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### Changes In Appendicular Skeletal Muscle Mass In Division I Collegiate Baseball Pitchers

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(No relevant relationships reported)

Skeletal muscle mass (SKM) plays a critical role in sports performance and injury risk. For baseball players, maintaining SKM throughout the in-season is challenging given the large number of games played (50 to 56), shortened recovery time and travel. Of concern, pitchers rely heavily on the repeated use of their dominant arm followed by between-game resting periods. Quantifying changes in SKM from pre- through in-season is understudied, especially using gold standard methodology.

**PURPOSE:** To quantify the changes in SKM from pre- through in-season in Division I collegiate baseball pitchers and evaluate differences between dominant and non-dominant upper and lower body limbs

**METHODS:** Seventeen, male baseball players aged  $20.9 \pm 1.3$  yrs with an average height and weight of  $186.3 \pm 3.8$  cm and  $92.7 \pm 6.5$  kg, respectively, participated in the study. Appendicular SKM mass, the summed SKM masses of the upper and lower limbs, was quantified via DEXA scans at two, time points, pre- (February 2024) and late, in-season (April 2024). Participants followed the established pre-testing guidelines and were eligible for DEXA scans (e.g., fasted, hydrated). All scans were completed in the morning. Changes in SKM mass were quantified for the dominant and non-dominant limbs and compared via studentized paired t-tests.

**RESULTS:** In pitchers, appendicular SKM significantly declined ( $1.9 \pm 0.7$  kg; 95% CI: 1.5, 2.3 kg;  $p < 0.001$ ) from pre through late, in-season. Similarly, significant reductions in the dominant ( $0.5 \pm 0.5$  kg; 95% CI: 0.3, 0.8 kg;  $p < 0.001$ ) and non-dominant upper limbs ( $0.3 \pm 0.4$  kg; 95% CI: 0.08, 0.4 kg;  $p = 0.004$ ) and dominant ( $0.5 \pm 0.4$  kg; 95% CI: 0.3, 0.7 kg;  $p < 0.001$ ) and non-dominant ( $0.6 \pm 0.4$  kg; 95% CI: 0.3, 0.8 kg;  $p < 0.001$ ) lower limbs. The SKM mass of the dominant arm decreased 11.2% compared to 5.8% in the non-dominant arm, this difference, however, did not reach statistical significance.

**CONCLUSIONS:** Significant decrements in total appendicular SKM mass in collegiate baseball pitchers were observed. Pitchers also exhibited a nearly 2-fold non-statistically significant decrease in SKM mass in their dominant relative to their non-dominant arm. Tracking changes in SKM mass throughout pre- and in-seasons of collegiate baseball may provide coaches information critical to their pitchers' performance and risk of injury.

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### The Relationship Between Vertical Jump Acceleration And Fastball Velocity In Major League Baseball

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(No relevant relationships reported)

Vertical jump has been widely used to estimate athletic potential in diverse sport contexts. Moderate associations between vertical jump and fastball velocity (FV) have been found in various levels of play. Vertical jump acceleration and FV in Major League Baseball (MLB) remains unexamined.

**PURPOSE:** To evaluate the relationship between vertical jump acceleration and FV in MLB pitchers.

**METHODS:** We tested 28 MLB pitchers using a Proteus device (Proteus Motion, USA). All athletes wore a waist harness, faced away from the equipment, and performed 5 repetitions of vertical jump against 6 lb of resistance. Peak acceleration in  $m/s^2$  was recorded for each repetition, and the mean of all 5 peak values was used as the independent variable. The dependent variable was peak in-game FV recorded subsequently by the MLB. Simple linear regression examined this relationship. Further regression models held significant confounders constant.

**RESULTS:** Players were  $29.5 \pm 4.1$  years of age and had played  $4.1 \pm 3.1$  previous MLB seasons. Height was  $75.6 \pm 2.4$  inches, weight was  $213.1 \pm 20.3$  lb, and vertical jump acceleration was  $13.0 \pm 2.6$   $m/s^2$ . Peak FV was  $92.6 \pm 2.6$  mph; it was related to age ( $r^2=0.231$ ;  $\beta=-0.303$ ;  $p=0.010$ ; 95% CI: -0.526, -0.080) and number of seasons played ( $r^2=0.306$ ;  $\beta=-0.456$ ;  $p=0.002$ ; 95% CI: -0.733, -0.179) but not height ( $p=0.784$ ) or weight ( $p=0.617$ ). In a simple linear regression, vertical jump acceleration significantly predicted FV ( $r^2=0.449$ ;  $\beta=0.666$ ;  $p < 0.001$ ; 95% CI: 0.368, 0.963). Holding age ( $p=0.005$ ) constant, vertical jump acceleration retained significance ( $\beta=0.611$ ;  $p < 0.001$ ; 95% CI: 0.350, 0.872); the overall model was significant ( $r^2=0.602$ ;  $p < 0.001$ ). Holding number of seasons played ( $p=0.006$ ) constant, vertical jump acceleration retained significance ( $\beta=0.555$ ;  $p < 0.001$ ; 95% CI: 0.284, 0.827); the overall model was significant ( $r^2=0.594$ ;  $p < 0.001$ ). Age ( $p=0.481$ ) and seasons played ( $p=0.149$ ) did not predict vertical jump acceleration.

**CONCLUSION:** Advancing age and number of seasons played corresponded to reductions in FV, whereas increased vertical jump acceleration predicted higher velocity. This finding was not affected when controlling for age or seasons played. Exercise prescriptions that increase vertical jump acceleration should be considered for professional pitchers aiming to increase FV.

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### The Relationship Between Sports Performance Variables And Hitting Performance In NCAA Division II Softball Athletes

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(No relevant relationships reported)

**The Relationship Between Sports Performance Variables and Hitting Performance in NCAA Division II Softball Athletes** Matthew R. Miltenberger, Chrystiana N. Brettelle, Angelina E. Monti, Brandon W. Snyder, Brendan S. Finn, Shala E. Davis, Connor M. Saker. East Stroudsburg University of Pennsylvania, East Stroudsburg, PA. Literature suggests that lower body strengthening and explosive training can be effective in increasing the rate of force development, and in turn bat velocity in baseball players. Despite the similarities between the hitting movements associated with baseball and softball players, there has been little research done on the relationship between resistance training and the effect of swing performance in softball players.

**PURPOSE:** The purpose of this study was to examine the relationship between measures of strength or power to bat swing velocity (BV) and batted ball velocity (BBV) in NCAA Division II softball players.

**METHODS:** Twenty-two NCAA Division II softball players from a regional Northeast University (age:  $19.50 \pm 1.44$  years, height:  $65.55 \pm 2.30$  inches, mass: 148.68