

ABSTRACT

THESIS: The Relationship Between Leg Dominance and Knee Mechanics During the Cutting Maneuver

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PAGES: 80

The purpose of this study was to examine the relationship between leg dominance and knee mechanics to provide further information about the etiology of ACL injury. Sixteen healthy females between the ages of 18 and 22 who were NCAA Division I varsity soccer players participated in this study. Subjects were instructed to perform a cutting maneuver; where they sprinted full speed and then performed an evasive maneuver (planting on one leg and pushing off to the other leg in a new direction) at a 45° angle with their dominate leg (DL) and non-dominate leg (NDL). Subjects were required to perform five successful cuts on each side given in a random order. Bilateral kinematic and kinetic data were collected during the cutting trials. After the cutting trials, subjects performed bilateral isometric and isokinetic testing using a Cybex Norm dynamometer at a speed of 60°/sec to evaluate knee muscle strength. During the braking phase the NDL showed greater (P=0.003) power absorption, greater (P=0.01) peak internal rotation angle and greater (P=0.005) peak flexion velocity. During the propulsive phase the DL showed greater (P=0.01) power production, greater (P=0.038) peak internal adductor moment and greater (P=0.02) peak extension velocity. In addition, no differences (P>0.05) in knee extensor and flexor

isometric and isokinetic torques between the two limbs were shown. The results of this study show that a difference in knee mechanics during cutting does exist between the DL and NDL. The findings of this study will increase the knowledge base of ACL injury in females and aid in the design of more appropriate neuromuscular, plyometric and strength training protocols for injury prevention.