

Abstract

Title:

Comparison of the shoulder joint rotation in relation to anthropometric measures in baseball and softball pitchers

Objectives:

The main objective of this study was to compare the ranges of shoulder joint rotations in male baseball and softball pitchers due to differences in pitching biomechanics. Furthermore, to determine the difference in range of motion to rotations on the dominant and non-dominant upper extremity and to determine the prevalence of glenohumeral internal rotation deficits of the shoulder. The subject was also investigated to find possible relationships between measured anthropometric (HK length, arm span, biacromial width) values and goniometric values of range of motion into rotations including the prevalence of glenohumeral deficit.

Methods:

The research sample included 20 active Czech Extraliga baseball and softball players, who were divided by sport for the purpose of the study. The baseball group included 10 probands (10 male, aged 25.1 ± 3.5 years, height 185.5 ± 7.8 cm, weight 93.7 ± 9.7 kg, years baseball of participation 14.9 ± 3.8 years). The softball group also included 10 probands (10 male, aged 23.1 ± 2.5 years, height 183.2 ± 8.1 cm, weight 88 ± 11.9 kg, years softball of participation 12.2 ± 1.8 years). None of the players reported an upper extremity injury in the last 5 years. Range of motion was measured into external and internal rotation during passive and active movement using a two-arm plastic goniometer. Arm position during measurement was given as 90° of abduction at the shoulder joint and 90° of flexion at the elbow joint. Measurements in each direction and movement were taken three times for each player; these values were then averaged into one final value. Anthropometric values were measured using available measuring instruments. The obtained values were statistically processed using t-test and evaluated to confirm or reject the hypotheses based on the established significance level.

Results:

The results show a significant increase in the range of motion into external rotation and a decrease in the range of motion into internal rotation in baseball players, consistent with the observed high prevalence of glenohumeral deficits in these players. A significant difference in range of motion into rotations was also measured between the two groups studied. The association between upper limb length, height, bi-acromial width, arm span and the prevalence of deficit was not confirmed.

Keywords: shoulder girdle, range of motion, glenohumeral internal rotation deficit (GIRD), baseball, softball, pitching, goniometry, anthropometry