

ORIGINAL RESEARCH

INTRA AND INTERSESSION RELIABILITY OF A POSTURAL CONTROL PROTOCOL IN ATHLETES WITH AND WITHOUT ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION: A DUAL-TASK PARADIGM

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ABSTRACT

Background: Quantification of dynamic balance is essential to assess a patient's level of injury or ability to function so that a proper plan of care may commence. In spite of comprehensive utilization of dual-tasking in balance assessment protocols, a lack of sufficient reliability data is apparent.

Purpose: The purpose of the present study was to determine the intra- and inter-session reliability of dynamic balance measures obtained using the Biodex Balance System® (BBS) for a group of athletes who had undergone anterior cruciate ligament reconstruction (ACLR) and a matched control group without ACLR, while using a dual-task paradigm.

Methods: Single-limb postural stability was assessed in 15 athletes who had undergone ACLR and 15 healthy matched controls. The outcome variables included measures of both postural and cognitive performance. For measuring postural performance, the overall stability index (OSI), anterior-posterior stability index (APSI), and medial-lateral stability index (MLSI), were recorded. Cognitive performance was evaluated by measuring error ratio and average reaction time. Subjects faced 4 postural task difficulty levels (platform stabilities of 8 and 6 with eyes open and closed), and 2 cognitive task difficulty levels (with or without auditory Stroop task). During dual task conditions (conditions with Stroop task), error ratio and average reaction time were calculated.

Results: Regarding intrasession reliability, ICC values of test session were higher for MLSI [ACLR-R group (0.83-0.95), control group (0.71-0.95)] compared to OSI [ACLR-R group (0.80-0.92), control group (0.67-0.95)] and APSI [ACLR-R group (0.73-0.90), control group (0.62-0.90)]. Furthermore, ICC values of first test session were higher in reaction time [ACLR-R group (0.92-0.95), control group (0.80-0.92)] than error ratio [ACLR-R group (0.72-0.88), control group (0.61-0.83)]. ICC values of retest session were higher for MLSI [ACLR-R group (0.83-0.94), control group (0.87-0.93)] than OSI [ACLR-R group (0.81-0.91), control group (0.83-0.93)] and APSI [ACLR-R group (0.73-0.90), control group (0.53-0.90)]. Moreover, ICC values of retest session were higher in reaction time [ACLR-R group (0.89-0.98), control group (0.80-0.92)] equated with error ratio [ACLR-R group (0.73-0.87), control group (0.57-0.79)].

With respect to intersession reliability, ICC values were higher for MLSI [ACLR-R group (0.72-0.96), control group (0.75-0.92)] than OSI [ACLR-R group (0.55-0.91), control group (0.64-0.87)] and APSI [ACLR-R group (0.55-0.79), control group (0.46-0.89)]. Additionally, ICC values were higher in reaction time [ACLR-R group (0.87-0.95), control group (0.68-0.81)] in contrast to error ratio [ACLR-R group (0.42-0.64), control group (0.54-0.74)].

Conclusion: Biodex Balance System® measures of postural stability demonstrated moderate to high reliability in athletes with and without ACLR during dual-tasking. Results of the current study indicated that assessment of postural and cognitive performance in athletes with ACLR may be reliably incorporated into the evaluation of functional activity.

Level of Evidence: 2b

Key words: Anterior cruciate ligament reconstruction, attention, Biodex Balance System®, dual-task paradigm, reliability

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Statement of the Institutional Review Board Approval:

Informed consent form approved by the Ethics Committee at University of Social Welfare & Rehabilitation Sciences.