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The differences in knee joint kinematics between vertical jump landing and rotation jump landing

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【Purpose】

The purpose of the present study is to assess peak knee abduction angles and moments during vertical jump landings and 180 degrees rotation jump landing and 360 degrees rotation jump landings.

【Methods】

Seven healthy females participated in this study. The tasks were vertical jumps, clockwise 180 degrees rotation jump and clockwise 360 degrees rotation jumps. Peak knee angles and peak knee moments about right leg and left leg were analyzed during 3 types of jumps with a VICON motion system and AMTI force plate. The sixteen reflective markers were placed bilaterally on the subject. A repeated-measures ANOVA with Bonferroni post hoc analysis was used to determine whether there were any significant differences between tasks for angles and moments. Significance was set at $p < .05$.

【Results】

Peak abduction angles and peak abduction moment during 180 degrees rotation jump were significantly increased in comparison to vertical jump landings ($p < .05$). Peak abduction angles and peak abduction moment during 360 degrees rotation jump were significantly increased in comparison to other jump landings ($p < .05$).

【Discussion】

Our findings showed that knee kinematics changed with different rotation jump landing. Increasing abduction angles and moments in jump landings were major factors related to Anterior Cruciate Ligament (ACL) injury. Rotation jump was included for ACL injury prevention program. The results of the present study provide important foundational practical knowledge. Information about lower extremity kinematics in rotation jump landings will help to understand the characteristics of ACL injury and to develop ACL injury prevention programs.