SWACSM Abstract

Examining the Acute Effects of Virtual Reality on the Star Excursion Balance Test in Chronic Ankle Instability

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ABSTRACT

Chronic ankle instability (CAI) patients display mechanical and functional restrictions, along with neurocognitive dysfunction after lateral ankle sprains. Athletes need to divide their attention to effectively multitask during sports activities. Recent studies have utilized virtual reality (VR) to simulate dynamic sporting environments, aiming to enhance cognitive and postural control. However, little is known about the acute effects of VR on dynamic postural control in CAI patients. **PURPOSE**: To identify the acute effects of VR gear on dynamic postural control in CAI patients. **METHODS**: This study was a cross-over study. Twenty CAI patients (11males, 9females; age=21±3year; height=1.63±0.28m; mass=74±13.1kg). We used the Foot and Ankle Ability Measures and Ankle Instability Instrument questionnaires for CAI. VR training included 3 trials of single-leg stance; double and single-leg drop landings; and 5 trials of jump landing/cutting. Before and after VR training, participants performed 3 trials each in 3 directions: anterior (ANT), posteromedial (PM), and posterolateral (PL). The average reach distance was normalized by an individual's leg length from the anterior superior iliac spine to the distal end of the medial malleolus. Matched paired t-tests were used to evaluate the acute effect (posttest-pretest difference) of VR training. The significance level for all analyses was set at a priori of $p \leq 0.05$. **RESULTS**: Acute effects were not observed in both ANT and PM directions (60.2±7.2 vs. 60.9±6.9, p=0.15 and 103.3±10.4 vs. 104.6±11.2, p=0.31). CAI patients showed an acute effect, improving PL reach distance (98.3±11.2 vs. 102.1±13.3, p=0.006) during the star excursion balance test after VR training. **CONCLUSION**: VR resulted in no difference in ANT direction, which is related to the dorsiflexion range of motion, suggesting that VR training had no improvement in mechanical restriction. After VR training, PL reach distance was increased, suggesting improvement in functional restriction in CAI patients. Therefore, VR training may affect functional restriction, by potentially increasing eversion strength and improving mediolateral static postural control. More data are needed to determine if VR may reduce the risk of recurrent ankle sprains in CAI patients.