

Comparison of Shock Transmission and Forearm Electromyography between Experienced and Recreational Tennis Players during Backhand Strokes

Wei, S. H. ; Chiang, Jinn-Yen; Shiang, T. Y. ; Chang, H. Y.

Abstract

Objective: To test the hypothesis that recreational tennis players transmit more shock impact from the racket to the elbow joint than experienced tennis players during the backhand stroke. Also, to test whether recreational tennis players used higher electromyographic (EMG) activities in common wrist extensor and flexor around epicondylar region at follow-through phase. **Design:** A repeated-measure, cross-sectional study. **Setting:** National College of Physical Education and Sports at Taipei, Taiwan. **Participants:** Twenty-four male tennis players with no abnormal forearm musculoskeletal injury participated in the study. According to performance level, subjects were categorized into 2 groups: experienced and recreational. **Main Outcome Measurements:** Impact transmission and wrist extensor-flexor EMG for backhand acceleration, impact, and follow-through phases were recorded for each player. An independent *t* test with a significance level of 0.05 was used to examine mean differences of shock impact and EMG between the 2 test groups. One-way ANOVA associated with Tukey multiple comparisons was used to identify differences among different impact locations and EMG phases. **Results:** Experienced athletes reduced the racket impact to the elbow joint by 89.2%, but recreational players reduced it by only 61.8%. The largest EMG differences were found in the follow-through phase ($P < 0.05$). Experienced athletes showed that their extensor and flexor EMGs were at submaximal level for follow-through phase, whereas recreational players maintained their flexor and extensor EMGs at either supramaximal or maximal level. **Conclusions:** Our results support the hypothesis that recreational players transmit more shock impact from the racket to the elbow joint and use larger wrist flexor and extensor EMG activities at follow-through phase of the backhand stroke. Follow-through control is proposed as a critical factor for reduction of shock transmission. Clinicians or trainers should instruct beginners to quickly release their grip tightness after ball-to-racket impact to reduce shock impact transmission to the wrist and elbow.