

Coactivation Patterns of the Biceps and Triceps Brachii in Division I Baseball Pitchers

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ABSTRACT

Agonist-antagonist coactivation patterns provide valuable insights into the coordination and efficiency of movement, serving as a reliable indicator of proficiency in a task as intricate as throwing. **PURPOSE:** The purpose of this investigation was to examine biceps and triceps brachii coactivation patterns in overhead throwing athletes during isokinetic contractions. **METHODS:** Twelve (21.40 ± 1.36 yrs., 185 ± 4.79 cm, 90.78 ± 7.65 kg) Division I baseball pitchers participated in this study. Following a familiarization visit, subjects completed maximal voluntary isokinetic contractions (MVC) of the biceps and triceps brachii followed by randomized percentage-based contractions at 25% and 50% MVC. All contractions were performed on a Biodex System 4 dynamometer at a velocity of $60^\circ/\text{sec}$, and surface electromyography (EMG) was used to record muscle activation from the biceps and triceps brachii. Root mean square (RMS) coactivation ratios were calculated for both bicep flexion and tricep extension. A 2-way [muscle action (flexion vs extension) x intensity (25% vs 50% vs MVC)] repeated measures ANOVA was used to compare RMS ratios. **RESULTS:** There was no significant muscle action x intensity interaction ($p > 0.05$); however, there was a significant main effect on intensity ($p < 0.001$). Specifically, the 25% MVC had the highest coactivation ratio, followed by 50% MVC, and then MVC (3.580 ± 0.632 , 2.033 ± 0.195 , 0.136 ± 0.022 ; respectively; mean \pm SE). **CONCLUSION:** The observed differences in coactivation imply that overhead throwing athletes demonstrate greater proficiency in maximal effort contractions of the biceps and triceps brachii. This is to be expected, as these movements more closely replicate the demands of sport-specific performance.