TACSM Abstract

Body Composition and Blood Biomarkers Correlate with Muscle Strength and Anaerobic Performance

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ABSTRACT

Blood biomarkers and body composition are sensitive indicators to monitor and predict performance in the athletic population. The analysis of these markers can help monitor progression in athletes competing in aerobic and anaerobic sports; however, it is unclear which biomarkers are associated with muscle strength and anaerobic performance. **PURPOSE**: To explore the correlations of body composition and blood biomarkers with muscle strength and power tests of the countermovement jump (CMJ), broad jump (BJ), isometric mid-thigh pulls (IMTP), hand grip strength (HGS), and the Wingate anaerobic test. **METHODS**: This study recruited nine collegiate intramural sports club students (Height=171.43±10.05 cm, Weight=70.36±13.18 kg, Age=23.87±3.65 years). Body composition was assessed with air displacement plethysmography (BodPod), and muscular strength was measured by IMTP and HGS. Muscular power was assessed via CMJ and BJ and calculated from ground reaction forces. Additionally, peak power output and mean power output were determined from the 30-second Wingate test. Blood biomarkers of hemoglobin (Hb), red blood cell count (RBC), and hematocrit (Hct) were analyzed by Quest Diagnostics. Data normality was confirmed with a Shapiro-Wilk test. Pearson-R correlations were conducted to determine associations between body composition, blood biomarkers, and the above performance tests. Significance was set at an alpha level of $p<0.05$. **RESULTS**: Fat free mass was positively correlated with BJ distance ($r=0.805$, $p=0.016$), IMTP peak force ($r=0.907$, $p=0.002$), Wingate peak power ($r=0.708$, $p=0.049$), and Wingate mean power ($r=0.910$, $p=0.002$). Additionally, body fat percentage was negatively associated with IMTP peak force ($r=-0.850$, $p=0.008$) and mean power in the Wingate ($r=-0.800$, $p=0.017$). There was a positive correlation between blood biomarkers (RBC, Hb, and Hct) and mean power of the Wingate ($r=0.693$-0.906, $p<0.05$), and peak force of the IMTP ($r=0.710$–0.833, $p<0.05$). Furthermore, RBC was found positively correlated with CMJ height ($r=0.815$, $p=0.007$) and BJ distance ($r=0.763$, $p=0.028$), while HGS was positively associated with RBC ($r=0.910$, $p=0.012$) and Hct ($r=0.962$, $p=0.002$). **CONCLUSION**: Body composition and blood biomarkers correlate with muscle strength, power, and anaerobic performance, which could be potentially used to monitor and predict human performance in athletes.