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Applicability of an unstable platform integrated with virtual reality in the rehabilitation of postural control

Abstract:

Introduction: Cognitive-sensorimotor tasks can be developed safely in controlled environments, using unstable surfaces and motion sensors. Gamification concepts associated with the control of the progression of this instability can be applied in the development of new devices in virtual reality environments. Finally, the application of neuroscientific principles that underlie postural control training and motor learning can enhance the positive effects of innovative technological tasks applied in rehabilitation.

Objective: To evaluate the applicability of an unstable platform integrated with virtual reality developed for cognitive-sensorimotor training in a virtual environment aimed at the rehabilitation of postural control. Method: 35 healthy, experienced physical therapists, 26 (74.3%) female, underwent immersive and non-immersive system interventions. Then, participants answered a questionnaire that assesses the necessary requirements for postural control training, the System Framework for Postural Control (SFPC). In addition, they answered the Simulator Sickness Questionnaire (SSQ), to assess the tolerability of the solution, and the System Usability Scale (SUS), which measures the acceptability of new devices.

Results: The total average in the SFPC was 7.7 (1.3) for immersive task and 7.9 (1.3) for non-immersive task ($p = 0.2$). In the SSQ, the average total score was 7.4 (14.4) for immersive task and 2.5 (10.5) for non-immersive task ($p = 0.04$). The average total score in the SUS was 77.4 (14.4) for the immersive task and 82.4 (10.5) for the non-immersive task ($p = 0.03$).

Conclusion: The unstable platform integrated with virtual reality (VR) was considered applicable, safe and acceptable for postural control training.

Keywords: Postural control. Virtual reality exposure therapy. Interactive simulators. Video games. Motivation. Neuroplasticity

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