

COMPARISON OF 3D SHOULDER KINEMATICS BETWEEN THROWING AND NON-THROWING ARMS IN DIVISION II COLLEGIATE BASEBALL

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Study design was approved by the Concordia University, St. Paul IRB.

Background and Purpose: Shoulder 3D kinematics in athletes who participate in overhead sports have been found to be different between their throwing and non-throwing arm. Currently, there is limited research on comparative 3D shoulder kinematics in baseball players. The purpose of this study was to examine the differences in 3D shoulder kinematics between the throwing and non-throwing arms in Division II collegiate baseball players. It was hypothesized that there would be differences in glenohumeral joint ROM in at least one plane of motion in throwing versus non-throwing arms.

Subjects: 15 NCAA Division II right handed baseball players (\bar{x} = 20.7 years, s.d. = 1.5) participated in the study. All participants provided informed consent prior to taking part. Study design was approved by the Concordia University, St. Paul IRB.

Methods and Materials: Each participant completed one session of data collection. Glenohumeral kinematics during abduction, external rotation, flexion, internal rotation, and scapular plane abduction were randomized and collected on the throwing and non-throwing arm using the Polhemus G4 3D electromagnetic motion capture system. Three repetitions of each motion were performed. The trial with the greatest motion was used for data analysis.

Analysis: Data was analyzed using paired t-tests. **Results:** Participants demonstrated a statistically significant difference with greater glenohumeral external rotation of 11.16 degrees ($t= 2.73$, $p = 0.017$) in their throwing arms compared to non-throwing arms.

Conclusions: There were statistically significant differences in glenohumeral joint kinematics between the throwing and non-throwing arm. The external rotation results were also clinically significant. These findings support the hypothesis.

Implications: A greater insight to shoulder complex injury kinematics can be achieved by studying glenohumeral kinematics in a larger population. The differences are clinically important and should be looked at prospectively, as altering dysfunctional shoulder complex kinematics may lead to injury prevention strategies.