

KINETIC ANALYSIS OF THE UPPER EXTREMITY BETWEEN DIFFERENT STANCES IN TENNIS TWO-HANDED BACKHAND

Yi-Chien Peng, Yung-Chun Hsieh*, Kuo-Cheng Lo**, and Lin-Hwa Wang

Institute of Physical Education, Health & Leisure, Cheng Kung University, Tainan, Taiwan; * Institute of Physical Education, University of Tainan, Tainan, Taiwan;

** Department of Physical Education, Kun Shan University, Tainan, Taiwan

KEY WORDS: Tennis, Kinetic, Two-handed backhand.

INTRODUCTION: Now the tennis players could explore more racket capabilities through the change of racket materials and design. The open stance comes out in modern tennis relative to the traditional square stance. This study was conducted to analyze the upper extremity joint forces and moments between the different stances in advanced and intermediate athletes, who separated from ITN rating system, during two-handed stroke.

METHOD: 18 markers were placed on the 6 advanced and 6 intermediate players' upper extremities which divided into shoulder, elbow and wrist. We adopted the 3-D motion analysis system including 8 cameras (500Hz) for recording. The inverse dynamics solution and ANOVA-repeat measure were respectively employed for calculation and comparing the differences between stances and levels (Winter, 1990).

RESULTS: Shown in Figure1.

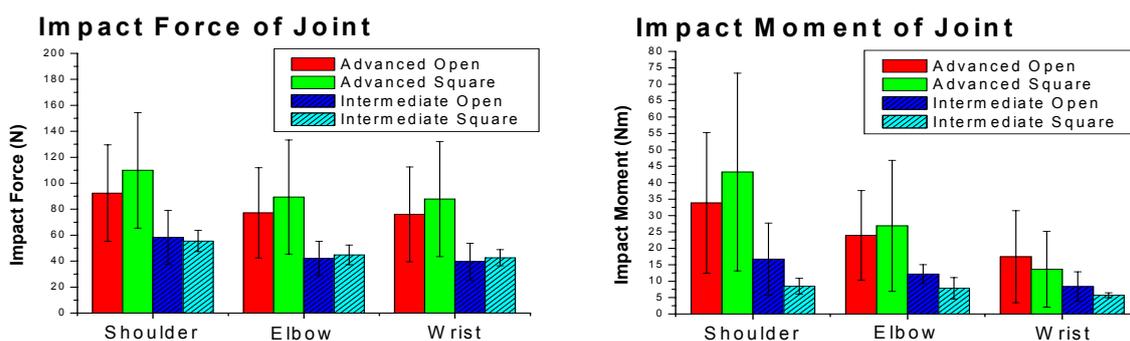


Figure 1: The joint impact force and moment between two stances

DISCUSSION: Significant result was not found between stances but in different skill levels. Thus different stances in two-handed backhand didn't influence the joint force and moment production in acceleration or at impact. It might be a reason since the racket was held by two hands. The advanced players showed less force and moment in acceleration but larger at impact, which indicates that experienced players can swing the racket easily before and after impact, but they have a tight handhold at impact. This skill is important to reduce the joint moment in follow-through (Wei, et al., 2006).

CONCLUSION: These forces and moments of upper extremity were similar in different stances at impact. Comparing with the intermediate players, the advanced players had higher kinetic data at impact but lower in the follow-through phase. These findings meant that advanced players reduced mostly joint load and showed efficient stroke skills. Thus the intermediate players should focus more on the force release after stroke and finishing complete whole follow-through movement, to decrease the injury risks.

REFERENCES

- Wei, S. H., Chiang, J. Y., Shiang, T. Y., & Chang, H. Y. (2006). Comparison of shock transmission and forearm electromyography between experienced and recreational tennis players during backhand strokes. *Clinical Journal of Sport Medicine*, 16(2), 129-135.
- Winter, D. A. (1990). *Biomechanics and motor control of human movement (2nd ed.)*. New York: Wiley, 103-139.