

## Test-Retest Reliability and Learning Effect of the Modified CTSIB Balance Protocol

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**PURPOSE:** The purpose of this study was to determine the test-retest reliability of the modified Clinical Test of Sensory Integration and Balance (CTSIB) test on a clinical balance system. A secondary purpose was to study if short term balance training could improve proprioceptive integration for future study of populations that are prone to balance difficulties. **METHODS:** Twenty individuals who were free of concussion, lower leg injury or balance conditions volunteered to participate in the study. The participants were randomly separated, and counterbalanced for gender, into an experimental group (n=10) and a control group (n=10). All testing was conducted on the Biodex Balance System SD to determine center of pressure sway using the modified CTSIB protocol which consisted of four 30-second trials under different conditions; eyes-open firm surface (EO-F), eyes-closed firm surface (EC-F), eyes-open soft surface (EO-S) and eyes-closed soft surface (EC-S). Both groups were tested on days one, two and six; however, the experimental group received two ten-minute balance training sessions on hard and soft surfaces between days two and six. A 3 (day) x 4 (condition) x 2 (group) ANOVA with repeated measures was conducted to determine significance ( $p < 0.05$ ). **RESULTS:** The main effect of day was not significant ( $p = 0.43$ ). The main effect of group was significant ( $p < 0.001$ ). The training group had less sway than the control group ( $1.04 \pm 0.03$  vs  $1.18 \pm 0.03$ ). The main effect of condition was significant ( $p < 0.001$ ). A Fisher LSD was used to follow up this effect. As balance conditions became more difficult sway increased. EO-F ( $0.54 \pm 0.04$ ) had less sway than EC-F and EO-S ( $0.85 \pm 0.04$  and  $0.87 \pm 0.04$ , respectively) which were lower than EC-S ( $2.81 \pm 0.04$ ). There were no interaction effects. **CONCLUSIONS:** The modified CTSIB demonstrated strong reliability for multiple day comparisons suggesting no learning effect between trials. In addition, the results suggest that a short-term (1 week) training program could result in reduced sway. Finally, the CTSIB uses multiple conditions across the testing protocol which stresses the sensory feedback system needed to maintain balance. The results indicate that sway increases as sensory input is challenged. This could have application for balance training or rehabilitation.