

Shoulder Range of Motion in Professional Pitchers With a History of Arm Injury

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Purpose: Alterations in glenohumeral external (ER), internal (IR), and horizontal adduction (HAdd) range of motion (ROM) are reported in pitchers and thought to predispose the throwing shoulder to injury. However, there is limited data on shoulder ROM in pitchers with an injury history. Therefore, the purpose of this study was to examine shoulder ROM in pitchers with a history arm injury.

Subjects: Bilateral shoulder ROM was assessed in 93 (69 right handed; 23 left handed) professional pitchers (mean age=22; height=189 cm; weight=94 kg) during spring training. All pitchers were currently asymptomatic and participating without restriction, in all training, practice, and games.

Methods: Two trials of bilateral shoulder ROM and strength were assessed. A digital inclinometer (DI) was used to assess supine ER, IR, and HAdd ROM with the scapula stabilized at 90° of abduction. The same examiner assessed all pitchers and was blinded to arm dominance. Good to excellent reliability was observed for all measures (ICC_(2,1)= 0.82-0.91, SEM= 7°-9°). The average of the two trials was used for analysis. Injury history was determined by self-report and defined as a shoulder or elbow injury that resulted in missing 1 or more starts or appearances. A mixed model ANOVA (side by group) was used to compare differences the throwing (T) and non-throwing(NT) sides between pitchers who reported an injury history and those who reported no history of injury ($\alpha \leq .05$). Tukey's post hoc analysis was used to compare interaction effects.

Results: 26/93 (28%) players reported a history of injury (10 shoulder 16 elbow). There was a significant interaction effect for side x group for ER ($F_{(2,90)} = 4.7$, $p = 0.02$; mean difference(diff)=20°, standard error (SE)=8°, 95% CI=4, 36). Tukey's post hoc analysis revealed pitchers with a history of shoulder injury displayed 20° less ER in their T shoulder compared to their NT shoulder while those without an injury history or a history of elbow injury displayed similar or increased ER. There were no significant effects involving group for IR or HAdd indicating that these measures were similar between groups upon evaluation ($p > 0.05$).

Conclusions: Pitchers reporting a history of shoulder injury displayed less ER compared to non-injured and pitchers reporting elbow injury. These results suggest there may be a relationship between loss of T shoulder ER and injury history. We were surprised that IR and HAdd was not observed in these individuals with an injury history. This may be that these measures are not related to injury history or that the rehabilitation programs addressed these impairments.

Clinical Relevance: Clinicians should carefully monitor shoulder external, internal, and horizontal adduction range of motion in rehabilitation of the pitching athlete.

Key Words: shoulder, pitchers, rotator cuff, baseball