

Virtual reality cues for gait improvement in patients with idiopathic senile gait disorders and in patient with history of previous strokes

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Background: Senile gait disorder is characterized by shuffling and slowness of movement. This is particularly true for older patients with previous history of strokes. Closed-loop visual feedback cues have been shown to be safer and more effective than open-loop fixed-velocity visual cues for gait improvement in Parkinson's disease patients. The effects of such cues on the walking abilities of patients with idiopathic senile gait disorder (SG) and on patients with previous history of strokes (PS) do not appear to have been studied before.

Methods: The immediate effects of visual feedback cues, provided through a portable virtual reality (VR) apparatus, on walking speed and stride length was measured in 21 randomly selected old-age home residents, including 6 patients with history of PS, with complaints of gait disturbances.

Results: Thirteen patients (13/21), including four (4/6) PS patients, improved their walking speed or stride length or both. Nine patients, including four PS patients improved their walking speed or stride length or both by more than 10%. In the PS group, a marked improvement (13.2% \pm 6.0% in walking speed and 16.6% \pm 4.7% in stride length) was noted in patients whose baseline performance was above the median. VR visual cues did not improve the gait of patients with vascular risk factors but without history of PS. Education was a relatively good predictor of improvement (e.g., for the three patients with 8 years of study, average improvement in walking speed was -8.83% \pm 23.81% and in stride length -4.67% \pm 15.30%, for the four patients with 12 years of study, average improvement in walking speed was -1.85% \pm 26.83% and in stride length 3.82% \pm 9.75%, and for the two patients with 20 years of study average improvement in walking speed was 6.75% \pm 0.49% and in stride length 14.55% \pm 12.66%).

Conclusion: VR visual-feedback cues can improve gait parameters in elderly patients with history of previous strokes. Education level is a good predictor of improvement.