

Quick Movement in Tennis Footwork - Effectiveness of the Split Step -

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Introduction

Many sports require quick lateral footwork. The split step is a preparation for the lateral movement in tennis footwork. However there has been no evidence to show the effectiveness of the split step. Therefore, the purpose of this study was to show the effectiveness of the split step by comparing kinetics and kinematics of the limb during the lateral movement between the split step and without the split step.

Material and Methods

Five skilled tennis players (average age: 20.6yrs) participated as subjects. A five camera motion analysis system and a force plate were used at 120Hz. The subjects were instrumented with sixteen retro-reflective markers on the body. Each subject moved to lateral direction as quickly as possible at the direction instruction signal which flashed in left or right side randomly. Crossover step (pivot on the foot closest to the ball and step with the opposite foot) was used as the initial step.

Result

The reaction time (to reach the peak in Y-component of the ground reaction force) was average 0.16 sec faster with the split step than without the split step. Maximum knee flexion angles in the split step were larger than that without the split step. The time to reach the peak knee flexion angle was significantly shorter with the split step than without the split step.

Conclusion

Using the split step, one could bend knees faster and larger and move to lateral direction more quickly with less force since the gravity can be used to support knee flexion. In addition, they could be able to change foot position in the air. Furthermore the timing of the split step could be a key point. Quickness of footwork should be influenced by the nervous system, however we remarked the initial motion in this study. Using the split step, the reaction time in lateral movement was faster and maximum knee flexion angle was larger. The gravity should support quicker knee flexion.

Key word: Footwork, Quick movement, Knee flexion angle

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