ABSTRACT

**Background:** Pitching velocity is a critical measure of performance, but it may also play a role in the development of injury. It has been proposed that increased humeral retrotorsion (HRT) may be an advantageous adaptation among throwers, resulting in increased throwing velocity. However, there is limited published data directly investigating this relationship.

**Purpose / Hypothesis:** The purpose of this study was to examine the effects of HRT on pitching velocity in a group of youth baseball players. We hypothesized that there would be a positive association between pitching velocity and increased humeral retrotorsion.

**Study Design:** Cross-sectional cohort study

**Methods:** Demographic and physical variables that may correlate to pitching velocity (age, height, weight, glenohumeral external rotation (ER) range of motion, dominant arm humeral retrotorsion and shoulder internal rotation (IR) strength) were assessed. Univariate analysis using Pearson correlation coefficients examined the relationship of each variable to pitching velocity. Significant variables were retained and entered into a multivariable regression analysis.

**Results:** All variables significantly correlated with pitching velocity ($p < 0.05$) with the exception of ER ($r = -0.169, p = 0.145$). Multivariable regression model was significant and accounted for 81.7% of pitching velocity ($R^2 = 0.817, F(5,70) = 62.59, p < 0.001$). Player age ($B = 1.7, p < 0.001$), height ($B = 0.225, p = 0.001$) and shoulder IR strength ($B = 0.622, p < 0.001$) significantly contributed to the model. After accounting for all other variables, HRT had a non-significant ($B = 0.005, p = 0.884$) and very small contribution to pitching velocity adding only .005mph per degree of HRT.

**Conclusions:** Pitching velocity in youth baseball players is strongly influenced by age, height and IR strength. In opposition to the hypothesis, the degree of humeral retrotorsion did not have a significant effect on pitching velocity.

**Level of Evidence:** Level 3

**Key Words:** Humeral Retrotorsion, Baseball, Pitching Velocity, Shoulder Motion