TACSM Abstract

Establishing a Predictive Equation for Anaerobic Capacity Utilizing the 300-yard Shuttle Field Test

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ABSTRACT

Anaerobic capacity can be tested through the Running-based Anaerobic Sprint Test (RAST), Wingate test (gold standard), and the 300-yard shuttle. While each testing is recognized as a valid method of assessing anaerobic capacity, previous investigations found no significant correlation between Wingate test and time to completion of 300-yard shuttle test. The insignificant relationship found between the 300-yard shuttle times and the Wingate outputs insinuate a need for further research investigating the correlations between these two anaerobic tests. **PURPOSE**: The aim of this study was to determine the influence of 300-yard shuttle measures on anaerobic capacity obtained via the Wingate test. **METHODS**: Twenty-two Division I softball players (20.41 +1.50 yr) completed two anaerobic testing sessions. Session 1 consisted of the 30s all out Wingate test. Sessions 2 was completed 48 hours following session 1 and involved the performance of two 300-yard shuttle run tests separated with 5 minutes rest. The Wingate test data included: anaerobic peak power (PP), average power (AP), power drop (PD), power drop per second (PD/s), maximal speed (MS), and power at maximal speed (PMS). The recorded 300-yard shuttle measures were time and kinetic energy factor (K-factor) (new anaerobic variable) for both attempts, as well as average time and average K-factor. K-factor during the 300-yard shuttle was calculated by utilizing the mass of participants multiplied by speed (distance divided by time elapsed) squared. A backwards stepwise multiple linear regression was employed to examine the influence of 300-yard shuttle on anaerobic capacity measure obtained via Wingate test. **RESULTS**: Statistical analysis identified the second 300-yard shuttle attempt time (S300) predicting AP as the model of best fit, which S300 explaining 32.7% of the variance of AP; furthermore, generating the following predictive equation: AP = 9.91 – (.049 x S300). Secondly, 84.2% of the variance in PD was explained by Average K-factor (AKF), establishing PD = -.85 + (.098 x AKF) as a predictive equation. Lastly, AKF, also, predicted 84.3% of the variance in PD/s: PD/s = -.028 + (.003 x AKF). **CONCLUSION**: An aspect of these finding contradicted preview investigations, as the S300 was recognized as a significant predictor of AP, suggesting faster 300-yard shuttle performance may increase AP. The positive significant correlation between the AKF and Wingate PD and PD/s suggest higher AKF may influence greater measures of PD and PD/s. These finding appear to support that calculating K-factor provides a richer understanding of field tested (300-yard shuttle) anaerobic capacity.