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ORIGINAL RESEARCH

DEVELOPMENT OF AN UPPER EXTREMITY 'SWING COUNT' AND PERFORMANCE MEASURES IN NCAA DIVISION I VOLLEYBALL PLAYERS OVER A COMPETITIVE SEASON

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ABSTRACT

Background: Monitoring the volume of activity (i.e. pitch counts) and tracking upper extremity (UE) performance changes is common in overhead athletes; however, a lack of evidence exists for volleyball players.

Purpose: The purpose of this study was to investigate changes in shoulder mobility, strength, and pain, along with UE swing count volume in Division I collegiate female volleyball athletes over a competitive season.

Study Design: Observational, longitudinal study

Methods: Swing count data was collected during two separate days of practice during weeks 1, 7, and 14 of the competitive season. Perceived swing counts were collected after each practice from athletes and two coaches. Actual swing counts were tallied by retrospective viewing of video footage. Dominant shoulder internal (IR) and external rotation (ER) range of motion (ROM) and isometric strength, along with UE pain, were assessed on five occasions: baseline, in-season (weeks 1, 7, 14) and post-season (week 22).

Results: Five Division I female volleyball athletes participated. Perceived UE swing counts among coaching staff were significantly correlated with actual swing count (r = 0.93 - 0.98, p<.05), while athlete perceived swing count was moderately correlated and was not statistically significant (r = 0.64, p =.25). Shoulder IR ROM decreased from baseline to week 14 (-5.6 $\pm$ 10.6, 95% CI: -18.76, 7.6; p = .03), with a large effect size (d = 1.0). Large effect sizes were observed for increases in UE pain, shoulder ER ROM, and IR strength (d = 0.8 - 2.3). An increase in shoulder IR strength occurred from baseline to week 14 (p = .001), but decreased during the eight weeks of post-season relative rest (p =.02).

Conclusions: UE swing count estimates by coaching staff demonstrated higher correlation with actual swing counts obtained through video recording, as compared to volleyball athlete self-report. This cohort experienced increased shoulder IR strength and ER ROM over a competitive season. Shoulder IR ROM decreased during the first 14 weeks with a large effect size. Monitoring UE performance changes and swing count volume may have implications for injury prevention and program development for volleyball athletes.

Level of Evidence: Level 2B

Key words: Female, range of motion, shoulder, strength, volleyball

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Financial Disclosures: Brandon Ness is an instructor for a continuing education company and receives honorariums for teaching courses related to sports physical therapy, is in the process of commercializing a rehabilitation measurement device with patent pending, and is the owner of a company which distributes rehabilitation resources.

Kory Zimney is senior faculty with a post-professional educational company and receives honorariums for teaching courses related to pain neuroscience education and has published books related to pain neuroscience education for which he receives royalties.

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