



Myositis International
Health & Research
Collaborative Alliance

Creating a World Where We Cure Myositis Together.

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Useability and Feasibility Trial of the Carbonhand Glove in People with Myositis and Impaired Hand Function

Background

Grip strength is reduced in adults with IIM diseases

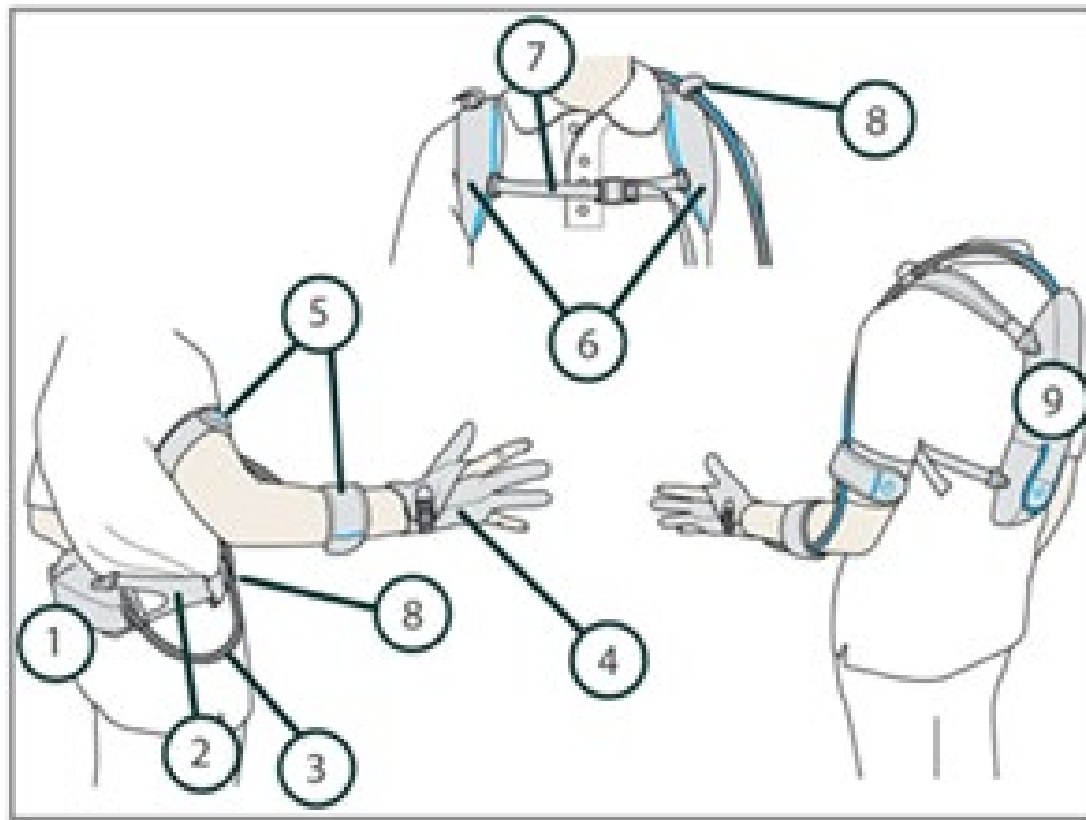
The Bioservo Carbonhand glove improves the grip of persons with weak or unsteady grip imitated by voluntary, active motion by the person him/herself.

Carbonhand mimics a user's grip movements and provides additional grip force. It is designed to make life easier at work, at home and in everyday life.

Carbonhand Study Aims

- To assess the usability and feasibility of the Carbonhand Glove in myositis
- To assess the degree to which patients' perceive the Carbonhand Glove as useful and probable in daily life for enhancing hand function
- To learn of any perceived worries about the device by patients
- To test the completion of daily activities before and after donning the device

Methods



- 40 participants at TMA annual patient conference participated
- Assessments before using glove
 - EQ5D, IBM Functional rating scale, PROMIS physical function 8b, PRO Upper Extremity Functional (PRO-UEFS) scale, NRS overall and hand pain, Grip strength (Jamar)
- Assessment without and with glove
 - Modified PRO-UEFS for IBM, Participants chose 3 of activities in modified PRO-UEFS to perform with and without the glove
- Open-ended questions regarding perceived usability and concerns

Item	Name	Function
1	Hip carry	Used to carry and protect the Power unit when carrying it on the hip
2	Belt	Used for hip carry solution
3	Glove cord	Transmits sensory data and provides force
4	Glove	Provides grasp force
5	Arm straps	Keeps the Glove cord attached to your arm
6	Shoulder straps	Used for back carry solution
7	Sternum strap	Connects the shoulder straps
8	Cord clips	Holds the cord in place
9	Back carry	Used to carry and protect the Power unit when carrying it on the back

Results

Table 1. Demographic data and status on the participants.

Demographic and status	IBM, n=40
Age md (IQR), years	69 (64-74)
Gender male/female (%)	52.3/47.5
IBM FRS (0-40) md (IQR)	20 (14-25)
PRO-UEFS for IBM (0-48) md (IQR)	23 (15.5-33)
EQ5D VAS (0-100) md (IQR)	74.5 (66.25-83.75)
Jamar right hand md (IQR) kilogram	4.3 (1.6-10.7)
Jamar left hand md (IQR) kilogram	3.2 (1.3-9.6)

IBM=inclusion body myositis, FRS=functional rating scale, md= median, IQR=interquartile range, EQ=EuroQoL, VAS=visual analogue scale.

The most commonly selected activities, with pre-and post-glove ratings are shown in Table 2.

All activities were perceived easier to perform with the glove

Table 2. Measures on difficulty in chosen activities with and without the glove, were 0 indicates “unable to do” and 4 “without any difficulty”.

Chosen activity	Without the glove	With the glove	p-value
Free weights, n=16	2 (1-2)	4 (3.25-4)	p<0.001
Previously open jars, n=16	1 (1-2)	4 (3-4)	p=0.008
Lift heavy bag from floor n=15	2 (2-2)	4 (4-4)	p<0.001
Frying pan, n=11	1 (1-2)	3 (3-4)	p=0.004
Picking coin from table, n=8	2 (1.3-3)	3.5 (2.3-4.0)	p=0.039

Results from the open-ended questions

That the glove would be beneficial for use in everyday tasks, lifting objects, grocery shopping, stabilizing the hand and would increase independence.

Most participants did not foresee activities in their daily routine where the glove might not work

Some conveyed foreseeing some difficulty of glove use during personal hygiene and social activities.

A few showed an interest to use the glove on both hands.

Those with only little limitation in hand function thought it would be more beneficial when the hand function was more limited.

Those with severe limitation in hand function, especially in combination with reduced arm strength were not helped in activities by the glove.

Acknowledgements



All participants and their care-givers!

