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Effect of Anterioposterior Weight Shifting Training with Visual Biofeedback in Subacute Stroke

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Introduction

Post-stroke patients typically exhibit an asymmetric gait pattern. Weight shifting to the affected side is reduced in post-stroke patients. Recent studies have shown that visual feedback for weight shift is an effective method for obtaining a symmetrical posture after stroke. However, no study has been conducted on the therapeutic effect. We aimed to investigate the effect of Anterioposterior Weight Shifting Training with Visual Biofeedback in subacute post-stroke patients with step length asymmetry.

Method

24 patients with Step Length Asymmetry after Stroke were enrolled in this study. The inclusion criteria were 1) less than 6 months from onset, 2) can walk independently at least 10m, 3) K-MMSE score of at least 15, 4) step length asymmetric ratio greater than 1.1, 5) over 20 years of age. The exclusion criteria were 1) quadriplegia 2) past history of stroke 3) past history of musculoskeletal or neurological disorders. The subjects were randomly assigned into two groups. Both groups received general rehabilitation treatment. The training group received an additional anterioposterior weight shifting training with visual Biofeedback 5 times per week for 4weeks. The spatiotemporal and kinematic data were obtained during walking through 3D motion analysis (MX-T10, Vicon Motion Systems Ltd., UK). Functional Ambulation Category, Self-selected walking speed, Maximum safe walking speed, Berg balance Test, Fugl-Meyer Assessment, Medical Research Council Score, Functional Independent Measure-mobility, Timed Up and Go test were assessed at pre, during, post- training, and 4week follow-up. Those were compared between two groups by repeated measures ANOVA.

Result

The asymmetric Index of step length and step length on affected side were significantly improved in the training group compared to the control group ($p<0.05$). The score of Berg

balance test, Medical Research Council Score of knee extensor and ankle dorsiflexor increased significantly in the training group compared to the control group ($p<0.05$). But, The maximum and self-selected walking speed, and timed up and go test were not significantly different between both group. In the kinematic data, the training group had a more significant effect on maximal hip flexion angle at initial contact, maximal hip flexion angle during swing phase and maximal knee flexion angle during swing phase compared to the control group ($p<0.05$).

Conclusion

This study suggested that Anterioposterior Weight Shifting Training with Visual Biofeedback may be helpful to improve the gait pattern in subacute post-stroke patients.