

# ORIGINAL RESEARCH

## ACUTE CHANGES IN PASSIVE GLENOHUMERAL ROTATION FOLLOWING TENNIS PLAY EXPOSURE IN ELITE FEMALE PLAYERS

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### ABSTRACT

**Background:** Alterations in glenohumeral (GH) rotation especially internal rotation and total range of motion have been associated with altered GH kinematics and susceptibility to injury. Researchers have evaluated long-term change in baseball and tennis players, and short-term changes in baseball players. However, acute (short-term) changes in GH rotation have not been evaluated in tennis players.

**Hypotheses/Purpose:** The purpose of this study was to quantify short-term glenohumeral rotational changes within a group of professional women's tennis players following competitive play. It was hypothesized that there would be acute alterations in passive glenohumeral internal rotation and total range of motion following episodes of tennis play.

**Study Design:** Cohort Study

**Methods:** Passive glenohumeral external rotation (GER), glenohumeral internal rotation (GIR), and total range of motion (TROM) were evaluated in a cohort of 79 professional adult female tennis players. Measurements were taken at three different time points (TP): baseline before match play (TP1), immediately after match play (TP2), and 24-hours after baseline (TP3).

**Results:** There was a statistically significant decrease in the mean GIR from TP1 ( $43 \pm 11^\circ$ ) to TP2 ( $39 \pm 9^\circ$ ) ( $p=0.002$ ) and from TP1 to TP3 ( $38 \pm 10^\circ$ ) ( $p=0.001$ ). All measures were at the level of minimal detectable change (MDC) ( $4^\circ$ ) indicating clinical significance. There was a decrease in mean TROM from TP1 ( $146 \pm 11^\circ$ ) to TP2 ( $142 \pm 12^\circ$ ) ( $p=0.04$ ), which was not above MDC ( $7^\circ$ ). Subgroup analysis showed that 47% of the players demonstrated a decrease in GIR beyond MDC, and 37% demonstrated a decrease in TROM beyond MDC. GER remained unchanged across all time points ( $p>0.05$ ).

**Conclusion:** Both GIR and TROM were reduced after acute exposure to tennis play. In a large subgroup of the cohort, the changes were clinically significant and approached values previously demonstrated to be associated with increased injury risk. Given the changes in glenohumeral motion following acute exposure to tennis, evaluation of players for significant motion alterations following overhead activity and intervention strategies to minimize such alterations in these players are recommended for high level tennis players.

**Level of evidence:** Level 3

**Keywords:** Glenohumeral range of motion, tennis, tournament play, shoulder

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