Can severe upper extremity hemiplegia improve with functional electrical stimulation?

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Introduction
Stroke survivors with low levels of arm and hand function, characterized by Cheokde–McMaster Stages of Motor Recovery Levels 1 and 2, or Upper Extremity Fugl-Meyer Score (UE-FM) of ≤ 20, are often considered unlikely to make significant functional gains with upper extremity (UE) intervention. Very few treatment options have been designed or tested with this population due to this assumption. Often one handed compensatory interventions are instituted early with this most severe hemiparetic group resulting in learned non-use. Effective new treatment options are required to enhance recovery for individuals with severe UE hemiparesis.

Objectives
To investigate whether treatment with MyndMove™, a novel, non-invasive, advanced functional electrical stimulation (FES) therapy improves recovery of voluntary arm function in stroke patients with severe UE deficits.

Methods
Design: Multi-centre, open-label, single group intervention assignment.
Subjects: Twenty-five (25) chronic stroke patients with severe upper extremity hemiparesis, who were greater than 6 months after onset of stroke.
Inclusion criteria: Age 18 or older, ischemic or hemorrhagic stroke, greater than 6 months post stroke, severe hemiparesis as defined by an UE-FM score of less than 10, able to follow instructions, provide consent and participate in 20 one-hour sessions of treatment.
Exclusion criteria: Global aphasia, history of a previous stroke, previous neurological or musculoskeletal condition which interferes with UE function, life expectancy of less than 12 months, history of seizure disorders and or seizure medications, participant has an existing stimulation device (e.g. pacemaker), rash or open wound on arm, cellulitis/tuberculosis infection in the last 3 months, enrolled in another UE study, previously enrolled in a drug or biology study in last 6 months.

Results
Twenty-five (25) chronic stroke patients were enrolled in the study. Twenty-four (24) patients completed 19 or 20 sessions. One patient was withdrawn from the study for medical reasons unrelated to MyndMove™ Therapy.

Discussion
MyndMove™ Therapy provides benefit to chronic stroke with severe hemiparesis with half of the number of treatment sessions than previously studied.

Conclusions
Twenty (20) 1-hour sessions of MyndMove™ therapy resulted in clinically meaningful improvements in UE usability in chronic stroke individuals with severe hemiparesis. This study design (multicentre, open label, single group intervention) enabled therapists to become comfortable with the new technology, collaborate and problem solve in how to best implement MyndMove™ therapy. This open-label study has guided the design of a randomized controlled trial to further support the clinical use of MyndMove™ therapy.

Future Recommendations
Documentation of MyndMove™ treatment approaches used by therapists would be valuable to learn more about therapists perceptions of the technology. Future RCT studies should include functional assessment and how participants use their hemiparetic side throughout the day, dose response and monitoring of their impaired limbs in functional tasks such as putting on a glove and holding objects.

References

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