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Additional Information

Virtual reality-based telerehabilitation program for balance recovery. A pilot study in hemiparetic individuals with acquired brain injury.

OBJECTIVES

The increasing number of studies reporting the use of specific virtual reality (VR) applications for the rehabilitation of motor impairments after acquired brain injury (ABI) together with the progressive decrease of the costs, are facilitating the introduction of new tools not only in the clinical setting but also in the home setting. A VR-based system for balance rehabilitation was integrated in the physical therapy program of our neurorehabilitation unit 5 years ago. Patients were being included in the program according to their particular condition and expected clinical benefits. Previous results showed that the system is effective for the recovery of balance in hemiparetic individuals with ABI. The off-the-shelf Kinect™ meant a technological breakthrough that allowed some individuals to interact with custom made VR applications without wearable devices and with affordable costs. The objective of this study is to analyze the clinical effectiveness of a telerehabilitation program using this VR system in the home setting of individuals with chronic ABI.

METHODS

A sample of 8 participants with a mean score in the Berg Balance Scale of 47.6 ± 3.8 were considered in the study. A complete setting of the VR system consisting of a laptop and a Kinect™ was provided to each participant. A therapist guided them in the home installation, setup and common usage of the system. The program consisted of twenty 45-minute sessions with a stepping exercise, which difficulty was previously estimated by experienced clinical therapists, 3 to 5 times a week. The program was monitored by the clinical team from the neurorehabilitation unit. Participants were assessed before and after the treatment with a battery of motor scales that included the Berg Balance Scale (BBS) and the Tinetti Performance-Oriented Mobility Assessment (POMA), and also a posturography test. In addition, the subjective experiences of the participants after the program were registered by two questionnaires: the SUS and the Intrinsic Motivatory Inventory (IMI).

RESULTS

Statistical analyses showed that the participants had a significant improvement in the BBS ($p < 0.01$), the POMA ($p < 0.05$), and in the posturography tests that assessed the rhythmic weight shift ($p < 0.05$) and the vestibular index ($p < 0.05$). Scores of the SUS and IMI show high satisfaction and a good usability perception of the telerehabilitation system.

CONCLUSIONS

The results of the clinical scales and the posturography test support that the training with the telerehabilitation program provided clinical benefits to individuals with ABI. The high chronicity of the sample highlight the clinical improvement, suggesting that these programs can provide benefits, even long time after the injury. Scores to the questionnaires reported that the experience was very positive, even though the training was performed in their places, instead of in the neurorehabilitation unit.