

RESULTS: There were no significant differences in performance or HR response during the warm-up between the CTRL and EXPT.

CONCLUSION: These findings suggest that the addition of a mental task during a warm-up on a cycle ergometer has no effect on sympathetic activity or performance during a 30 s WAnT. The lack of significant findings may be due to the small sample size. Future work should focus on more challenging psychological stressors in conjunction with warm-up protocols to determine whether dual stress challenges can be utilized to optimize performance.

3437 Board #125 June 1 8:00 AM - 9:30 AM

Vertical Jump Versus Kinematic Sequencing: Advanced Technology Doesn't Always Enhance Appraisal

Margaret E. Bristow, Nathaniel J. Holmgren, J. Mark VanNess, Brian G. Graham, Joey Rossi, Courtney D. Jensen. *University of the Pacific, Stockton, CA.*

Email: m_bristow@u.pacific.edu

(No relationships reported)

In an age when science informs sport, new technology for athlete appraisal is often adopted before it is tested. Sparta kinematic sequencing (Sparta Science Corp.) is an instrument for player assessment that's employment has outpaced its examination.

PURPOSE: To evaluate the effectiveness of Sparta data in predicting basketball performance.

METHODS: We analyzed 37 basketball players from a D1 collegiate basketball program over a 4-year period (2013-2014 through 2016-2017). Each player's vertical jump (VJ) was measured and tested on a Sparta force plate, which provides 3 proprietary outputs: Load, Explode, and Drive. On average, each player was tested 24.9 ± 20.3 times; there were 922 total observations evenly distributed over the 4 years and over year in school. The Sparta outputs were used to predict on-court performance of each athlete during each season that the values were collected via multiple linear regression analyses. The dependent variables were in-game statistics per 40 minutes of court time: points, rebounds, assists, blocks, and turnovers.

RESULTS: Athletes played 19.3 ± 12.7 games per year. On average, they scored 12.8 ± 4.4 points, had 6.6 ± 2.7 rebounds, and turned the ball over 2.4 ± 1.0 times. Regression analyses found no significance with Load, Explode, or Drive in points per game, field goals per game, or assists per game. In each analysis all 3 Sparta outputs had negative associations that didn't reach significance while VJ had a positive association that failed to reach significance. Load predicted rebounds per game ($\beta=0.18$; $p<0.001$) and blocked shots per game ($\beta=0.03$; $p=0.021$). Explode and Drive had non-significant negative relationships and VJ had a non-significant positive relationship. Explode ($\beta=0.31$; $p=0.017$) and Drive ($\beta=0.304$; $p=0.011$) predicted more turnovers per game, VJ predicted fewer ($\beta=-0.982$; $p=0.020$), and Load had a non-significant positive association. Without controlling for the full Sparta profile, Explode associated with fewer rebounds ($p<0.001$) and more turnovers ($p=0.020$); it had no association with improvements in performance.

CONCLUSION: Athletic programs are often quick to incorporate new technology believing that it equates to improved player assessment. More analyses are required before simple jumping analyses can be displaced by sophisticated equipment.

3438 Board #126 June 1 8:00 AM - 9:30 AM

Differences In Performance Traits In Intermittent Versus Continuous Exercise Testing Of Handball Players and Triathletes

Björn Sterzing, Tobias Ehlert, Sarah Breitbart, Perikles Simon. *Johannes Gutenberg University, Mainz, Germany.*

Email: sterzing@uni-mainz.de

(No relationships reported)

External validity of endurance performance diagnostics may depend on type of sports. In order to reflect different load quality for the muscle specific endurance testing regimes have been developed for intermittent sports. Here we examined the influence of an intermittent versus a typical continuous step-wise progressive treadmill protocol on metabolic and cardiorespiratory parameters.

PURPOSE: To determine if handball players (HB) in comparison to triathletes (T) show differences in typical submaximal lactate thresholds (LT and LT + 1.5 mmol), or in VO₂max depending on either continuous or intermittent type of a step-wise progressive exercise testing.

METHODS: 13 HB and 13 T; mean (SD) age 24.7 (3.1 yrs) height 184.2 (7.2 cm), weight 82.7 (10.8 kg) with a training load of 6.8 (3.1) h/wk in HB versus 8.8 (3.3) h/wk in T. Each subject performed two treadmill protocols within one week. First a typical step-wise incremental treadmill test (CTT) starting at 6 km/h increasing every 3 min by 2 km/h until exhaustion. Second a step-wise incremental intermittent test (IMT) with steps split into 6x15s load phase interlaced with 6x15s active recovery. Load phase started at 8km/h and was increased every 3 min by 2 km/h, while active recovery remained at 6 km/h throughout all steps until exhaustion. VO₂max, velocity at LT, velocity at LT + 1.5 mmol/l lactate (IAT).

RESULTS: VO₂max in ml/min/kg was not significantly different between sports and testing protocols (all 4 groups) with CTT for HB 50.5 (4.7) and T 53.2 (3.5), or with IMT 50.1 (3.7) in HB and 51.2 (4.2) for T. Velocity in km/h at IAT was not significantly different between all groups with CTT for HB 11.9 (0.8) and 12.4 (1.3) for T, or with IMT 11.2 (0.4) for HB and 11.5 (0.7) for T. For the LT in km/h we revealed in an analysis of co-variance a slightly significantly higher velocity of $\Delta V = 0.74$ km/h (95% CI = 0.03-1.45, $p < 0.04$) in T than in HB in CTT.

CONCLUSIONS: We recruited a collective of HB and T with an almost comparable weekly training load. HB and T showed comparable typical performance trait characteristics for the higher work-load demand (VO₂max and IAT), which was even independent of type of test. The slightly better performance of T in specifically the continuous test setting principally reflects higher load and potentially a better adaptation to this type of working demand.

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A Comparison of Techniques for Estimating and Detecting Changes in Skeletal Muscle Cross-Sectional Area

Johnathon H. Moore¹, Cody T. Haun², Emily L. Grandprey³, Katelyn P. Joubert³, Christopher G. Vann¹, Paul A. Roberson¹, Petey W. Mumford¹, Matthew A. Romero¹, Shelby C. Osburn¹, C Brooks Mobely¹, Jordan R. Moon⁴, Michael D. Roberts⁵, Kaelin C. Young⁵. ¹Auburn University, Auburn, AL. ²LaGrange College, LaGrange, GA. ³Edward Via College of Osteopathic Medicine-Auburn Campus, Auburn, AL. ⁴ImpediMed, Inc., Carlsbad, CA. ⁵Auburn University, Edward Via College of Osteopathic Medicine-Auburn Campus, Auburn, AL.

(No relationships reported)

Muscle biopsy and subsequent histological analysis of muscle fibers is a criterion technique for determining hypertrophy of skeletal muscle in resistance- and endurance-trained individuals. However, due to the training necessary to complete the biopsy, and the invasive nature of the biopsy itself, alternative methods for depicting muscle fiber hypertrophy offer increased ability to gather data discerning skeletal muscle hypertrophy. Furthermore, such procedures require less training and are noninvasive.

PURPOSE: This project sought to determine if estimated mid-thigh whole muscle cross-sectional area (CSA) is related to muscle fiber CSA from muscle biopsies.

METHODS: Twenty-nine resistance-trained men (age: 21 ± 2 yrs, weight: 83.6 ± 11.0 kg, height: 178.7 ± 8.1 cm) underwent six weeks of total-body resistance training. Muscle biopsies were taken from the Vastus lateralis prior to and following training. Mid-thigh circumference and skinfold measurements (anterior, posterior, medial, and lateral) were used to estimate whole muscle mid-thigh cross-sectional area using the methods of Moritani and deVries.

RESULTS: Whole-muscle CSA did not significantly increase from pre- (272.737 ± 37.401 cm) to post-training (277.286 ± 29.474 cm; $p = 0.201$). Muscle fiber CSA did not significantly increase from pre- (4068 ± 865 μ m) to post-training (4221 ± 704 μ m; $p = 0.368$). Additionally, pre muscle fiber CSA did not correlate to pre whole-muscle CSA ($r = 0.029$, $p = 0.882$). Also, Muscle fiber CSA percent change did not correlate with whole-muscle CSA percent change ($r = -0.064$, $p = 0.741$).

CONCLUSION: Estimated whole-muscle CSA and muscle fiber CSA do not appear to correlate well. A lack of a relationship between the changes in these measurements following hypertrophy are puzzling and warrant further study.