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Post-stroke Neglect, Virtual Reality and Music Therapy: A Review

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Introduction

Neglect is a common result of a right hemispheric stroke. Neglect may also be referred to as hemineglect, spatial neglect, visuospatial neglect, visual neglect, unilateral spatial neglect, paresis, and hemiparesis. Chen et al. (2012) indicate that the frequency of patients suffering from neglect in the United States (USA) is estimated to be between 13% and 81% in populations who have experienced a right hemispheric stroke. They also describe rates in other countries that exist at approximately 50% of the stroke population. Neglect can affect various areas of functioning, including impaired cognitive performance, motor performance of the limbs, and perception. According to Karnath and Rorden (2012), a distinct deficit in patients experiencing neglect is an orientation bias to the right. Despite various rehabilitative interventions used in the treatment of neglect, there is no consensus about the most effective intervention or treatment. Due to Virtual Reality's (VR) multimodal capability, it may be used adjunctly with music therapy practices offering a promising intervention for use during neglect rehabilitation.

Methods

This review summarizes evidence of existing interventions and assessments used for post-stroke and neglect rehabilitation on patients in VR and music therapy research. Non-systematic searches of the PubMed and PsycINFO databases were conducted to retrieve relevant articles.

Discussion and Commentary

Overall, literature found in small studies suggests promising findings for symptom reduction during neglect rehabilitation using multiple VR and one music therapy, (Musical Neglect Training) intervention(s). This was coupled with a demonstration of feasibility and safety. Novel evidence is found in the stimulation of specific neurological regions in neglect patients during exposure to a VR intervention. For instance, Wåhlin et al. (2019) present data on resting-state functional connectivity within the Dorsal Attention Network (DAN) in chronic neglect patients undergoing rehabilitation using VR, aiming to improve left-side awareness. The results from this study indicate that as patients completed training using a VR intervention, a region responsible for saccadic eye movements to the left became more integrated with the left posterior parietal cortex. In addition, Functional Magnetic Resonance Imaging (fMRI) scanning presented results indicating a longitudinal increase in interhemispheric functional connectivity between the right frontal eye field and left intraparietal sulcus following VR rehabilitation. Their further analysis revealed that VR rehabilitation stimulated DAN connectivity more than other networks. This is highlighted as potentially a new mechanism that can be used during the rehabilitation of patients with visuospatial neglect. Based on the evidence reviewed, intersections of VR and music therapy practices are discussed with the purpose of neglect rehabilitation.

References

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