ABSTRACT

Background: The lateral step-down test is an established clinical evaluation tool to assess quality of movement in patients with knee disorders. However, this test has not been investigated in individuals after anterior cruciate ligament reconstruction (ACLR) in association with quantitative 3D motion analysis.

Purposes: The purpose of this study was to determine the strength of association between visually-assessed quality of movement during the lateral step-down test and 3D lower limb kinematics in patients with history of ACLR. A second purpose was to compare kinematics between subgroups based on the presence or absence of faulty alignments during the task. The final purpose was to compare visually-assessed quality of movement scores between box heights during lateral step-down testing.

Methods: Twenty subjects at least one year status post-ACLR (18 females, age of 24.5 ± 4.6 years and body mass index of 23.4 ± 2.3 kg/m²) performed the lateral step-down test unilaterally on the surgical limb atop four and six inch boxes. A board-certified orthopedic physical therapist scored overall quality of movement during the lateral step-down test using established criteria during 2D video playback. Lower limb kinematics were simultaneously collected using 3D motion capture. An alpha level of 0.05 was used for all statistical treatments.

Results: Overall 2D quality of movement score significantly correlated (r = 0.47-0.57) with 3D hip adduction and hip internal rotation across box heights. Across box heights, the presence of faulty pelvic alignment differentiated a subgroup exhibiting less peak knee flexion, and the presence of faulty knee alignment differentiated a subgroup exhibiting greater peak hip adduction. The six inch box elicited worse quality of movement compared to the four inch box.

Conclusions: These results suggest that visually-assessed quality of movement is associated with several kinematic variables after ACLR. 2D movement deviations at the pelvis appear to consistently relate to less knee flexion, and 2D deviations at the knee appear to suggest greater hip adduction. Generally, poorer quality of movement was observed for the six inch box height. Clinically, these data suggest that interventions targeting hip abductor and knee extensor strength and neuromuscular control may be useful in the presence of poor quality of movement during lateral step-down testing.

Level of Evidence: 2b

Key words: Anterior cruciate ligament reconstruction, lateral step-down test, movement, 2D motion analysis, 3D motion analysis

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The authors report no conflicts of interest

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