Integrated Effect of Repetitive Transcranial Magnetic Stimulation and Task-specific Trunk Control Training on Balance in Individuals with Parkinson's Disease

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ABSTRACT

Introduction: Parkinson's Disease (PD) is a neurodegenerative disease characterised by rigidity, bradykinesia, tremor, and postural instability which are attributed to the loss of striatal dopaminergic neurons. Disease progression reduces functional limits of stability, impaired postural responses, and gait dysfunction, which increases the risk of falls. There are advanced innovative rehabilitation strategies such as repetitive Transcranial Magnetic Stimulation (rTMS) used to enhance cortical excitability and task–specific training which puts demands on the cortex thus, promote neuronal plasticity.

Aim: To investigate the combined effect of rTMS and task-specific trunk control training on balance in individuals with PD.

Materials and Methods: Ten participants diagnosed with PD were randomly allocated to Group A (experimental) and Group B (control). Both groups underwent interventions 5 sessions per week for 3 weeks. Group A received high-frequency rTMS (10 Hz at 90% Resting Motor Threshold) for 20 minutes, followed by 30 minutes of task-specific trunk control exercises and conventional physiotherapy in each session. In contrast, Group B received sham-rTMS for 20 minutes, along with the same task-specific trunk control exercises and conventional physiotherapy. Evaluations were done on day 0 and day 15, using the Movement Disorder Society-Unified Parkinson's Disease Rating Scale (MDS-UPDRS-III), modified Clinical Test of Sensory Integration in Balance (m-CTSIB), and Parkinson's Disease Quality of Life (PDQL) as outcome measures.

Result and conclusion: There was a significant difference observed in MDS-UPDRS-III, mCTSIB and PDQL in both Group A (experimental) and Group B (control). However, the p-value ($p < 0.05$) was significantly greater in Group A as compared to Group B. The findings indicate that integrating rTMS with task-specific trunk control training significantly improves balance in individuals with PD.

Keywords: Bradykinesia, Neuronal plasticity, Postural instability, Rigidity, Tremor