

Inhibiting Spasticity & Improving Functional Outcomes in Individuals with Multiple Sclerosis



The Study

The Neubie Device uses direct current electrical stimulation to communicate with mechanoreceptors of the peripheral nervous system (PNS). This action supports functional changes for a variety of FDA cleared indications, including neuromuscular re-education, reducing spasms, and increasing range of motion. Multiple sclerosis (MS) has a high incidence of spasticity and motor deficits. This case series assessed the efficacy of the Neubie as a therapeutic intervention for spasticity and function in 7 MS diagnosed participants with Expanded Disability Status Scale (EDSS) scores of 6-8.

Location:

Centura Home Health, Colorado

Primary Investigator(s):

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Why Use the Neubie to Manage Symptoms Related to MS?

Multiple sclerosis (MS) has a high incidence of debilitating spasticity. Central Nervous System (CNS) intrafusal settings have an impact on spasticity level. Mechanoreceptors of the Peripheral Nervous System (PNS) communicate monosynaptically with the central nervous system (CNS). The Neubie can be used to create inputs that result in changes to the PNS and CNS for improved management of motor dysfunction in neurological conditions like MS.

The Design:

- 7 participants with progressive MS with mobility impairment (EDSS of 6-8)
- Completed 18 visits over 6 weeks of home health-delivered physical therapy
- A four part intervention was used with each participant



Neubie Footbath protocol to target neuropathy symptoms.



Flexibility and movement training combined with Neubie to target areas of measured spasticity.



Agonist strength training combined with Neubie through tolerated ranges without identified compensatory movements (work to rest ratio of between 1:2 and 1:4 depending on fatigue response).



Functional training combined with Neubie to reduce or eliminate compensatory patterns.

The Results

Compliance

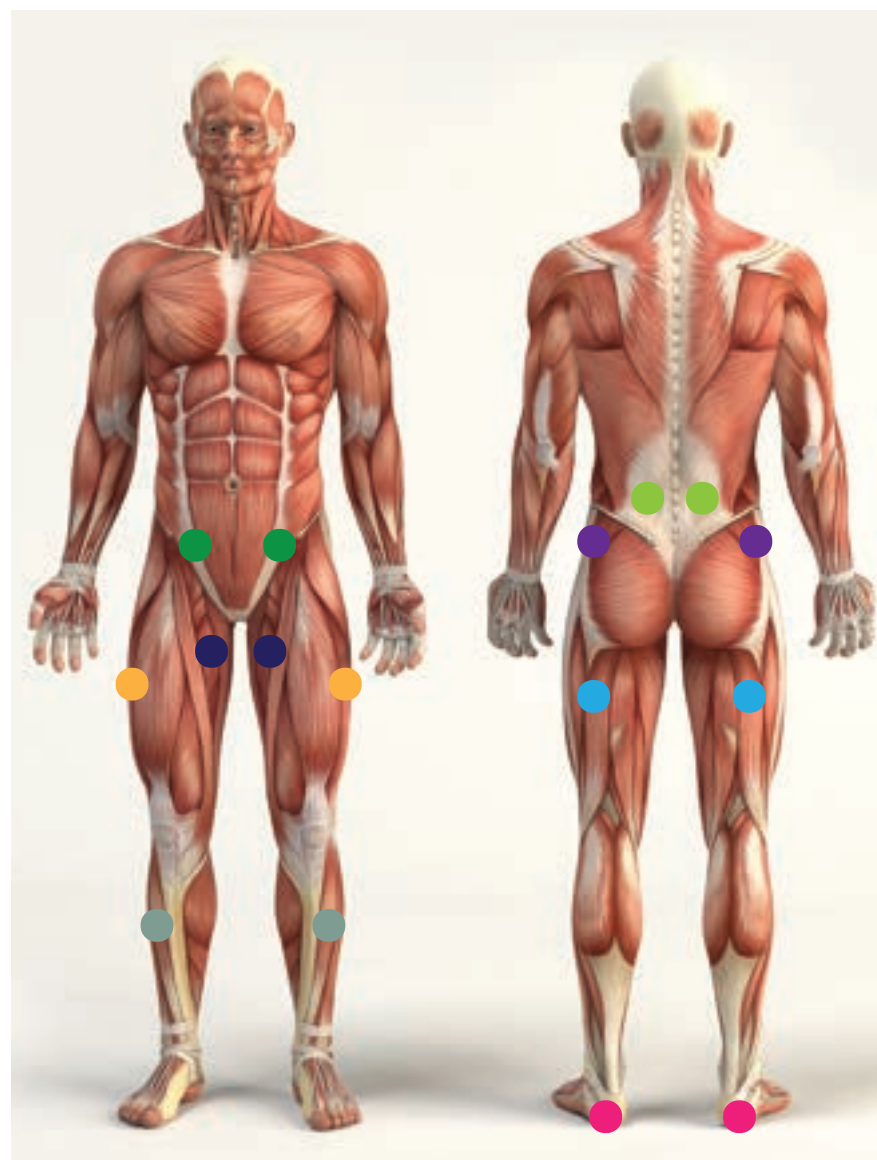
125/126

125/126 visits were completed, demonstrating a high level of tolerance to the Neubie device. Further, there were no trends across subjects demonstrating worsening measurements in spasticity, MMT, or ROM.

Functional Improvements by Specific Muscle Groups

Group improvements were seen in the following areas:
(Percentage = % of participants showing improvement.)

MANUAL MUSCLE TESTING	LEFT	RIGHT
Psoas	71.4%	57.1%
Quadratus Lumborum	57.1%	71.4%
Vastus Lateralis & Medialis	100%	71.4%
Gluteus Medius	57.1%	100%
Biceps Femoris	83.3%	66.7%
Hip Adductor Group	71.4%	71.4%
Tibialis Anterior	71.4%	71.4%
MODIFIED ASHWORTH TEST:		
Plantar Flexor	71.4%	71.4%



CONCLUSION

From the results of this case series, we can conclude that in individuals with progressive MS, electrical stimulation with the Neubie DC device is feasible and well tolerated. Our findings demonstrate the potential of the Neubie to reduce hypertonicity in forms of spasticity and clonus. In some cases, this treatment also demonstrates improvement in agonist muscle strength with trends toward improvement in functional outcome measures. Trends across subjects show improvement in spasticity, strength and ROM, demonstrating a possible correlation between mechanoreceptor input from the Neubie allowing greater stretch and improved agonist strength. Though a small sample size, the findings of this case series are promising, and warrant further research on the use of the Neubie for managing MS symptoms.

REFERENCES: Ellerbusch CL, Chapple KM, Seibert JB. A case series in individuals with multiple sclerosis using direct current electrical stimulation to inhibit spasticity and improve functional outcomes. Multiple Sclerosis Journal - Experimental, Translational and Clinical. 2023;9(3). doi:10.1177/20552173231186512