

Effects of 3D immersive virtual reality on postural control in patients with functional motor disorders

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Introduction: Motor symptoms in functional motor disorders (FMDs) are disabling neurological conditions exhibiting involuntary learned altered movement patterns [1-3]. Developing interventions for treating the pathophysiological features of FMDs (altered focus of attention, sense of agency, and belief/expectations) is an unmet need [1]. Virtual reality (VR) can manipulate attentional focus and improve postural control by capitalizing simultaneously on patients' motivation.

Objective: To explore whether a 3D immersive VR environment can shape postural control in FMDs by manipulating attentional focus in FMDs.

Methods: This exploratory posturographic study involved 17 patients (mean age, 45.25 ±15.20 years) and 19 healthy controls (mean age, 41.58 ±16.58 years). Postural parameters were measured in the real environment (single real task), a virtual 3D room-like copy of the real room (single-task VR), a custom-made 3D city-like scene where subjects maintained visual fixation while disregarding distractors (VR visual dual-task) or counted them (VR visual-cognitive dual-task). The dual-task effect (DTE) was calculated for sway area, length of the center of pressure (CoP), and anteroposterior and mediolateral CoP displacement.

Results: Sway area and mediolateral CoP displacement were improved in patients compared to controls (all, $p < 0.049$) on the VR visual-cognitive dual-task, measured by a decrease in DTE. A reduction in sway area DTE on the VR visual-cognitive dual-task compared to the VR visual dual-task was observed in patients ($p=0.025$). No other significant effects were noted.

Conclusions: This study provides novel preliminary evidence for the effects of a 3D immersive VR environment combined with visual-cognitive dual-tasking in shaping postural control. Our findings may inform interventions for the rehabilitation of FMDs.

References:

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