdose rates, and OPK alternatives. RESULTS: Initially, females disagreed more strongly than males regarding the sharing of OPKs (t = -3.15, p = .002). Compared to never-prescribed, students that had previously been prescribed OPKs disagreed more strongly that they would finish their prescription regardless of pain (t = 4.44, p < .001). Those that knew at least one person who was addicted to OPKs, compared to those who did not know an OPK addicted person, were more in favor of prescription monitoring programs (t = -3.19, p = .002). The intervention positively influenced responses to statements regarding taking OPKs without first visiting a doctor, sharing unused OPKs, favorability of OPK monitoring programs, and agreement with doctors describing the risks of OPKs upon prescription (all p < 0.002). Participants were more concerned about the risks of OPKs and agreed more strongly that over-prescription of OPKs is a problem following the intervention (both p < .001). CONCLUSIONS: Gender and OPK exposure influence initial feelings regarding OPKs. A brief low-cost and low-intensive educational intervention appears to have potential for positively influencing college students’ ratings related to responsible OPK usage.

Non-steroidal anti-inflammatory drugs are often perceived as performance enhancing due to their anti-inflammatory and analgesic effects. However, these drugs are known to cause gastrointestinal (GI) damage and alter cardiovascular function, which could be detrimental to performance. PURPOSE: To determine the effects of naproxen on GI distress and performance in hydrated humans cycling in the heat. METHODS: A double-blind, randomized and counterbalanced, cross-over design was utilized. Four trials: 1) placebo and ambient (Control); 2) naproxen and ambient; 3) placebo and heat (ambient); 4) naproxen and heat. Each trial consisted of three 1-hr cycling sessions (60 min warm-up, 30 min cycling, 30 min cool-down). RESULTS: Throughout all trials, there were no statistically significant differences in rate of perceived exertion (RPE). Participants completed the 30 min heat trial at a heart rate (HR) corresponding to 75% VO2max, before completing a 10 min heat trial for maximum distance. Heart rate, rate of perceived exertion (RPE) and GI symptoms were measured throughout cycling. Gastrointestinal symptoms were also assessed pre-, post-, and 24 hrs post-cycling. Fecal occult blood was measured 24 hrs pre- and 24 hrs post-cycling. RESULTS: No statistically significant differences were found between conditions. Max HR was higher during N (177.2 ± 15 bpm) than C (175.7 ± 14.2 bpm) and NH (179.0 ± 18.0 bpm) than H (177.8 ± 18.2 bpm). Mean distance covered was greatest during N (3.3 ± 0.8 miles) and lowest in NH (2.8 ± 0.8 mile). During exercise, GI symptoms occurred in 64% of all trials (C = 82%, N = 73%, H = 45%, and NH = 55%). At 3 hrs post-exercise, C experienced more frequent and serious upper, lower, and systemic GI symptoms than any other condition. Compared to other trials, H experienced higher GI symptoms more frequently. Con: Although naproxen did not significantly affect performance or GI distress during 90 min of exercise in the heat, a possible negative interaction between naproxen and heat stress may exist, as indicated by higher max HR and lower distance during NH, which warrants further research. Supported by the ACSM Foundation Carl V. Gisolfi Memorial Fund.
Erythropoiesis

Methods: Three studies were conducted. 1) application of 5mg (n=9) or 10 mg (n=7) per day for 5 days, and 2) application of 5mg Co/day for 3 weeks followed by a 3-week wash-out period (n=16). In all studies a low dose Co application on red cell production.

Results: There was no improvement in maximal oxygen uptake (running VO2max) or maximal power output (cycling watts) with Co supplementation. Interestingly, subjects in the AX group showed a significant ~10% lower average heart rate at submaximal running intensities (aerobic threshold, AeT; AX 130±17 v. PL 154±14; and anaerobic threshold, AT; AX 139±20 v. PL 154±11, p<0.05) compared to placebo. CONCLUSIONS: Supplementation with 12mg/day of AX for 8 weeks reduced running heart rate at submaximal endurance intensities (AeT & AT), but not at higher “peak” intensities. These data confirm earlier reports suggesting that AX may be a beneficial ergogenic aid for long/ultra-distance endurance athletes, but not necessarily for athletes competing in shorter higher intensity efforts. In addition, these data are also suggestive of a general “cardiotonic” effect of AX, that should be investigated in non-athletic populations including elderly subjects and those with cardiac complications including post-myocardial infarction, heart failure, stasis usage, mitochondrial dysfunction, chronic fatigue, and related conditions.

3300 Board #205 June 2 3:30 PM - 5:00 PM

Effect Of Low Dose Cobalt Administration On Erythropoiesis

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Previous research relating to Alpha-GPC supplementation and physical performance has been limited to researching Alpha-GPC as a single ingredient supplement. Further research is needed to investigate the effect of Alpha-GPC in combination with other ergogenic ingredients on physical performance. Purpose: The purpose of this study was to investigate the acute effect of a supplement on physical performance in Division 2 football players. Methods: 14 male Division 2 football players (20.4 ± 3.1 years) participated in a 4-week blinding crossover experiment separated by at least 7 days. Subjects were given either supplement or placebo 60 minutes prior to testing. Using polyphenol-based soap might attenuate the activities of serum CK and the scores of fatigue. Fifteen minutes after blood sampling, isotonic smart gel (3302 Board #206 June 2 3:30 PM - 5:00 PM

Effect Of an Alpha-GPC Supplement on Physical Performance in Division 2 Football Players

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3303 Board #208  
June 2 3:30 PM - 5:00 PM  

dietary Anti-oxidant Cocktail Supplementation Against Metabolic And Functional Alterations Induced By Physical Inactivity In Humans  
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PURPOSE: Recent studies showed several nutrients taken individually, i.e. resveratrol, quercetin, α-3 fatty acids, vitamins and others, partially prevent metabolic alterations induced by physical inactivity. We hypothesized additive effects will be obtained when these nutrients are taken as a cocktail. In a pilot study, we tested the efficacy of such a cocktail, composed of polyphenols (530mg/d), α-3 (2.1g/d), selenium (80ug/d) and vitamin E (160mg/d) during 20 days of enforced physical inactivity coupled during the last 10 days with fructose supplementation (3.5g/kg/d) to trigger metabolic deterioration. METHODS: Twenty healthy active (14000 steps/d measured by accelerometer) young men, randomized in a control (n=10) and a cocktail supplemented group (n=10), were asked to stop exercise and reduce their daily physical activities (2800 steps/d). Body composition, glucose tolerance, substrate oxidation, blood anti-oxidant capacities and v. Lactate muscle biopsies were assessed before and after intervention. Analyses used linear mixed models taking into account repeated measures. RESULTS: Twenty days of deconditioning reduced by 20% total and type 2 myosin heavy chain cross sectional area in the control group that was prevented in the supplemented group (P=0.01 for both). While insulin sensitivity was only modestly affected in the two groups, plasma adiponectin was higher in the supplemented than in the control group at the end of the intervention (P=0.05). The supplementation counteracted the increase in fasting plasma triglycerides (P<0.02) and HDL (P=0.001) induced by reduced activity, was associated with greater fat oxidation (P<0.02) and higher muscle FATPI cell protein content. The supplemented group had higher blood anti-oxidant capacities (P<0.01). CONCLUSION: These results are very promising as they can have a number of scientific and clinical implications for both the general sedentary populations and hospitalized bed-rested patients.

3304 Board #209  
June 2 3:30 PM - 5:00 PM  
Folic Acid-layered Double Hydroxide (LDH) Nanoparticles To Improve Endurance Capacity In Mice  
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(No relationships reported)

PURPOSE: Folic acid possesses a significant antioxidant effect and reduces oxidative stress. Folic acid-layered double hydroxides (LDH) nanoparticles have been successfully prepared in our previous study. In this study, we determined whether folic acid-LDH nanoparticles could improve the endurance capacity in mice, the increase the anti-fatigue and anti-oxidation effect. METHODS: Sixty mice were randomly divided into six groups with ten mice each: two control groups, two folic acid treatment groups, and two folic acid-LDH treatment groups. Endurance was measured on a treadmill enclosed in a plexiglass chamber that was outfitted with a shock grid at the rear of the belt to keep the animal running during the test. For the folic acid, folic acid-LDH and control mice groups, the speed was first set at 15 m/min with a 5 minute. The speed then was gradually increased from 15 to 24.6 m/min and was maintained at 24.6 m/min until exhaustion. The creatine kinase (CK) and lactate dehydrogenase (LDH) activities in blood were determined using commercial diagnostic kits. The antioxidant enzymes superoxide dismutase (SOD), catalase (CAT) /glutathione peroxidase (GSH-Px) and activities were determined using assay kits. RESULTS: In the treadmill test, folic acid-LDH treated mice could prolonged the running time by 25% and 49% compared to folic acid and control groups, respectively. Additionally, plasma creatine kinase (CK) levels of exhausted mice were significantly lower in the folic acid-LDH group than in the other groups. The lactate dehydrogenase (LDH) level of mice was significantly increased for folic acid-LDH mice (P<0.05). It also improved the endogenous cellular antioxidant enzymes in mice by increasing the activities of SOD, CAT and GSH-Px. Therefore, folic acid-LDH nanoparticles could significantly improve the endurance capacity in mice; it also can alleviate fatigue of the mice. CONCLUSION: These results imply that folic acid-LDH antioxidant system increases the endurance capacity and facilitates recovery from fatigue. It might be used as a novel antioxidant and anti-fatigue sports nutritional supplement. Future work will focus on the study of antioxidant and anti-fatigue mechanisms at the molecular level.

3305 Board #210  
June 2 3:30 PM - 5:00 PM  
Effects Of Calcium & Magnesium Lactate Supplementation On Vo2peak & OBLA  
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Professional and recreational athletes use nutritional ergogenic aids to enhance aerobic performance, facilitate training adaptations, and reduce exercise recovery time. While the use of sodium bicarbonate and beta alanine as ergogenic aids have been investigated extensively, support for the use of calcium and magnesium lactate supplementation to improve aerobic performance has been mixed. To the best of our knowledge, the effectiveness of calcium and magnesium lactate supplementation on aerobic performance markers (i.e., VO2peak and the onset blood lactate accumulation) has not been investigated. PURPOSE: The purpose of this study was to examine the effect of calcium and magnesium lactate supplementation on VO2peak and the onset blood lactate accumulation (OBLA) METHODS: Eighteen healthy individuals (24±5 yrs) participated in a double-blind, placebo controlled study and randomly assigned to one of 2 groups: placebo (PLA, n=8), or supplement, SUP, (n=10). Prior to and following supplementation, participants performed a graded exercise test on a cycle ergometer to volitional failure. VO2peak, time to exhaustion (TTE), OBLA power, heart rate (HR) at OBLA, VO2 at OBLA, and rating of perceived exertion (RPE) at OBLA were determined. 2×2 mixed repeated measures analysis of variance (ANOVA) procedures were performed to determine differences in group and time. RESULTS: There were no significant differences between PLA and SUP in direct markers of aerobic performance (all P>0.05; Table 1). CONCLUSION: Lactate supplementation did not present an advantage over a placebo in improving aerobic performance in healthy individuals. The results from this study support those by previous investigators suggesting that there is no physiological rationale for using lactate supplementation to improve performance. Consequently, athletes should explore the use of alternative and/ or well-established forms of ergogenic aids to extend the limits of sports performance.

3306 Board #211  
June 2 3:30 PM - 5:00 PM  
Astaxanthin Formulation Increases Muscle Strength and Endurance Increases Beyond High Intensity Training in Elderly Subjects  
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Purpose: Reduced muscle strength and endurance is strongly associated with functional decline in older adults. We conducted a randomized, double-blind, placebo-controlled trial of the impact of daily oral astaxanthin treatment with high intensity interval training (HIIT) in the elderly. Astaxanthin is a natural product that combined with vitamin E has both anti-inflammatory and anti-oxidant properties that may improve muscle adaptation to exercise training in the elderly. Methods: Healthy males and females (n=44), age 65-82 yrs, undertook 3 months (3x/week for 30 min) of HIIT using an incline treadmill protocol (target 85% HRmax). Participants were randomly assigned to formulation (astaxanthin; 12 mg/day and vitamin E; 10 mg/day) or placebo groups. Tibialis anterior muscle (TA) strength and endurance were measured in an exercise tolerance test to fatigue using dorsiflexion exercise. Treadmill and 6-minute walking tests were also performed. Results: TA muscle maximal force (MVC) increased by 11% only in the astaxanthin group (Δ8.7±4.0 N mean±SEM, P=0.029). Improvement in TA exercise endurance were found only in the supplemented group as measured by an increase in total contractions of 46% (Δ192±79 contractions, P=0.015) and in total force generated by 28% in the exercise test (Δ17.2±8.6 N, P=0.004). Significant improvements in treadmill exercise time, exercise efficiency, VO2peak (Balke method), and reduced respiratory exchange ratio in addition to greater 6 minute walking distance were observed in both groups (P=0.025 for all). Conclusion: In healthy elderly, astaxanthin improved TA muscle strength and endurance with HIIT significantly more than placebo. These results suggest that the anti-inflammatory and anti-oxidant properties of astaxanthin formulation enhance training adaptations in elderly subjects. An important impact of these findings is the potential to improve exercise tolerance with less frequent or intense training in elderly subjects. Supported by AstaMed NIH/NIA T32 AG000057.
Aging is associated with increases in oxidative stress. Redox imbalance occurs when production of reactive oxygen species (ROS) exceeds the capacity of antioxidant enzymes to eliminate ROS. Increased levels of intracellular ROS can compromise proteostasis by causing irreversible damage to proteins. The transcription factor nuclear factor erythroid-derived 2-like 2 (Nrf2) mediates the cellular endogenous antioxidant defense system by regulating antioxidant enzymes that are cytoprotective against ROS. Nrf2 can be activated phychochemically through the supplement Protandim. Previous work from our lab has demonstrated that a phychochemical based Nrf2 activator improves proteostasis in skeletal muscle in vivo. Recently, we have begun to characterize a second generation Nrf2 activator (PB125) that has increased anti-inflammatory action in addition to anti-oxidative properties. Since inflammation can blunt protein synthetic responses, we speculated that PB125 might provide additional benefits on proteostatic processes. PURPOSE: The purpose of the present study was to examine in vivo the effects of three different doses (10, 100, and 300 ppm) of PB125 supplementation on Nrf2 activation and proteostasis. METHODS: 60 male C57BL6 mice aged 10-11 months were assigned to diets containing low, medium, or high doses of product PB125 in a 5 week feeding study. Mice were isotopically labeled with 8% deuterium oxide (D2O) to simultaneously measure protein and DNA fractional synthesis rates (FSR) in liver, heart, and skeletal muscle. Nrf2 activation was assessed through analysis of gene expression profiles via Affymetrix GeneChip microarray. RESULTS: Proteostatic mechanisms were increased in the liver mitochondria fraction in the 10 ppm treatment group (18.9 vs 16.3 FSR%/day, p<0.05). However, there were no differences in proteostatic mechanisms in heart or skeletal muscle. Nrf2 activation was assessed through analysis of gene expression profiles via Affymetrix GeneChip microarray. RESULTS: Proteostatic mechanisms were increased in the liver mitochondria fraction in the 10 ppm treatment group (18.9 vs 16.3 FSR%/day, p<0.05). However, there were no differences in proteostatic mechanisms in heart or skeletal muscle. Nrf2 activation was assessed through analysis of gene expression profiles via Affymetrix GeneChip microarray. RESULTS: Proteostatic mechanisms were increased in the liver mitochondria fraction in the 10 ppm treatment group (18.9 vs 16.3 FSR%/day, p<0.05). However, there were no differences in proteostatic mechanisms in heart or skeletal muscle. Nrf2 activation was assessed through analysis of gene expression profiles via Affymex...
the skin over the posterior leg muscles. After the contusion, mice were allowed to recover. One mouse was without contusion and was used as a control. Fluorescein isothiocyanate (FITC)-labeled Lycopersicon esculentum lectin was injected into the caudal vein and allowed to circulate for 3 min before sacrifice. Endothelial cells of open and functioning blood vessels were labeled by this lectin for 3 min. Leg muscles were removed, frozen and 3 serial cross-sections (10 µm) were obtained from each specimen using a cryostat. Open and functioning capillaries were detected by immunostaining for lectin from PECAM-1 (CD31) using an adjacent section. The third section was stained with hematoxylin and eosin for histological assessment. Photographs of these sections were carefully compared.

RESULTS: Muscle swelling was observed immediately after contusion. Myofibers were disorganized due to the expansion of intercellular spaces. At 24 h after muscle contusion, disrupted myofibers with infiltrated cells were observed. Some non-flowing capillaries were found within the injured area by immunostaining for lectin from PECAM-1 immediately after contusion to 24 h.

CONCLUSIONS: The present study clearly demonstrated non-flowing capillaries within the injured muscle area after contusion injury for the first time by histochernistry. This method is useful for evaluating microvascular circulation after muscle contusion.

Clinical observations of CO₂ hot spring (CO₂ ≥1000 ppm) immersion revealed the effects, such as an immersed part reddening, skin blood flow improvements, blood catecholamine decrease, etc. In response to the CO₂-water bath, the reduction of sympathetic nerve activity may imply the facilitation of muscle fatigue recovery.

METHODS: We investigated whether the immune responses influencing agonist muscles into artificially made high concentration CO₂-water (CO₂≥1000 ppm) influences recovery of muscle hardness in fatigue after resistance exercise.

METHODS: The healthy male college students (n=11, age; 18-19 yrs, height; 168.6±4.5 cm, weight; 66.2±0.9 kg) participated in this study. The subjects were randomly divided into the CO₂-water foot bath group (n=6) and the tap-water foot bath group (n=5). A laser blood flow in the immersed skin (BF) and electrocardiogram (ECG) were recorded continuously throughout the experiment. The subjects performed 100 times calf raise resistance exercise and immersed lower legs into tap-water or artificial CO₂-water at 35°C for 10 minute after exercise. MG dominant muscle hardness was evaluated using ultrasound real-time tissue elastography and visual analog scale in muscle (VAS) at pre-exercise, immediately after exercise, after 10 min recovery. The strain ratio (SR) between the MG and a reference material was calculated. RESULTS: BF in the CO₂-water foot bath was significantly higher than in the tap-water foot bath (CO₂-water vs. tap-water; 5.7±2.4 vs. 1.5±0.6 mm1/100g1, p<0.05). After 10 min recovery, in the CO₂-water foot bath compared with the tap-water, SR significantly decreased quicker (1.37±0.38 vs. 6.20±0.07, p<0.05). In addition, VAS after 10 min recovery became smaller in the CO₂-water than the tap-water (22±13.5 vs. 38±13.5 mm, p<0.05).

CONCLUSIONS: The present study suggested that high concentration artificial CO₂-water foot bath may contribute to rapid recovery from the high intensity exercise-induced muscle hardness.

Using DT-MRI and 31P-MRS to Assess Muscle Damage Following Unaccustomed Eccentric Exercise

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(No relationships reported)

POUROSE: To detect the muscleulocellular structure and metabolism changes in vivo by diffusion tensor magnetic resonance imaging (DT-MRI) and 13P-Magnetic resonance spectroscopy (13P-MRS) after a single bout of eccentric exercise.

METHODS: Thirty two male Sprague Dawley rats (body weight 238±15g) were randomly divided into either a sham group (n=8) or a downhill running group (n=24). Rats in the downhill running group ran 120 min on treadmill at a speed of 20 m/min at −10 degrees grade. DT-MRI and 13P-MRS were performed in right lower limb at pre-exercise (sham), immediately , 24 hr and 48 hr post-exercise at 7T MR. The MR sequence included RARE T2, T2 Relaxation and EPI-DTI. MRS observational indices included the peak areas of inorganic phosphate concentration (Pi), phosphocreatine concentration (PCr) and the ratio of Pi/Pcr. The morphological changes were confirmed by histological and immunohistochemical methods. One-way ANOVAs and Tukey's test were used to assess the differences among different time points.

RESULTS: On diffusion tensor tractography images, a single bout of downhill running significantly disrupted muscle fibber structure. The peak areas of Pi were significantly higher after pre-exercise (4.1±0.8 mM; 0 hr post-exercise: 4.7±1.4 mM; 24 hr post-exercise: 6.6±1.9 mM; 48 hr post-exercise: 6.1±1.7 mM, all P<0.01). Muscle Pi/Pc did not differ between the sham group and post-exercise, sequentially. Pi Cr values were significantly higher following EIMD (pre: 0.14±0.05; 0 hr post: 0.18±0.05; 24th post:0.22±0.08; 48h post: 0.2±0.08; all P<0.05). According to the histological detection, Z-band streaming was higher post-exercise compared with baseline (all P<0.05). The histopathological indices of damage coincided with changes in DT-MRI parameters of fractional anisotropy and apparent diffusion coefficient.

CONCLUSIONS: The data suggest that exercise-induced muscle damage was accompanied by structural and metabolic alterations in skeletal muscle following a single bout of downhill running. The ability of DT-MRI and 31P-MRS to accurately detect these changes in vivo makes them promising approaches to evaluate skeletal muscle damage after unaccustomed exercise. (This research is supported by the National Natural Science Foundation of China, Grant#: 81301195)

Board #221  June 2 3:30 PM - 5:00 PM
Knee Extensor Strength is Associated with Femoral Cartilage Thickness in Individuals with ACL Reconstruction

Mike N. Vakula, Melissa M. Montgomery, Tyler J. Moffit, Kevin Choe, Derek N. Pamukoff. California State University, Fullerton, Fullerton, CA. (Sponsor: Dr. Lee Brown, FACS)

(No relationships reported)

POUROSE: To (1) determine the relationship between quadriceps function and femoral cartilage morphology in individuals with anterior cruciate ligament reconstruction (ACLR), and (2) compare quadriceps function and femoral cartilage morphology between injured and uninjured limbs.

METHODS: Quadriceps function and femoral cartilage was assessed with unilateral ACLR in 20 subjects (women=15, age= 22.3±3.3years, time since ACLR=44.9±32.8 months). Quadriceps function was assessed using peak isometric knee extension torque (PT) and rate of torque development (RTD) at 45 degrees of knee flexion, and peak isokinetic knee extension torque at 60, 180 and 240°/sec. Femoral cartilage morphology (area and thickness) were obtained via ultrasound imaging at 140° of knee flexion. Partial correlations were used to evaluate the associations between indices of quadriceps function, and cartilage area and thickness accounting for time since reconstruction. Paired samples t-tests were used to evaluate interlimb differences.

RESULTS: The ACLR limb produced smaller isometric peak torque (2.56±0.42 vs. 2.75±0.30 Nm/kg, p=0.04), slower isometric rate of torque development (38.12±13.27 vs. 43.14±12.13 Nm/kg/s, p=0.03), and isokinetic knee extension torque at 60°/sec (2.38±0.54 vs. 2.80±0.63 Nm/kg, p<0.01) compared to the uninjured limb.
No differences were found in isokinetic peak torque at 180 or 240°/sec (p=0.06 and 0.60, respectively). After accounting for time since ACLR, a positive association was found between isometric peak torque and medial femoral cartilage thickness (r=0.41, p=0.04).

CONCLUSIONS: The ACLR limb demonstrated deficits in quadriceps function. We found a moderate association between isometric peak torque and medial femoral cartilage thickness. Our results suggest that restoring quadriceps strength may delay femoral cartilage thinning following ACLR.

Background: Work-related musculoskeletal disorders (WMSDs) are significant problems in the workplace that are extremely costly to employers, employees, and society. One of the most common symptoms of WMSDs is musculoskeletal pain which has been associated with detrimental effects to health behaviors including a decrease in physical activity levels. Lower levels of physical activity have been associated with elevated levels of obesity which increases the risk for the negative health consequences associated with a higher BMI.

Purpose: To compare the prevalence of obesity, musculoskeletal pain, and the difficulty to engage in physical activity of Correctional Officers (COs) to the U.S. adult general population at two time points. Furthermore, to explore the associations between musculoskeletal pain and health behaviors amongst COs.

Design: Seventy-seven Correctional Officers from two maximum security correctional facilities in the Northeastern United States were enrolled in the study. The health profiles (musculoskeletal pain, difficulty to engage in physical activity, and BMI characteristics) of participants were collected at two time points (Time 1 (2011) and Time 2 (2013)) and compared to the U.S. adult general population. The health profiles of COs were also used to investigate associations between musculoskeletal pain and the difficulty to engage in physical activity at two time points. Also to explore the musculoskeletal pain at Time 1 predicts the difficulty to engage in physical activity at Time 2.

Results: Correctional employees exhibited a significantly higher prevalence of overweight and obesity, musculoskeletal pain, and difficulty to engage in physical activity than the U.S. adult general population at both time points (p<0.05). Musculoskeletal pain was also associated with a difficulty to engage in physical activity at both time points (p<0.05). Musculoskeletal pain was predictive of the future difficulty to engage in physical activity (p<0.05).

Conclusions: As a result of the musculoskeletal pain, COs report difficulties to engage in physical activity than the U.S. adult general population. Musculoskeletal pain is associated with a higher BMI.

Purpose: The purpose of the study was to determine if resistance training postural exercises (RTPE), stretches, and self-myofascial release (SMR) could be used to counteract the protracted shoulder imbalance and improve the overall health of the upper extremity. Methods: Initial meetings included goal setting and fitness screening. Subject characteristics include: Height~ 1.74m, Body Mass=65kg, BMI=22.4, Resting HR=68bpm, Resting BP= 115/70mmHg and FMS shoulder mobility of left arm grade III and right arm grade II. The program included RTPE, stretching, and hand/wrist training. After each workout specific exercises, stretches and/or SMR modalities were performed to target her upper back and pectoral area to help with shoulder girdle imbalances. Pre- and posttest measures included assisted push-ups, curl ups, and self-awareness of back pain. Results: Molly’s upper body strength increased from 19 assisted pushups to 35, Curl-ups improved from 23 to 42. Improved alignment of her shoulders were observed in an axillary line with her ear and superior iliac crest. Additionally, she reported changes that included: an increase in overall mood, more energy, reduced upper back pain, improvement in body image and fewer aches throughout the day. Conclusion: An 8-week training program consisting of resistance training and specific postural exercises can effectively improve posture and decrease upper back pain. Through a multimodal approach, including strengthening and lengthening of muscles and tendons, posture can be improved which may lead to a decrease in pain.

Purpose: The number of primary anterior cruciate ligament (ACL) reconstructions has increased in parallel with graft failures, with a resultant effect on revision surgery. Primary ACL reconstruction is successful for most patients, but some have had persistent giving-way symptoms and recurrent ruptures, such that revision surgery is required. Knee strength deficits are among the consequences of muscle weakness after ACL reconstruction. This study compared knee strength and stability in primary and revision ACL reconstruction.

Methods: This was a cross-sectional study with a total of 78 participants, in whom 38 revision surgeries were performed at a single hospital between April 2013 and May 2016. All revision reconstructions used tibialis anterior tendon allografts. Forty primary ACL reconstructions using double-looped semitendinosus and gracilis autografts. Knee strength and stability results were compared in primary and revision ACL reconstruction. All participants were measured with an isokinetic device to assess the main outcome of knee strength; a KT-2000 arthrometer was used to measure anterior laxity. Knee function status was evaluated using International Knee Documentation Committee and Lysholm scores. Knee strength and stability results were compared for primary and revision ACL at 12 months postoperatively.

Results: The study results with revision surgery were inferior to those with primary reconstruction (1.5±1.1 mm vs. 2.6±1.5 mm: p = .001). However, there were no significant differences in knee extensor deficits at 60°/sec or 180°/sec (respectively, no significant differences in knee extensor deficits at 60°/sec or 180°/sec (respectively), respectively, respectively).
No indication of muscle damage is evident after 30 or 60 low-intensity (10%) of maximal voluntary isometric contraction strength (MVC) eccentric contractions (LIEC) of the elbow flexors (EF, Chen et al., 2012) or the knee flexors and extensors (Chen et al., 2013, 2015). Nosaka & Newton (2002) reported that a large number of LIEC of the EF (lowering a dumbbell of 9% MVC 1800 times) resulted in significant changes in MVC torque, range of motion (ROM), upper arm circumference, muscle soreness (SQR) and plasma creatinine kinase (CK) activity lasting for 4 days post-exercise. It appears that LIEC induce muscle damage when the number of contractions exceeds a certain level, but the level has not been determined. PURPOSE: This study investigated the threshold number of LIEC of EF resulting in significant changes in indirect muscle damage markers. METHODS: A pilot study showed no indication of muscle damage after 480 LIEC, but muscle damage markers changed significantly after 960 LIEC. Thus, the present study focused the number of contractions between 600 and 960. Fifty-two young men who had not performed resistance training were recruited and assigned randomly to one of the four groups (n=13 per group) based on the number of LIEC performed in the exercise in which a dumbbell set at 10% was lowered repeatedly either 600, 720, 840 or 960 times by the non-dominant arm. Maximal voluntary concentric contraction torque (MVC-CON), ROM, SQR, CK activity and echo-intensity (EI) were measured before, immediately after and for 5 days post-exercise, and their changes were compared among the groups. RESULTS: The 600, 720 and 840 groups showed significant (P<0.05) decreases in MVC-CON (8-10%), and ROM (2-3%) immediately post-exercise only, without changes in SQR, CK and EI. All variables changed (P<0.05) for the 960 group (peak change, MVC-CON: -18%, ROM: 3%, SQR: 20 mm, CK: 410%, EI: 8%) lasting for 3-4 days post-exercise. CONCLUSIONS: These results show that no muscle damage is induced when the number of LIEC is less than 840. It is interesting to investigate further what changed between 840 and 960 contractions to make the muscles susceptible to muscle damage. Supported by MOST, TAIWAN (MOST105-2410-H-003-052-MY3).

PURPOSE: The purpose of these pilot studies is to validate PCR primer sets intended to describe mitochondrial damage-associated molecular patterns (mtDAMPs), which influence the immune systems in human plasma samples. mtDNA was amplified via thermocycling in routine endpoint PCR, and visualized on 1.5% agarose-EtBr gels. Amplicons of the mtDNA primer sets were similarly assessed. RESULTS: Pilot endpoint PCR studies of 3 candidate housekeeping genes (one primer set for beta-actin, and two distinct GAPDH primer sets) indicate that a specific GAPDH primer set provides data which are unaffected by marathon participation, and also indicate that the pattern of these data is consistent among individuals. Additionally, endpoint PCR validated the mtDNA primer sets. CONCLUSIONS: These pilot studies validated the following human primer sets: Housekeeping gene—GAPDH; cytochrome B; cytochrome C; oxidase subunit III; NADH dehydrogenase. Supported by the WSSU Research Initiation Program.
significantly higher in HIJ group at 0 hour (C1W vs. HIJ, P<0.05). MMP-1 mRNA expression reached peak value at the 6 hour (C1W:12.0±3.7, HIJ:13.3±5.78 vs. CON:9.9±0.9, P<0.01), and significantly higher in HIJ group at 0 hour in joint (C1W:1.40±0.70 vs. HIJ:7.8±1.18, P<0.05). COX-2 mRNA expression reached peak value at the 0 hour (C1W:7.5±2.01, HIJ: 18.02±4.17 vs. CON:7.8±0.29, P<0.01), and significantly higher in HIJ group at 0 hour and 6 hour (C1W vs. HIJ, P<0.01).

Conclusion: The CWI treatment transiently reduces the inflammation factors, MMP-1 and COX-2 releasing in patellar tendon after exercise.

3323 Board #228 June 2 3:30 PM - 5:00 PM
Altered Joint Loading Affects Cartilage Degeneration and Limb Function in Rats following Knee Meniscal Transsection

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(No relationships reported)

PURPOSE: Either reduced or elevated joint loading has been associated with post-traumatic osteoarthritis (OA); however, which altered loading condition may be more detrimental to cartilage health post-injury remains unknown. This study examined the effects of reduced and elevated joint loading on cartilage degeneration, knee locomotion kinematics, and degree of voluntary activity in rats following medial meniscal transsection (MMT).

METHODS: A total of 22 male Lewis rats (weight: 304 ± 57 gm) underwent MMT in their left hind-limbs and were assigned to one of the three conditions: 1) regular loading (N = 7), 2) reduced loading via hind-limb immobilization (N = 8), or 3) elevated loading via daily treadmill running (N = 7). A sham surgery was performed in 7 separate rats. Rats were evaluated pre-MMT and 8 weeks post-MMT for the amount of voluntary daily run time/distance on a running wheel and hind-limb joint kinematics during treadmill locomotion (speed: 30 m/min) using a 3D X-ray motion analysis.

RESULTS: When compared to the elevated-loading group at the 8th week post-MMT, the reduced-loading group demonstrated a greater reduction in voluntary run time (47.7 ± 46.8 vs. 18.0 ± 69.9, P = 0.043) and distance (57.2 ± 38.3 % vs. 19.7 ± 81.2 %, P = 0.029). Cartilage data from 4 rats per group indicated that the elevated-loading group had the greatest lesion/ exposed bone area and subchondral bone volume (0.50 ± 0.35 um2 and 1.16 ± 0.24 mm2, respectively), followed by the regular-loading rats (0.43 ± 0.19 um2 and 1.06 ± 0.22 mm2) and reduced-loading rats (0.14 ± 0.17 um2 and 0.97 ± 0.03 mm2). All three MMT groups demonstrated a more extended knee position (by about 8-18°) at mid-stance during locomotion when compared to the sham rats.

CONCLUSIONS: Our current findings suggest that while elevating joint loading (via treadmill running) exacerbates post-traumatic OA, reducing joint loading (via joint immobilization) may delay OA progression in MMT rats. However, the difference in cartilage degeneration among different loading conditions may not correlate with the behavior changes in voluntary activity and knee locomotion kinematics.

3324 Board #229 June 2 3:30 PM - 5:00 PM
Prevalence of Joint Pain Before and After Bariatric Surgery and Impact on Physical Activity

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(No relationships reported)

Consistent physical activity (PA) is one of the strongest predictors of successful long-term weight loss maintenance. However, joint pain is common among severely obese patients and is a significant barrier to regular PA. PURPOSE: Our data was to compare the prevalence of hip, knee, and back/other pain before and after bariatric surgery and explore interrelationships among joint pain, BMI, and PA. METHODS: Data were drawn from a convenience sample of adults undergoing bariatric surgery at an urban academic center. In a phone survey, participants reported whether they had experienced knee, hip, and/or back/other pain prior to surgery, and changes in joint pain post-surgery. We compared BMI and PA by pain status (improved vs. same/worse) using t-tests and chi-square. RESULTS: The 285 participants had undergone surgery a mean (SD) of 10 (3) years earlier. At follow up [FU], participants had an average age of 51 (10), BMI of 34.4 (8.4), and change in BMI of -19.0 (9.4); 191 (68%) had a BMI>30. Prior to surgery, 21-45% reported joint pain; at FU, 123 (43%) reported no pain; 80 (28%); 66 (23%); and 16 (6%) reported pain in 1, 2, or 3 joint regions, and 62 (22%) were on NSAIDs or analgesics. Participants who reported having less joint pain had greater reductions in BMI, and a significantly larger proportion reported being more active than prior to surgery (Table 1). Those with improved knee and back pain were also more likely to meet recommended PA guidelines. CONCLUSION: Joint pain was common among bariatric surgery patients and had improved in 34-40% even 10 years later. Improvements in pain were associated with greater reductions in BMI, greater likelihood of being more active, and of meeting PA guidelines. For the >60% with similar/worse joint pain, effective pain management strategies may be needed to facilitate reaching PA goals.

3325 Board #230 June 2 3:30 PM - 5:00 PM
Cartilage And Subchondral Bone Histomorphometry In Osteoarthritis Knee.

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(No relationships reported)

Importance of subchondral bone in the pathogenesis and management of osteoarthritis retain recently the interest of both clinicians and researchers community. In fact, the integrity of articular cartilage relies on subchondral bone to provide mechanical support and nutrition supply. Herein, we investigated the relation between bone and cartilage structures and the vascular supply in human knee OA. METHODS: 37 osteoarthritic tibial plateaux were collected after a total knee replacement surgery. Samples from macroscopically different ICRS grades were prepared from tibia plateaux. Samples were scanned using the micro-computed tomography at 10μm resolution (Skyscan 1072, Bruker), projections were reconstructed using the medical software. A manual segmentation has been performed on each sample to separate subchondral from trabecular bone and microarchitectural analysis was performed. The same samples were processed for histology, decalcified in 14% EDTA, sectioned into 4um slices, coloured with HES and scored into 6 groups, based on histological OARSI grades. Subchondral bone volume fraction, trabecular thickness , spacing , and number were positively correlated OARSI grades. Also, blood vessels spacing , and number were positively correlated OARSI grades.

3326 Board #231 June 2 3:30 PM - 5:00 PM
Early Unloading and Loading Exercises for Preventing Posttraumatic Osteoarthritis after Anterior Cruciate Ligament Injury

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(No relationships reported)

How to prevent posttraumatic osteoarthritis remains controversial. However, a suitable unloading and/or loading exercise offers stimulus to reduce articular joint inflammation.
and facilitate cartilage regeneration. Continuous passive motion (CPM) and active treadmill exercise (TRE) have been shown to increase cartilage repair in knee stability condition. PURPOSE: To understand the protective effects of early unloading CPM, and loading TRE after ACLR. METHODS: Sixteen adult New Zealand White male rabbits were studied and randomly assigned to two groups: (I) CPM group, rabbits performed the CPM exercise for continuously 7 days post ACLT. (II) TRE group, rabbits performed active treadmill exercise at the third week for two weeks after ACLT. All animals received the ACL transection of right knee. Left knee was for the sham group. All animals sacrificed at 4 weeks after surgery. All knees were taken out for whole knee evaluations including gross appearance, histology, and OA quantitative scores as well as inflammatory reactions. RESULTS: Regarding gross appearance, the TRE group had more obvious cartilage abrasion than the CPM group. The CPM group demonstrated the better cartilage smooth than the TRE group. The total OA scores in the TRE group (13.14) were significantly higher than the CPM group (7.88) (p<.01). Regarding histological aspect, the TRE group showed the more severe cartilage degeneration, while the CPM group showed no degeneration status. On the basis of H&E and Alcian blue stainings, the TRE group showed much cell disorganized, decreased of cartilage cells, and decreased of GAG. In contrast, CPM had smoother surface of cartilage, retained GAG, cell density and oriented arrangement of chondrocyte, indicating protecting articular cartilage. We also found that the CPM group had the least TNF-α and caspase-3, suggesting anti-inflammation and sound chondrocyte growth. However, the TRE group had the significantly increased TNF-α and caspase-3 (p<.01), particularly in superficial and middle layers of the cartilage. CONCLUSION: CPM in the early stage after ACL injury provides the protection of cartilage. In contrast, active treadmill exercise may lead to osteoarthritis. CPM after acute ACL injury for short-term arthritic cartilage protection is beneficial, while TRE should be judiciously applied.

3327 Board #232 Abstract Withdrawn

F-61 Free Communication/Poster - Musculoskeletal
Friday, June 2, 2017, 1:00 PM - 6:00 PM
Room: Hall F

3328 Board #233 June 2 2:00 PM - 3:30 PM
Rock Climbers’ Utilization Of Healthcare In The Management Of Hand Injuries
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(Purpose reported)

PURPOSE: Examine rock climbers’ behaviors and perspectives on utilizing healthcare systems for climbing-related hand injuries. METHODS: Participants meeting inclusion criteria were identified at seven climbing locations in the Rocky Mountain and Sierra Nevada ranges. Qualitative data was collected via recorded and transcribed semi-structured interviews. Participants were asked about their healthcare utilization and outcomes for each climbing related hand injury. RESULTS: Twenty-eight climbers were interviewed, with a lifetime injury burden of 88 climbing specific hand injuries. Forty-six injuries occurred when climbers had hand insurance. Of those, 78% did not see healthcare professionals. Rationales for not seeking care included (1) trusting one’s own and peers’ knowledge, (2) trusting health insurance. Of those, 78% did not see healthcare professionals. Rationales for not seeking care included (1) trusting one’s own and peers’ knowledge, (2) trusting health insurance. Of those, 78% did not see healthcare professionals. 

3329 Board #234 June 2 2:00 PM - 3:30 PM
Effects of Athletic Tape, Leukotape P, and Prophylactic Bracing During a Dynamic Postural Control Test
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(No relationships reported)

Context: Athletic tape (AT), leukotape P (LEU), and prophylactic ankle bracing (BR) are commonly used in sport activity where dynamic postural control is important in optimal performance. The relationship between balance and these different types of tape and bracing have not been extensively studied. Purpose: The purpose of this study was to examine the effect of no intervention (NO), AT, LEU, and BR on modified Star Excursion Balance Test (SEBT) reach distance. Participants: Twenty-four healthy volunteers (9 males, 15 females; age: 22.13 ± 2.37 years; height: 164.99 ±8.71 cm; mass: 70.06 ± 12.42 kg) who were self-reported recreationally active and have not experienced a lower extremity injury in the past six months participated. Methods: NO, AT, LEU, and BR were applied during four randomized trials. Reach distance during a modified SEBT were recorded for individual directions and as composite scores for each leg and standardized by leg length. Results: One-way repeated measures ANOVA showed a significance F omnibus value between type of tape and reach distance for right composite score, F(3, 20) = 10.071, p = .000, right anterior reach F(3, 21) = 7.082, p = .002, and left anterior reach F(3, 21) = 6.231 p = .003. Post hoc comparisons revealed that AT condition had significantly less right composite score compared to LEU condition; t(22) = 3.85, p = .001 and BR condition; t(22) = 4.12, p = .000. Right anterior reach for AT condition was less than NO, t(23) = 4.179, p = .000 and BR condition), t(23) = 3.045, p = .006. Left anterior reach for AT was also less compared to NO, t(23) = 4.579, p = .000; and LEU; t(23) = 3.690, p = .001. Conclusion: AT is often used to address ankle instability, however it may limit dynamic postural control stability. Using other tape or braces may exhibit the same stabilizing effect without impeding dynamic postural control.

3330 Board #235 June 2 2:00 PM - 3:30 PM
Effect of Cold Water Immersion or Contrast Water Therapy on Muscle Soreness After Exercise
Christine Lauber, Shelby Hickle, Jordyn Jargstorf, Casey West. University of Indianapolis, Indianapolis, IN. (Sponsor: Matthew Beckley, FACSM).
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(No relationships reported)

Sponsor: Matthew Beckley, FACSM; matthewbeckley@depauw.edu Tissue damage leads to delayed onset muscle soreness (DOMS), often resulting in pain or discomfort that gradually increases within the first 24 hours post-exercise, and typically peaks at 48 hours post activity. Cold-water immersion (CWI) and contrast water therapy (CWT) are commonly used as interventions for reducing DOMS; however, it remains unclear which treatment is more beneficial. PURPOSE: To determine if post-exercise cold-water immersion decreases muscle soreness compared to contrast water therapy at 48 hours post DOMS inducing exercise. METHODS: Thirty-nine healthy college student volunteers (20 males; 19 females) with ages ranging from 18 to 23 years (M = 20.36, SD = 1.35) agreed to perform 5 sets of 20 drop jumps from a 0.6m box to induce DOMS. Subjects identified perceived muscle soreness on a 11-point (0 = no pain; 10 = most intense pain imaginable) numeric pain rating scale (NPRS) measured at baseline, immediately post exercise, and at 24, 48, 72, and 96 hours post exercise. Subjects were randomly assigned to a CWI (10°C) or CWT (1:1 ratio of 40°C and 10°C) intervention up to the iliac crest for 10 minutes immediately, 24, 48, and 72 hours post-exercise. An independent-samples t-test was used to compare muscle soreness between groups at 48 hours with an alpha level of 0.05 for statistical significance. RESULTS: There was a statistically significant difference in NPRS scores for the CWI (M = 2.90, SD = 1.92) and CWT (M = 4.32, SD = 2.41); F(3, 77) = 2.04, p = 0.049. Interventions at 48 hours. Further, Cohen’s effect size value was d=−0.66. CONCLUSION: CWI significantly decreased muscle soreness compared to CWT 48 hours post DOMS inducing exercise. CWI can be considered superior to CWT to decrease muscle soreness associated with DOMS 48 hours post-exercise. Additionally, the effect size indicates the intervention had a moderate effect. These results add to previous literature indicating CWI is more effective than CWT to decrease muscle soreness associated with DOMS; however, the effect size indicates the intervention had a moderate effect.
Can Weakness in End-Range Plantarflexion after Achilles Repair Be Prevented?

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(No relationships reported)

**Purpose**
Disproportionate end-range plantarflexion weakness, decreased passive stiffness, and inability to perform a heel rise on a decline after Achilles tendon repair, are thought to reflect increased tendon compliance or anatomical tendon lengthening. Since this was first noted, we have performed stronger repairs and avoided stretching into dorsiflexion for the first 12 weeks after surgery. It was hypothesized that these treatment changes would eliminate end-range plantarflexion weakness and normalize passive stiffness.

**Methods**
Achilles repairs with epidural augmentation were performed on 18 patients. Plantarflexion torque, dorsiflexion ROM, passive joint stiffness, and standing single-leg heel rise on a decline were assessed 43±24 months after surgery (range, 9 months-8 years). Maximum isometric plantarflexion torque was measured at 20° and 10° of dorsiflexion, neutral, and 10° and 20° of plantarflexion. Passive dorsiflexion ROM was measured goniometrically. Passive joint stiffness was computed from technical stiffness measurements in passive torque from 10° to 20° of dorsiflexion measured before isometric contractions. Tendon thickness was measured by digital calipers. Plantarflexion EMG was recorded during strength and functional tests. ANOVA and Wilcoxon tests were used to assess weakness and function.

**Results**
Marked weakness was evident on the involved side at 20° plantarflexion (deficit 26±18%; \( p = 0.01 \)) with no weakness at 20° dorsiflexion (deficit 6±17%; \( p = 0.39 \)). Compared to the noninvolved side, dorsiflexion range of motion was decreased 6±8° and tendon thickness was 7±3 mm greater (\( p < 0.001 \)) on the involved side. Passive joint stiffness was similar between the involved and noninvolved sides. Only 3 of 18 patients could perform a decline heel rise on the involved side versus 18 of 18 on the noninvolved side (\( p = 0.01 \)). There was no difference in EMG amplitude between the involved and noninvolved sides during all tests.

**Conclusion**
Normalized passive joint stiffness and reduced dorsiflexion ROM were likely due to a stronger, protected repair. EMG data confirmed that end-range weakness was not due to neural inhibition. Weakness with the plantar flexors in a shortened position may be suggested face mask removal only (keep). Participants were transferred to an ambulance cot which could put pressure on the spinal cord. Coupled with faster time of task, these findings suggest face mask removal only, before transferring patient to an ambulance cot, is preferred.

Previous vitamin D research analyzes the regulation of calcium and phosphate levels, as well as bone mineralization and turnover. Very little is known about vitamin D’s role in the prevention of stress fractures in high level athletes. **PURPOSE:** We aim to investigate vitamin D’s role in the prevention of stress fractures in collegiate athletes. **METHODS:** Prospective: 118 NCAA Division I athletes were recruited from the high risk sports of track and field, cross country, soccer, and basketball. Blood samples were procured in August and February to determine fall and spring baseline 25(OH)D levels. Subjects with serum 25(OH)D <30 ng/ml were supplemented with 50,000 IU of vitamin D3/week for 8 weeks. Treated subjects were re-tested to ensure serum 25(OH)D levels rose to sufficient status. All enrolled subjects were monitored for the development of stress fractures. **RESULTS:** A retrospective chart review of non-supplemented athletes from the same sports team was conducted to determine the incidence of any reported stress fractures. **RESULTS:** Prospective: 112 of the 118 enrolled subjects were tested in August. 61 were of sufficient status (40.2 ng/ml ±8.28) and 51 were either insufficient or deficient (22.7 ng/ml ±4.89). 104 of the 118 enrolled subjects were tested in February. 56 were of sufficient status (40.7 ng/ml ±9.47) and 48 were insufficient or deficient (21.6 ng/ml ±5.87). 2 stress fractures were diagnosed in 118 currently enrolled subjects (1.69%). **Conclusions:** 34 stress fractures were diagnosed in 453 subjects from 01/2010-05/2015 (7.51%). **Conclusions:** In our population, almost half of the tested athletes proved to be vitamin D insufficient or deficient by the current normative value standards. Despite vitamin D supplementation, hypovitaminosis D was prevalent throughout the winter months. With vitamin D supplementation in this particular year, the stress fracture rate in our particular cohort significantly decreased from 7.51% to 1.65% (\( p = 0.009 \)) following vitamin D supplementation.

**A Comparison of Two Equipment Removal and Spinal Restriction Protocols on Cervical Spine and Head Motion during Football Player Stretcher Transfer**

Tyler Melnicove, Jennifer Kalash, Steven Leigh, Montclair State University, Montclair, NJ. (No relationships reported)

Current research suggests full spinal immobilization is not effective and is potentially harmful during the treatment of spinal injuries. EMS agencies nationwide have adopted new spinal motion restriction protocols in response to these findings. However, these protocols do not account for the protective equipment worn by many athletes. Removing protective equipment from an athlete is necessary for treatment but causes potentially harmful motion of the head and spine. Optimal time on task for equipment removal is also unknown. **PURPOSE:** To compare the differences in time and head/neck kinematics when transferring a football player with a scoop stretcher between full and partial equipment removal. **METHODS:** A stratified sample of twenty students representing a football team (20.8 ± 1.7 years; 1.71 ± 0.12 m; 84.0 ± 15.9 kg). Participants were fitted with football equipment and placed supine. EMS spinal restriction protocols were conducted with helmet and shoulder pad removal (remove) and face mask removal only (keep). Participants were transferred to an ambulance cot with a scoop stretcher. Time to completion, linear/angular head, trunk, cervical spine, and helmet motion were measured in 3-D with an electromagnetic motion tracking system. **RESULTS:** Time on task was twice as fast during keep versus removal (42 s vs 78 s, \( p < 0.001 \)). Cumulative cervical flexion was about 40% less (407° vs 571°, \( p = 0.038 \)) and cumulative cervical rotation was about 50% less (246° vs 378°, \( p = 0.026 \)) during keep versus removal. Cumulative linear head motion was about 1.5 times greater (0.15 vs 0.35 m, \( p = 0.018 \)) during keep versus removal. Maximum angular and linear motions were similar between conditions. **CONCLUSIONS:** There was considerable head and neck motion during both removal protocols. Motion was cumulatively greater during full equipment removal. Maximum linear and angular head and neck motion was similar between protocols and any deviation from neutral
CONCLUSIONS: The KOOS has limited measurement capabilities for athletes, as the items do not measure the high end of functional ability. For the KOOS to be clinically applicable to athletes, difficult items should be developed.

INTRODUCTION: Rotational knee laxity is known as an intrinsic risk factor for anterior cruciate ligament (ACL) injury. However, there was no convenient way to measure rotational range of motion (ROM). To this end, we developed the RotorMeter, a simple and non-invasive external device intended to measure rotational ROM of the knee, which we reported to be reliable and valid at the ACSM2016 Annual Meeting. PURPOSE: The purpose of this current study is to use the RotorMeter to clarify the characteristics pertaining to ROM of the knee in healthy subjects under varying conditions.

METHODS: A total of 10 healthy women (20 knees) participated in the study (20.8 ± 1.8 years). Torques of 2.5 Nm, 5 Nm and 7.5 Nm were applied at 90°, 60°, and 30° angles of knee flexion and the examiner’s apprehension of End-Point-Feel (EPF) was used to measure total range of motion using the RotorMeter. One-way ANOVA was used for statistical analysis.

RESULTS: Total (internal + external) ROM of each condition is shown on Figure 1. No laterality was observed at any flexion angle and applied torque. When different torques were applied at the same flexion angle, total rotation significantly increased at all flexion angles with increased torque. Furthermore, with regard to EPF, a significant difference was observed only in comparison with 2.5 Nm. When the same torque was applied at different flexion angles, a significant difference was observed only between 90° and 30° when a torque of 2.5 Nm was applied, whereas when torques of 5 and 7.5 Nm were applied, no significant difference in total rotation was observed at any of the flexion angles.

CONCLUSION: Knee ROM increased when greater torque was applied, but it was not affected by the knee flexion angles during the measurement. This study was supported by a Grant-in Aid Exploratory Research from NUHW (2013-A-30).

Platelet-rich plasma (PRP) is an autologous concentration of human platelets and has been used for treatment of tendon, ligament, and muscle injuries. However, it contains deleterious cytokines and growth factors that can cause fibrosis and inhibit muscle healing. PRP therapy has grown in popularity over the past few years but the effect of the PRP with physical rehabilitation is not clear. PURPOSE: To assess the effect of physical rehabilitation with PRP injection on treatment of hamstring strain injuries. METHODS: Eight physically active males (age 22.7 ± 3.6 yrs) with acute hamstring strain injuries and nine matched controls (age 21.9 ± 2.8 yrs) were recruited as research participants. Approximately 60 mL of blood was drawn from an antecubital venipuncture then centrifuged to approximately 5-6 mL of PRP by a BioMet System. A single dose of PRP was injected into the biceps femoral muscle using ultrasound guidance after 5-7 days of injury and before an 8 wk rehabilitation program. Before and 48 hrs after the PRP injection, the following blood markers were recorded and compared: Vascular endothelial growth factor (VEGF) (0.346 ± 0.182 vs 1.504 ± 0.463 pg/L), platelet-derived growth factor (PDGF) (0.352 ± 0.11 vs 5.721 ± 1.57 pg/L), and Insulin-like Growth Factor-1 (IGF-1) (0.577 ± 0.28 vs 1.013 ± 0.381) (p < 0.05 for all comparisons). Maximal hamstring force (HF) and knee flexion range of motion (ROM) were recorded at the same 8 wk rehabilitation program. RESULTS: There were no significant differences between the PRP and control groups for HF (105.8 ± 3.18 N vs TDC = 0.18). CONCLUSIONS: Using global changes in pro-inflammatory cytokine levels as an indicator of IRI, we found that the effects of PRP on pro-inflammatory cytokine levels were not significant. However, the effects of PRP on anti-inflammatory cytokine levels were significant. Further studies are needed to determine the effects of PRP on muscle regeneration and healing.

Plate rotator related to knee angle and applied torque

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(No relationships reported)

Purpose: The use of tourniquets during total knee arthroplasties (TKA) has been debated given the possibility that prolonged application of a tourniquet may result in ischemia-reperfusion injury (IRI), potentially contributing to post-operative muscle atrophy. The goal of this study was to elucidate the influence that the use of a tourniquet may have on the induction of IRI in muscle tissue following TKA. Methods: 50 patients undergoing TKA were divided into 3 groups: no tourniquet (NoT; n=18), operative tourniquet (OT; n=15), and tourniquet during implant cementation (TDC; n=17). Induction of IRI was evaluated by measuring changes in cytokine concentrations in blood samples collected from an antecubital vein immediately before and after surgery. Pre- to post- surgery changes in cytokine concentrations were compared between groups. Results: Compared to immediately before surgery, cytokine levels generally decreased after surgery in the NoT and OT groups, but increased in the TDC group. Despite these differences, pre- to post- operation changes in IL-1β, IL-10, IFN-γ, IL-7, IL-8, Eotaxin, IP-10, MCP-1, MCP-1, TNF-α, and TNF-α concentrations were not significantly different between groups. However, significant differences were found for IL-12, a pro-inflammatory cytokine (p<0.01). After surgery, IL-12 concentrations decreased in the NoT (pre: 72.8 ± 88.9 pg/mL, post: 41.3 ± 28.6 pg/mL) and OT (pre: 92.1 ± 142.2 pg/mL, post: 82.9 ± 167.4 pg/mL) groups, and increased in the TDC group (pre: 52.0 ± 85.1 pg/mL, post: 63.0 ± 116.7 pg/mL). However, Cohen’s d effect sizes between groups were small (NoT vs OT = 0.08; NoT vs TDC = 0.12; OT vs TDC = 0.38).

CONCLUSIONS: Using global changes in pro-inflammatory cytokine levels as an indicator of IRI, these data suggest that the use of a tourniquet does not significantly contribute
to induction of IRI in TKA surgeries. However, additional studies comparing local plasma cytokine changes near the tourniquet site and utilizing larger sample sizes are necessary to determine if tourniquets should be used in TKA without inducing IRI.

**CONCLUSIONS**

Our study has demonstrated that local rinsing of the wound with an antibacterial solution can significantly reduce the incidence of IRI in patients undergoing TKA.

**Figure 1:** Sensitivity, Specificity, PPV, and NPV of 1.5T and 3.0T MRI

<table>
<thead>
<tr>
<th>MRI Finding</th>
<th>Arthroscopic Finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tear Present (+)</td>
<td>Tear Absent (-)</td>
</tr>
<tr>
<td>47</td>
<td>5</td>
</tr>
<tr>
<td>25</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>72</td>
</tr>
</tbody>
</table>

**Sensitivity:** 65.3%, **Specificity:** 54.5%, **PPV:** 90.4%, **NPV:** 19.4%
CONCLUSION: Quadriceps strength decrement was greater than the hamstring's at first month post-surgery when compared to contralateral limbs' strength. However, quadriceps and hamstring LSI's were found similar at third and sixth months post-surgery which showed quadriceps strength recovered faster than hamstring strength. Although the participants attended a regular ACL neuromuscular training program, their LSI for strength could not reach 90% at 6 months after surgery when patients usually return to sport.

<table>
<thead>
<tr>
<th>First month</th>
<th>Third months</th>
<th>Sixth months</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps (%)</td>
<td>49.35±17.17</td>
<td>79.27±14.97</td>
<td>84.09±12.55</td>
</tr>
<tr>
<td>Hamstring (%)</td>
<td>55.04±12.13</td>
<td>77.87±12.19</td>
<td>85.19±11.29</td>
</tr>
</tbody>
</table>

p value: 0.02 0.62 0.64 Not applicable

RESULTS: Muscle by time interaction was found significant for LSI (f,180=4.43, p=0.01). Quadriceps LSI was lower than hamstring LSI at first month (p=0.02) but no difference was observed between quadriceps and hamstring LSI at third (p=0.62) and sixth months (p=0.64) post-surgery. Both quadriceps and hamstring LSI gradually increased after ACL reconstruction (p<0.001) (Table 1).
of two groups showed that there was no significant difference between two groups (A: 49.2±9.3, p<0.05; B: 54.6±10.9, p=1.09±0.05). Over four-week-exercise period (2nd assessment), A was better than B. There was a significant difference of JOA scores (A: 94.3±3.2, excellent; B: 79.3±6.9, good, p<0.00±0.01). However, the improvement rates of A and B had no significant difference (p<0.26±0.05). Improvement rate—(2nd assessment – 1st assessment)/1st assessment. Conclusion Both active functional training and passive functional training are beneficial to postoperative patients with simple olecranon fractures, but active functional training method is the first choice.

High levels of sedentary behaviour are associated with functional decline, elevated blood pressure, weight gain, and increased risk for metabolic conditions in people with osteoarthritis independent of time spent in moderate-to-vigorous physical activity. While physical activity levels do not change substantially after total knee arthroplasty (TKA), the effects on sedentary behaviour have not been investigated. PURPOSE: To compare sedentary behaviour patterns in people with osteoarthritis awaiting TKA and individuals recovered from TKA. METHODS: Sedentary behaviour was measured with the 7-day Sedentary and Light Intensity Physical Activity Log (SLIPA), the Longitudinal Aging Study Amsterdam Sedentary Behavior Questionnaire (LASA-SB), and 7 day accelerometer (ActiGraph GT3X+, < 100 activity counts/min) in 32 participants awaiting TKA and in 38 individuals one year after TKA (69.9 ± 5.3 SD and 67.9 ± 7.3 yrs of age respectively). T-tests and Mann-Whitney Rank Sum tests were used to detect differences between groups. A one-way RM ANOVA was used to detect differences between measures of sedentary time. RESULTS: There were no differences between pre- and post-operative groups for GT3X+ wear time (13.9 ± 1.1 hours/day vs. 14.4 ± 1.1 respectively, p>0.05), total sedentary time (9.3 ± 1.4 hours/day vs. 9.2 ± 1.4, p>0.05), and number of sedentary bouts/day 30 min in duration (median 3.4 [1.9] IQR vs. 3.1 [2.0], p>0.05). In addition, SLIPA and LASA-SB scores did not differ between groups (p>0.17 and p>0.14 respectively). Measures of sedentary time (combined groups) were all statistically different from one another: GT3X+ 9.2 ± 1.4 hours/day, SLIPA 6.7 ± 2.5 hours/day, LASA-SB 10.3 ± 3.7 hours/day (all comparisons p<0.05). CONCLUSIONS: Self-reported and objective measures of sedentary behaviour do not differ, and are on the wait-list for TKA and one-year recovered from TKA. This suggests that after TKA there is still an increased risk for physical disability and cardiovascular health conditions related to high levels of sedentary behaviour. In addition to promoting increased physical activity after TKA, individuals would benefit from education regarding strategies to reduce sedentary behaviour.

Verbal directions and encouragement are common in exercise testing; however, the verbiage used during each is rarely controlled despite the likelihood it may affect the participant’s performance. PURPOSE: To examine the effects of four variations in verbal encouragement verbiage on isokinetic performance during alternating concentric knee extensions and flexions. METHODS: Fourteen healthy participants (8M, 6F; height = 1.73 ± 0.09 m, mass = 70.0 ± 20.2 kg, age = 24.2 ± 3.9 y.) completed four isokinetic knee extension and flexion testing sessions on a Biodex isokinetic dynamometer. Each session consisted of 5 repetitions at 1.05 rad/s (60°/s), 10 reps at 3.14 rad/s (180°/s), and 15 reps at 5.24 rad/s (300°/s), separated by 5 min passive recoveries. Participants received the same methodological instructions before each session. Variations in verbal encouragement, however, were randomized during each testing session using the following statements: (1) “as fast as you can” (FAST); (2) “as hard as you can” (HARD); (3) “as hard and as fast as you can” (BOTH); and (4) no verbal encouragement (NONE). Repeated measures ANOVAs were conducted to evaluate differences in isokinetic performance metrics. RESULTS: FAST produced significantly higher total work (M = 172.2, SD = 44.3, p < .011), relative work (work/ body weight) (M = 9.0, SD = 2.3, p < .009), work first third (M = 71.0, SE = 19.2, p = .016) and average power (M = 32.0, SE = 7.5, p < .006) than NONE during knee flexion at 300°/s, with no further differences for any speed or movement direction. CONCLUSION: Verbal encouragement stating “as fast as you can” is recommended to increase work and power during high speed isokinetic knee testing since it consistently produced the best performances.
Bilateral transfer is a common source of experimental study in motor learning. It is suggested that successful transfer from a non-dominant hand to dominant hand exists in the area of speed. However, there may be a difference between left and right-handed individuals in the interhemispheric transmission of visuo-motor information. Left handed may have lower accuracy in trials.

**PURPOSE:** The focus of this work was to quantify the amount of bilateral transfer of subjects and determine if there is a preferred dominant hand for the greatest amount for transfer.

**METHODS:** Participants first completed a handedness survey to establish laterality. They were then asked to trace a printed star pattern as quickly and accurately as possible while gazing at a mirror image of the pattern. The pattern for tracing was as follows: 1 time with non-dominant hand, 7 times for dominant hand, 1 time for non-dominant hand with 30 second breaks in between. Errors were measured by marks made outside of the star pattern. The distance outside the line was measured with a ruler.

**RESULTS:** A total of 14 college age students were enrolled in this study, 50% (N=7) dominated hand with 30 second breaks in between. Errors were measured by marks made outside of the star pattern. The distance outside the line was measured with a ruler.

**CONCLUSIONS:** This study suggests that there may be a significant skill transfer from the dominant to non-dominant hand. It does appear that perfection of a task (number of errors) is as easily transferred, regardless of which hand is dominant. The later may not significantly different (p=0.09). The complete task was significantly different (p=0.04); whereas, the number of errors was not significantly different (p=0.09).

**REFERENCES:**

1. participants completed 5 trials of the upper airway may have the ability to elicit ergogenic effects thereby improving respiratory capacity and athletic performance.
2. the study suggests that jaw-repositioning custom-designed mouthguards which increase output by 3% and decreased the 20- and 40-meter sprint time by 4% and 2% respectively.
3. standard deviation). The Illinois Agility Test (IAT) measures sport agility by combining multi-directional movements into a single task. The purpose of this study is to understand the physiological responses of a mandibular repositioning mouthguard on athletic performance. We hypothesize that MG designs that increase anatomically desirable jaw adjustments for an increase in jump height, there is an increase in power output. However, there appears to be limited research on focal points and their impact on vertical jump (VJ) performance.

**PURPOSE:** To compare the potential differences between no set focal point, a set focal point (i.e., governed), and a sport specific focal point on VJ performance in no less than averagely fit males. METHODS: Thirty-four averagely fit college aged males participated in this study. After descriptive data and reach height was recorded, subjects completed an 8-min warm-up on a leg cycle ergometer followed by 4-min of passive recovery (i.e. standing still). Subjects then completed 4 practice (i.e. familiarization trials) counter-movement jumps (CMJ) utilizing a VJ measurement device. Upon completion of 2-min of passive recovery the subjects then completed, in a counter-balanced order, 3 different jump series consisting of 4 maximal effort CMJs with 30-secs between each jump. The various jumps were as follows: No Set Focal Point (FPP), Focal Point (FP), and Sport Specific Focal Point (FSP). The highest jumps for FPP, FP, and FSP were compared using ANOVA statistical techniques with an alpha level of 0.05. RESULTS: FPP (69.19 ± 9.40 cm) was significantly different (p = 0.001) than FPN (67.77 ± 12.41 cm). Also, FPN was significantly different (p = 0.0003) than FP (67.92 ± 9.92 cm). Conversely, there was no significant difference (p = 0.308) between FPN and FP. CONCLUSION: The results suggest that individuals who use a sport specific focal point tend to jump higher than those who use no set focal point or a governed focal point. Therefore, it may be prudent to suggest that a sport specific focal point, as selected by the subject, should be utilized during VJ assessment. Future studies should assess the impact of a sport specific focal point on VJ performance using male athletes who participate in sports with jumping movements.

**REFERENCES:**

1. *New Mexico State University,* Las Cruces, New Mexico.
2. *University of Utah,* Salt Lake City, Utah. (Sponsor: Dr. Doug Harman, FACSM)
3. *Colorado State University,* Fort Collins, Colorado (Sponsor: Dr. Mitchel L. Cordova, FACSM)
4. *Acadia University,* Wolfville, NS, Canada. (Sponsor: Dr. Thomas Best, FACSM)
5. *Florida Gulf Coast University,* Fort Myers, FL. (Sponsor: Michelle L. Mekary, FACSM)

Few studies have assessed factors that directly impact vertical jump performance in females. Prior studies investigated varying warm-up protocols as a means to enhance jump performance without seeking to manipulate the target (i.e., sport specific focal point, non-controllable, or governed focal point) that the female subjects focused on to complete the jumps. A previous focal point vertical jump study utilizing male subjects suggested that vertical jump performance increased when using a sport specific focal point. However, this has not been assessed using a female population to the best of the researchers’ knowledge. PURPOSE: To determine if a sport specific focal point contributes to an increase in jumping performance compared to non-controllable (i.e. no set focal point), and a governed (i.e. set focal point) in averagely fit females.

METHODS: Thirty averagely fit female participants had descriptive data collected (i.e. age, HT, WT, BF). Participants completed an 8 min warmup, which avoided static movements, and then received a 4 min passive recovery. After completing four familiarization jumps in a counter movement manner participants completed four jumps per each jump trial with thirty seconds of rest between jumps and 2 min of passive rest between each trial. The jump series protocol consisted of three separate counterbalanced trials which included a sport specific (FPS), governed (FP), or non-controllable focal point (FPN). FPN, FP, FPS were compared using ANOVA with significance determined at an alpha level of 0.05. RESULTS: FPS (51.56 cm ± 8.69 cm) was significantly different (p = .0005) versus FPN (50.50 ± 8.83 cm). Also, there was no significant difference (p = .245) between FPN and FP. CONCLUSION: It appears that using a sport specific focal point may elicit a higher jump in averagely fit females as compared to the jumps when females utilized a non-controled focal point or a governed focal point. Further research is necessary in order to evaluate the use of a sport specific focal point on vertical jump performance with females who participate in jumping sports (i.e. basketball, volleyball) at the high school, collegiate, and professional level.

PURPOSE: We reported in a previous study (ACSM’s 60th Annual Meeting) that passive rest between each trial. The jump series protocol consisted of three separate jumps per each jump trial with thirty seconds of rest between jumps and 2 min of passive rest between each trial. The jump series protocol consisted of three separate counterbalanced trials which included a sport specific (FPS), governed (FP), or non-controllable focal point (FPN). FPN, FP, FPS were compared using ANOVA with significance determined at an alpha level of 0.05. RESULTS: FPS (51.56 cm ± 8.69 cm) was significantly different (p = .0005) versus FPN (50.50 ± 8.83 cm). Also, there was no significant difference (p = .245) between FPN and FP. CONCLUSION: It appears that using a sport specific focal point may elicit a higher jump in averagely fit females as compared to the jumps when females utilized a non-controled focal point or a governed focal point. Further research is necessary in order to evaluate the use of a sport specific focal point on vertical jump performance with females who participate in jumping sports (i.e. basketball, volleyball) at the high school, collegiate, and professional level.

RESULTS: Odds ratio (p value as Fischer’s exact test) of each season was 28.6 (0.00) in 2010-11, 19.24 (0.00) in 2011-12, 8.40 (0.00) in 2012-13, and 2.88 (0.09) in 2013-14. The adjustment of odds ratio that standardized the player total number of each season to 60 players at the minimum of four seasons was 17.16 (0.00), 19.24 (0.00), 14.35 (0.05), and 0.99 (1.00), respectively. Apart from 2013-14, the regular player group had higher BT than the reserve group. Team result finished second in the Japan university championship in 2010-11 and 2012-11, but defeated in the first round of the championship in 2012-13, and defeated in the qualifying round in 2013-14. In the season when odds ratio was high, i.e. most players with high BT participated in a game as regular players, team result was high.

CONCLUSIONS: In the 2013-14 season, the contribution of breakthrough power, i.e. fitness level to assessment of player performance (regular or reserve) was low, thus team fitness was low. As result, the team performance was low. Thus the contribution of fitness factor to assessment performance level is important in rugby football. Breakthrough power is an effective assessment of team performance of university rugby football.
Muscular power declines 6-10% per decade throughout life. It is unknown, however, when the decrease is most apparent. Therefore, it’s important to examine the difference in power amongst different age cohorts. PURPOSE: The purpose of this study was to examine the difference in power output measures among adults over the age of 18 years, separated into age decade cohorts (18-29, 30-39, 40-49, 50-59, 60-69, 70-79, and 80-89 years). METHODS: A total of 160 men and women participated in the study (40.6 ± 20.1 years; 71.1 ± 14.0 kg), spanning in age from 18-86 years. Power was assessed using the Tendo power analyzer during a sit-to-stand (STS) task. Participants sat on a standard height (0.47 m) chair, arms crossed over their chest and performed five separate STS trials, rising from a seated to full standing position as quickly as possible; one-minute rest periods provided between each trial. The Tendo was positioned on the floor in alignment with the participant’s heel and the Kevlar string attached to the participant’s hip with a carabiner clip and belt. With each STS task, peak (PPOW) and average (APOW) power, as well as peak (PEVL) and average (AVEL) velocity were recorded in watts (W) and meters per second (m/s), respectively. PPOW, APOW, PEVL, and AVEL were recorded for each stand, with the average taken. RESULTS: One-way ANOVA analysis indicated a significant difference between groups for PPOW, APOW, PEVL, and AVEL measures (p < .05). Younger subjects produced significantly greater PPOW and APOW than individuals in age cohorts over 40 years (p < .05). When assessing PEVL and AVEL, the younger age cohorts produced significantly greater values than the older age cohorts (p < .05). CONCLUSION: Findings indicate muscular power to be significantly greater among younger cohorts (≤ 40 years), as compared to older cohorts (> 40 years); however, among older cohorts, there was no significant decline in power. This gives an indication that muscular power may occur around the age of 40, which is when the decline becomes less apparent. Based on findings, preservation of muscular power is necessary before 40 years of age.

CONCLUSIONS: Moon phases did not affect evening explosive performances (mainly phosphagens’ pathway-based efforts) among young trained athletes. Therefore, it seems that moon phase / illumination do not have an effect on short term physical performance in young trained adolescents. Future studies may evaluate whether High Intensity (predominance of the “glycolytic pathway” in addition to the “phosphagenes’ pathway”) and Endurance (predominance of “oxidative phosphorylation”), performances would be affected by lunar cycle in athletes.
percent differences were calculated and used for analysis. Pearson’s r correlations were conducted to analyze the relationship between hamstring and quadriceps percent differences and lower body explosive performance variables.

RESULTS: There was no significant correlation between BO’s and total sprint time (r = -0.22; p = .85), vertical jump height (r = .06; p = .68), and peak power (r = -1.3; p = .36). There was no significant correlation between BHP’s total sprint time (r = -22; p = .14), vertical jump height (r = .001; p = .99), and peak power (r = -26; p = .08).

CONCLUSIONS: No relationship was observed between bilateral asymmetry and any lower body explosive performance in this particular population. The lack of a relationship may be due to the type of participants involved in the investigation; since they were recreationally trained there may be varied training experience.

3363 Board #268 June 2 3:30 PM - 5:00 PM
The Importance of Skating Economy to Performance on a Repeated Shift Test in Ice Hockey
Nicholas R. Lamoureux, 58203, John S. Fitzgerald, Grant R. Tomkinson. University of North Dakota, Grand Forks, ND. (Sponsor: James R Whitehead, FACSM)

No relationships reported

Ice hockey is a sport characterized by repeated high intensity bouts, with the ability to resist fatigue both between and within bouts conferring competitive advantage. However, there is no evidence to support skating economy as a factor in fatigue resistance.

PURPOSE: To determine the importance of skating economy to fatigue during repeated high-intensity efforts of a simulated ice hockey shift.

METHODS: Forty-five collegiate and Junior A male ice hockey players (aged 18-24 years) performed a continuous protocol graded exercise test to volitional exhaustion using a skate treadmill, as well as an on-ice repeated shift test. Breath-by-breath data for VO2 and respiratory exchange ratio (RER) was collected and used to derive energy expenditure (EE) averaged over the final 10 seconds of each stage. Economy was determined as the slope of the regression line relating VO2 and EE against skating speed separately. Participants who completed fewer than three stages of the graded exercise test were excluded to increase reliability of regression slope measures. Participants also completed eight bouts of maximal ice skating through a course designed to simulate the duration and skating skills of a typical shift, with three separate TC Speed Trap-II wireless timing gates used to determine first half, second half, and total fatigue decrement as calculated by a percent decrement score (Decrement Score = 100 x [Total Sprint Time - Ideal Sprint Time] / 100). Each bout lasted approximately 23 seconds, with 99 seconds of passive recovery allowed between bouts. Partial correlation was used to determine the association between economy measures and decrement during the repeated shift test.

RESULTS: Twenty-six participants met the inclusion criteria and were included in the data analysis. Skating economy measures (both relative VO2 and EE) were moderate and statistically significant correlate of total fatigue decrement (VO2: r=0.46, p<0.05; EE: r=-0.44, p<0.05), but not with first or second gate decrement.

CONCLUSION: Our results indicate that skating economy may play an important role in fatigue resistance over repeated on-ice sprints designed to simulate a typical shift. This may lend support to the use of technical skating coaches and training techniques to enhance skating economy as a valid way to improve ice hockey performance.

3364 Board #269 June 2 3:30 PM - 5:00 PM
The Influence Of Pace On Performance During A Five-Week Online Fitness Competition.
Cassie Williamson, Yuri Feito, FACSFM, Brian Kliszczewicz, Gerald Mangine. Kennesaw State University, Kennesaw, GA. (Sponsor: Dr. Yuri Feito, Ph.D., FACSFM, FACSFM)

Email: cwi3197@kennesaw.edu

No relationships reported

Purpose: To determine the influence of exercise pace on individual performance during an annual lower body online fitness competition.

Methods: Competition pacing data was collected from individuals with more than six-months of experience during an annual five-week online fitness competition.

Results: There was no significant correlation between BO’s and total sprint time (r = -0.22; p = .85), vertical jump height (r = .06; p = .68), and peak power (r = -1.3; p = .36). There was no significant correlation between BHP’s total sprint time (r = -22; p = .14), vertical jump height (r = .001; p = .99), and peak power (r = -26; p = .08).

Conclusions: No relationship was observed between bilateral asymmetry and any lower body explosive performance in this particular population. The lack of a relationship may be due to the type of participants involved in the investigation; since they were recreationally trained there may be varied training experience.

Abstracts were prepared by the authors and printed as submitted.
sec; p<0.05). CONCLUSION: The long crank arm is less efficient than the standard crank arm at lower workloads. Conversely, lower long RPE at high exercise intensities and distance, time, speed, the transit and heart rate (HR) were recorded. The distance of running was divided into three phases: 0–2, 2–4, and 4–5 km, and the time interval was compared. RESULTS: The total time record of the exercising included the transit 3126±137 in TCP and 3096±103 sec in TCP (p<0.05). The cycling time was 1956±69 in TCP and 1967±54 sec in TCP (p>0.05). The average HR was 166±7.8 in MCP and 165±5.7 bpm in TCP during cycling, and 175±4.8 in MCP and 175±4.8 bpm in TCP during running. No differences were found in HR during the exercises. CONCLUSION: The cleat position did not change the total time record of simulated duathlon in elite triathletes. However, the time record of early stage of running following cycling was faster when they cycled with the shoes of middle cleat.

**CONCLUSION:** Despite a small sample size, these findings suggest psychological stress may enhance force development. A possible mechanism could be sympathetically-mediated potentiation of calcium release. While academic stress presents many challenges for student-athletes, it does not appear to be detrimental to muscular performance.

**Purpose:** Decaffeinated Green Tea Extract (GTE) supplementation can increase fat oxidation during leg exercise, but many people cannot perform leg exercise. The purpose of this study was to investigate the effect of GTE supplementation on fat utilization during 1h arm cycle exercise. We hypothesized that GTE supplementation will increase lipolysis and fat oxidation.

**Methods:** This was a randomized, controlled, triple blind study with a crossover design. 8 healthy adults (4 females, 32-37 yrs) performed an incremental arm cycle test to exhaustion followed by 4 time trials at fixed workloads. After an 8h fast subjects did 1h of arm cycling at 50% W_{\text{peak}}. Subjects were randomly assigned to either decaffeinated GTE (650mg, 61mg EGCG) or placebo (PLA) for 4wks. Subjects then repeated the 1hr arm cycle trial. A 4wk washout period was followed by the corresponding crossover trial. 5ml of blood were drawn pre and post exercise while respiratory gases were collected continuously. Plasma glycerol and free fatty acid (FFA) concentrations were assessed with commercially available analysis kits. The study was powered at 1-β=0.05 given a reported effect size of F=3.39 for the time by treatment interaction.

**Results:** Mean VO2 during all 1hr trials showed no significant differences (83±9 vs. 19.25 L/min, p=0.46). Similarly, mean total energy expenditure (EE) showed no differences across all trials (264.58 ± 266.15 kcal vs 420). The percentage of total EE from fat oxidation was higher after GTE supplementation compared to PLA, but this difference was not significant (22.83 ± 11.57 vs 25.8 ± 11.3% vs. 23.39 ± 9.97T vs 20.69 ± 8.9%, p<0.532). There were no significant changes in g/min of fat oxidized between treatments before and after supplementation (GTE = 11 ± 0.08 vs .12 ± 0.06 vs PLA = 11 ± 0.09 to 11 ± 0.04, p=0.220. Blood Glycerol concentration increased post exercise in all trials, with no significant differences between treatments (8.55 ± 3.44 mg/dl to 8.47 ± 2.6 vs. 10.05 ± 2.86 to 8.99 ± 3.51 mg/dl, p=0.527). FFA concentration was also increased post exercise for both groups with no significant difference between treatments (8.30 ± 3.8 mg/dl to 8.69 ± 2.59 vs 9.06 ± 4.49 to 7.16 ± 3.79, p=0.234).

**Conclusion:** These results suggest that there is no effect of 1g GTE supplementation on fat utilization during 1hr arm cycle exercise at 50% W_{\text{peak}}.

**MEDICINE & SCIENCE IN SPORTS & EXERCISE®**

**3369 Board #274 June 2 3:30 PM - 5:00 PM Electrolytes Drink Increases Performance During Repeated Exhaustive Exercise Tests

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(No relationships reported)

**Purpose:** To investigate the effects of electrolyte drink on subsequent exhaustive exercises, 14 male-university students voluntarily participated. They were healthy and passed medical screening and physical exam prior to three exercise tests of at least 1 week apart. **Methods:** Two consecutive exhaustive exercise tests, with 2 hours recovery period in between, were done within a day. After the first exhaustive exercise, subject was randomly intervened by drank one of the followings fluids: a) water (WT), b) placebo (PLA), only sucrose 7%, dextrose 4% and sports drink (SD, NaCl 0.13%, KCl 0.03%, sucrose 7%, dextrose 4%). During 2 h recovery period, the amount of energy drink given was divided into 3 parts: first at 50% body weight (BW) at immediately after finished glycogen depletion, then at two sessions of 25%BW at 30 minutes and 60 minutes respectively Exhaustive exercise testing was conducted on cycle ergometer. This study was approved by Mahidol University IRB. Statistical analysis was done using two-waves repeated ANOVA at p<0.05. **Results:** Increasing in most of cardiopulmonary variables (heart rates, stroke volumes, cardiac outputs, end-diastolic volumes, total peripheral resistance, breathing frequencies, tidal volumes, minute ventilations, maximum oxygen consumption and carbon dioxide productions) are not significantly different among the groups with an exception of exception fraction where SD was higher than WT (p=0.05). Estimations of substrate utilizations revealed that fat oxidation was higher in WT (p=0.05) while carbohydrate oxidations in PL and SD were higher than WT (p=0.05). On the second exhaustive exercise, SD had significantly higher than WT and PLA. **Conclusion:** In addition to carbohydrate alone, sports drink-containing electrolytes found to increase endurance performance on the subsequent exercise. The presence of these electrolytes are found to enhance carbohydrate absorption in human gastrointestinal tract and may possibly act as co-enzymes in metabolic pathways. Supported by T.C.Pharmaceutical Industries Co.Ltd. Thailand. * corresponding author, contact email address: gmrunghchai@gmail.com

**3370 Board #275 June 2 3:30 PM - 5:00 PM The Effect of Green Tea Extract on Fat Oxidation during 1hour Arm Cycle Exercise

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**Purpose:** The cleat position did not change the total time record during cycling and running following cycling was faster when they cycled with the shoes of middle cleat of simulated duathlon in elite triathlete. However, the time record of early stage of running following cycling was faster when they cycled with the shoes of middle cleat position. It appears that cleat position during cycling have some influence on muscle recruitment during running in trained elite triathletes.
The participants underwent a VO2max graded exercise maximal exertion test using a modified treadmill protocol. Subjects warmed up for 3 minutes at 8km/h and 0% grade, then started running at 9km/h with 0.5km/h increase every 30 seconds until exhaustion. Exhaustion was defined as three of the four criteria: plateau of VO2 for at least two consecutive readings, RPE higher than 18, RER > 1.1 and maximal heart rate (HR) within 10 beats of the age predicted maximum HR. The VO2 data was collected using the ParvoMedics TrueOne 2400 Metabolic System. RESULTS: The two groups were significantly different in their training participation; 31.6 ± 8.5 months compared to 9.1 ± 4.1 months, P < 0.001. The experienced individuals had a greater VO2max (51.3 ± 5.5 ml/kg/min) compared to the novice individuals (45.3 ± 4.8 ml/kg/min) (P = 0.02). A forward regression analysis indicated that weight alone was a significant predictor for VO2max (adjusted R² = 0.47, P < 0.001). This group difference appears to be mediated primarily by body weight, as individuals exposed longer to CrossFit were leaner (88.0 ± 9.4 kg) compared to the novice individuals (97.5 ± 14.7 kg, P = 0.03). CONCLUSIONS: These results suggest that CrossFit provides the appropriate stimulus to increase an individual’s VO2max over time. This could be due to increased cellular oxidative metabolism caused by the high intensity nature of the exercise and the ability of more experienced CrossFit athletes to endure workouts at a greater intensity. Most of these adaptations seem to be mediated by the effects of the training program on body weight.
PURPOSE: This study examined the alterations in circulating creatine kinase (CK) levels, leukocyte trafficking, delayed onset muscle soreness (DOMS), neuromuscular function and sprint performance in response to Gaelic football match-play. 

METHODS: Participants (n=30, age 17.41±0.78 yr, height 176.42±7.13 cm, and mass 72.03±6.89 kg) played single competitive 15-a-side Gaelic Football game of 60 min duration. Blood samples were taken before the game, immediately post game (Post), 24 h post game (+24 h), 48 h post game (+48h) and 72 h post game (+72 h). Subjective muscle soreness, sprint performance and muscle power were measured Post, +24 h, +48h and +72 h. Heart rate and movement patterns were continuously measured throughout the game using telemetry and GPS tracking, respectively. Heavy to severe impacts were classified as acceleration G-forces ≥ 7 recorded via portable accelerometry.

RESULTS: Participants covered an average distance of 6.1 ± 1.1 km during match play. The majority (72%) of the distance involved walking and jogging. High speed and maximal running accounted for 10% of the total distance. There were a total of 155 impacts ≥ 7 G-forces. CK levels were significantly higher than baseline immediately post-game and 12h+ and returned to pre-game values at +36 h. Compared to pre-match values circulating leukocytes and granulocytes were significantly higher than pre-game values post game and decreased significantly below pre-game values at +12h, +36 h and +60 h. Circulating lymphocyte numbers were significantly decreased below pre-game levels at +36h. Compared to pre-game values, there was a significant decrease in peak force at +12 h and +60 h and a significant decrease in 5 m and 20 m sprint times at +12 h, +36 h and +60 h. Compared to pre-games values there was no changes in any of the other measured neuromuscular performance indices (flight time, jump time and jump height performance) at any time point. DOMS scores were significantly higher than pre-games values at +12h and +46 h and lower (p<0.05) than pre-game values at +60 h. There was no significant relation between impact and CK levels.

CONCLUSIONS: Competitive Gaelic football match results in significant changes in CK levels, DOMS, leukocyte trafficking, peak force development and 5 m and 20 m sprint performance.

Maximal voluntary contractions (MVCs) of the leg extensors on an isokinetic dynamometer have recently been used to evaluate maximum velocity (Vmax) and rate of velocity development (RVD) in young adults. It has been hypothesized that Vmax and RVD characteristics of the leg extensors may be important predictors of athletic performances for movement activities such as balance recovery and running. However, limited data exist regarding how these parameters associate with vertical jump performance. PURPOSE: To examine the relationships between vertical jump height and maximal and rapid velocity characteristics of the leg extensors in healthy young men. METHODS: Fifteen young men (mean ± SD: age = 23 ± 3 years; height = 176 ± 8 cm; mass = 80 ± 9 kg) performed three countermovement vertical jumps (CMJs) following a single competitive 15-a-side Gaelic Football game of 60 min duration. Blood samples were taken before the game, immediately post game (Post), 24 h post game (+24 h), 48 h post game (+48h) and 72 h post game (+72 h). Subjective muscle soreness, sprint performance and muscle power were measured Post, +24 h, +48h and +72 h. Heart rate and movement patterns were continuously measured throughout the game using telemetry and GPS tracking, respectively. Heavy to severe impacts were classified as acceleration G-forces ≥ 7 recorded via portable accelerometry.

RESULTS: Participants covered an average distance of 6.1 ± 1.1 km during match play. The majority (72%) of the distance involved walking and jogging. High speed and maximal running accounted for 10% of the total distance. There were a total of 155 impacts ≥ 7 G-forces. CK levels were significantly higher than baseline immediately post-game and 12h+ and returned to pre-game values at +36 h. Compared to pre-match values circulating leukocytes and granulocytes were significantly higher than pre-game values post game and decreased significantly below pre-game values at +12h, +36 h and +60 h. Circulating lymphocyte numbers were significantly decreased below pre-game levels at +36h. Compared to pre-game values, there was a significant decrease in peak force at +12 h and +60 h and a significant decrease in 5 m and 20 m sprint times at +12 h, +36 h and +60 h. Compared to pre-games values there was no changes in any of the other measured neuromuscular performance indices (flight time, jump time and jump height performance) at any time point. DOMS scores were significantly higher than pre-games values at +12h and +46 h and lower (p<0.05) than pre-game values at +60 h. There was no significant relation between impact and CK levels.

CONCLUSIONS: Competitive Gaelic football match results in significant changes in CK levels, DOMS, leukocyte trafficking, peak force development and 5 m and 20 m sprint performance.

In baseball, one game or a season can depend greatly on the pitcher’s performance. A pitcher’s success can be greatly affected by velocity and their ability to maintain that velocity throughout the game. A better understanding of what physical attributes and training protocols affect a pitcher’s velocity would be helpful in designing training programs. PURPOSE: To examine variables that may potentially impact baseball throwing velocity (BTV). METHODS: 12 Division I collegiate baseball pitchers (height=186.7±9.3 cm, weight=91.2±12.4 kg and age=20.5±2.3 years) underwent assessments for upper body power and balance. Lower body power data was collected using the vertical jump test VERTEC (Jump USA, Sunnyvale, CA), and an incline 4.5 kg medicine ball chest press to measure upper body power. Balance was assessed using the BIODEX Balance System SD (Biodex, Inc, Shirley, NY) and measured in the one legged follow through position of the pitch. BTV was collected while pitcher’s participated in actual games, off speed pitches were not used in this analysis and the number and type of pitches thrown varied depending upon the circumstance of the game. BTV was recorded using a Stockersport II (Applied Concepts INC, Plano TX) radar.

RESULTS: Overall power output was highly correlated to BTV (r=0.51, p<0.006) with the majority of that correlation coming from lower body power (r=0.47, p<0.01) and upper body (r=0.33, p<0.039). Body weight also correlated with BTV (r=0.74, p<0.001), neither height (r=0.16, p=0.167) or balance (r=0.07, p=0.365), anterior (r=0.087, p=0.33), and medial/lateral (r=0.11, p=0.208) correlated with BTV. Game BTV was significantly decreased when comparing innings 1-3 to innings 4-6 respectfully (x=88.06 mph, x=86.57 mph. p<0.039).

CONCLUSIONS: There is a strong correlation between power and BTV, more specifically lower body power. With no correlation between height and balance with BTV, but a strong correlation with weight. In addition, fatigue appears to negatively impact BTV. Based on these findings it appears that baseball pitchers may benefit from a conditioning program focused on lower body power to increase the velocity of their pitches. Future investigations could help establish if this type of training could also reduce the impact of fatigue on BTV in the later innings of a game.
Effects of Speed and Agility Training on Combine Performance in Young Male Athletes

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PURPOSE: To investigate the use of cMetS scoring in a sample of adolescents, and determine associations with physical activity (PA) and inflammation.

MATERIALS: As part of a larger study, a subset of 16 y.o. (N=107; 57% female; 1.5 hr·session-1) participated in this study by completing three testing sessions: combines 1 and 2 (C1 and C2) were separated by up to 4 days for familiarization and test-reliability, while combine 3 (C3) was performed 9 wks after C2. Combine measures included vertical jump (VJ, cm), broad jump (BJ, cm), pro-agility drill (PA, s), L-cone drill (LC, s), and 40-yd sprint (S40, s) with 10- and 20-yd splits (S10 and S20, s). The SAT group (n = 23) participated in a 9-wk SAT camp with 1 session·wk-1 (1.5 hr session-1). The control (CON) group (n = 23) was age-matched, did not perform the SAT, but maintained their regular sports activities. Sensitivity, as 

RESULTS: There was no difference in sports participation hours reported between the SAT and CON groups (p = 0.17). There were no group × time interactions (p ≥ 0.12), no main effects for group (p ≥ 0.28), but there were main effects for time for BI and PA (p ≤ 0.01). There were systematic improvements in PA, LC, and S10 (p ≤ 0.01) from C1 to C2, but not VJ, BI, S20 or S40 (p ≥ 0.06). Intraclass correlation coefficients (ICC3,1), coefficients of variation (CV, %), standard errors of measurement (SEM), and minimum detectable changes (MDC) were [test: ICC (CV, SEM, MDC)] VJ: 0.91 (6.6%, 0.3 cm, 1.1 cm); BI: 0.89 (6.8%, 0.15 cm, 0.42 cm); S40: 0.84 (4.5%, 0.42 s, 1.18 s); LC: 0.84 (4.5%, 0.42 s, 1.18 s); S10: 0.68 (6.8%, 0.15 s, 0.42 s); S20: 0.91 (3.8%, 0.14 s, 0.40 s); S40: 0.70 (7.2%, 0.52 s, 1.44 s). Over the 9 wks, 1 boy exceeded the MDC for BJ and LC; 5 exceeded MDC for S10; and 3 exceeded MDC for S20. Seventeen boys exceeded the SEM for VJ; 16 exceeded the SEM for BI; 11 exceeded the SEM for PA; 12 exceeded the SEM for LC; 15 exceeded the SEM for S10 and S20 and S20 tests. Future studies aiming to examine combine performance enhancement training in youth athletes may consider using these tests.

F-63 Free Communication/Poster - Physical Activity and Health in Youth

A Comparison of Infant Physical Activity in Daycare vs Homecare Environments

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The impact a childcare environment has on a child’s cognitive and behavioral development has been widely studied. Differences have been found between children primarily cared for at home by a stay-at-home parent (homecare) compared to a child who attends full-time daycare. Positive findings can be found in both environments with homecare children potentially showing less aggressive and impulsive behaviors and daycare children achieving cognitive development milestones earlier. However, little work has assessed a child’s, particularly an infant’s (<12 months old) physical development (i.e., physical activity level) in both environments. PURPOSE: To compare the level of infant physical activity in homecare vs daycare environments. METHODS: Twelve homecare infants (age = 6.5 ± 0.5 months, weight = 8.20 ± 1.17 kg and length = 66.54 ± 2.66 cm) and fourteen daycare infants (age = 6.5 ± 0.5 months, weight = 8.71 ± 1.34 kg, and length = 68.94 ± 3.02 cm) were recruited to participate in the study. Infant physical activity was assessed using Actigraph GT3X Link accelerometers. Infants were two accelerometers, left wrist and ankle, for two consecutive 7-day weekdays. Accelerometer data from two 3-daycare hours from 8 am to 5 pm were only utilized for the data analyses. Two-day total (i.e., 18 hours) ankle and wrist vector magnitude counts (VMC) were used as the physical activity indicator.

Statistical analyses were performed using independent sample t-tests for homecare and daycare infants. RESULTS: Homecare infants had significantly lower VMC (t(24) = -1.20, p = 0.036) at the wrist (VMC=1689546.13) compared to daycare infants (VMC=2091775.09). However, there was not a significant difference in physical activity at the ankle (t(24) = -0.542, p = 0.080) between homecare infants (VMC=1300498.16) and daycare infants (VMC=1438831.43). CONCLUSION: Daycare infants appear to be achieving more physical activity than homecare infants. Further research studies are needed to understand this variation and to determine why infants may be achieving more physical activity in the daycare environment. Future research should consider utilizing larger sample sizes as well as assessing variables such as infant to caregiver interaction and the type of infant play.

Recent reports suggest that metabolic syndrome (MetS) may emerge as early as childhood or adolescence, but no universal definition of MetS is available for these age groups. Continuous metabolic syndrome (cMetS) scores—standardized-normalized z scores based on the 5 components of MetS—take into account the severity of a single risk factor, and subclinical values. This composite score may more appropriately distinguish cardiovascular risk when compared to the traditional dichotomous outcome. PURPOSE: To investigate the use of cMetS scoring in a sample of adolescents, and determine associations with physical activity (PA) and inflammation. METHODS: As part of a larger study, a subset of 16 y.o. (N=107; 57% female; 68% Caucasian) completed a blood draw, anthropometric (BMI, waist circumference (WC)), and blood pressure measurements. Self-reported PA was assessed using the Godin Leisure-Time Exercise Questionnaire. Blood was analyzed for metabolic and immune markers; glucose, triglycerides (TG), c-reactive protein (CRP), and HDL were used in the present analyses. The cMetS score was calculated as the sum of the z scores based on sample means and standard deviations of each of the 5 factors that make
up MetS (glucose, TG, HDL-inverse, WC and mean arterial pressure). Correlations were performed to assess associations between cMetS, individual MetS components, PA, BMI and CRP. RESULTS: The consistent and previous findings, MetS was low in our sample (6107). Of the 45 participants with the highest cMetS scores, 44 did not achieve clinical MetS criteria. Neither total nor strenuous PA were associated with cMetS, however PA was correlated with WC (r = -0.49, p < 0.001). Higher levels of CRP (r = 0.38, p < 0.001) and increased concurrent BMI (r = 0.53, p < 0.001) were associated with higher cMetS scores. CONCLUSION: In populations where clinical MetS is low, cMetS may provide increased resolution and reflect a more global assessment of cardiovascular risk. This is supported in our findings, which show that cMetS scores were not necessarily indicative of the number of clinical MetS risk factors in adolescents. Since cMetS is unrelated to self-reported PA, future work should attempt to identify whether associations exist with other health behaviors or objective PA measures.

3384 Board #289 June 2 2:00 PM - 3:30 PM Physical Activity, Body Mass Index And Cardio-metabolic Risk In U.S. Adolescents
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PURPOSE: Examine clustered metabolic risk (cMetS) score in adolescents classified as not overweight/active (NOA), not overweight/not active (NONA), overweight/active (OA), and overweight/not active (ONA). METHODS: Sample (n=975) included adolescent (12-17 years) participants in the 2007-2012 National Health and Nutrition Examination Survey. The cMetS score included triglycerides, high-density lipoprotein cholesterol, fasting blood glucose, and mean arterial pressure. Age- and sex-specific body mass index percentiles were utilized. Activity data included self-reported frequency of moderate-to-vigorous physical activity (PA). Adolescents reporting ≥60min/d of PA were considered “active”. A six-year fasting sample weight was applied to the analyses. Findings were adjusted for age, sex, and race/ethnicity.
RESULTS: The cMetS scores were significantly (p<0.05) higher in OA and ONA adolescents when compared to NOA (β=1.08 and β=1.57, respectively). In OA males, cMetS was significantly (p<0.01) higher when compared to NOA males. In OA and ONA females, cMetS scores were significantly higher (p<0.05 for both).
CONCLUSIONS: The cMetS scores were higher in OA and ONA adolescents when compared to NOA.

3385 Board #290 June 2 2:00 PM - 3:30 PM The Association Between Physical Activity And Health Risk Behaviors in Brazilian Adolescents
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Adolescence is a critical period where major physical and psychologic changes occur. It is also a period where several lifelong health related behaviors are adopted and established. Behaviors such as unhealthy eating, tobacco use, alcohol use, and physical inactivity are related to major causes of morbidity and mortality among young and adults. Physical activity (PA) is an important behavior during adolescence not only because it is associated with general health, but also because it may be associated with other health-related risk behaviors.

PURPOSE: To examine the association of physical activity with health risk behaviors in adolescents from Curitiba, Brazil.

METHODS: A cross-section study was carried out with a representative sample of 928 (mean age 14.06 ± 1.91 years old, 467 girls) adolescents enrolled in 14 randomly selected public schools from Curitiba, Brazil. The Brazilian version of the Youth Activity Profile survey evaluated PA levels and the YRBS survey evaluated fruit, vegetable, alcohol, and tobacco consumption in the past 30 days. The Adolescent Sedentary Questionnaire evaluated total screen time. Binary Logistic regression measured the association between PA levels and risk behaviors after controlling for gender, age, BMI status, income status, and parent educational level.

RESULTS: PA was inversely associated with low fruit consumption (OR = 50, 95% IC = 38 - 66, p < 0.001), low vegetable consumption (OR = 55, 95% IC = 42 - 73, p < 0.001), and high screen Time (>3 hours/day) (OR = 79, 95% IC = 65 - 96, p < 0.001). Additionally, PA was positively associated with the consumption of at least one dose of alcohol in the past 30 days (OR = 1.47, 95% IC = 1.15 - 1.88, p < 0.001), and with the excessive consumption of alcohol (OR = 1.73, 95% IC = 1.29 - 2.33, p < 0.001). PA was not associated with Tobacco consumption (OR = 1.01, 95% IC = 0.67 - 1.52, p = 0.96).

CONCLUSION: The results indicated that adolescents with higher PA levels consumed more fruits and vegetables and spent less time in front of electronic screens. However, adolescents with higher levels of PA were also more likely to report alcohol consumption in the past 30 days. The social characteristics of alcohol consumption may explain its positive relationship to PA.

Supported by CNPq, Brazil.

3386 Board #291 June 2 2:00 PM - 3:30 PM Understanding the Relations between Physical Activity and Obesity among Chinese Children and Adolescents
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Purpose: The purpose of this study was to examine the relations between self-reported physical activity and obesity among children and adolescents in China.

Methods: The participants are 18424 students (51.9% boys, 49.1% girls) aged 8-18 years old in grades 3 to 12 from six provinces in China. They were divided into three groups by age: 8-12, 13-15, and 16-18. Physical activity level (PAL) was measured by Physical Activity Questionnaire for Children and Adolescents in Chinese (PAQ; Chen, 2008; Li, 2015; Jing, 2016). The summary scores of the PAQ were classified into three PAL categories “low (PAQ≤2), medium (2<PAQ≤3), and high (PAQ >3)”. In addition, physical fitness including high and weight were measured according to national standards of physical fitness during physical education classes. Weight status was classified into four categories “malnutrition, normal, overweight and obese” using BMI cut-points. Descriptive analysis, independent t-tests, ANOVA and Chi-square were used in the study.

Results: The distribution of PAL decreased for girls with age and the PAL of boys was significantly higher than in girls in all three groups (t=9.12, t=18.91, t=16.72, p < 0.01). The percentage of PAL in the low category drastically increased from 15 years (47%) to 18 years (66%). Significant differences in PAL were found across obesity classifications (for 8-12, χ² =12.39, χ² =6.86; for 13-15, χ² =11.88; for 16-18, χ² =7.66, χ² =6.69, p = 0.001) except girls aged 13-15 years (t=1.42, p=0.05). Furthermore, the distribution of PAL in obesity classifications presents like a “U” that shows values of PAL were higher in the classifications of malnutrition and obesity than values in normal and overweight. Obesity status was significantly related to PAL (for 8-12, χ² =34.86, χ² =28.07; for 13-15, χ² =27.80; for 16-18, χ² =21.56, χ² =29.04, p < 0.001), but not girls aged 13-15 (χ² =5.81, p < 0.05).

The predictive relationship between muscular strength and endurance and cardio-metabolic health, independent of aerobic fitness, is not clear in disadvantaged Hispanic children. PURPOSE: The purpose of this study was to examine the predictive relationship between muscular strength and endurance and clustered cardio-metabolic risk, controlling for aerobic fitness, in Hispanic children from low-income schools. METHODS: Participants were 320 Hispanic children (Mean age = 10.1 ± 1.1 years; 164 girls, 156 boys) recruited during the 2014-2015 and 2015-2016 academic years from five low-income schools from the state of Utah in the U.S. Muscular strength and endurance was assessed using the push-up and curl-up tests and estimated VO₂ max was calculated from the Progressive Aerobic Cardiovascular Endurance Run. A clustered metabolic syndrome composite score (MetS) was calculated from cardio-metabolic health measurements consisting of HDL cholesterol, triglycerides, waist circumference, blood glucose, and mean arterial pressure (MAP). Multi-level general linear mixed effects models were used to examine the predictive relationship between muscular strength and endurance and MetS, controlling for the effect of aerobic fitness and the clustering of children within classrooms and schools. RESULTS: Children who were in the middle and upper tertiles for muscular strength and endurance associated with a lower (more favorable) MetS score (middle tertile: β = -2.59, 95% C.I. [-4.23, -0.95], p < 0.05; upper tertile: β = -1.57, 95% C.I. [-3.20, -0.16], p < 0.05). CONCLUSION: The results suggest that higher levels of muscular strength and endurance have a protective effect on cardio-metabolic risk, independent of aerobic fitness, in Hispanic children from low-income schools.
Conclusions: PAL was significantly related to weight status in Chinese children and adolescents. Boys demonstrated higher levels of PAL across all age groups. Girls demonstrated a 19% decrease in PAL across 15 to 18 years of age.

3387 Board #292 June 2 2:00 PM - 3:30 PM
The Correlations Between Types of Families and Physical Activity Levels of Adolescents in Shanghai, China
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Previous studies have indicated that families can influence adolescents’ physical activity. The fifth census in China (2010) showed that 65.3% of the families in China are nuclear, but few studies have explored the association between the various types of families and the physical activity (PAL) levels of adolescents in China using a large sample survey.

**PURPOSE:** To determine the correlations between types of families and the PAL levels of adolescents aged 9-19 years while accounting for background demographic factors, such as age, gender, and socioeconomic status, in Shanghai, China.

**METHODS:** In 2014, 9-11-year-old (N=13,237), 12-14-year-old (N=11,157), and 15-19-year-old (N=8,819) adolescents and their guardians were randomly sampled from 17 districts in Shanghai, China. The adolescents’ moderate-to-vigorous physical activity (MVPA) levels, attitudes toward the type of family, and the guardians’ sociodemographic factors were collected via a questionnaire completed by the adolescents and guardians.

**RESULTS:** Analysis of covariance revealed that, after controlling for socioeconomic status and the age of the adolescents, 9-11-year-old boys from two-parent families spent more minutes per week in MVPA (297.4±120.4) than those who live with their grandparents (286.9±120.1) and those from single-parent families (284.6±129.4, p<0.05). Regarding the girls aged 12-14 years, those who live with their grandparents spent more minutes per week in MVPA (274.4±105.7) than those from two-parent families (271.9±105.1) or single-parent families (257.3±107.0, p<0.05). Regarding the adolescents aged 15-19 years, we did not find significant differences between the boys and girls. Logistic regression analysis showed that 9-11-year-old adolescents those who live with their grandparents had 28% for boys (OR 0.72, 95% CI 0.61-0.84) and 16% for girls (OR 0.84, 95% CI 0.72-0.98) decreased odds of not reached the recommended level (<60min/day MVPA), respectively, compared with those who from single-parent families. **CONCLUSION:** Being from a single-parent family and living with grandparents are two important factors that influence adolescents’ MVPA levels in Shanghai, China.

3388 Board #293 June 2 2:00 PM - 3:30 PM
Self-Reported Physical Activity of High School Students in Southern Maine
Karen Croteau, FACSM1, Rose Angell1, Laurie Milliken, FACSM2, 1Saint Joseph’s College, Standish, ME. 2University of Massachusetts Boston, Boston, MA.
Email: keroteau@sjcmc.edu (No relationships reported)

Knowledge of high school students’ physical activity (PA) can assist in identifying areas of programmatic need within physical education (PE) and for out of school programs. **PURPOSE:** The purpose of this study was to assess the PA levels and patterns of high school students in southern Maine. **METHODS:** Participants were 142 students (86 females, 56 males) from 4 high schools in southern Maine (one urban, one suburban, two rural). Mean age was 14.9 years with 87% of the sample in grade 9. The validated Physical Activity Questionnaire for Adolescents (PAQA) was used in this study to assess PA. The PAQA asks participants to recall their PA during the last 24 h. Information about the type of family, and the guardians’ sociodemographic factors were collected via a questionnaire completed by the students and their guardians.

**RESULTS:** Analysis of covariance revealed that, after controlling for age, gender, and socioeconomic status, 9-11-year-old boys from two-parent families spent more minutes per week in MVPA (274.4±120.4) than those who live with their grandparents (286.9±120.1) and those from single-parent families (284.6±129.4, p<0.05). Regarding the girls aged 12-14 years, those who live with their grandparents spent more minutes per week in MVPA (274.4±105.7) than those from two-parent families (271.9±105.1) or single-parent families (257.3±107.0, p<0.05). Regarding the adolescents aged 15-19 years, we did not find significant differences between the boys and girls. Logistic regression analysis showed that 9-11-year-old adolescents those who live with their grandparents had 28% for boys (OR 0.72, 95% CI 0.61-0.84) and 16% for girls (OR 0.84, 95% CI 0.72-0.98) decreased odds of not reached the recommended level (<60min/day MVPA), respectively, compared with those who from single-parent families. **CONCLUSION:** Being from a single-parent family and living with grandparents are two important factors that influence adolescents’ MVPA levels in Shanghai, China.

3389 Board #294 June 2 2:00 PM - 3:30 PM
ICT USE Influence on Activity Pattern & Body Composition Of University Students In Kwara State, Nigeria
Chibuzo A. N. Oji1,2, 1Department of Nutrition and Dietetics, University of Ilorin, Kwara State, Nigeria. 2Department of Home Economics. University of Ilorin, Kwara State, Nigeria.
Email: oji.nni@ilorin.edu.ng (No relationships reported)

The use of ICT is a prominent aspect of students’ lifestyle in tertiary institutions. ICT creates efficiency in performing tasks but encourages sedentariness, alters body composition and may affect health. **PURPOSE:** To determine influence of ICT use on physical activity pattern and body composition of tertiary institution students.

**METHODS:** The study design was Ex-post facto. Multistage sampling was used to select 2,442 students with mean age 22.8 years from three tertiary institutions in Kwara state, Nigeria. Body composition was determined using height scale, body fat hydration monitor scale (brand number 7032497) and two birds non-elastic tape rule. Validated ICT Use and Physical Activity Questionnaire (IUPAQ) (Rho of .71) was used to assess level of ICT use and physical activity pattern. Approved Ethical Clearance from University of Ilorin and informed consent were duly obtained. Inclusion criteria were penultimate and final year students. Percentage, Mean, and Standard Deviation described the data. Hypotheses were tested at 0.05 alpha level using PPMC, ANOVA and Multiple Regression. **RESULTS:** Many of the students did not perform the recommended physical activity (n = 1,065; 43.6%) and their physical activity pattern was sedentary-based (14 hours per day). Average ICT time per day was 9 hours (65% of which mobile phone time was 4 hours (25%). Strong positive relationship existed between ICT use and sedentariness r = .84, p = .001; physical activity pattern and ICT use p = .001; r = .155; and ICT use and body composition p = .001. Sedentariness was the highest predictor of excessive ICT use Beta = .20, p = .001 & BMI predictor of risk factor Beta = .156. However, light to vigorous intensity physical activity levels indicated low predictive ability of ICT use p<.05. Significant difference in the level of ICT use based on age range, p = .001 and type of institution of participants p = .001. **CONCLUSION:** Prolonged ICT use causes sedentariness and alters body composition with BMI as the highest predictor of risk. This study advocates for institutional physical activity awareness for regulated ICT use campaign.

3390 Board #295 June 2 2:00 PM - 3:30 PM
Phsical Activity, Sedentary Time And Cardiorespiratory Fitness in Brazilian Children
Lilian M S Brito, 80060900, Neiva Leite, 80215-370, Monica N L Cat, 80060900, Margaret C S Boguszewski, 80060900. Universidade Federal do Paraná, Curitiba, Brazil.
Email: lilainmessias@yahoo.com.br (No relationships reported)

**PROPOSE:** to evaluate physical activity (PA), time expended in sedentary activities and cardiorespiratory fitness (CF) in boys and girls before and after 3 months of regular school.

**METHODS:** children were evaluated at school after summer vacation and 3 months after regular classes. Weight (kg), height (m), maturational stage was evaluated. CF was evaluated by determining the maximum volume of oxygen during the Test Come and Go 20 motors by Léger. In addition, a questionnaire about PA and screen time during 3 days (3-DPAR instrument) was applied. Data are expressed as average and standard deviation. T Student and Wilcoxon tests were applied to estimate the difference between averages. Level of significance was set at P<0.05. **RESULTS:** 319 students were included, 146 boys (age 13.6 ± 1.2yrs) and 173 girls (age 13.6 ± 0.9yrs). For girls, first VO2max was 43.5ml/kg/min and second was 48.3ml/kg/min (P<0.002). For boys, respective numbers were 45.8 ml/kg/min and 49.8mg/ml/min (P<0.05). No significant difference was found among boys and girls. No difference was found for PA>30 min/week between the two evaluations and among boys and girls. In time spend with sports, only girls increased significantly from the first to the second assessment (p<0.001). Boys spent more time in sedentary activities (TV, computer and video game) and increased this time between initial evaluation and re-evaluation (p<0.001). **CONCLUSION:** Girls became more active after school start, with increment of VO2max and less time in sedentary activities.
For the results of \( F_{\text{M}} \), MPA contributed for PB, SB\_ for PG, and WT for SG, but these branch points were not confirmed. ADs were associated with \( F_{\text{M}} \) for SB, and sports activities were better than cultural activities.

CONCLUSION:
MVPa is a determinant for reduction of DT, such as \( F_{\text{M}} \), in early adolescence. ADs are an important factor for secondary-school students. Recommended MVPa time is minimally 5 h/week for all early adolescents, >10 h/week for primary-school children, and >21 h/week for secondary-school students.

Supported by Grant-in-Aid for Scientific Research (B) (15H03108), Japan.

## 3393 Board #298 June 2 2:00 PM - 3:30 PM
**Physical Activity and Diet Behavior Patterns of U.S. Adolescent Girls with Different Weight Status**
Yaozong He, Hai Yan, Weimo Zhu, FACSM. University of Illinois at Urbana-Champaign, Urbana, IL. (Sponsor: Weimo Zhu, FACSM)

**Purpose:** The study was to identify the physical activity and diet behavior patterns of U.S. adolescent girls with different weight status.

**Method:** Data was derived from the 2012 National Youth Fitness Survey. A representative/weighted sample of 7,785,784 girls, aged 12-15 yr. old responded to both the physical activity and diet behavior and nutrition questionnaires. ANOVA analysis was applied to determine the difference in physical activity patterns and eating behaviors among girls with different weight status (underweight, normal weight, overweight, and obese, and defined by the CDC percentile classifications).

**Results:** Significant differences were detected in the physical activity and diet behaviors patterns, and the results are displayed in the table below.

<table>
<thead>
<tr>
<th>Weight Status</th>
<th>Underweight</th>
<th>Normal weight</th>
<th>Overweight</th>
<th>Obese</th>
<th>Total F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigorous-intensity work (min)</td>
<td>71.54±33.31</td>
<td>81.72±54.62</td>
<td>0</td>
<td>0</td>
<td>97.86±91.52</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Moderate-intensity work (min)</td>
<td>32.78±15.95</td>
<td>58.65±45.41</td>
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<td>Sedentary activity (min)</td>
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<td>506.04±125.89</td>
<td>522.75±125.89</td>
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<td>508.88±150.59</td>
<td>8608.16 &lt;.001</td>
</tr>
<tr>
<td>% of times/week get school lunch</td>
<td>3.16±2.24</td>
<td>3.17±2.24</td>
<td>3.96±1.56</td>
<td>4.17±1.40</td>
<td>4.39±2.18</td>
<td>45523.19 &lt;.001</td>
</tr>
<tr>
<td>% of times/week get school breakfast</td>
<td>1.09±2.06</td>
<td>1.28±2.08</td>
<td>1.64±2.07</td>
<td>1.65±1.23</td>
<td>1.28±1.96</td>
<td>15019.78 &lt;.001</td>
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<tr>
<td>% of meals not home prepared/week</td>
<td>2.29±2.62</td>
<td>1.87±1.85</td>
<td>1.98±2.04</td>
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<td>31966.502 &lt;.001</td>
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<tr>
<td>% of ready-to-eat foods in past 30 days</td>
<td>27±.95</td>
<td>88±2.91</td>
<td>1.00±1.61</td>
<td>1.35±1.61</td>
<td>87±2.74</td>
<td>12704.638 &lt;.001</td>
</tr>
<tr>
<td>% of frozen meals/pizza in past 30 days</td>
<td>3.23±3.85</td>
<td>2.61±4.06</td>
<td>1.86±3.00</td>
<td>2.42±2.67</td>
<td>2.57±3.91</td>
<td>14507.226 &lt;.001</td>
</tr>
</tbody>
</table>

**Conclusion:** Overweight and obese girls tended to have less vigorous work and more ready-to-eat food.

## 3394 Board #299 June 2 2:00 PM - 3:30 PM
**The Effect of Bullying on Health Behaviors in Adolescents**

**Email:** kayla.baker@ucf.edu

**Purpose:** To examine the association of bullying with physical activity, sedentary behaviors, and participation in organized sports in a sample of adolescents living in Ireland.

**METHODS:** The sample consisted of 7,314 adolescents (13 years of age; 55% female) who were part of the Growing Up in Ireland (GIU) study, a national study that focused on a broad range of adolescents’ characteristics, experiences, and development. Adolescents completed a series of questionnaires assessing whether participants had been victims of bullying, and their feelings associated with bullying (fear, isolation, and anger). Participants also reported amount of time engaging in vigorous physical activity (VAPA), sedentary behaviors (SB) (watching the television, playing computer games, and playing video games), playing an organized sport (SPORTS), and the number of friends who engage in these activities with participants. Multiple regression analysis was used to examine the association of bullying with

**Results:**

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Childrenhood obesity is a public health concern with the trajectory into adult obesity. Increasing moderate-to-vigorous physical activity (MVPA) and decreasing sedentary behavior (SB) are associated with lower childhood obesity. Environmental factors, such as outdoor time and TV viewing time (TVVT), may contribute to MVPA and SB in preschool children. The child-care environment influences MVPA and SB, and is an area for improving activity patterns. PURPOSE: The purpose of this study is to determine the relationship between outdoor time and TVVT with physical activity in preschool children at the child-care center, while adjusting for classroom similarities. METHODS: An observational study at child-care centers was conducted during 2011-2014. Outdoor time was defined as time children spent in an outdoor play space, and TVVT was defined as time children spent watching TV. Physical activity intensity and duration was measured for the entire school-day using waist-worn accelerometers. Data were recorded in 15-second epochs and analyzed with age-specific cut points to determine intensity. Dependent movement variables included minutes of SB, light physical activity (LPA), MVPA, and total steps. Hierarchical models were adjusted for weather, and used for the clustering of children within the classroom. RESULTS: Participants (n=202) of 34 classrooms were 3.7±0.7 years old, 51% male, and 66% Caucasian. Children took 4453±1655 steps, 310±83 minutes of SB, 36±13 minutes of LPA, 307±70 minutes of MVPA, and 241±52 minutes of TVVT. Outdoor time was observed in 87% of classrooms for 77±65 minutes, and TVVT was observed in 52% classrooms for 57±39 minutes. In hierarchical modelling, outdoor time was associated with SB (p<0.01), LPA (p<0.01), MVPA (p<0.01), and steps (p<0.01). At the classroom level there were mixed results on the impact of outdoor time, some classrooms with higher outdoor time exhibited higher LPA, MVPA and steps, while others engaged in more SB. TVVT was only associated with MVPA (p<0.01), with differing directions of association at the classroom level. With higher TVVT, some classrooms showed more and others less MVPA. CONCLUSIONS: Investigating the differences between classrooms and the role of the teacher may help increase children’s physical activity.

3395 Board #300 June 2 2:00 PM - 3:30 PM The Relationship between Outdoor Time and TV Viewing Time With Children’s Physical Activity At Child Care Chelsea L. Smith1, Alexandra Benear2, Michael P. Anderson1, Jill Soto1, Sandra Arnold1, Susan B. Sisson, FACSM1, 1University of Oklahoma Health Sciences Center; Oklahoma City, OK; 2University of Oklahoma, Norman, OK. (Sponsor: Susan B. Sisson, FACSM) Email: csmith37@ouhsc.edu (No relationships reported) Childhood obesity is a public health concern with the trajectory into adult obesity. Increasing moderate-to-vigorous physical activity (MVPA) and decreasing sedentary behavior (SB) are associated with lower childhood obesity. Environmental factors, such as outdoor time and TV viewing time (TVVT), may contribute to MVPA and SB in preschool children. The child-care environment influences MVPA and SB, and is an area for improving activity patterns. PURPOSE: The purpose of this study is to determine the relationship between outdoor time and TVVT with physical activity in preschool children at the child-care center, while adjusting for classroom similarities. METHODS: An observational study at child-care centers was conducted during 2011-2014. Outdoor time was defined as time children spent in an outdoor play space, and TVVT was defined as time children spent watching TV. Physical activity intensity and duration was measured for the entire school-day using waist-worn accelerometers. Data were recorded in 15-second epochs and analyzed with age-specific cut points to determine intensity. Dependent movement variables included minutes of SB, light physical activity (LPA), MVPA, and total steps. Hierarchical models were adjusted for weather, and used for the clustering of children within the classroom. RESULTS: Participants (n=202) of 34 classrooms were 3.7±0.7 years old, 51% male, and 66% Caucasian. Children took 4453±1655 steps, 310±83 minutes of SB, 36±13 minutes of LPA, 307±70 minutes of MVPA, and 241±52 minutes of TVVT. Outdoor time was observed in 87% of classrooms for 77±65 minutes, and TVVT was observed in 52% classrooms for 57±39 minutes. In hierarchical modelling, outdoor time was associated with SB (p<0.01), LPA (p<0.01), MVPA (p<0.01), and steps (p<0.01). At the classroom level there were mixed results on the impact of outdoor time, some classrooms with higher outdoor time exhibited higher LPA, MVPA and steps, while others engaged in more SB. TVVT was only associated with MVPA (p<0.01), with differing directions of association at the classroom level. With higher TVVT, some classrooms showed more and others less MVPA. CONCLUSIONS: Investigating the differences between classrooms and the role of the teacher may help increase children’s physical activity.

3396 Board #301 June 2 2:00 PM - 3:30 PM Time Segment Specific Physical Activity During School Hours In Six-Nine- And 15-year-olds Knut Eirik Dalene, Bjørge H. Hansen, Ulf Ekelund, FACSM, Sigmund A. Andersen, Fabian Andersen, Elin Kolle. Norwegian School of Sport Sciences, Oslo, Norway. (Sponsor: Jorunn Kainerd Sundgot-Borgen, FACSM) Email: k.e.dalene@nh.no (No relationships reported) It is recommended that youth spend ≥60 min/d in physical activity (PA) of moderate-to-vigorous intensity (MVPA). Because the vast majority of children attend school, this environment can provide an ideal arena for PA promotion and it has been argued that schools should provide opportunities to accumulate ≥30 min/d of MVPA (i.e., ≥50% of recommended daily minimum). However, the current knowledge of MVPA accumulated during school is limited by small sample sizes, short duration of observation and inaccurate segmentation of periods during the school day. Purpose: To examine time segment specific MVPA during school hours, using accurately segmented accelerometer data collected over a full school week in a representative, population-based sample of 6-, 9-, and 15-year-olds attending a diverse sample of schools. Methods: We used accelerometer data (ActiGraph GT1M/ GT3X+) from a sub-sample of the PA among Norwegian Children Study. Participants attended 34 different schools (82 classes) that provided class schedules describing the exact start and end time of the school day, recess periods and physical education (PE) classes. To classify time segment specific MVPA, we summed all 10 sec epochs within the different time segments containing ≥333 activity counts (vertical axis). We applied random effects linear regression models, accounting for the clustered nature of the data. Results: Among 6- (n=166), 9- (n=296) and 15-year-olds (n=323), 57%, 35% and 9% accumulated ≥30 min of MVPA per school day, respectively. Boys accumulated significantly more MVPA than girls during school hours, recess and PE (adjusted for age and sex). However, during individual PE classes (p<0.03). Conclusion: Greater attention should be paid to the prevention of bullying in schools. In addition to the negative psychological effects on adolescents, bullying may deter adolescents from participation in sports, and indirectly increase time spent in SB.

3397 Board #302 June 2 2:00 PM - 3:30 PM Day-to-day Reciprocal Associations Between Sleep Health, Physical Activity, And Sedentary Behavior In Adolescents Youngdeok Kim1, Masatsuma Udema2, Marc Lochbaum1, Steven Stegemeier1. Texas Tech University, Lubbock, TX. (Sponsor: University of Texas at San Antonio, San Antonio, TX) Email: youngdeok.kim@ttu.edu (No relationships reported) Physical activity (PA) has been continuously examined as one of the modifiable lifestyle factors influencing sleep health in adolescents. However, the evidence is inconclusive and scarce data are available exploring temporal, bidirectional relationships between PA, sedentary behavior (SB), and sleep health in this population. PURPOSE: This study examined the day-to-day reciprocal associations of objectively measured PA, SB, and sleep parameters in young adolescents. METHODS: 263 adolescents (135 boys in 6th-8th grades were asked to wear the ActiGraph GT9X accelerometer on their non-dominant wrist for 24-hour across three consecutive school days while completing sleep quality survey every morning. The parents recorded daily screen time of their child. Total sleep time (TST), sleep efficiency, and sleep fragment index (SFI) were estimated using the Sadeh algorithm. The % of moderate and vigorous PA (MPV A) and SB, relative to total wear time in a day, before and after school ends (BS and AS, respectively), were estimated using the Chandler’s cut points for each measurement day. Multilevel models were constructed to examine the day-to-day reciprocal associations between study variables after adjusting for the repeated measures within participants as well as study covariates. RESULTS: MVPA and SB on one day were significantly associated with TST on that night. The reduced TST was associated with increased MVPA-BS (b=-2.72; p<0.045) and AS-BS (b=-2.62; p<0.001) with an inverse relationship was observed with SB-BS (b=2.20; p<0.01). The increased SB-AS was associated with improved sleep efficiency (b=0.16; p<0.006) and SFI (b=-0.24; p<0.002), and screen time was associated with a decreased likelihood of having good sleep quality (OR=0.89; 95% CI = 0.82, 0.97). Meanwhile, TST on previous night was associated with SB-BS (b=0.02; p<0.001) on next day, and lower sleep quality was associated with decreased MVPA-BS (b=-0.24; p<0.042), increased SB-AS (b=1.62; p<0.022) and screen time (b=14.54; p<0.049) on next day, respectively. CONCLUSIONS: The current study suggests that, in general, a good perceived sleep quality on the previous night can potentially promote PA and reduce SB on next day. However, the temporal effects of PA and SB on sleep health are still inconclusive that warrants future study.

3398 Board #303 June 2 2:00 PM - 3:30 PM Recess, Regular Physical Activity Outside Of School And Academic Achievement In U.S. Elementary School Students Beate Henschel, Andrea Kaye Chomistek. Indiana University; Bloomington, IN. (Sponsor: Georgia C. Frey, FACSM) Email: bhenschel@indiana.edu (No relationships reported) Physical activity (PA) in general, but also time for recess, has declined in recent decades among children in the U.S. Carlson et al (2008) found small beneficial effects of time spend in physical education on math and reading scores but did not include recess or other PA measures. PURPOSE: To assess the association between recess, regular PA outside of school, and math scores in U.S. elementary school students. METHODS: We used the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K) for this analysis. Students followed in the ECLS-K cohort were followed from Kindergarten (KG) through 1st, 3rd, 5th and 8th grade; but here only data from full-time KG, 3rd and 5th grade was used (N=1036). Mixed models with random effects were estimated to account for clustering by schools and repeated measures by students.

Abstracts were prepared by the authors and printed as submitted.
RESULTS: We confirmed the decline of recess over time; however, the majority of students in KG, 3rd and 5th grade had daily recess. In the unadjusted models, we found significantly higher math scores in 5th grade among students with more than average (β=-4.3), average (β=-1.4) and below average (β=-4.4) time for recess compared to students with no recess (all p<0.001). The effect of recess in 3rd grade was similar but less strong. Additionally, regular PA/exercise outside of school resulted in significantly higher math scores in 3rd grade students (β=−4.9) and 5th grade students (β=3.3) compared to children without regular exercise (all p<0.001). However, once we adjust for race, parental education and gender, the majority of effects of recess on math scores did not remain significant. Only students with a low amount of recess compared to no recess in 5th grade had significantly higher math scores (β=2.1, p=0.03). Also, regular exercise outside of school was positively associated with math scores in 3rd grade (β=2.5, p=0.001).

CONCLUSIONS: Academic achievement is related to future health since school outcomes are highly correlated with future socio-economic status which itself is correlated with health status in adults. We conclude that - compared to race and SES - recess and regular PA seem to be beneficial but of lower importance for academic achievement. Nonetheless, both PA measures are modifiable factors and thus can potentially play a vital role in both health promotion and improved school outcomes.

3399    Board #304    June 2 2:00 PM - 3:30 PM
Tracking Of Clustered Metabolic Syndrome Risk Factor In Japanese Children
KENSAKU SASAYAMA1, MINORU ADACHI2. 1Okayama University of Science, Okayama, Japan. 2Okayama University, Okayama, Japan.

PURPOSE: Longitudinal studies about “tracking” of metabolic syndrome (MetS) risk factors are limited in Asian children. It is also unknown how fatness and physical activity levels contribute the track of MetS risk. The purpose of this study was to investigate tracking clustered metabolic syndrome (MetS) risk taking into account of fatness and aerobic fitness from childhood to adolescence in Japanese children.

METHODS: This cohort study included 113 participants (47 boys and 66 girls) who were measured for MetS risk factors at 9 years and 12 years of age. This study was performed in Ibara city of Okayama prefecture in Japan. All participating children and their parents provided written informed consent before participation. MetS risk scores were calculated from the total sex-specific values (z-scores) of the following five parameters: waist to height ratio, predicted VO2peak, triglycerides, high density lipoprotein cholesterol, and mean arterial pressure. All measurements were investigated at baseline (September, 2008) and follow-up (September, 2011). Partial correlation coefficients were calculated to determine the tracking of MetS risk variables and clustered MetS risk score from childhood to adolescents. A correlation ranging from 0.00 to 0.29 indicates low correlation, a correlation from 0.30 to 0.59 indicates a moderate relationship, and a correlation from 0.60 to 1.00 indicates a high relationship.

RESULTS: Sex-adjusted partial correlation coefficients for HDL-c (r=0.436, p<0.001), W/H (r=0.753, p<0.001) and systolic blood pressure (SBP, r=0.452, p<0.01) indicated a moderate relationship. In addition, MetS risk score (r=0.647, p<0.001) indicated a high correlation. Correlation coefficients of MetS risk score between 9 and 12 years were higher in low W/H (r=0.713, p<0.001) than those in high W/H (r=0.402, p=0.01). In addition, that in low VO2peak (r=0.630, p=0.001) was higher than that in high VO2peak (r=0.452, p=0.01).

CONCLUSIONS: We found that MetS risk was stable from childhood to adolescence in Asian children. Furthermore, our results show that both the fitness and fitness are crucial for tracking clustered MetS risk factors. Schools are viewed as optimal settings for intervention efforts aimed at reducing childhood obesity. Identification of ways to increase physical activity throughout the school day is an important public health issue. Modern modifications to curriculum delivery or physical environment provide direct avenues to address this issue.

PURPOSE: The purpose of this study was to examine physical activity levels of middle school-aged students during a studio-based learning experience. The studio-based learning environment utilized the “purpose, critique, iterate” cycle of repetitive thinking and learning that comes from the system of training used by designers across many professional fields. METHODS: Eleven 7th and 8th grade students who were identified as being “at-risk” for dropout were invited to participate in an educational service project aimed at developing areas of core curriculum by working collaboratively.胁: A studio-based learning experience was conducted between the hours of 8AM and noon (240 minutes) for two weeks in the summer. Participants were issued an Actigraph GT3x+ accelerometer upon arrival and monitors were collected at the end of each day. Physical activity was also measured the following fall semester in the same students. General anthropometric measurements were also assessed. RESULTS: Height approximated the 50th percentile for both boys and girls. Weight and BMI approximated the 90th percentile for boys and the 75th percentile for girls. Participants took part in an average of 25.0 and 7.2 minutes of moderate and vigorous physical activity, respectively, during the studio-based learning experience. During the regular school year, these students procrastinated an average of 7.4 and 3.1 minutes of moderate and vigorous physical activity, respectively, during the hours of the school day corresponding with the summer experience. CONCLUSIONS: Studio-based learning may provide a viable option for increasing physical activity levels while addressing academic performance. This is particularly important for students classified as “at-risk” for dropout as they are often the same population affected by health disparities.

3400    Board #305    June 2 2:00 PM - 3:30 PM
The Association of FNPA Score and Nighttime Sleep With Preschooler Body Size and Adiposity
Emily Hil Guseman1, Cassandra L. Ayres1, Susan B. Sisson, FACSM2. 1University of Wyoming, Laramie, WY. 2University of Oklahoma Health Sciences Center, Oklahoma City, OK.

PURPOSE: The purpose of this study was to examine the cross-sectional associations between characteristics of preschoolers’ home environment and sleep habits with body size and adiposity. Methods: Parents of 2-5-year-old children who completed the Family Nutrition Physical Activity (FNPA) tool and Children’s Sleep Habits Questionnaire (CHSQ). Child height and weight were determined according to standard procedures and BMI percentile was determined using the 2000 CDC growth charts. Adiposity was assessed using skinfold thicknesses (tricip, subscapular, suprailliac) and sum of skinfolds was calculated. Results: To date, 19 girls (mean age 3.1 ± 0.9 y) have participated in the study. Boys and girls did not differ in terms of any anthropometric variables; therefore, analyses are not divided by sex. Twenty-one percent of the sample (n=4) met criteria for overweight or obesity based on BMI percentile. Correlations between anthropometric variables and the FNPA total score did not reach statistical significance. Nap duration tended to be inversely related to BMI percentile (r=−0.51, p=0.06) and z-score (r=−0.50, p=0.07). The FNPA total score was strongly correlated with total daily sleep (r=0.88) and minutes of moderate activity (r=0.80), indicating that children who live in generally healthy family environments are more likely to demonstrate healthy sleep habits. Conclusion: To our knowledge, this is the first study to use the FNPA as a measure of the family environment in a preschool-aged sample. Our results suggest that sleep characteristics may be associated with the family environment and adiposity in preschoolers; however, additional research with larger sample sizes is necessary to confirm these findings.
metabolic disorders. In order to reduce the increasing prevalence of MetS, increasing the total number of steps/day in conjunction with a focus on moderate-vigorous physical activity levels may reduce the risk factors associated with MetS later life. Ongoing participant collection will continue, looking to establish correlates between MetS criteria and physical activity.

**PURPOSE**
- Use of the body mass index percentiles (BMI%) allows for consideration of growth and maturation throughout childhood but creates a ceiling effect for children with severe obesity who are classified at the 99th percentile. This study aimed to evaluate variances by age and gender of alternative measures of weight status in children and adolescents.

**METHODS**
- Age, height and weight from all children ages 3-18 were obtained from NHANES 2009-2010, 2011-2012, and 2013-2014 and BMI variables were calculated. These included raw BMI (kg/m²), BMI%, BMI z-score, and percent over the 50th and 95th percentiles. Means and variances of these variables were calculated for all children with BMI% of 99% as well as 50% for comparison purposes. Analyses were conducted for 3-6, 7-11, and 12-18 year-old age groups.

**RESULTS**
- Data was available for 9049 subjects. Raw BMI for all subjects with BMI% ~ 99 ranged from 19.06 - 57.1 kg/m² and mean BMI was 22.5, 29.6, and 39.6 kg/m² for 3-6 year olds, 7-11 year olds, and 12-18 year olds, respectively. The range was much narrower among children at the 50th percentile (15.2 - 22.0 kg/m²). Average BMI z-score for subjects at the 99th percentile ranged from a low of 2.5 in 7-11 year olds to a high of 2.9 in 3-6 year olds. Percent over the 50th percentile ranged from 22.3% - 155.8% in 3-6 year olds, 44.6% -189.6% in 7-11 year olds, and 60.0% -169.1% in 12-18 year olds. These ranges were narrower in children at the 50th percentile (-0.3% to 0.9%, -0.8% to -0.4%, and -0.9% to -0.2%, respectively). Among subjects at the 99th percentile, percent over the 95th percentile ranged from 0.5% to 114.1% in 3-6 year olds, 17.8% -122.7% in 7-11 year olds, and 20.8% -99.6% in 12-18 year olds.

**CONCLUSIONS**
- Alternative weight variables including percent over the 50th percentile and percent over the 95th percentile may allow for better distinction among children and adolescents presenting with severe obesity.

**Does a child’s BMI percentile change from 1st to 10th grade?**

**PURPOSE**
- Obesity, specifically in childhood, has become an important public health concern because of possible long-term correlations with heart disease and chronic illnesses in adulthood. However, there is limited evidence measuring the link between childhood to adolescent BMI by trained professionals. The purpose of this study is to track BMI measurements in 1st graders and later in 10th graders to analyze BMI trends from childhood to adolescence.

**Methods**
- Child height and weight were measured in 1st grade (by school nurses) and 10th grade (by Physical Education teachers) and converted to Body Mass Index percentiles (BMI%) for sex and age using standard CDC SAS code. Subjects were grouped into BMI Categories (Cat) based on 1st grade BMI% with all children with BMI% less than 10% in Cat0, BMI% from 10-19% in Cat1 and so forth, up to Cat9 with 1st grade BMI% of 90% or higher. Average 10th grade BMI% and average change in BMI% from 1st to 10th grade were computed for each BMI Category.

**Results**
- Complete data was available for 559 subjects. Average 10th grade BMI% ranged from 35.8% in Cat1 to 90.2% in Cat9. Average BMI% change was 2.86% from 1st to 10th grade. Average BMI% in Cat0 increased by 31.4% while Cat9 showed an average decrease of 6.9%. Cats 7, 8, and 9 all showed overall decreases in BMI% while Cats 0-6 showed increases.

**Conclusion**
- Categories 7, 8, and 9 show a decrease in BMI; however, that may be due to the maximum category limit. Childhood and adolescent obesity is an important public health concern as it shows an increased risk of becoming overweight and obese in adulthood, placing them at higher risk for chronic illness and heart disease. Obesity remains an issue and should continue to be monitored from childhood to adolescents.


**Associations between Physical Activity, Sedentary Time and Percent Body Fat in Chilean Adolescents**

Maribel Parra-Saldias1, Farah A. Ramirez-Marrero, FACSM2. 1Universidad de Los Lagos, Santiago, Chile. 2University of Puerto Rico, San Juan, Puerto Rico. Email: mparrasaldias@gmail.com

The prevalence of overweight and obesity among Chilean adolescents in 8th grade has increased from 41% in 2014 to 45% in 2016. However, physical activity (PA) and sedentary characteristics in this group of adolescents has not been evaluated. **PURPOSE:** To evaluate PA and sedentary time (ST) and their association with percent body fat among 8th grade adolescents in Chile. **METHODS:** A group of 156 adolescents (87 males, 69 females, mean age~13.4±0.7 yrs) were recruited from 4 public schools in the metropolitan region in Chile. Measures of height, weight, and percent body fat using bioelectrical impedance were obtained. Physical activity and sedentary behavior were measured with ActiGraph GT3X+ accelerometers that adolescents wore in the right hip area attached to an elastic waist band for 8 consecutive days. T-tests were conducted to detect gender differences, and Pearson correlations and linear regressions were used to evaluate associations between PA, ST, and percent body fat. **RESULTS:** Males and females were not different in ST (9.0±2.6 vs. 8.9±2.8 day/hr, P=0.97), but females had higher percent body fat compared with males (27.8±5.9 vs. 17.2±7.1, P<0.001). lower moderate to vigorous PA (MVPA) (170.7±112.8 vs. 285.3±161.1 min/week; P=0.001), and lower steps/day (5951±2139 vs. 7181±2668; respectively, P=0.002). MVPA was inversely associated with percent body fat (r=-0.30, P=0.0004) but ST was not associated with percent body fat. However, a strong inverse association was observed between percent of the day in ST and MVPA (r=-0.62, P<0.001). **CONCLUSION:** This group of Chilean adolescents had high ST and no compliance with PA recommendations, particularly females; and those with less MVPA had higher percent body fat. To help control the obesity trend among adolescents in Chile, school programs that incorporate more PA and reduce ST is warranted.

**Associations with Physical Activity and Sedentary Behavior with Physical Fitness in Chinese Children and Adolescents**

Zheng Zhu1,2, Peijie Chen2, Zhen-Bo Cao1, Yan Tang, Jie Zhuang, Yang Liu. Shanghai University of Sport, Shanghai, China. (No relationships reported)

**PURPOSE:** The purpose of this study is to examine the associations of physical activity and sedentary behavior with physical fitness in Chinese children and adolescents. **METHODS:** A total of 33,414 participants (boys:48.9%, age:12.5±2.5 yr, weight:48.0±14.9 kg, height:154.6±13.9 cm, BMI:19.7±3.9 kg/m2) completed physical activity and sedentary behavior questionnaire and physical fitness test including Body Mass Index (BMI), lung capacity, sit and reach, jump rope/long jump, sit-ups/pull up and shuttle run /800meter/1000meter run. The participants were categorized into either “fit” or “ unfit” by using National Students Physical Fitness Standard depending on whether they met the standard or not. Multiple logistic regressions were performed to examine the associations of physical activity and sedentary behavior with physical fitness after controlling for gender, age and BMI. **RESULTS:** After adjusting gender, age and BMI, physical activity and sedentary behavior were significantly associated with physical fitness, independently. The children and adolescents who did not meet the recommendation of 60 min/day of moderate and vigorous physical activity (MVPA) had 1.97 times the odds of being unfit compared to those meeting guideline (95% confidence interval [CI] of Odds Ratio:1.69-2.30). The children and adolescents who did not meet the sedentary behavior guideline had 1.27 times the odds of being unfit compared to those meeting guideline (95% CI of Odds Ratio:1.07-1.50). In joint association analysis, children who did not meet the physical activity nor sedentary behavior guidelines had 2.26 times higher odds of being unfit than children who met both guidelines (95% CI of Odds Ratio: 1.61-3.17). **CONCLUSION:** The results demonstrated that being physically active and reducing the sedentary behavior are independently and positively associated with physical fitness in children and adolescents.
PURPOSE: Recent literature suggests that anthropometric measures are correlates of gross motor competence in children. The purpose of this study was to determine if body mass index (BMI) or waist circumference (WC) are associated with children’s scores on the Canadian Agility and Movement Skill Assessment (CAMSA).<br><br>METHODS: Children aged 8-12 years (n = 7,773), with parental consent, from 7 Canadian provinces had their physical literacy level measured using the Canadian Assessment of Physical Literacy (CAPL). CAPL testing was completed between 2012-2016 and administered by trained research staff. As part of the CAPL tests, movement competence was measured using the CAMSA which evaluates fundamental, combined, and complex movement and motor skills. Children were scored on time to complete the CAMSA (range 0-14 points) and ability to demonstrate the movement skill criteria (range 0-14 points) for a combined score out of 28, with the best of two trials used for analyses. BMI was calculated from measured height and weight and converted to BMI z-score using the World Health Organization’s (WHO) BMI-for-age growth charts. SB and BMI were measured at 18 sites across Canada and used the Walk 4 Life Pedometer for 7 days. Also completed a series of motor skills tests: running 60 meters, overhand throw, and horizontal jump. A Spearman correlation analysis was used to identify relationships between variables.<br><br>RESULTS: The results showed that students did not fulfill the current PA recommendation assessed by pedometer (6,546.6 steps/day + 3234). Nevertheless, according to IPAQ, the population obtained a moderate/vigorous PA (5,499 METS + 6993), and engaged an average of 285 min/day of sedentary time in their most active day. Total FMS score averaged 19.4±3.8 PA (step/day) and METs were not correlated with FMS (r² = 0.04, p = .75) and (r² = 0.12, p = .24). PA (METs) was significantly correlated with overhand throw (r² = .255, p < .02).

CONCLUSION: In conclusion, the participants did not comply with the total amount of daily steps recommended for PA and did not reach the expected level of FMS.

Background: The Norwegian Directorate of Health recommends that children between 3 to 5 years accumulate at least 60 minutes of moderate-to-vigorous intensity physical activity daily. However, knowledge about physical activity levels in preschoolers is limited.

PURPOSE: To compare physical activity levels in kindergarten preschool during summer and winter in children aged 3-5 years.

METHODS: From Monday to Wednesday, physical activity levels were measured using the Actigraph GT3X between 6:30 am and 4:30 pm. PA (as METs) was measured in duplicate using a WHOCG AP10 activity monitor. The Norwegian Directorate of Health recommends that children between 3 to 5 years accumulate at least 60 minutes of moderate to vigorous physical activity daily, whereas 29% was in MVPA between physically active 30-59 minutes per day, and 6% were in MVPA active ≥ 60 minutes per day, while 39% were active/active MVPA between 30-59 minutes per day, and 11% was in MVPA less thanwere active >29 minutes. In total for bout periods the boys spent significantly more time in MVPA (84.11 minutes ± 37.97) compared to girls (63.46 minutes ± 31.39) (p<0.001). In the winter, 65.8% of the boys met the recommendations, and the percentage was reduced to 58% in the summer. For girls, the respective numbers were 34.5% and 41%. Boys were significantly more active than girls ( ) in both periods.

CONCLUSION: More than 2/3 of preschoolers do not reach the recommendations of 60 minutes moderate-to-vigorous physical activity. More children in preschool reached the recommendations of MVPA above 60 minutes in the winter, compared with the summer period.

There is growing interest in sedentary behaviour (SB) and its association with health outcomes. However, few studies have considered the changes in SB as an index of increasing levels of Fundamental Motors Skills (FMS) would be more physically active. The lack of PA is currently a global problem for it has caused 1.9 million deaths. Furthermore, only 33.8% of the population in Puerto Rico meets the current PA guidelines, thus placing in the top position with the lowest percentage among all the states and territories of the United States.<br><br>PURPOSE: To investigate the relationship between PA and FMS in college-age students in Puerto Rico. METHODOLOGY: Participants were 91 college-age students that completed the International Physical Activity Questionnaire (IPAQ) and used the Walk 4 Life Pedometer for 7 days. Also completed a series of motor skills tests: running 60 meters, overhand throw, and horizontal jump. A Spearman correlation analysis was used to identify relationships between variables.

RESULTS: The results showed that students did not fulfill the current PA recommendation assessed by pedometer (6,546.6 steps/day + 3234). Nevertheless, according to IPAQ, the population obtained a moderate/vigorous PA (5,499 METS + 6993), and engaged an average of 285 min/day of sedentary time in their most active day. Total FMS score averaged 19.4±3.8 PA (step/day) and METs were not correlated with FMS (r² = 0.04, p = .75) and (r² = 0.12, p = .24). PA (METs) was significantly correlated with overhand throw (r² = .255, p < .02).

CONCLUSION: In conclusion, the participants did not comply with the total amount of daily steps recommended for PA and did not reach the expected level of FMS.
METHODS: Secondary data were analyzed via descriptive statistics, paired t-tests. ΔSB and its associations between ΔMVPA and ΔBMI were assessed using a multivariate linear regression model, adjusted for gender and baseline values of age, SB, MVPA and BMI. RESULTS: The SB and BMI baseline increased significantly compared with follow-up (56.21 ± 46.81 and 577.29 ± 49.81 min/day; p = 0.033; 17.55 ± 2.44 kg/m², 19.61 ± 3.21 kg/m²; p = 0.0001, respectively) and MVPA was not significantly different (67.23 ± 15.38 and 65.24 ± 20.73; p = 0.380). Multiple linear regression analyses showed that ΔSB was negatively related to ΔMVPA (β = -0.609; 95% CI: -2.30, -1.39; p = 0.0001), however it was not associated significantly with ΔBMI (β = -0.088; 95% CI: -0.71, 1.58; p = 0.218). CONCLUSIONS: The increase of SB with age could displace the time spent in MVPA, although the influence of the BMI values remained unclear for the children sample presented here. This reinforces public health measures and suggests the need of interventions focusing in decline SB and increase MVPA during childhood. Supported by the CIAFEL under grant number UID/DTP/00617/2015; FCT under grant number SFRH/BPD/86538/2012; CNPq under grant number 206862/2014-8 and CAPES under grant number 6099/13-0.

### Table

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<tr>
<th>Variables</th>
<th>Pretest Mean (SD)</th>
<th>Post-test Mean (SD)</th>
<th>Δ Mean difference (post-pre)</th>
<th>t</th>
<th>P</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>SW</th>
<th>P (Wilcoxon)</th>
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<td>Body fat percentage</td>
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<td>23.53 (10.96)</td>
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<td>520.70 (30.02)</td>
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<td>131.71 (19.11)</td>
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<td>Self-efficacy score</td>
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**No sample size**

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<th>SD= standard deviation</th>
<th>Δ-paired t-statistic</th>
<th>P=p-value for paired t-test; *indicated significance at the 0.05 level</th>
<th>SW=p-value of Shapiro-Wilk test</th>
<th>P (Wilcoxon)</th>
<th>*indicated significance at the 0.05 level</th>
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<tr>
<td>Disease risk Analysis Results</td>
<td>Disease risk assessed via Bowker’s test for table symmetry</td>
<td>Δ-paired t-statistic</td>
<td>P=p-value for paired t-test; *indicated significance at the 0.05 level</td>
<td>SW=p-value of Shapiro-Wilk test</td>
<td>P (Wilcoxon)</td>
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<td>Disease risk</td>
<td>55/56 subjects had same pretest and posttest disease risk (p = 0.936)</td>
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### Instrument Description

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<th>Variable</th>
<th>Measurement Tool</th>
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<tr>
<td>Disease risk</td>
<td>ACSM Guidelines for Exercise Testing and Prescription (2010) Table utilizing combination of BMI and waist circumference to obtain disease risk</td>
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<tr>
<td>Cardiorespiratory fitness</td>
<td>Three Minute Step Test (Powers &amp; Dodd, 2009)</td>
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<td>Body fat percentage</td>
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<td>Self-motivation</td>
<td>Self-Motivation Inventory (Dishman &amp; Ickes 1981; Merkle, 1997)</td>
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<tr>
<td>Exercise self-efficacy</td>
<td>Exercise Self-Efficacy Scale (Bandura, 1997)</td>
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### Purpose:

**Board #316**

**Effect of a Lifetime Health and Fitness Class on College Students**

Tiffany Young Klockzien¹, Chinaro Kennedy², °Bethany Lutheran College, Mankato, MN. °Centers for Disease Control and Prevention, Atlanta, GA.

Email: tyoung@blc.edu

(No relationships reported)

**PURPOSE:** A pre-post, quasi-experimental study was conducted to evaluate the association between a health and fitness class, physical education 215 (PHED 215) and chronic disease risk, cardiorespiratory fitness (CRF) level, body fat percentage, self-motivation, exercise self-efficacy, and transtheoretical model (TTM) physical activity stage of change progression among male and female college students (n = 64).

**METHODS:** Secondary data were analyzed via descriptive statistics, paired t test (or Wilcoxon signed-rank test if data were not normal), and Bowker’s test of symmetry.

**RESULTS:** Results showed a statistically significant association between PHED 215 and 2 dependent variables: cardiorespiratory fitness level (p = 0.0001) and progressive movement through the TTM stages of change (p = 0.0061). No statistically significant difference was found between PHED 215 and 4 dependent variables: disease risk, body composition, self motivation, and self-efficacy.

**CONCLUSIONS:** Because college age students are shaping their adult behaviors, positive health change adopted during this critical time could increase CRF, establish lifelong exercise habits, improve quality of life, and delay and decrease obesity risk and chronic disease and related costs. While further study in different settings is warranted, PHED 215 could be used as a blueprint for other interventions in the education, community, and healthcare settings.

### Abstracts were prepared by the authors and printed as submitted.
CONCLUSIONS: Physical activity with low level of GMC was found to have a negative influence on the development of physical activity levels in children. Further longitudinal studies are needed to better understand the relationship between GMC and physical activity in children.

**METHODS**

Twenty-six children (15) male and (11) female (age 9.4±0.3 years), diagnosed with overweight or obesity participated in a program of physical activity with moderate to vigorous under the model of CATCH for 10 months, consisting of exercise intensity of 56% evaluated by the equation Slaughter with the formula: 

\[
\text{Exercise Intensity} = \frac{\text{VO}_{2}\text{max}}{\text{HR}_{max}} \times 100
\]

**RESULTS:** The results of student T test showed significant improvement (p<0.05) comparing before and after the program in VO2max (p=0.000) and percentage change (Δ%) of 11.3. CONCLUSIONS: Physical activity with moderate to vigorous under the model CATCH was able to enhance aerobic capacity in overweight or obesity children, however, will be appropriated in the future more studies to better clarify the possibilities of improvements improvement in the percentage of body fat.

**CONCLUSIONS:**

This study showed an association between low SP levels with poor GMC, and the green zone, as high GMC. Body mass index (BMI) was assessed during the early years regardless physical activity levels. Further longitudinal studies are needed to confirm this data. Supported by the CAFEL under Grant UID/DTP/00617/2013; FCT under Grant SFRH/SBD/66538/2012; and CAPES under Grant 6099/13-0.

**CONCLUSIONS:**

Low-income pregnant and postpartum women were recruited nationwide using an online platform. Participants (n=109) recalled pregnancy HPA and JPA using the International Physical Activity Questionnaire (IPAQ) and answered a survey on personal (demographics, self-efficacy, lifestyle beliefs), social (social support, social perceptions, social roles strain) and environmental factors (safety, community involvement). Descriptive statistics were assessed for all variables. Median split was used to categorize HPA and JPA. Correlation matrices were created for personal, social, and environmental factors. Based on established criteria, significant variables were selected to be included in confirmatory factor analysis (CFA). A CFA model for each personal, social, and environmental latent factor and two structural equation models were created for predicting HPA and JPA. RESULTS: Participants' mean age was 29.5 years (±5.6) and 51.9% of women were on Medicaid. Median, range HPA was 28, 0-354 MET-hrs/wk and JPA was 0.2, 0-14.57 min/day (p = 0.01), and visits two (M = 84.49 ± 17.33 min/day) and three (p = 0.045). Overweight/obese mothers displayed no significant change in PA over time. No significant change in sleep over time was observed in either group. No significant differences were observed between the PA and sleep levels of overweight/obese and normal weight mothers. CONCLUSION: Normal weight mothers tended to increase PA levels while overweight/obese mothers did not significantly change their PA levels over time. These findings can help guide future efforts aiming to increase the health of postpartum mothers, especially those that are also overweight/obese.

**CONCLUSIONS:**

Low-income pregnant women are less likely to meet physical activity (PA) recommendations compared to higher income counterparts. Some studies suggest that the difference in activity levels is diminished when household (HPA) and job physical activity (JPA) levels. PURPOSE: To examine personal, social, and environmental factors impacting HPA and JPA during pregnancy in low-income women based on the Ecological Model. METHODS: Low-income pregnant and postpartum women were recruited nationwide using an online platform. Participants (n=109) recalled pregnancy HPA and JPA using the International Physical Activity Questionnaire (IPAQ) and answered a survey on personal (demographics, self-efficacy, lifestyle beliefs), social (social support, social perceptions, social roles strain) and environmental factors (safety, community involvement). Descriptive statistics were assessed for all variables. Median split was used to categorize HPA and JPA. Correlation matrices were created for personal, social, and environmental factors. Based on established criteria, significant variables were selected to be included in confirmatory factor analysis (CFA). A CFA model for each personal, social, and environmental latent factor and two structural equation models were created for predicting HPA and JPA. RESULTS: Participants' mean age was 29.5 years (±5.6) and 51.9% of women were on Medicaid. Median, range HPA was 28, 0-354 MET-hrs/wk and JPA was 0.2, 0-367 MET-mins/hr. Latent personal, social, and environmental factors were not significantly related to HPA or JPA. However, significant interactions occurred between personal and environmental factors (-0.218, p<0.05) and social and environmental factors (-0.207, p<0.05) in the HPA model as well as personal and environmental factors.
There is some evidence to suggest that social support and self-efficacy aid in goal-directed behaviors and may increase levels of physical activity (PA). PURPOSE: To examine the relationship between social support from family and friends, self-efficacy, and PA in a sample of pregnant women. METHODS: Participants (n=23) ≥18 years of age and 14-20 weeks gestation were enrolled in a nutrition and physical activity intervention. A survey assessing demographics (age, marital status, education, and race) was administered. Social support and self-efficacy for engaging in PA was also assessed. Height and weight were objectively measured to calculate body mass index (BMI). An accelerometer was worn to assess percent of day spent sedentary, in light PA, and in vigorous PA. Future research is needed to fully understand the effects of social support from friends, Pearson correlations showed a significant negative relationship with light PA (r=0.43, p=0.04), a significant positive relationship with moderate to vigorous PA (r=0.40, p=0.03) but no relationship with sedentary time (r=0.36, p=0.09). Pearson correlations also indicated significant positive relationships between self-efficacy and sedentary time (r=0.43, p=0.03) and light PA (r=0.45, p=0.02), but no relationship with moderate to vigorous PA (r=0.07, p=0.71). No significant relationships were found between social support from family and any intensity of PA. CONCLUSIONS: Findings indicate that social support from friends may be an important factor to consider when encouraging participation in vigorous PA during pregnancy. Future research is needed to fully understand the effects of social support and self-efficacy on PA during pregnancy. Prospective research with larger sample sizes should consider including more diverse samples of pregnant women. Furthermore, relationships between social support from family and friends, self-efficacy, and PA should be assessed across trimesters.

Physical activity (PA) during pregnancy has an important impact on public health as it reduces the risk of common pregnancy complications and chronic diseases and provides numerous protective factors for pregnant women and their children. Despite national and international guidelines having recommended regular PA for all pregnant women since the 1980s, only a small proportion of women achieve the recommended levels of PA during pregnancy, and longitudinal studies have shown a decline in PA levels as pregnancy progresses. PA levels are also lower in pregnant women compared to their non-pregnant counterparts. Understanding correlates of PA during pregnancy is important in order to target effective interventions to preclude inactivity among pregnant women. PURPOSE: To systematically review the literature regarding different correlates of PA during pregnancy including studies from all over the world. METHODS: A comprehensive and systematic search of the Medline, Embase, PsycINFO, Cochrane Library, SwoMed+, Sociological Abstracts and Web of Science databases up until January 14 2016 was conducted by a professional librarian. Only studies in which PA was assessed prospectively during pregnancy were included. We conducted the present review as suggested by the PRISMA group and used a predefined PICO (Population, Intervention, Comparison, and Outcome) worksheet. RESULTS: Out of 342 records, we reviewed 16 original studies. Half of these used a cross-sectional design. We identified different types of correlates and categorized them into 1) demographic or biological variables; 2) psychological variables; 3) behavioral variables; and 4) social and cultural variables. Most studies reported demographic (e.g. maternal age, education and ethnicity) and biological correlates (e.g. pre-pregnancy PA, smoking and diet) of PA during pregnancy but the results varied widely. Pre-pregnancy PA was the most robust correlate reported. None of the studies reported environmental correlates such as the home environment, transportation, or weather conditions. CONCLUSIONS: PA before pregnancy was the most consistent correlate of pregnancy PA across studies. We need more knowledge on psychological, social and environmental correlates of pregnancy PA, particularly from low- and middle-income countries.

Abstract
Purpose. To examine the effect of trunk exercise program on pain, quality of life (QoL) and physical health (PH) in the late pregnancy and post-partum periods as well as baby weight and size and delivery. METHODS. 90 nulliparous women allocated to a training group (TG) or to a control group (CG). TG carried out a structured program with exercises for flexibility, balance and strengthening for the majority of skeletal muscles specifically for the spinal ones, between the 24th and 36th week of pregnancy. Both TG and CG are evaluated for the pain at the beginning of the program (T1), at the end of the program (T2) and two months post-partum (T3). (QoL) at (T1; T2 and T3). (PH) at T1 and T3. Results. At T1, no significant difference was found between the two groups in: pain intensity (pain interference p=0.317), QoL (p=0.18) and PH (flexibility p=0.06; walking p=0.85). At T2, women of TG had a lower intensity of pain than CG (legs p=0.029, low back (p=0.001), upper back (p=0.02), pelvis (p=0.017), groins (p=0.043), lower pelvis (p=0.009) and interference of pain (p=0.0001)). At T3, TG had a lower intensity of pain than CG, in low back and upper back (p=0.001) and interference of pain (p=0.0001). Best scores of QoL were observed in TG compared to
Patellar tendinopathy is a debilitating condition that often occurs in athletes who participate in jumping sports, such as volleyball or basketball. Ultrasound imaging has previously been used as a diagnostic tool in identifying tendon morphology. However, previous research has not tracked the time course of patellar tendon morphology changes following tenotomy. PURPOSE: The purpose of this study was to track and quantify changes in tendon morphology after bilateral patellar tenotomy in a female collegiate basketball player. METHODS: A Division I female basketball player (height=1.9 m, weight=85 kg) with chronic bilateral patellar tendon pain was recruited for participation in the study. Longitudinal B-mode images were taken of the patellar tendon with a research-grade ultrasound machine (Verosonics Inc, Kirkland, WA, USA) and high frequency (5-12 MHZ) linear transducer at a center frequency of 10 MHz. The subject performed all rehabilitation exercises as prescribed by the athletic trainer and returned for weekly imaging sessions. As secondary measures of recovery, perceived pain and knee function were evaluated using the Victorian Institute of Sport Assessment (VISA) scale which was completed at each visit. Tendon micromorphology was evaluated using a custom MATLAB code (MathWorks, Natick, MA, USA). A region of interest was manually selected from the images and a two-dimensional fast Fourier transform was performed. The peak spatial frequency radius (PSFR) parameter was used to assess the micromorphology of the tendon, where higher PSFR values were associated with increased collagen organization. RESULTS: At the time of abstract submission, the subject had completed two post-surgical visits. The average PSFR increased for both knees (right: 1.00 vs. 1.28; left: 1.07 vs. 1.54). There was a small increase in the total VISA score between visits (5 vs. 8). CONCLUSION: Ultrasound imaging was used to characterize initial micromorphology changes in the patellar tendon following bilateral tenotomy. Preliminary results showed increased collagen organization and improved VISA scores. Future findings may suggest a correlation between self-reported measures of knee pain and function and tendon morphology.

Athletes participating in overhead throwing sports such as pitchers, volleyball players, and javelin are prone to ulnar collateral ligament (UCL) injuries of the elbow. UCL sprains typically occur when the elbow is subjected to repetitive or sudden valgus stress causing the UCL to exceed its tensile limits. Recently, the use of musculoskeletal ultrasound (MSK) during a valgus stress exam of the UCL has gained great interest. PURPOSE: To examine medial elbow joint space (MJS) opening changes during a constant valgus load to the UCL through MSK in collegiate baseball pitchers during 6 weeks of a competitive season. METHODS: Thirteen Division I college baseball pitchers with a mean age of 20.4 ± 1.45 yrs and body mass index of 24.56 ± 1.78 participated. Ultrasound images of the medial joint space on the participant’s throwing arm were obtained using a GE LOGIQ E ultrasound unit. The participants were placed in a supine position with a wedge placed underneath their throwing hand to maintain their elbow angle at 30 deg. A hand held dynamometer was used to apply a 3 kg valgus force 20 cm distal to the medial epicondyle to maintain a constant 5 Nm valgus stress to each participant. The medial joint space of the elbow was imaged at the beginning of the spring baseball season.

Dual-energy x-ray absorptiometry (DXA) is used to assess appendicular lean soft tissue mass (aLM), however, the aLM measured by DXA contains non-skeletal muscle tissue components (fat-free adipose tissue, FFAT). These components, if not accounted for, could falsely inflate the aLM in individuals with a relatively high amount of adipose tissue mass. Ultrasound is an imaging technique used to estimate body composition. Recently, we developed prediction equations for estimating aLM, accounting for other body composition interfaces. aLM was estimated from MT-ulna using a previously published equation (aLM = 4.89 x MT-ulna x body height - 9.15). Pearson correlation coefficients were performed for all variables. Statistical significance was set at p<0.05. RESULTS: There was no significant difference between DXA-derived (17.1 [SD 4.0] kg) and ultrasound predicted (16.9 [SD 3.9] kg) aLM. The ultrasound predicted aLM was strongly correlated to DXA-derived aLM (r=0.910, p<0.001). In addition, DXA-derived appendicular FFAT was significantly correlated to AT forearm (r=0.680, p<0.001).

CONCLUSIONS: Ultrasound forearm measurement correlates well with both aLM and FFAT. This one site measurement might be a quick and useful method for estimating muscle mass in older adults.

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F-65 Free Communication/Poster - Ultrasound and Spectroscopy Applications

3421 Board #326 June 2 2:00 PM - 3:30 PM
Pregnancy Physical Activity Beliefs and Attitudes in a Non-pregnant Population
Mallory R. Marshall, 35229, Katie Hammond, Christian Watts, Caroline Ellis, Bailey Gray, Emily Stallings, John Petrella, FACSM. Sanford University, Birmingham, AL.
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PURPOSE: The purpose of this study was to examine the attitudes and beliefs about pregnancy physical activity (PA) in non-pregnant individuals.

METHODS: Participants were non-pregnant individuals between the ages of 20 and 60 years and were recruited by word-of-mouth and social media, or through one of five doctor’s offices located in the southeastern United States. 738 participants completed at least some of the survey and 454 have complete data. The survey consisted of 27 items in five sections: basic demographic information, PA over prior six months, agree/disagree questions regarding safety and efficacy of PA during pregnancy, importance of exercise for the woman’s health and well-being, and PA beliefs about exercise and lifestyle for pregnant women, and safety of moderate or vigorous intensity PA for mother and offspring. For analysis, participants were dichotomized by age (20 to 40 years; 40-60 years), sex (male; female), and education (Bachelor’s degree; no Bachelor’s degree).

RESULTS: For age, the older group (age 41 to 60) was more likely to view pregnancy PA favorably (p=0.001 to 0.010). Females were more likely than males to view pregnancy PA positively (p=0.007 to 0.024). Participants with a college degree were more likely to agree that pregnant women can begin an exercise program during pregnancy (p=0.047) and benefit from moderate exercise (p=0.017), but were less likely to believe PA is safe for mother and baby (p=0.000 to 0.001).

CONCLUSIONS: Overall, participants who were older, female, and did not have college degrees viewed pregnancy PA more favorably.

3422 Board #327 June 2 2:00 PM - 3:30 PM
Associations Of DXA-derived Appendicular Lean And Fat-Free Adipose Tissue Mass With A Single Forearm Ultrasound Image
Takashi Abe1, Takuya Akamine1, Takuya Akamine1, Mark Loofin, FACSM2. National Institute of Fitness and Sports in Kanoya, Kanoya, Japan. 1The University of Mississippi, Oxford, MS. 2Texas Weslyan University, Fort Worth, TX. (Sponsor: Mark Loofin, FACSM)
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(no relationships reported)

PURPOSE: To investigate the relationships between DXA-derived appendicular fat mass and forearm adipose tissue thickness (AT-forearm) measured by ultrasound and DXA-derived and ultrasound-predicted aLM in older adults.

METHODS: Two hundred fifteen older adults (91 men and 124 women) aged 60-79 had appendicular fat mass and aLM measured by the DXA as well as AT-forearm and MT-ulna measured by ultrasound. Appendicular FFAT was calculated based on the results of a previous study (Appendicular FFAT = appendicular fat mass/0.85 x 0.15). AT-forearm and MT-ulna were measured as the distance between the appropriate tissue interfaces. aLM was estimated from MT-ulna using a previously published equation (aLM = 4.89 x MT-ulna x body height - 9.15). Pearson correlation coefficients were performed for all variables. Statistical significance was set at p<0.05. RESULTS: There was no significant difference between DXA-derived (17.1 [SD 4.0] kg) and ultrasound predicted (16.9 [SD 3.9] kg) aLM. The ultrasound predicted aLM was strongly correlated to DXA-derived aLM (r=0.910, p<0.001). In addition, DXA-derived appendicular FFAT was significantly correlated to AT-forearm (r=0.680, p<0.001).

CONCLUSIONS: Ultrasound forearm measurement correlates well with both aLM and FFAT. This one site measurement might be a quick and useful method for estimating muscle mass in older adults.
then 16 games or 6 weeks after baseline testing. Three images were taken during each session, where specific measurements from the apex of the trochlea to the apex of the ulna were taken. RESULTS: The MJS width increased approximately 15% from an initial baseline testing value of .49 cm±.06 to .56 cm±.02 after 16 games or 6 weeks [F(1,10)= 8.51, p<.01]. The covariates of total innings pitched [F(1,10) = 0.19 p = .68] and year of participation [F(1,10) = 0.11 p = 0.75], were not significant factors in the change of MJS width over time. CONCLUSIONS: The results of this investigation demonstrate that MJS width and UCL integrity can be assessed accurately using diagnostic ultrasound during a valgus stress test. Moreover, these data indicate that total innings pitched during a season and year of participation did not have an influence on the MJS width. Further research is recommended to perform multiple imaging testing throughout the entire year (Fall and Spring seasons) to determine specific time points at which MJS width changes in collegiate baseball pitchers.

PURPOSE: To examine the reliability of ultrasound imaging measurements of UCL width at 2 different anatomical locations using 5Nm valgus stress; and to determine if a difference in ligament width exists between the two measurements 4 weeks apart within the season. METHODS: Thirteen Division I college men’s baseball pitchers participated with a mean age of 20.4 ± 1.45 SD) and body mass index (BMI) 24.56 ± ± 1.78 SD). Ultrasound images were obtained of the anterior band of the UCL on the participant’s throwing arm using a GE LOGIQ E ultrasound unit with a linear probe at 12Mhz. Participants were placed in a supine position with a wedge placed underneath their forearm to maintain their elbow position at a 30 deg. flexion angle. A 5Nm valgus stress was applied to 2 centimeters distal to the medial epicondyle. Measurements at the mid substance and the apex of the trochlea were taken at the beginning of the baseball season and then 4 weeks later. Three images were measured during each session. RESULTS: Intra-rater reliability as expressed by ICC (3, 3) was .929 (SEM= 0.18mm) & .935 (SEM= 0.20mm) for the apex of trochlea measurement site and .861 (SEM= 0.22mm) & .920 (SEM=0.16mm) for the mid-substance measurement site, indicating excellent intra-rater reliability. There was no difference between the measurements obtained on the two testing dates (Apex of trochlea mean width 2.90mm & 2.92mm; t= -1.155; p ≥ 0.05) and (Mid-substance mean width 4.49 mm & 4.44 mm; t= -0.51; p ≥ 0.05) CONCLUSIONS: Excellent intra-rater reliability was found at all four measurement sites. There was no significant difference in UCL width from the beginning of the season and one-month into the season. Further research is recommended to perform multiple imaging sessions throughout the year to determine the long term physiological effects of overhead throwing on the anterior band of the UCL and to study the connection between UCL width changes, tissue quality, and injury risk.

Ultrasonography is a noninvasive imaging modality which has been used extensively to evaluate tendon/bone interfaces. In applying the technology to evaluate the aspect of tendon microstructure, the study aims at characterizing the differences in the tendon microstructure between an asymptomatic group and a symptomatic group of patients suffering from chronic tendinopathy. As a pilot study, this research will determine the feasibility of the technology application and the clinical implications. PURPOSE: To characterize asymptomatic Achilles tendon (AT) structure in an adult population, identify factors that may be associated with tendon structure variation as measured by UTC, and provide a foundation for future research. METHODS: 575 asymptomatic subjects (male: 217, female: 291) were recruited. Each subject completed a medical history questionnaire and underwent UTC scanning of the right AT. The motorized tracking device moved an ultrasound probe along the long axis of the AT capturing 598 transverse images at intervals of 0.2 mm over 12 cm. UTC algorithms quantified the stability of pixel brightness over every 17 contiguous images into four echotypes (ET): (I) aligned tendon bundles, (II) waving tendon bundles, (III) mainly fibrillar tissue, and (IV) mainly amorphous matrix. A region of interest (ROI) was selected from the calcaneus to the musculotendinous junction. Tendon borders were outlined manually in the transverse view at intervals no greater than every 25 frames (0.5 cm) across the ROI. Contours were interpolated to generate average percentages (%) of each ET for the total tendon volume. 67 subjects were excluded due to poor quality scans or not meeting inclusion criteria, resulting in 508 subjects in final analysis. RESULTS: Average ET % for the volume was: I-45.73% (SD:6.61, range 35.29-80.17), II-32.00% (SD:6.64), III-1.74% (SD:0.85, range 0.54-6.22), and IV-0.57% (SD:0.45, range 0.07-3.59). Differences between subgroups were compared and p-values <0.05 were considered significant. Higher % of ET I and lower % of ET II were associated with age 50-65 years old, male gender, African American race, and hypertension. Higher % of ET III was associated with age 50-65 years old, BMI-30, diabetes, and COPD. CONCLUSION: This work provides a baseline ET distribution that can be used in future AT research. We have shown numerous associations between tendon morphology and patient demographics/health that begin to help stratify differences in asymptomatic Achilles tendons.

PURPOSE: The purpose of this investigation was to determine if Diffuse Correlation Spectroscopy (DCS) provides a reproducible measure of micro-vascular blood flux during post-occlusive reactive hyperemia (PORH). Previous techniques utilized to assess forearm muscle blood flow include brachial artery blood flow and Near Infrared Spectroscopy (NIRS). DCS provides a novel ability to examine red blood cell (RBC) flux within the muscle microvasculature. We hypothesized that DCS would provide a reproducible measure of muscle microvasculature RBC flux during PORH. METHODS: 7 healthy male subjects (25.9 ± 4 yrs) performed 3 trials of brachial artery PORH tests. The DCS probe was placed on the flexor digitorum superficialis of the cuffed arm and provided Blood Flow Index (BFI). Brachial artery blood flow was assessed using Doppler Ultrasound to provide time-averaged maximum velocity (TAMAX). Following a 10 min supine rest period baseline measurements were performed for 1 min at which time a pneumatic cuff was inflated to at least 250 mmHg for 5 minutes. Measurements continued to be made for the 5 min of occlusion and 3 min post cuff release. The subjects were given 10 min rest between trials. RESULTS: The peak TAMAX of the brachial artery for PORH1, PORH2, and PORH3 occurred at 7.3 ± 3.4, 6.0 ± 2.4, and 6.4 ± 2.7 sec respectively (p<0.397). The peak in BFI for PORH1, PORH2, and PORH3 occurred at 25.6 ± 4.5, 26.4 ± 8.3, and 22.3 ± 3.5 sec respectively (p<0.311). The time to peak for TAMAX was significantly different from the time to peak in BFI (p<0.001). CONCLUSIONS: Similar time to peak for BFI across trials indicates that the DCS provides a reproducible signal of muscle microvascular blood flux during PORH conditions. We speculate that the significant difference between time to peak for TAMAX and BFI may be due to compliance between the brachial artery and the microvasculature.
A role for aquaglyceroporin 7 (AQP7) in the control of lipid accumulation in white adipose tissue (WAT) has been hypothesized; however limited information is available regarding the impact of physical exercise. PURPOSE: We aimed to analyze the role of voluntary physical activity (VPA) and endurance training (ET) on WAT AQP7 expression. Further investigations are required to determine whether increased subjective appetite following short duration exercise would result in greater next-meal food intake.

3429  
Board #334  
June 2 3:30 PM - 5:00 PM  
Self-monitoring As A Predictor For Weight Loss In A Family-based Pediatric Obesity Treatment Program

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(No relationships reported)

Family-based pediatric obesity treatment programs for children in the 95th-99th BMI percentile are suggested to be comprehensive and multidisciplinary to change behaviors and decrease weight. Self-monitoring (SM) has shown to be an effective strategy in child weight loss. PURPOSE: To determine if child and parent SM of weekly nutrition (NUTR), physical activity (PA), and body mass (BM) predict weight loss during a 12-week pediatric obesity treatment program. METHODS: 51 children (age: 9.8 ± 2.3 years, BMI percentile: 98.0 ± 13.3), 45 mothers (age: 41.5 ± 6.2 years), and 37 fathers (age: 41.5 ± 6.2 years) participated in 12 weekly healthy living education sessions. SM scores were determined as the number of weeks participants logged exercise and food intake (SM-NUTR), monitored steps per day (SM-PA), and weighed-in (SM-BM) over the 12 weeks. A summary score (SM-SUM) of the three SM components was created. Stepwise multiple regression models were used to predict parent and child weight loss from SM scores. RESULTS: In 12 weeks, children lost 5.1 ± 4.4% of BM, mothers lost 5.3 ± 8.0% of BM, and fathers lost 8.2 ± 4.7% of BM. SM-SUM was 79% for fathers, 81% for children, and 98% for mothers. Table 1 represents Pearson correlation coefficients between parent body mass loss and self-monitoring scores.

<table>
<thead>
<tr>
<th>Child % BM loss</th>
<th>Mother % BM loss</th>
<th>Father % BM loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>SM-NUTR r = 0.33*</td>
<td>r = 0.41*</td>
<td>r = 0.49*</td>
</tr>
<tr>
<td>SM-PA r = 0.20</td>
<td>r = 0.36*</td>
<td>r = 0.17</td>
</tr>
<tr>
<td>SM-BM r = 0.13</td>
<td>r = 0.38*</td>
<td>r = 0.15</td>
</tr>
<tr>
<td>SM-SUM r = 0.34*</td>
<td>r = 0.49*</td>
<td>r = 0.36*</td>
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</tbody>
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Stepwise multiple regression models suggested that Child’s SM-SUM accounted for 19% of the variance in Child’s % BM loss after 12 weeks (R^2=0.19, p<0.05). Mother’s SM-NUTR score (R^2=0.47, p<0.05) and Child’s SM-SUM score (R^2=0.08, p<0.05) accounted for 55% of the variance in Mother’s % BM loss (p<0.05). Father’s SM-NUTR score accounted for 29% of the variance (R^2=0.29, p<0.05) in Father’s % BM loss. CONCLUSION: SM-NUTR, SM-PA, and SM-BM all appear to play a role with family weight loss, with SM-NUTR being most influential. Continuance of self-monitoring post-intervention and its influence on weight loss should be examined.

3430  
Board #335  
June 2 3:30 PM - 5:00 PM  
Effects Of Physical Exercise On The Modulation Of Aquaglyceroporin 7 From Visceral Adipose Tissue

Jorge Beleza, Silvia Rocha-Rodrigues, Inês O. Gonçalves, António Ascensão, José Magalhães. Faculty of Sports, University of Porto, Porto, Portugal.  
(No relationships reported)

A standard diet (53% fat-derived Kcal) or a high-fat diet (HFID), (70% fat-derived Kcal), as follows: SS, SVPA, SET, HS, HVPA and HET, during 17 wks. VPA groups had free access to running wheel throughout the entire protocol. After 9 weeks of HFID, SET and HET animals were submitted to 8-wks of ET on treadmill while maintained dietary treatments. Plasma non-esterified fatty acid (NEFA), glycerol and insulin levels were determined and epidymal white adipose tissue (eWAT) was used to determine gene and protein expression of AQP7 and fatty acid translocase (FAT/CD36). Diet and exercise effects were performed using 2-way ANOVA. RESULTS: The relative caloric intake was constant between groups. HFID increased visceral adiposity index (9.0±0.2 vs. 11.8±0.4; p<0.0001) and adipocyte area mean (3716.1±301.4 vs. 5348.6±471.5; p<0.001), ET reduced these obesity-related anatomical features (p<0.001). Both AQP7 and FAT/CD36 protein and gene expression remained unchanged after HFID regimen. VPA decreased plasma glycerol levels (12.6±0.8 vs. 12.5±0.6; p<0.001) and eWAT AQP7 gene expression (p<0.001) in 5 diet-fed animals. ET had no impact either on plasma NEFA levels nor FAT/CD36 protein content. Eight-wks of ET decreased NEFA (SS vs. SET, 16.4±0.5 vs. 12.0±0.4; HS vs. HET, 14.7±0.7 vs. 10.8±0.7; p<0.001) and glycerol (SS vs. SET, 17.4±0.7 vs. 12.5±0.6; HS vs. HET, 15.6±0.5 vs. 10.3±3.0; p<0.001) plasma levels. ET decreased gene and protein expression of AQP7 (p<0.001) in eWAT in both diet types and increased FAT/CD36 gene (p<0.001) in SET group and its protein expression (p<0.001) in both diet types. CONCLUSION: Our data suggest that 8-wks of ET decreased AQP7 expression, which might play an important role preventing lipid overaccumulation in visceral adipose tissue of obese rats. Supported by: U/D/TTP/00617/2013; PCOI-01-0145-FEDER-016690

3431  
Board #336  
June 2 3:30 PM - 5:00 PM  
Effects Of Intermittent Periods Of Severe Negative Energy Balance On Weight Maintenance During US Special Operations Forces Training

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(Sponsor: Stefan M Pasiakos, FACSM)  
(No relationships reported)

Physically active individuals often fail to meet energy requirements during sustained periods of increased activity, resulting in negative energy balance. Failure to increase energy intake during periods of high energy expenditure may compromise body mass and subsequent performance. Whether individuals adequately restore body mass between intermittent periods of severe negative energy balance during long-term training is not well characterized. PURPOSE: To examine energy balance and changes in body mass during US Special Operations Forces (SOF) training. METHODS: Energy expenditure (EE, doubly labeled water), energy intake (EI, 24 h recalls), energy balance (EB, intake - expenditure) and body mass were measured in 22 US Marines (mean ± SD, 25 ± 2 y, 86 ± 10 kg) during the 4 most physically demanding phases of a 261 d SOF training program (days 15-29 (I), 115-123 (II), 191-201 (III), and 243-261 (IV)). RESULTS: EE was highest during phase II (6376 ± 712 kcal/d) compared to phase I (4011 ± 475 kcal/d), III (4189 ± 476 kcal/d), and IV (3735 ± 314 kcal/d) (P<0.05). ET was lowest during phase I (300 ± 0 kcal/d) compared to phase II (2410 ± 338 kcal/d), III (2816 ± 488 kcal/d), and IV (2702 ± 738 kcal/d) (P<0.05). EB was more negative during phase I (3711 ± 475 kcal/d) and II (3966 ± 776 kcal/d) compared to phase III and IV (P<0.05). Body mass was lost during phases I, II, and IV, and the degree of body mass lost was equivalent between phase I (6.5 ± 1.5%), phase II (5.6 ± 1.7%) and phase II (5.8 ± 2.0%); 4.9 ± 1.9 kg), and greater than phase IV. Initial body mass predicted the loss of body mass (r = 0.67, P < 0.05) during phase I. Body mass did not change during phase III. Body mass was restored before the start of each subsequent phase and was not different between the start (86.4 ± 9.8 kg) and end of the 261 d training (86.7 ± 9.0 kg). CONCLUSION: These data suggest that well-trained Marines adequately compensate EI to restore body mass between intermittent periods of severe negative EB. Supported by U.S. Army Medical Research and Material Command The opinions or assertions contained herein are the private views of the author(s) and are not to be construed as official or reflecting the views of the Army or the Department of Defense.

3432  
Board #337  
June 2 3:30 PM - 5:00 PM  
Retrospective Analysis Of Weight Loss Relative To Protein Intake During Short-term Exercise Training In Women

Conrad P. Earnest, FACSM1, Britanic Locke1, Claire Baetge2, Mike Greenwood1, Richard B. Kreider, FACSM1. 1Texas A&M University, College Station, TX. 2University of Texas at San Antonio, San Antonio, TX.  
(No relationships reported)

PURPOSE: To retrospectively examine the effects of circuit weight training (10-wk) in 663 sedentary, overweight/obese women (age 46±y, BMI 34.85 ± 6.17 kg/m²) on weight loss, anthropometry and indices of cardiovascular health relative to PRO ingestion. Supported by: U/D/TTP/00617/2013; PCOI-01-0145-FEDER-016690

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snacking on foods comprised mainly of fat and sugar. body composition in overweight/obese young men. Surprisingly, oral glucose tolerance

CONCLUSIONS

3.60±0.49) and MICT (Pre: 3.06±0.73, Post: 3.36±0.79) (p<0.001), with no change in

p=0.01) and Control (Pre: 5,666±2826, Post: 4,214±2,194, p=0.002) with no change

2-h OGTT improved significantly in MICT (Pre: 3,801±2,453, Post: 2,518±2584,

Fat mass was unchanged in control and MICT, with a trend for increase in HIIT (Pre: 96.0±7.7kg, Post: 97.4±7.9kg, p=0.002) and lean mass (Pre: 64.2±4.9kg, Post: 65.1±4.7kg, p=0.02) improved significantly in HIIT and were unchanged in MICT.

Trends for an increase in body weight (Pre: 93.1±11.8kg, Post: 94.6±12.8kg, p=0.07) and lean mass (Pre: 61.1±5.9kg, Post: 61.8±6.5kg, p=0.11) were observed in Control.

Fat mass was unchanged in control and MICT, with a trend for increase in HIIT (Pre: 28.3±5.3kg, Post: 28.9±5.3kg, p=0.11). Glucose AUC (mg/dl 120 min) during the 2-h OGTT improved significantly in MICT (Pre: 3.80±2.4, Post: 2.51±8284, p=0.01) and Control (Pre: 5.66±2826, Post: 4.21±2,194, p=0.002) with no change in HIIT. VO2peak (L/min) increased significantly in both HIIT (Pre: 3.21±0.49, Post: 3.60±0.49) and MICT (Pre: 3.06±0.73, Post: 3.56±0.79) (p=0.001), with no change in Control. CONCLUSIONS: The addition of ~14,500 kcal of fat-sugar snacks in the

PRO groups, high PRO consumers were significantly more likely to achieve CSWL

adjres = -3.1), while those ingesting High PRO were significantly more likely to achieve CSWL (adjres = 4.7).

CONCLUSION: Despite the lack of difference for magnitude of weight loss between PRO groups, high PRO consumers were significantly more likely to achieve CSWL during a short exercise intervention consisting of resistance and aerobic training. Equally, higher PRO consumption may offset the magnitude of weight gain vs. lower PRO intakes if weight loss is not achieved.

Sponsor. Curves International

PURPOSE: To determine the effects of high (HWP) and low whey protein (LWP) at breakfast[TM1] on appetite profile, thirst, energy metabolism and subsequent energy intake. METHODS: Seventeen healthy participants (age 27 ± 7 y, BF 21.5 ± 6.9%, BMR 1741 ± 391 kcal/day) consumed one of three smoothies at breakfast on three separate days in randomized order. The energy intake from smoothies consisted of control (10% fat and 90% carbohydrate), LWP (20% whey protein, 10% fat and 70% carbohydrate) and HWP (40% whey protein, 10% fat and 50% carbohydrate), followed by an ad libitum lunch 3 hours later. Appetite profile was completed using a visual analog scale (VAS) before, at 0, 60, 120, and 180 minutes. Resting metabolic rate (RMR) 30 minutes before and after the meal to help energy expenditure for food intake. RESULTS: Energy intake at lunch was higher (p = 0.02) following control (770 ± 289 kcal) compared to HWP (654 ± 252 kcal) and LWP (671 ± 217 kcal). Participants hunger, desire to eat, and perceived amount were significantly higher, whereas, satiety and fullness were lower after control compared to HWP and LWP. A significant difference over time was observed for thirst and craving of sweet, salty savoury and fatty, however there were no significant time by condition interactions. Additionally, a lower RQ (p < 0.001) and higher VO2 (p < 0.001) was observed for HWP (4.3 ± 0.6, 4.2 ± 0.5, and 4.1 ± 0.5 ml · kg^-1 · min^-1) compared to LWP (4.1 ± 0.6, 3.9 ± 0.5, and 3.5 ± 0.5 ml · kg^-1 · min^-1) and control (4.0 ± 0.6, 3.7 ± 0.5, and 3.5 ± 0.4 ml · kg^-1 · min^-1) at 45-60, 105-120, and 165-180 minutes, respectively. CONCLUSION: Breakfast with HWP and LWP were rated as more satiating coinciding with reduced subsequent energy intake at lunch. In addition, these results suggest a dose-response effect of whey protein on energy metabolism over 3 hours following breakfast.

Dose Response Effect of a Whey Protein on Appetite Profile, Energy Metabolism and Intake

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No relationships reported

PURPOSE: Diets high in fat and sugar have been implicated in the pathogenesis of obesity, diabetes and cardiovascular disease. Exercise aids in the prevention of weight gain, and may prevent adverse cardiometabolic changes during periods of energy excess. We examined the interactions of fat-sugar snacking, with and without exercise training, on anthropometry, oral glucose tolerance and cardiorespiratory fitness in overweight and obese men. METHODS: Twenty-seven, healthy overweight/obese (BMI >25 kg/m2) men were fed a fat-sugar snack (2 donuts per day, ~600 kcal), 6 days/wk for 4 wks, while being asked to maintain their habitual diet. In addition, all participants were randomized to one of three groups: sedentary control or isocaloric supervised exercise (250kcal/session, 4 days/wk for 4 wks): either moderate-intensity continuous training (MICT) (50% VO2peak), or high-intensity interval training (HITT) (90-95% peak heart rate). A two-way repeated measures ANOVA was used to assess changes in body composition, oral glucose tolerance and cardiorespiratory fitness between and within groups.

RESULTS: Body weight (Psen: 96.7±7.9kg, Post: 97.4±7.9kg, p<0.002) and lean mass (Psen: 64.2±4.9kg, Post: 65.1±4.7kg, p=0.02) increased significantly in HIIT and were unchanged in MICT. Trends for an increase in body weight (Pre: 93.1±11.8kg, Post: 94.6±12.8kg, p=0.07) and lean mass (Pre: 61.1±5.9kg, Post: 61.8±6.5kg, p=0.11) were observed in Control. Fat mass was unchanged in control and MICT, with a trend for increase in HIIT (Pre: 28.3±5.3kg, Post: 28.9±5.3kg, p=0.11). Glucose AUC (mg/dl 120 min) during the 2-h OGTT improved significantly in MICT (Pre: 3.80±2.4, Post: 2.51±8284, p=0.01) and Control (Pre: 5.66±2826, Post: 4.21±2,194, p=0.002) with no change in HIIT. VO2peak (L/min) increased significantly in both HIIT (Pre: 3.21±0.49, Post: 3.60±0.49) and MICT (Pre: 3.06±0.73, Post: 3.56±0.79) (p=0.001), with no change in Control. CONCLUSIONS: The increase of ~14,500 kcal of fat-sugar snacks in the form of donuts over a 4-week period was insufficient to induce deleterious changes in body composition in overweight/obese young men. Surprisingly, oral glucose tolerance was improved in Control. MICT may be preferable to HIIT during extended periods of snacking on foods comprised mainly of fat and sugar.

Dietary and Exercise Interventions to Improve Fat Mass, Lean Mass, and Cardiometabolic Health in Latino Adults

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PURPOSE: To determine sex differences in total PYY and GLP-1 after moderate-intensity continuous and sprint interval cycling exercise.

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No relationships reported

Sex Differences In Total PYY And Glp-1 After Moderate-Intensity Continuous And Sprint Interval Cycling Exercise

Abstracts were prepared by the authors and printed as submitted.
Male endurance athletes have been reported to have lower testosterone concentrations than their sedentary counterparts, which may have detrimental health effects including increased risk of musculoskeletal injury and fertility complications secondary to decreased sex hormone production. Cholesterol supplementation has been reported to increase serum sex hormones. PURPOSE: The purpose of this study was to investigate whether a treadmill endurance exercise program would cause exercise-induced reproductive dysfunction in male rats and assess the impact of increased dietary cholesterol on sex hormone levels. METHODS: Male Sprague-Dawley Rats (n=20) were randomly assigned to a control group (C) or an exercise training group (EX) that performed treadmill running 40 min/day, 6 days/wk for a duration of 12 wks. At study midpoint (wk 6), rats were randomized to receive either a High-Cholesterol (HC) Diet (n=10) or remain on standard purified diet (n=10). Fasting blood samples were collected at baseline, wk 6, and wk 12. Serum testosterone (T) and leptin were measured via ELISA. Serum lipids (TC, HDL, LDL, TG) were measured via clinical chemistry analyzer. Body weight (BW) and voluntary food intake (EI) were measured weekly. RESULTS: At end of wk 6, EX had significantly lower BW (494.3±34.7 g versus 565.3±47.9 g, p<0.001), mean daily EI (77.5±3.5 kcal versus 91.6±5.2 kcal, p<0.001), and serum leptin (90.8±40.1 pg/mL versus 635.7±225.6 pg/mL, p<0.001) in comparison to C. No difference was observed between EX and C in serum T (12.7±6.0 ng/mL versus 12.9±5.8 ng/mL). At end of wk 12, exercise groups (EX and EX+HC) were compared to C. No difference was observed between EX and C in serum T (12.7±6.0 ng/mL versus 565.3±47.9 g, p=0.001), mean daily EI (77.5±3.5 kcal versus 91.6±5.2 kcal, p<0.001), and serum leptin (90.8±40.1 pg/mL versus 635.7±225.6 pg/mL, p<0.001) in comparison to C and C+HC. HC diet did not have significant impact upon serum T in comparison to standard diet (3.8±3.4 ng/mL versus 4.9±2.4 ng/mL). CONCLUSIONS: Despite low energy availability, exercise-induced reproductive changes may not occur in training programs <12 weeks. Lower EI observed in exercise despite higher energy expenditure may indicate that low energy availability in endurance-trained individuals may be inadvertent. Supported by American Egg Board Graduate Fellowship Research Grant.

Increased water consumption has potential to promote weight loss but previous interventions have been equivocal. PURPOSE: To examine the effects of hydration on energy intake at lunch and the remainder of the day. METHODS: Ten males and 12 females attended 3 study sessions where they drank either 1, 3, or 4 bottles (500 mL) of water throughout the morning before lunch. Each participant was their own control (drinking on one occasion and not drinking on the other two occasions). Food items were weighed and arranged on a tray in large portion sizes to allow for their desired amount of lunch intake. Participants rated hunger on a visual analog scale at three different time points before lunch and once after. When the participants selected to stop eating, food was reweighed to calculate caloric intake. Participants kept a food and beverage log for the remainder of the day. The detailed logs were then reviewed with the participant at the next visit and entered into the Nutritionist Pro software. Results: When energy consumed the rest of the day compared to when they were in the control group, hydration significantly influenced energy intake for the remainder of the day. Drank males, males who drank three bottles of water throughout the morning, significantly increased energy consumed the rest of the day compared to when they were in the control group, 1686 ± 256 kcal vs. 990 ± 203 kcal (p=0.027). When energy intake at lunch was taken into account there was an effect of hydration status on daily energy intake. For women, energy consumed at lunch and the remainder of the day was not significant when compared with water intake (p=0.081 vs p=0.074, respectively). Conclusion: Drinking water throughout the morning had no effect on energy intake during lunch. Furthermore, energy intake was not suppressed even when 2L of water (4 bottles) was consumed over a 3.5-hour period. Males increased the amount of energy consumed for the remainder of the day when in the hydrated condition. Increased hydration may have adverse effects on energy intake due to the volume of water consumed prior to a meal.

Introduction: To combat the effects of excess energy intake on obesity and glucose intolerance, non-nutritive sweeteners (NNS) have been used as a replacement for more energy dense traditional sweeteners. However, limited research has been completed regarding the metabolic effects of moderate consumption of non-nutritive sweeteners. PURPOSE: The purpose of this study was to determine the effect of moderate consumption of NNS (aspartame and sucrose) on glucose tolerance and the insulin response to an oral glucose load, and on body composition in an animal model. METHODS: Male Sprague-Dawley rats (N=30) were given aspartame (ASP, n=10, 8.5 mg/kg/day) or sucrose (SUC, n=10, 2.6 mg/kg/day) in drinking water, or untreated water as a control (n=10) for 6 weeks. In the morning, after overnight fasting, rats underwent an oral glucose tolerance test (2g/kg 50% dextrose w/v by gavage). Blood was obtained by tail clip; glucose was measured by glucose meter and insulin was measured by radioimmunoassay. Following euthanasia, lean mass and fat mass were determined by dual energy x-ray absorptiometry; epididymal fat pads were removed and weighed. Results: No significant differences were found between groups in area under the curve for glucose or insulin response to an oral glucose load. Significant differences in serum insulin were seen 15 minutes after the glucose load between both the ASP (0.72 ± 0.06 ng/mL vs 0.94 ± 0.08 ng/mL, p<0.003) and SUC group (0.72 ± 0.07 ng/mL vs 0.94 ± 0.08 ng/mL, p<0.048) compared to the control. While percent body fat was not different between groups, epididymal fat pad mass was significantly higher in the ASP group compared with the control group (5.50 ± 0.34 g vs 4.55 ± 0.19 g, p<0.042), while the ratio of trunk fat to total fat was significantly lower in the SUC group compared with controls (0.49 ± 0.02 vs 0.60 ± 0.14, p<0.01). Conclusion: Moderate consumption of aspartame or sucrose had no effect on percent body fat. Fifteen minutes following a glucose load, serum insulin was significantly lower in both NNS groups compared with the control, suggesting a potential suppression in insulin response. Both aspartame and sucrose altered body fat distribution. These results may have implications for addressing abdominal obesity.
Recently, a new rule has been suggested to replace the 3500 calorie rule to predict long term weight loss (WL) but whether practitioners are aware of this is not known. PURPOSE: To assess the awareness of recent facts related to the misuse of the 3500 calorie rule while F were the most aware, though awareness of some statements than those without a certification (54.4 - 65.0%; p<0.05). For 4 of the 8 statements focused on the misuse of the 3500 calorie rule while F were the most aware, though awareness of some statements than those with Poor knowledge (18.4 - 63.3%; p<0.05). For 7 of 8 statements, those with EX self-reported knowledge had an awareness (30.4 - 83.0%) of WL statements than those without a certification (54.4 - 65.0%; p<0.05).

CONCLUSIONS: S were the least aware of the newest developments in the misuse of the 3500 calorie rule while F were the most aware, though awareness of some statements were low for all. Awareness levels were highest in those who self-reported EX knowledge. Those with certifications had higher awareness levels of some WL concepts. More dissemination is needed to raise awareness of WL concepts.

PPARγ indicates browning processes in scWAT given that the mRNA of UCP1 was not significant difference was not observed between HYP and NOR. Plasma GLP-1 concentrations were not altered significantly after exercise evaluated 30 min after exercise or rest.

RESULTS: On Day 29, circulating alpha lipoic acid was greater (p<0.01) in L-ABC (412±73 nm/g) compared with ABC (154±33 nm/g). During the sedentary high fat overfeeding, dietary intake was not different (p>0.6) between groups (~3,400 kcal/day; ~50% from fat). Sedentary high fat overfeeding increased (p<0.05) waist circumference 30 mm in the placebo (±7.2 cm) and ABC (±13.2 cm) groups but not the L-ABC group (±0.7 cm). The magnitudes of increase (p<0.05) in body mass (1.7±0.3 kg), fat mass (0.7±0.2 kg), and blood pressure (±3±1 mmHg) and decrease (p<0.05) in insulin sensitivity (Matsuda Index: ±2.9±0.9) after overfeeding were not different between groups (p>0.5).

CONCLUSIONS: Liposomal encapsulated alpha-lipoic acid, benfotiamine and curcumin: 1) promoted alpha-lipoic acid bioavailability; and, 2) prevented sedentary high-fat overfeeding mediated increases in waist circumference in usually active healthy young adults. These data may have important public health implications for periods of inactive overconsumption such as during seasonal celebrations.

Research conducted in rodents and humans present conflicting results on the relationship between caloric intake and the browning of subcutaneous white adipose tissue (scWAT). For example, exercise combined with caloric restriction did not change browning indices measured from human scWAT samples. In another study, caloric restriction in mice resulted in the browning of both scWAT and visceral white adipose tissue. Few investigators, however, have examined the relationship between differences in macronutrient intake and browning processes of human scWAT.

EXERCISE: 15 female team sport athletes (age: 20.7 ± 0.2 years, height: 159.6 ± 1.7 cm, weight: 55.3 ± 1.4 kg, BMI: 21.7 ± 0.4) participated three trials on different days: either HIIT in hypoxia (HYP), HIIT in normoxia (NOR) or rest in normoxia (CON). We have collected data from 15 subjects, but three of 15 athletes were excluded for analyses (n = 12, age: 20.8 ± 0.2 years, height: 158.7 ± 1.9 cm, weight: 54.8 ± 1.3 kg, BMI: 21.8 ± 0.4) because the menstrual phase did not match among trials. Exercise trials (HYP, NOR) consisted of two successive sets of 8 repeated bouts of 6-maximal sprint separated with 30s of rest. A 10-min rest was provided between sets. Blood sample were obtained to measure plasma acylated ghrelin, GLP-1 and other hormonal and metabolite concentrations before, immediately and 30 min after exercise. Time-course of changes in subjective feeling of appetite and fatigue were also measured following exercise. Energy and macronutrient intake during ad-libium buffet test meal were evaluated at 30 min after exercise.

RESULTS: Plasma acylated ghrelin concentrations were significantly decreased after exercise (P < 0.001), whereas a significant difference was not observed between HYP and NOR. Plasma GLP-1 concentrations were not altered significantly after exercise (P = 0.507), with no significant difference between HYP and NOR at any point (P = 0.342). Although absolute energy intakes in both HYP (634 ± 67 kcal) and NOR (597 ± 63 kcal) were significantly lower than CON (756 ± 63 kcal, P = 0.006), no significant difference was not observed between HYP and NOR.

CONCLUSIONS: These results show that HIIT under hypoxic and normoxic conditions lowered plasma acylated ghrelin concentrations and energy intake, whereas these responses were not augmented by exposure to hypoxia during exercise.

Abstracts were prepared by the authors and printed as submitted.
**RESULTS:** We observed the reduction of hypothalamic glucose sensitivity in obese mice, which was accompanied by a lower protein expression of HIF-2α, as well as reduction of prolyl hydroxylase activation. Furthermore, we evaluated the impact of HIF-2α protein levels on fat mass, glucose homeostasis, and food intake. Our findings suggest that the exercise restored hypothalamic glucose expression and glucose sensitivity in obese rats.

**CONCLUSIONS:** Our preliminary results demonstrate that high-fat diet disrupts hypothalamic HIF-2α and affects glucose sensitivity in neurons, contributing with hyperphagia. On the other hand, exercise increased HIF-2α protein levels in the hypothalamus and potentiated glucose sensitivity in obese rats, reducing the food intake.

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**Board #350 June 2 3:30 PM - 5:00 PM**

**Hypoxia-inducible Factor 2 Alpha Mediates Exercise-induced Hypothalamic Glucose Sensing**

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(Purpose: To explore the role of HIF-2α in mediating exercise-induced glucose sensing in the hypothalamic region of rodents.)

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**Board #352 June 2 3:30 PM - 5:00 PM**

**Do Weight Concerns Put Female Prisoners at Risk for Re-Offending?**

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(No relationships reported)

Incarceration and substance abuse are two of the largest public health issues in America. Substance abuse is prevalent (80%) among imprisoned women; particularly stimulant use (e.g., methamphetamine) due to its appealing side effects including weight loss and increased energy. Ironically, newly abstinent from stimulant-type drugs during incarceration, metabolic and appetite suppression are removed and women experience significant amounts of unwanted weight gain.

**PURPOSE:** Examine female prisoner’s body weight, perceived weight concerns, and weight loss behaviors as risk factors for re-offending.

**METHODS:** Prior to participation in a health and body image program, 364 female inmates completed questionnaires to assess drug history and weight concerns/behaviors. Height, weight and body fat (4-site skinfolds) were assessed and body mass index (BMI) calculated. Results will be presented for the total sample and for subgroups of women age at 18 years or older, adult (age=37.8±10.2y), and 83% were overweight or obese (BMI=30±5.8 kg/m2).

**PURPOSE:** Randomized controlled trials demonstrate that exercise alone, if completed as a part of a comprehensive intervention, is beneficial in reducing body fat mass. However, further research needs to be conducted to determine the most successful behavioral/nutritional intervention programs have been shown to be effective at decreasing body mass in overweight and obese individuals. However, further research needs to be conducted to determine the most successful behavioral/nutritional intervention for weight loss in overweight and obese individuals. PURPOSE: To explore the role of HIF-2α in mediating exercise-induced glucose sensing in the hypothalamic region of rodents.

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**Board #351 June 2 3:30 PM - 5:00 PM**

**The Effects of a Clinical Outpatient Behavioral and Nutritional Intervention Program on Body Mass**

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(No relationships reported)

The prevalence of obesity has increased drastically over the past few decades in the United States. While a balanced nutrition and exercise program are suggested, more clinical-based treatments may be implemented (i.e., bariatric surgery and behavioral/nutritional interventions). Behavioral/nutritional intervention programs have been shown to be effective at decreasing body mass in overweight and obese individuals. However, further research needs to be conducted to determine the most successful behavioral and/or nutritional intervention for weight loss in overweight and obese individuals.

**PURPOSE:** The purpose of this study was to assess the effects of a clinical outpatient behavioral/nutritional intervention on body mass in overweight and obese individuals. METHODS: Forty-eight overweight (n=2) and obese (n=46) males (n=17) and females (n=29) [56 (13) yrs, height 1.70 (0.10) m, body mass 120.55 (33.83) kg, and BMI 41.45 (8.55) kg/m²] participated in this 15 week study. Participants self-selected one of two meal plans, offered through Healthy Management Resources, Decision Free or Healthy Solutions. The Decision Free meal plan required the consumption of 500-800 kilocalories per day through a minimum of five shakes and three shakes and two entrees. The Healthy Solutions meal plan required the consumption of 1,200 to 1,400 kilocalories per day through a minimum of three shakes, two entrees and five servings of fruits and vegetables. Both meal plans required regular physical activity of at least 2,000 kilocalories per week. Body mass was measured weekly. RESULTS: An independent samples t-test found no significant changes in body mass between the two meal plans. A paired samples t-test showed a significant decrease in the Decision Free meal plan pre [125.71 (32.50) kg] vs. post-body mass [105.49 (27.01) kg] (t=11.688, p<.001) and the Healthy Solutions diet pre [115.40 (35.06) kg] vs. post-body mass [98.55 (29.88) kg] (t=12.452, p<.001). CONCLUSIONS: The results of this study support past research and suggests that behavioral and nutritional interventions are effective strategies for reducing body mass.
to lose weight after leaving treatment. **CONCLUSIONS:** Female prisoners were typically overweight or obese and used risky behaviors to manage weight, which may increase their risk of re-offending. Poor weight management behaviors, combined with a lack of PA, in this vulnerable and underserved population leads to “self-medication” to lose weight, which may lead to life-threatening eating disorders and other compensatory behaviors. Health, PA, nutrition and healthy body image programs are warranted in this population.

3448 Board #353 June 2 3:30 PM - 5:00 PM

**Association Between Health-related Quality Of Life And Weight Loss, Fitness, And Physical Activity**

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(No relationships reported)

Weight loss is associated with improved health-related quality of life (HRQOL); however, it is important to know whether change in physical activity or fitness that also occurs during the weight loss process influences this relationship.

**Purpose:** This study examined the associations between change in HRQOL and weight loss, fitness, and physical activity in response to a 12 month behavioral weight loss intervention.

**Methods:** Participants (N=280; Age=45.1±7.9 years, BMI=32.3±3.9 kg/m²) engaged in a 12-month behavioral weight loss intervention program. Participants were randomized to a reduced calorie diet (DIET), diet plus a moderate dose of physical activity (MOD-EX), or diet plus a high dose of physical activity (HIGH-EX). All groups received weekly in-person intervention sessions for months 1-6, with combined in-person and telephonic sessions for months 7-12. Diet was prescribed at 1200-1800 kcal/day. MOD-EX was prescribed physical activity that progressed to 150 min/wk with HIGH-EX progressed to 250 min/wk. Weight, fitness, physical activity, and HRQOL were assessed at 0 and 12 months.

**Results:** There was significant (p<0.05) weight loss at 12 months (-10.2±7.9 kg; -11.1±7.8%), with no significant difference between intervention conditions. HRQOL, measured by the SF-36, also significantly improved across 12 months (p<0.05), with no significant difference between intervention conditions. Change in HRQOL was associated with change in weight (r=-0.35, p<0.001), percent weight change (r=-0.39, p<0.001), change in fitness (r=0.29, p<0.001), and change in physical activity (r=0.21, p<0.001). While somewhat diminished after controlling for change in fitness, the correlation between change in weight (r=0.25, p<0.001) and percent change in weight (r=0.29, p<0.001) remained significant. A similar pattern was shown when controlling for change in physical activity (r=0.34, p<0.001; r=0.38, p<0.001).

**Conclusions:** Weight loss across a period of 12 months is significantly associated with improved HRQOL in adults who are overweight or obese. It appears that change in fitness and physical activity partially mediate these associations. Thus, it appears that weight loss interventions should target improved fitness and physical activity to maximize improvements in HRQOL.

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