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Efficacy of Low-frequency Repetitive Transcranial Magnetic Stimulation, along with Conventional Rehabilitation on Functional Independence in an Individual with Spinocerebellar Ataxia: A Case Report

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ABSTRACT

Spinocerebellar Ataxia (SCA) is a progressive, autosomal dominant, neurodegenerative disorder distinguished by deficits in motor-coordination and balance. It significantly impairs daily functioning, leading to increased reliance on assistance. Contemporary therapeutic strategies primarily emphasise symptomatic management aimed at enhancing functional independence.

Therefore, early intervention is crucial to decelerate progression of the condition. The case-report aimed to evaluate the efficacy of low-frequency repetitive Transcranial Magnetic Stimulation (rTMS) combined with conventional rehabilitation in improving motor-coordination, balance, and quality of life in an individual with SCA. This study describes a case of a 56-year-old female diagnosed with SCA who presented with a history of balance impairment, mild incoordination, slowness in gait and difficulties with activities of daily living since 8 years. The participant underwent low-frequency rTMS (over the inion, bilateral cerebellar hemispheres) at 90% Resting Motor Threshold (RMT), 900 trains at 1 Hz, for 15 minutes/session, combined with conventional rehabilitation, including virtual reality and dual-task on treadmill. The participant was intervened for 5 days/week for the duration of 4-week. Progress was monitored using the Scale for the Assessment and Rating of Ataxia (SARA), Modified Clinical Test for Sensory Interaction on Balance (mCTSIB) and Quality of Life Scale (QOLS). Pre-intervention and post-intervention scores at Day 0 and Day 30 of SARA and mCTSIB were 13/40 to 5/40 and 46/120 to 97/120, respectively, indicating a marked improvement in motor-coordination and balance. The QOLS score also improved from 70/112 to 92/112, indicating enhanced overall health status, selfsufficiency and independence in daily activities. The case study indicated that integrated effects of rTMS with conventional rehabilitation could offer a viable therapeutic strategy for improving the symptoms of SCA, emphasising the need for further research to explore its long-term efficacy and applicability across larger populations.

Keywords: Modified Clinical Test for Sensory Interaction on Balance, Neurodegenerative disorder, Quality of Life Scale (QOLS), Scale for the Assessment and Rating of Ataxia (SARA)