

Vibration based Feedback for Gait Training In Those With Chronic Ankle Instability

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Background/ Purpose: 40% of patients with a lateral ankle sprain are diagnosed with chronic ankle instability(CAI). CAI is associated with proprioceptive impairments⁹⁻¹⁰ which may lead to gait changes including increased inversion and lateral center of pressure(COP) in stance.

Traditional treatments do not improve gait deficiencies. Therefore, the purpose of this study is to determine if baseline proprioception measures are associated with biomechanical changes following a single haptic feedback gait retraining session in those with CAI.

Methods: Baseline proprioception measures (joint positions sense (JPS), monofilament cutaneous sensation, postural sway) were obtained on seven participants with CAI. Participants then completed a 10-minute treadmill training session with haptic feedback. Stance phase was divided into 10 subphases. Spearman's bivariate correlations ($\alpha < 0.05$) were completed between baseline proprioception scores and changes in inversion and COP location for each subphase.

Results: Strong negative correlations exist between JPS error and change in COP location in phases 1-9 ($r_s = -.857$ to $-.964$, $p < 0.05$). Strong positive correlations exist between JPS error and change in inversion position in subphases 7-9 ($r_s = .857$ to $.929$, $p < 0.05$)

Discussion: There is a strong, negative association between JPS error and COP location across 9 stance phases, and a strong, positive association between JPS error and inversion in terminal stance. Additionally, these results indicate that a healthier proprioceptive system may be required to be able to utilize the haptic feedback. However, a larger sample size is necessary to determine the true extent of the relationship.