TACSM Abstract

Relationship Between Muscle Cross-Sectional Area and Counter-Movement Jump Performance in Semi-Professional Athletes

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ABSTRACT

Muscle cross-sectional area (CSA) has been identified as a major predictor of the force production capabilities in athletes, while countermovement jumps (CMJ) can be used to assess power production translated into jump height. However, there is a lack of literature looking at the relationship between CSA and CMJ performance in athletes at different timepoints throughout a competitive season. **PURPOSE:** To examine the relationship between change in lower limb muscle CSA and CMJ performance in semi-professional soccer players over the course of a season. **METHODS:** Twenty-three male players (mean ± standard deviation; age: 21.3 ± 2 years; height: 178.4 ± 6.7 cm; weight: 77.2 ± 7.9 kg) visited the laboratory during the pre-, mid-, and post-season for a total of three visits over the course of soccer season. During each visit, body mass (BM) of the player was measured first. Then, two ultrasound images of their dominant rectus femoris (RF) and vastus lateralis (VL) were acquired. Additionally, each player performed two CMJs with the highest height obtained used for data analysis. Percentage of changes of BM (%BM), CSA (%CSA), and CMJ (%CMJ) from baseline values were calculated for each player. Regression analyses were conducted to predict from %CSA to %CMJ without and with controlling %BM. **RESULTS:** Lower %CSA predicted higher %CMJ ($r^2 = 0.276$, $p = .007$) independent of %BM. When controlled, lower %CSA also predicted higher %CMJ ($r^2=0.294$, $p = 0.022$). However, RF %CSA did not predict %CMJ both without and with controlling %BM ($p > .05$). **CONCLUSION:** In semi-professional soccer players, lower VL CSA predicted higher CMJ performance. As %BM was not the predominant variable in the correlation, proven by the difference or variances between not controlling and controlling being minimal, reasoning could be speculated as other factors such as training load and recovery state.