CONCLUSIONS: As suggested by the observed relationships, both the SLHD and SLVJ data correlate significantly with leg peak power results obtained from the Keiser Air420 in healthy, collegiate athletes. Thus, this study suggests low-tech/low-cost functional tests like the SLHD and SLVJ appear to be appropriate for evaluating leg power and return to competition in this population.

3417 Board #105       June 1 8:00 AM - 9:30 AM
Investigation of Optimal Depth Jump Box Height for Reactive Strength Index
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(No relationships reported)

Reactive strength index (RSI) is used to assess athleticism through use of the stretch-shortening cycle for power and is determined by jump height over ground contact time. RSI is typically assessed utilizing an incremental drop jump test and while it is well-established that plyometric training positively impacts power production, the optimal depth jump box height for RSI remains unknown. PURPOSE: To measure RSI between different depth jump starting heights. METHODS: 20 college students were recruited for this study (M±13, F=7; age: 22.8±2.7y, height: 175.6±a11.8cm, mass: 78.3±13.5kg) and were prepped using reflective markers on their ASIS and PSIS, bilaterally, which allowed for vertical jump height measurements. After a specific warm-up, subjects were instructed to perform three maximal DJS onto a force plate from five different heights: 30cm (DJ30), 45cm (DJ45), 60cm (DJ60), 76cm (DJ76), and 91cm (DJ91). RESULTS: A repeated measures ANOVA revealed no effect of sex but significant differences in RSI between starting heights (DJ30=1.36a±0.11; DJ45=1.42a±0.12; DJ60=1.35a±0.12; DJ76=1.28a±0.12; DJ91=1.16a±0.11), with DJ45 and DJ60 being greater than DJ30, DJ76, and DJ91. CONCLUSION: A parabolic relationship was observed between depth jump box height and RSI, with the optimal depth jump starting heights being 45 and 60 cm. A potential avenue for future research would be to investigate training effects on RSI from various depth jump box starting heights.

3418 Board #106       June 1 8:00 AM - 9:30 AM
The Effects Of Different Local Muscular Endurance Training Protocols In Muscle Activity And Fatigue
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(No relationships reported)

The present study assessed fatigue and neuromuscular changes after fatigue submaximal horizontal chest press exercise between different strength trainings of concentric contractions intensities. PURPOSE: The purpose of this study was to evaluate the effect of strength trainings with higher intensity contractions in EMG activity and fatigue. METHODS: Fifteen trained males (24±2.9 years old, 181.8±5.8cm, 83.6±9.6kg) performed four different strength trainings protocols in horizontal chest press (HCP) with different intensities of a load % one repetition maximum (RM) with a similar total impulse and similar rest. Strength trainings protocols consisted of: A) 3 blocks x (1 repetition (reps)) of 95% RM - 1 rep of 90% RM - 3 reps of 80% RM - 5 reps of 70% RM - 8 reps of 60% RM - 8 reps of 50% RM - 12 reps of 45% RM - 15 reps of 30% RM - 12 reps of 20% RM) rest 5 sec between sets et 3 min between blocks; B) 2 blocks x (6 x 15 of 50% RM) rest 30 sec between sets et 3 min between blocks; C) 3 sets x (3 reps of 90% RM) rest 30 sec between sets and 1 min rest after block and 4 X (15 of 50% RM) rest 20 sec between sets et 1’40” rest after block et 3 min between sets; D) 3 blocks x (6 x 10 reps of 50% RM) rest 10 sec between sets and 2’30” after block. The maximal voluntary isometric contraction torque (MVIC) was assessed in the HCP exercise before and after exercise. Electromyography (EMG) of the pectoralis major (P), anterior deltoid (AD), and the long head of the triceps brachii (TB) were assessed during the different exercises. RESULTS: Similar reductions of the MVIC (1227.5±184 vs 992±196 N; P<0.01) were observed after the four strength training protocols. EMG DA activity was greater in protocol C compared to the other protocols (0.95±0.36 vs 0.87±0.347 mV; P<0.01). EMG TB activity was greater in protocol C compared to the other protocols (0.53±0.194 vs 0.47±0.249 mV; P<0.01). EMG P activity was greater in protocol B and D compared to the A and C (0.34±0.11 vs 0.29±0.170 mV; P<0.01). CONCLUSIONS: The effect of strength endurance trainings with higher load % RM contractions compared to the others with a lower, affect similarly the loss of performance in the HCP exercise but with greater activity of DA and T muscles.

3419 Board #107       June 1 8:00 AM - 9:30 AM
Cyclists’ Brain Cycling: An fMRI Study
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Functional and structural changes in the brain have been associated with regular aerobic exercise and expertise in several sports. A variety of neuroimaging techniques have revealed changes in brain activation with increased exercise intensity, however, how expertise modulates neural activation is still unclear for some sports, like cycling. PURPOSE: Using an adapted cycling MRI ergometer, we compared the neural patterns of cycling experts and non-cyclists during cycling periods of different intensities. METHODS: 22 participants were divided into two groups: 12 healthy adults who performed physical activity 4-6 h/week and 10 trained cyclists (>2 years of training and competitive experience, cycling 4-6 days/week for ~60 min). The participants performed an incremental test on an adapted cycling MRI ergometer while whole-brain activity was recorded with functional MRI. Using a one-sample t-test (p<0.05 family-wise error corrected for multiple comparisons), we identified the positive (activation) and negative (inhibition) blood-oxygenation-level-dependent responses associated with all cycling intensities in each group. RESULTS: The analysis revealed that both cycling experts and novices activated the precentral gyrus, postcentral gyrus, paracentral lobule and medial frontal gyrus (ts>11.1), while the cerebellum and insular cortex were activated only in cyclists (ts>8.83). In addition, both groups had inhibition of prefrontal cortical areas (ts>7.44) during cycling, but the non-cyclists had larger areas of the prefrontal cortex inhibited (ts>7.52).
CONCLUSION: Cycling expertise impacts the modulation of subcortical and prefrontal brain areas during cycling. We believe that these findings suggest that regular practice of cycling may enhance the neural regulation of cognitive, motor and homeostatic resources during exercise at different intensities, which may explain the higher performance of cycling athletes.