CASE STUDY

Use of the Electric Glove NEUBIE Attachment to Improve Hand Function, Gait, and Leg Spasms, in a Patient with ALS

PERFORMED BY & LOCATION:
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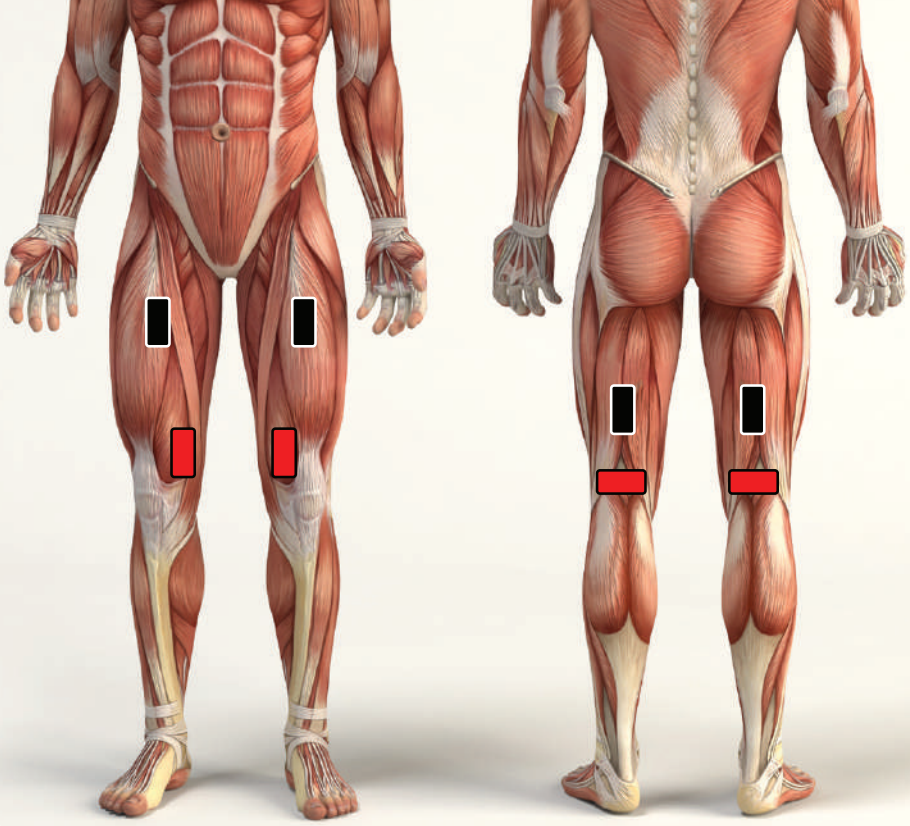
KEY WORDS:
ALS, hand function, spasticity, motor deficits, NMES, functional training, electric glove



DIAGNOSIS:

45yo female who was diagnosed with ALS in December of 2021

TREATMENT AND OUTCOME:

pon initial evaluation, patient demonstrated weakness and impaired coordination in her hands. She was not able to fully extend her fingers without assistance and had difficulty gripping objects, including utensils, to eat. Additionally, she demonstrated significant tightness and spasms in her legs, most predominantly, in her hamstrings, which contributed to gait pattern deficits including decreased stride length. She reports having spasms in her hamstrings at night that interrupted sleep. After one month of treatment sessions to address both hand and hamstring impairments, at a frequency of 2x/week using a variety of Neubie techniques (including the electric glove attachment), patient reported no continued spasms in her legs at night and demonstrated improved gait pattern and improved strength and coordination in her hands. She also demonstrated improved ability to perform functional tasks with her hands, most notably, she was able to eat sushi with chopsticks for the first time in two years.

PATIENT INFORMATION/DIAGNOSIS

45yo female who was diagnosed with ALS in December of 2021, though symptoms began before to this date. Prior to coming into Neufit for treatment, she had tried IV treatments and altering her diet.. Patient presents with global weakness in upper and lower body, core weakness, and impaired gait due to balance deficits and tightness and spasticity in the muscles of the leg. For the purpose of this case study, we will focus on the treatments provided to, and the outcomes of, her wrist, hand, and hamstrings after one month of treatment.

CLINICAL FINDINGS ON EVALUATION

PROCESS: Observed volitional movement of forearms, wrists, hands, and hamstrings. Performed scanning process.

FINDINGS: Patient was able to open hand/extend fingers to about 40% and demonstrates weak grip strength. She also demonstrated weakness in the muscles of the thumb. She reports having difficulty gripping objects and thus requires assistance to hold utensils, cups, and phone, and reports difficulty opening jars/cans. She demonstrated tightness and weakness in hamstrings and was not able to perform a prone hamstring curl independently and without it resulting in a spasm. Scan revealed points of interest (relevant to the areas this case study is focused on) at bilateral forearms, popliteal fossae, left medial mid hamstring, and right mid hamstring.

ASSESSMENT: Patient's functional abilities are limited by weakness and impaired coordination in her forearms, wrists, and hands, along with tightness and spasms in her hamstrings which affect her gait pattern and also her ability to sleep at night. The above will require the use of manual work by the therapist using the electric glove, functional training of the hands with the electric glove on the patient, and passive and active exercises with electrodes placed on the hamstrings, using the Neubie.

PATIENT REPORT AFTER INITIAL EVALUATION: Patient was enthusiastic about treatment after initial evaluation, as she felt as though she could open and use her hands a bit more and and had more feeling in her hands. She reports her legs felt looser as she walked out of the session and the next day reports that her leg spasms at night were not as bad as they normally are.

SUBSEQUENT TREATMENT SESSIONS

FREQUENCY: 2x/week over the course of one month

TECHNIQUES USED IN FOLLOW UP SESSIONS: We combined the following treatment techniques throughout our sessions.

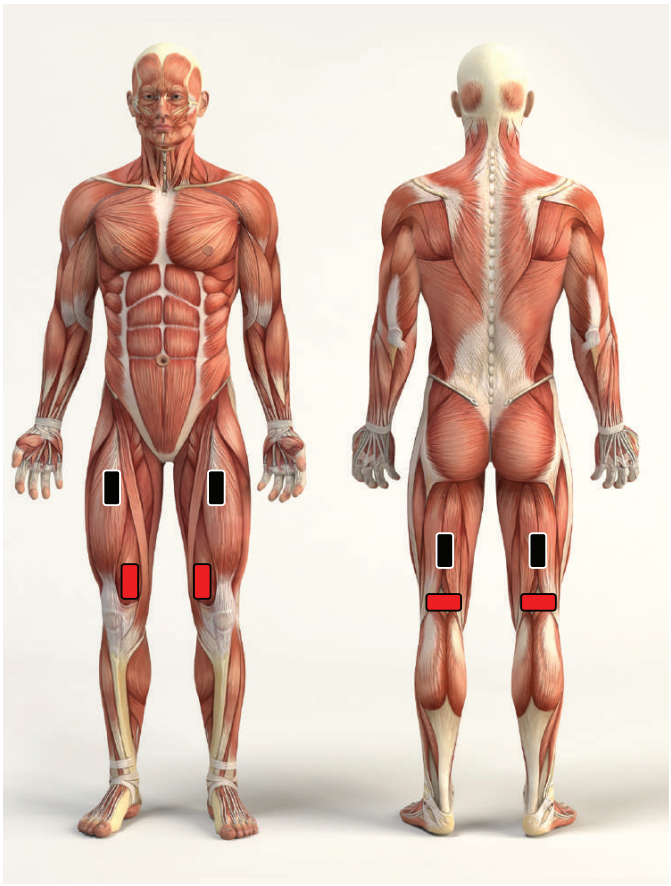
STUBSEQUENT TREATMENT SESSIONS (CONTINUED)

• Glove Work to patient's forearms, wrists, and hands - Using the electric glove attachment of Neubie at 500pps, I manually worked patient's foreaerm's wrists, and hands in order to provide these areas with stim/input in order to encourage more movement. **Channel 1** = **Black** plugged into glove on therapist's hand / **Red** (grounding) upper arm

• Wrist and hand exercises with glove on patient's hands - Using the electric glove attachment on patient's hand and the grounding electrode on the top of the forearm, at 500pps, performed wrist and hand stretches as well as (assisted) wrist and hand strengthening and coordination exercises. These exercises included, but were not limited to, wrist flexion/extension (in neutral), opening/closing of hands, thumb to each finger, and functional tasks.

Channel 1 = **Black** plugged into glove on patient's hand Right hand /
Red (grounding) top of Right forearm
Channel 3 = **Black** plugged into glove on patient's Left hand /
Red (grounding) top of Left forearm

• Glove work to patient's hamstrings - Using the electric glove attachment of Neubie at 500pps, I manually worked patient's hamstrings, focusing on the points of interest found during our scan. The goal of this approach is to lengthen these muscles and provide the system with input to re-educate it not to perceive this stim/perceived movement as a threat in order to decrease spasms and allow for better movement.



• Passive & active exercises with electrodes on patient's hamstrings - erformed 10-15 passive reps of prone hamstring curls followed by 3 sets of 8-12 active assisted reps of prone hamstring curls, each leg. One leg worked while the other leg rested (intensity on resting leg approximately half of what it was at working level).

Channel 1 = **Black** Right medial mid hamstring /
Red Right popliteal fossa
Channel 3 = **Black** Left mid hamstring /
Red Left popliteal fossa

RESULTS AFTER ALL THE TREATMENT COMPLETED (OR CURRENT RESULTS IF STILL BEING TREATED):

On evaluation, patient's hands rested in a closed position and she had difficulty grasping objects, including utensils. After one month of treatment, her hands rested in a more open opposition and she was able to eat sushi with chopsticks for the first time in 2 years. In terms of her hamstrings, on initial evaluation she reports having spasms that kept her up at night and was not able to perform prone hamstring curls without assist and without them resulting in spasms. After one month of treatment, she reports no night spasms and she was able to perform 3 sets of 8+ prone hamstring curls independently with minimal to no spasms during movement. Additionally, on initial evaluation, she ambulated with a short stride length, in part due to the spasticity in her hamstrings. After one month of treatment she was able to ambulate with a longer stride length and improved balance.

VIDEO OF OUTCOMES:

Glove work to increase ROM and coordination: https://vimeo.com/795021451

She eats sushi with chopsticks for the first time in 2 years!!

Pre and Post Neubie Stride Length

PRE Neubie Stride Length: https://vimeo.com/795021466

POST Neubie Stride Length: https://vimeo.com/795021476

DISCUSSION

The biggest take away from this case study is how much progress was made in one month by a patient with a neurodegenerative disease like ALS. She had been suffering leg and hamstring spasms for over a year and within one month (8 sessions), these spasms had dissipated. Additionally, she was able to regain enough strength and dexterity in her hands to be able to use chopsticks, something she had not been able to do for 2 years. It is also important to note that when she went to Mayo Clinic for re-evaluation, they could not offer her an explanation as to why she was getting better and not declining and concluded it must be at least in part due to the Neubie.

Limitations include limited objective data, as this case study relied primarily on observation of movement, patient report, and functional outcomes. Though obvious positive outcomes were noted, gathering more pre and post objective measures, like using a dynamometer for grip strength testing, would have provided even more data to back up the results of this case study.

Patient continues to require extensive therapy and exercise to continue to address her hands and hamstrings, as well as overall stretching and strengthening of the arms, legs, core, and functional and balance training. She is currently working with the Neubie at home using a program I created for her, and continues to send me updates weekly about how much better she is doing in terms of balance, flexibility, overall function and she reports feeling more "connected" overall.

PATIENT PERSPECTIVE:

Patient feels like the Neubie has been a game-changer for her and believes it is a major reason why she is making continued improvements in strength and function, versus declining. She has been frustrated with several professionals she has seen who write off ALS as a death sentence and she states that she will continue to throw at it whatever she can and work with the Neubie because “Nobody can tell me I’m not gonna get better, because look at me, I am getting better! I’m nowhere near where the doctors said I’d be.” Specific accomplishments she has shared with me since continued Neubie use:

- Sent a video of her bending down to touch her toes and reports “I would have fallen over before from lack of balance.”
- Sent a video of her climbing into bed, “I haven’t been able to climb into bed in over 2.5 years!”
- Also respors better balance, improved walking, better sleep, and improved coordination

“I feel very blessed to have found Neufit and most importantly, the magical Neubie! With a diagnosis of ALS, things can seem daunting with lots of unknowns. The Neubie gives you a reason to smile and hope. My experience has been nothing but positive along with notable improvements. I highly encourage everyone to give it a try and let the electric goodness fill you up!” ~Leticia