

## Abstract

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**THESIS:** Biomechanical Differences Between a Split-Step and Sidestep Cut in Female Tennis Players

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**Purpose:** Studies have shown that the use of a split-step could decrease knee loading and injury risk when compared to a sidestep cut. The populations used in these previous studies were not familiar with a split-step. A split-step is a common movement used by tennis players and allows for a quicker reaction time. Therefore the purpose of this study was to investigate the differences in joint loading and overall risk factors between a sidestep and split-step cutting maneuver in female tennis players. **Methods:** Eight female tennis players performed a sidestep cut and a split-step cut, with ground reaction forces, joint kinematics and moments measured during the contact phase. **Results:** Findings revealed that a split-step cut altered the ground reaction forces, and joint kinematics and kinetics. The split-step cut revealed an increase in knee flexion angle at ground contact ( $p < .010$ ) and ground contact time ( $p < .050$ ), and decreases in peak ground reaction forces ( $p < .001$ ) and braking forces ( $p < .010$ ) when compared to a sidestep cut.

**Conclusion:** These differences in mechanics show there are potential benefits to the use of a split-step as a way to prevent injuries. Since this is a fundamental movement in tennis it is possible that the differences seen are attributed to the performers experience with the movement. Although not commonly used in other sports there is support indicating that with appropriate

training the split-step could be translated into other sports. Future research should further assess the influence of gait velocity prior to contact between the two cutting movements.