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Effect of Forward Reach on Paretic Lower Extremity Muscles of Patients with Stroke in A Modified Sitting Position - Randomized Control Trial

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Abstract

Introduction: Stroke often leads to hemiparesis, significantly weakening motor functions. Various training methods, including postural reactions, have been documented as the techniques used to provoke muscle contractions in paretic lower extremities. This study investigated the effect of forward reach in a modified sitting position on the paretic lower extremity muscles of patients with stroke.

Methods: Seventy-first-time cerebral stroke survivors in their early sub-acute phase were recruited in the study. Through block randomization, participants were equally and randomly allocated into the experimental or control group. Both groups underwent conventional training sessions lasting 45 minutes. The experimental group engaged in training sessions focusing on reaching a target while seated with only the paretic foot on the stool, whereas the control group performed the same task with both feet on the stool. Each group completed 20 repetitions of forward reaching, extending to one and a half times their arm's length, twice daily for 8 days. Surface electromyography was utilized to measure the quadriceps and tibialis anterior muscle activity before the first and after the last intervention.

Results: Post-intervention, the quadriceps and tibialis muscle surface EMG activity were significantly higher in both groups ($p = 0.001$). Furthermore, the experimental group exhibited higher muscle activity in both quadriceps and tibialis anterior compared to the control group ($p = 0.001$).

Conclusion: Forward reaching with only the paretic lower limb grounded on the stool effectively improves quadriceps and tibialis anterior muscles recruitment in the early sub-acute phase of stroke.