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EFFECTIVENESS OF A NEW VIRTUAL REALITY SYSTEM (BIOTRAK) TO REGAIN BALANCE IN CHRONIC PATIENTS WITH ACQUIRED BRAIN INJURY: A RANDOMIZED CONTROLLED STUDY

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Background and objective

In the last years, the potential benefits of virtual reality in the rehabilitation process have been highlighted by several studies. This fact has given rise to a great number of virtual rehabilitation systems. However, just a few focus on balance rehabilitation, although it is one of the most disabling impairments.

BioTrak is a virtual rehabilitation system that provides exercises for the rehabilitation of different deficits. The objective of this study is to describe the clinical validation of the balance exercises through reaching movements in patients with acquired brain injury (ABI).

Methods

Twenty patients with chronic ABI were randomly assigned to either an experimental group or a control group. Experimental group underwent training with BioTrak for four weeks with concurrent conventional training while control group underwent only conventional therapy. All the participants were assessed at the beginning and at the end of the training with the Berg Balance Scale (BBS), the Tinetti Performance-Oriented Mobility Assessment (POMA), the Brunel Balance Assessment (BBA), and the 10 Meters Walking Test (10MWT). The subjective experiences of the participants were assessed by a Spanish adaptation of the Short Feedback Questionnaire (SFQm).

Results

A repeated measures analysis of variance (ANOVA) at the beginning and at the end of the clinical trial revealed a significant time effect for the BBS ($p < 0.001$), 10MWT ($p = 0.04$) and a tendency towards significance in the level of BBA ($p = 0.08$). No group effect was detected for any outcome, which confirms the comparability of both groups. Finally, significant group-by-time interaction was detected in the scores of the BBS ($p = 0.047$) and the 10MWT ($p = 0.048$). With respect to these variables, post-hoc analysis showed better improvement in experimental patients when compared to control (3.8 ± 2.6 vs 1.8 ± 1.4 in BBS and -0.2 ± 0.1 vs -0.02 ± 0.2 in 10MWT) throughout the therapy. The SFQm showed high degree of usability of the system in terms of experience (presence, immersion, ease of use) and absence of adverse effects.

Conclusions

According to our results BioTrak is an effective and usable tool for the rehabilitation of balance in this population. The clinical utility of the system is supported by the motor improvement in those participants included in the

experimental group when compared with those who underwent only conventional physiotherapy.