Can exercise combined with Cranial Nerve Non-Invasive Neuromodulation (CN-NINM) Improve Mobility in Non-ambulatory People with MS? A case study series

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Background: Though there is a growing body of evidence supporting rehabilita-

tion for people with MS, there is a scarcity of literature regarding effective inter-

ventions for people in the advanced stages of the disease. This case study series presents an innovative intervention that combines targeted physical thera-

py for movement control with a neuromodulation device. The resultant motor learning has the potential to improve functional mobility in people with advanced symptoms of MS.

Objectives: Pilot study to determine if the CN-NINM intervention can improve balance, gait, and mobility in subjects with advanced MS; to identify performance measures that are responsive in this population.

Participants: 6 subjects (EDSS 6.5-7.5) participated.

Outcomes: Trunk Impairment Scale (TIS), Multiple Sclerosis Impact Scale (MSIS-29), Modified Fatigue Imp-

act Scale (MFIS), 12-item MS Walking Scale (MSWIS), Impact of Visual Impairment Scale (IVIS), and Box & Blocks, Repeatable Battery for the Assessment of Neuropsychological Abilities (RBANS), video nystagmogra-

phy for movement control with a neuromodulation device. The resultant motor

learning has the potential to improve functional mobility in people with advanced

symptoms of MS.

Why the tongue?

Sensory stimulation projects to the brainstem, specifically the solitary and trigeminal nuclei, via Cranial Nerves V and VII. Sensory stimulation provides a rich sensory input that might help in improving mobility in people with MS.

Conclusions:

- Despite the rigorous training regimen, fatigue improved or remained unchanged in all subjects.
- Subjects at EDSS 6.5 and 7.0 made the most significant gains. These included functional improvements such as increased mobility with less restrictive devices and increased community access.
- Trend was toward improvement in all measures, when looking at aggregate results for EDSS 6.5 and 7.0. This improvement may not be appropriate for those at EDSS 7.5, at least without treatment module modification.
- A controlled study, with more mobile subjects (EDSS 6.5–7.0) could tease out the con-

tributions of stimulation and exercise to changes in mobility.

Previous results in ambulatory people with MS.

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