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Prophylactic Ankle Taping Effects on Knee Joint Kinematics During Lateral-Cutting and Jump Landing in an Open Field Environment in Female Division I Soccer Athletes

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Summary:
Use of wireless sensors in an open field environment demonstrates that prophylactic ankle taping significantly reduces peak knee varus-valgus moments and external rotation during lateral-cutting and during jump landing, significantly decreases knee flexion in collegiate female soccer athletes.

Abstract:
Objective:
Ankle taping has become standard procedure in many athletic events with the hope of preventing ankle instability. A number of studies have investigated the effects of ankle taping on the knee joint; however, to our knowledge, no study has collected data in an open-field environment. This is the first study to evaluate the effects of ankle taping on knee joint motion during open field cutting and off-axis vertical jump landings by using wireless inertial sensors.

Methods:
Fifteen (mean: 19.8 years) NCAA Division I female soccer athletes were recruited. Wireless motion-detecting sensors were placed on the leg, thigh and low back of each subject. Data was collected at the knee while the subjects performed unanticipated lateral-cutting maneuvers, at ¾ maximum speed, with and without ankle tape. Knee kinematics were also recorded when landing onto a slant board from a vertical jump with and without ankle tape.

Results:
During unanticipated lateral cutting, immobilization of the ankle joint with tape significantly reduced peak varus-valgus moments at the knee joint (8.3%, p=0.0264). Ankle taping also significantly reduced (8.4%, p=0.0315) peak external knee rotation.
During the jump landing trials, subjects with ankle taping demonstrated a significant (7.7%, p=0.041) decrease in knee joint flexion.

Conclusion:
The authors conclude that prophylactic ankle taping significantly reduces knee varus-valgus movements and knee rotation during lateral-cutting while running in an open field environment. The jump landing trials demonstrate a significant decrease in knee flexion with prophylactic ankle taping. Our data suggests that immobilization of the ankle with tape has a potentially protective effect on the knee joint during lateral-cutting tasks but may exacerbate damaging knee kinematics during uneven jump landings in female athletes.