Immediate Effects of Sensory-Targeted Ankle Rehabilitation Strategies on Balance and Range of Motion in Those with Chronic Ankle Instability

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Context: Deficient sensory input from damaged ankle ligament receptors is thought to contribute to impairments associated with chronic ankle instability (CAI). By targeting other available sensory receptors, rehabilitation outcomes for those with CAI may be enhanced. Two common rehabilitation outcomes for ankle instability are dorsiflexion range of motion (DFROM) and single-limb balance. Objective: To evaluate the immediate effects of sensory-targeted rehabilitation strategies (STARS) on DFROM and single-limb balance. Design: Randomized Controlled Trial Setting: Laboratory. Participants: 64 participants with self-reported CAI (27 males, 37 females; age:23.0±4.7yrs; height:1.7±0.9m; mass:75.4±14.7kg) participated. All subjects had a history of at least 1 ankle sprain with current symptoms of CAI on at least 1 side including recurrent episodes of giving way at the ankle. Each participant was asked to identify which ankle was considered to be the more limited of the two functionally based on the Ankle Instability Instrument. A score of ≥5 was considered as an ankle with CAI. Interventions: To measure DFROM, all subjects performed 3 trials of the weight-bearing lunge test (WBLT). Maximum dorsiflexion was defined as the distance from the great toe to the wall based on the furthest distance (cm) the foot was able to be placed without the heel lifting off the ground while the knee was able to touch the wall. For single limb balance, subjects performed 3 20-second trials of single limb balance on a firm surface (SLBT) while the testers tracked errors during the trials. Upon completion of testing, subjects were randomly allocated to 4 STARS groups: Ankle joint mobilization (JM), plantar massage (PM), triceps surae stretching (TS), or control (CON). Each subject received 5 minutes of their respective STARS and were immediately reassessed on the WBLT and SLBT. Change scores from post- to pre-STARS were generated. Main Outcome Measures: The independent variable was group (JM, PM, TS, CON). The dependent variables were the WBLT change (cm) and the SLBT mean error change. Independent t-tests were used to compare the change on each dependent variable between each treatment group and the CON group. Alpha was set a priori at p≤0.10. Results: For the WBLT, JM (WBLT change: 1.6±1.3cm; p<0.01) and TS (change: 1.3±1.1cm, p=0.01) resulted in improved changes compared to the CON change (0.4±0.6cm). PM (0.7±0.8cm, p=0.20) WBLT change did not significantly differ from CON. For the SLBT, JM (-0.9±1.4 errors, p=0.08), PM (-1.0±1.8 errors, p=0.10), and TS (-1.2±1.5 errors, p=0.02) treatments significantly reduced balance errors compared to the CON (-0.1±0.9 errors). Conclusion: Significant immediate DFROM improvements were found in the JM and TS groups, whereas all STARS groups demonstrated immediate improvements in postural control. Further study of prolonged effects across a longer treatment window on both DFROM and balance is warranted. Word Count: 450