

Dhitiyanant Pengmanee 2014: Anterior Cruciate Ligament Force During Sidestep Cutting, Jump Shot and Golf Swing. Master of Science (Sports Science), Major Field: Sports Science, Faculty of Sports Science. Thesis Advisor: Assistant Professor Siriporn Sasimontongkul, Ph.D. 72 pages.

This research aimed to determine the magnitude of ACL tensile force which occur during sidestep cutting whilst playing soccer, basketball jump shots and golf swings. Moreover, the risk of sustaining ACL injuries when engaging in these respective activities were also compared in terms of magnitude of ACL force which each of them is associated with. Thirty college athletes, aged 18-28 years, participated in the study. They were divided into three groups of 10 participants each depending on which of the three action they performed. After retro-reflection markers were attached to the lower body of the athletes, they executed ten jump shots, sidestep cutting maneuvers and golf swings, deploying maximum effort. Eight high speed cameras captured the motion of the athletes at 100 Hz whilst a force plate recorded the ground reaction force synchronously at 1000 Hz. The position and orientation of the captured markers were integrated with the lower body model in order to simulate the captured motions. The ACL tensile force was then calculated from the lower body model which ACL was modeled to consist of double bundles, anteromedial (AM) and posterolateral (PL) bundles. The resultant data were analyzed using the one-way MANOVA method and Tukey's test was employed for the conduct of multiple comparisons. Statistical significance was at a level of .05

The results revealed that the maximum amount of ACL tensile force occurred when athletes were performing jump shot. Moreover, peak ACL force in AM bundle was greater than that in PL bundle. However, the peak ACL force produced by these activities was insufficient to cause damage to the ACL.

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Student's signature

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Thesis Advisor's signature