Optimising whole body kinematics to minimize valgus knee loading during side stepping: Implications for ACL injury risk.

Knee injuries are common in sport, specifically those to the anterior cruciate ligament (ACL). These injuries come with a tremendous financial and physical burden. For example, the United States spend an approximate 1billion (USD) annually on ACL injury management. Moreover, it has been reported that approximately 55% of athletes who sustain an ACL injury are unable to return to their previous level of competition in the 2 years post-surgery.

It has been reported in previous research that > 50% of non-contact ACL injuries occur during a side stepping action. A valgus knee action which can be thought of as a knee collapsing during a side stepping action is a risk factor for ACL injuries. This investigation used computer simulations of data collected from 9 community level Australian football players that demonstrated valgus knee actions during planned and unplanned side stepping movement patterns.

Results of the computer simulations demonstrated that when the athletes centre of mass (COM) was redirected medially towards the desired direction of travel the valgus action of the knee were reduced. These findings are encouraging and can be used to inform future investigations using live participants and ultimately injury prevention programs in community Australian football.

How this research can be of use:

1. Future investigations can investigate the efficacy of repositioning the COM towards the desired direction on valgus knee loading during side stepping in live participants.
2. Coaches should reinforce to players to maintain a more upright trunk posture while completing side stepping tasks to reduce valgus loading and potential risk for ACL injury.

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