ABSTRACT

Background: A reliable measure of dynamic postural control is needed for inclusion in the sports-related concussion assessment battery. Currently, there is not a clinical gold standard. The Limits of Stability (LOS) test has potential to be a useful tool to collect objective data on important dynamic postural stability variables. Psychometric properties of the LOS test with healthy young adults are yet to be established.

Hypothesis/Purpose: The purpose of this study was to examine the intra-session and test-retest reliability for the LOS on the NeuroCom® VSR Sport when performed by young adults.

Study Design: Reliability study

Methods: Twenty-seven healthy university students completed four trials of the LOS in each of two testing sessions one week apart. Relative reliability was measured within each session with an intraclass correlation coefficient (ICC[3,k]) for Session 1 and Session 2, respectively, on each of the five dependent variables (movement velocity [MVL], directional control [DCL], maximum excursion [MXE], endpoint excursion [EPE], and reaction time [RT]) provided by the Neurocom. Test-retest reliability was assessed using a repeated-measures analysis of variance along with an ICC (3,k) for relative reliability. An ICC value of 0.90 or higher was defined as having a high reliability, moderate reliability for ICC values between 0.80-0.89, and below 0.80 as questionable.

Results: The reliability within each session for LOS composite scores for MVL, DCL, and MXE was moderate to high (ICC[3,k]=0.89-0.95). These same three variables also had high levels of test-retest reliability (ICC[3,k]=0.95-0.96). EPE and RT had moderate reliability over time (ICC[3,k]=0.88) but differences for within session reliability.

Conclusions: LOS provides a reliable measure of dynamic postural control for young adults. Two trials are recommended at baseline with the first being an adaptation trial to ensure accuracy of findings. Care needs to be taken when interpreting EPE and DCL scores on post-injury tests due to a learning effect for those variables.

Level of Evidence: 2c

Key Words: Balance, clinical test, dynamic postural control, reaction time