

The Relationship between Humeral Retroversion and Shoulder Rotation in Major League Baseball Pitchers

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Abstract

Overhead athletes have been shown to have increased external rotation(ER) and decreased internal rotation (IR) in their throwing arms (Brown, Carson, Doyle, Hansen, Bigliani, Kawamura, King, Magnusson). These changes have been traditionally thought to arise from soft tissue adaptations in the throwing shoulder (Bigliani, Brown, King, Magnusson). More recently, it has been suggested that the humerus undergoes an adaptive increase in retroversion in the throwing arm (Pieper), and that this adaptation may play a role in the change in the arc of motion seen (Mesister, AAOS, Kawamura, Makiuchi). The purpose of this study was to examine the relationship between humeral retroversion and changes in the motion arc seen in the dominant arm of professional baseball pitchers. Twenty-three pitchers were evaluated for ER and IR range of motion (ROM) at 0 and 90 abduction in both arms. Glenohumeral stability was also measured. Humeral retroversion of both dominant (D) and non-dominant (ND) arms were measured using a modified axillary radiograph (S derlund ACTA RAD, 1989:501-5). No significant differences were noted between total arc of motion, stability, forward elevation, ER at 0 abduction and cross body adduction between dominant and non-dominant arms. Significant differences ($p<0.05$) did exist, however, for humeral retroversion, ER at 90 and IR at 90 abduction for dominant vs. non-dominant arms. There were no significant correlations between humeral retroversion and the measured range of motion parameters. These data suggest that although significant differences in humeral retroversion and range of motion exist, our study did not have enough statistical power to demonstrate that humeral retroversion is a significant determinant of range of motion in throwing athletes. Nevertheless, we think changed ROM is due to both soft tissue and bony adaptation. So, we recommend rehabilitation programs which emphasize strengthening of the dynamic anterior stabilizers of the throwing shoulder and stretching of the posterior capsule for prevention and treatment of posterior capsular injury in overhead throwing athletes.