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### Impairments In Lower Limb Microvascular Function Associated With Cycle Phases In Young Healthy Women.

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Impairments in lower limb microvascular function associated with cycle phases in young healthy women.

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**PURPOSE:** Differences in women's hormone concentrations throughout the menstrual cycle affects vascular responsiveness. Previous investigations have shown that these changes can be modulated by regular use of oral contraceptives. However, most of these studies only assessed changes in vascular function at the upper limb conduit artery level. This study investigated whether vascular function at the lower limb microvasculature of healthy young women might be affected by the phase of the menstrual cycle.

**METHODS:** 14 young ( $25 \pm 5$  years of age) physically active women participated in the study. The participants were assigned to two groups of seven participants each according to oral contraceptive use: non-contraceptive group (women who did not use any contraceptive within the last two years prior to the intervention - NCP) and oral contraceptive group (seven women who used oral contraceptive regularly for at least two years prior to the intervention - OCP). The participants underwent two lower limb vascular occlusion tests (5 min of baseline, 5 min of occlusion, and 8 min following cuff release) in two different phases of the menstrual cycle (follicular and luteal phase). Microvascular responsiveness was assessed by the percent of change of the NIRS-derived muscle oxygen saturation ( $StO_2$ ) reperfusion slope (%/sec) of the tibialis anterior muscle.

**RESULTS:** There was no difference in the reperfusion slope of the NCP group between the follicular ( $1.18 \pm 0.5$  %/sec) and luteal ( $1.01 \pm 0.3$  %/sec) phases. The reperfusion slope of the OCP group was significantly steeper in the follicular ( $0.85 \pm 0.2$  %/sec) compared to the luteal phase ( $0.63 \pm 0.2$  %/sec).

**CONCLUSION:** Use of oral contraceptive is associated with reduced microvascular function in the luteal phase in young physically active women.

## F-54 Free Communication/Poster - Youth

Friday, May 31, 2019, 1:00 PM - 6:00 PM

Room: CC-Hall WA2

2955 Board #1 May 31 2:00 PM - 3:30 PM

### Vertical Jump and Agility Performance Improves After 8-week Conditioning Program in Youth Female Volleyball Athletes

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Volleyball athletes must employ specific conditioning exercises with high levels of force, high rates of speed, and quick changes-of-direction. Volleyball sport specific vertical jumping ability can be assessed through various types of vertical jumping protocols such as the block vertical jump (BVJ), the countermovement vertical jump (CMJ), and the two-step approach vertical jump (AVJ). Sport specific agility testing for volleyball can be assessed with a 9-cone (9C) test to determine the athletes' ability to generate quick and accurate movement with change-of-direction and/or acceleration and deceleration.

**PURPOSE:** The purpose of this study was to determine if an 8-week combined high intensity interval training and plyometric (HIIT-PT) conditioning program improves performance on three vertical jump protocols and agility time in youth female volleyball athletes.

**METHODS:** Eleven female youth volleyball players (ages:  $15 \pm 2.7$  yrs.; height:  $68.2 \pm 1.3$  in; mass:  $143.5 \pm 14.8$  lbs) completed an 8-week summer HIIT-PT conditioning program. The 8-week summer conditioning program consisted of combined 2 x week (60 min each) high intensity interval exercises and 2 x week (60 min each) plyometric exercises. Three vertical jump protocols (BVJ, CMJ, AVJ) and an agility test (9C) were administered at the beginning of the first week and at the end of week 8 of the summer HIIT-PT conditioning program.

**RESULTS:** Prior to data comparisons, a Kolmogorov-Smirnov test of normality was performed for each of the four variables and determined to be from a normal distribution (BVJ:  $p = .096$ , CMJ:  $p = .200$ , AVJ:  $p = .187$ , 9C:  $p = .127$ ). A series of paired sample t-tests were performed to compare pretest and posttest vertical jump heights (inches) and agility times (seconds). All three vertical jump protocols significantly increased (BVJ:  $14.6$  vs  $16.1$ ,  $p.000$ ; CMJ:  $17.3$  vs  $18.4$ ,  $p.000$ ; AVJ:  $21.0$  vs  $23.1$ ,  $p.001$ ) and agility times decreased (9C:  $25.3$  vs  $23.6$ ,  $p.000$ ) following the 8-week HIIT-PT summer conditioning program.

**CONCLUSION:** Results from this study indicate that employing an 8-week combined HIIT-PT conditioning program may improve jumping and change-of-direction outcomes in youth female volleyball athletes.

2956 Board #2 May 31 2:00 PM - 3:30 PM

### The Talk as a Measure of Exercise Intensity in Children

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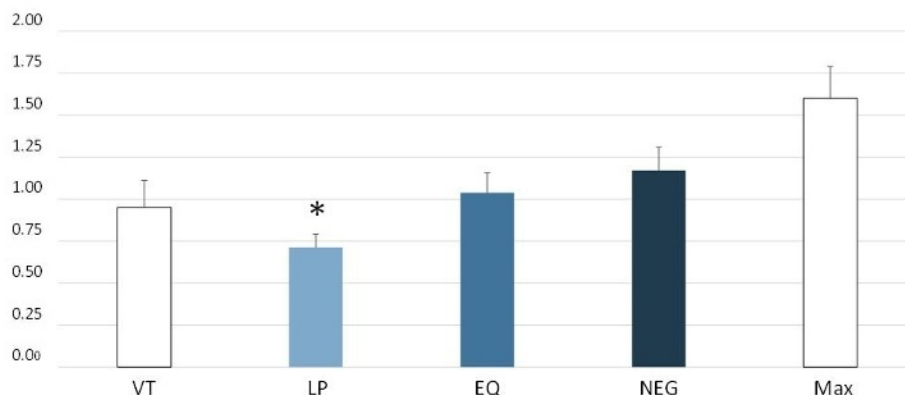
**PURPOSE:** The purpose of this study was to determine if the Talk Test (TT) is a valid measure of ventilatory threshold (VT) in children.

**METHODS:** Thirteen healthy children (age 8-12 y) performed maximal incremental exercise with respiratory gas exchange and with the TT. During the last 30 seconds of each stage they read a passage containing 100-106 words and were asked if they could "speak comfortably". Gas exchange was measured and was used to identify VT. Comparison measurements occurred at the last positive (LP), equivocal (EQ), and negative (NEG) stages of the TT.

**RESULTS:** There were significant ( $p < 0.05$ ) differences in  $VO_2$  (VT vs LP and NEG stages;  $0.95 \pm 0.580$  vs  $0.71 \pm 0.284^*$  and  $1.17 \pm 0.504^*$ ), HR (VT vs LP, EQ, and NEG stages;  $136.0 \pm 19.0^*$  vs  $126.3 \pm 12.91^*$  and  $152.5 \pm 15.40^*$  and  $160.5 \pm 16.28^*$ ), and RPE (VT vs LP and NEG stages;  $5.2 \pm 2.70$  vs  $3.6 \pm 1.32^*$  and  $7.2 \pm 1.09^*$ ).

**CONCLUSION:** It was concluded that the EQ stage of the TT is a valid measure of the exercise intensity at VT in children, as it is already known to be in adults.

## Results-VO<sub>2</sub>



2957 Board #3 May 31 2:00 PM - 3:30 PM

### Predicting Changes in Adolescent Muscle Mass with Field Testing

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With physical training and normal adolescent growth, gains in lean muscle mass can be seen among the healthy adolescent population. Assessing these gains is crucial to monitoring and adjusting training protocols and helping with client motivation and investment. However, the ability of common field tests to accurately predict changes in muscle mass among this population has yet to be proven.

**PURPOSE:** The purpose of this study was to assess the ability of the standing long jump (SLJ) and 90° push-up (PU) test to accurately predict changes in lean mass ( $\Delta$ LM) among healthy adolescents aged 12-18 years.

**METHODS:** Forty-five healthy adolescents completed the standing long jump, 90° push-up test, and a full-body dual energy x-ray absorptiometry (DEXA) scan twice with 7-10 months between test sessions. The difference in each outcome was calculated and used to indicate change. Field test predictive ability was evaluated using multiple regression and accounted for age (yrs), sex (female = 0, male = 1), height (cm), body mass, and pubertal stage using the Pubertal Development Scale (PDS).

**RESULTS:** A mean change of 2198.82 g of lean mass (range = -1193.60, 7307.70; SD = 1816.67) was shown using DEXA. The SLJ and PU had a mean change of 5.11 cm (range = -36.00, 35.70; SD = 16.40) and 0 repetitions (range = -13, 11; SD = 5.30) respectively. Both  $\Delta$ SLJ ( $r = .340, p = .011$ ) and  $\Delta$ PU ( $r = .315, p = .018$ ) had significant moderate relationships to  $\Delta$ LM. The inclusion of  $\Delta$ SLJ and  $\Delta$ PU in the model accounted for an additional 8.8% of the variability ( $R^2 = .551$  from .463) and 4.2% ( $R^2 = .593$ ) respectively. The overall model explained 59.3% of the variability in lean mass change and resulted in the following predictive equation:  $\Delta$ LM = 1237.59 + (-630.44 x age) + (-169.34 x PDS) + (847.31 x gender) + (33.89 x height) + (199.04 x BMI) + (29.07 x  $\Delta$ SLJ) + (73.13 x  $\Delta$ PU)

**CONCLUSIONS:** Along with anthropometric developmental factors, the SLJ and PU tests can be used to estimate changes in lean muscle mass. However, these factors only account for approximately 60% of the change in lean muscle mass leaving the remaining 40% attributable to other (neural, mechanical, motivational) factors. Nevertheless, this prediction equation can assist in monitoring changes in lean muscle mass during adolescence.

2958 Board #4 May 31 2:00 PM - 3:30 PM

### Relationship Between Physical Activity and Motor Skills in 3-5 year olds: National Youth Fitness Survey

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**PURPOSE:** The purpose of this study was to examine what kind of physical activity would have a positive relationship with motor skills in children through secondary data analysis.

**METHODS:** Data from children 3-5 years old (N=352, 179 males) who participated in the National Youth Fitness Survey (2012) were used. Included in this study were demographics, anthropometrics, physical activity questionnaire by parent report, and motor skill score determined by Test of Gross Motor Development-2<sup>nd</sup> Edition. Multiple regression was conducted to examine the relationship between physical activity and motor skills controlling for sex, race, and parent's socioeconomic status.

**RESULTS:** The most commonly reported activities were running (43%), playing outdoor games (35%), and riding a bike (34%). Motor skills standard scores were locomotor (Mean (SE)=(9.99 (.16)), object control (Mean (SE)=8.52 (0.14)), and gross motor skill (Mean (SE)=95.57 (.68)). Participation in the following activities were positively related to gross motor skill score: riding a bike ( $\beta$  (SE)=5.27 (2.02),  $p=0.02$ ), scooter riding ( $\beta$  (SE)=9.83 (2.59),  $p=0.002$ ), swimming ( $\beta$  (SE)=4.01 (1.17),  $p=0.004$ ), and jumping on a trampoline ( $\beta$  (SE) = 7.45 (3.09),  $p=0.03$ ). With the exception of riding a bike the activities positively related to gross motor skill score had a reported range of participation between 7-12%.

**CONCLUSIONS:** The key findings of this study indicated that participation in specific physical activities were related to gross motor skill score in preschool aged children. Further, it showed that with the exception of riding a bike the activities that the children participated in the most were not the same as those activities that were positively related to their gross motor skill score.