

# Muscle Firing With the Use of a Compact Elliptical Trainer

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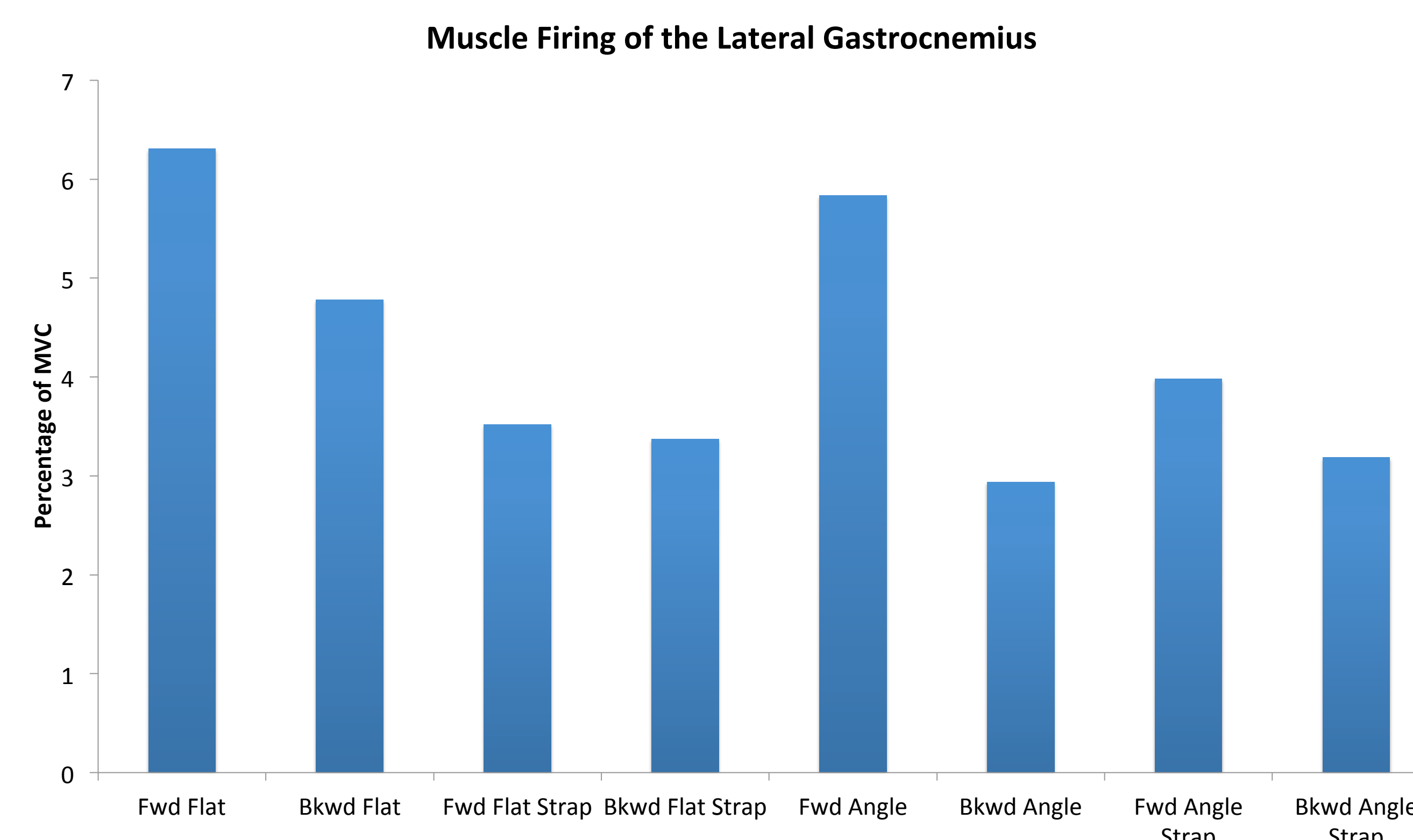
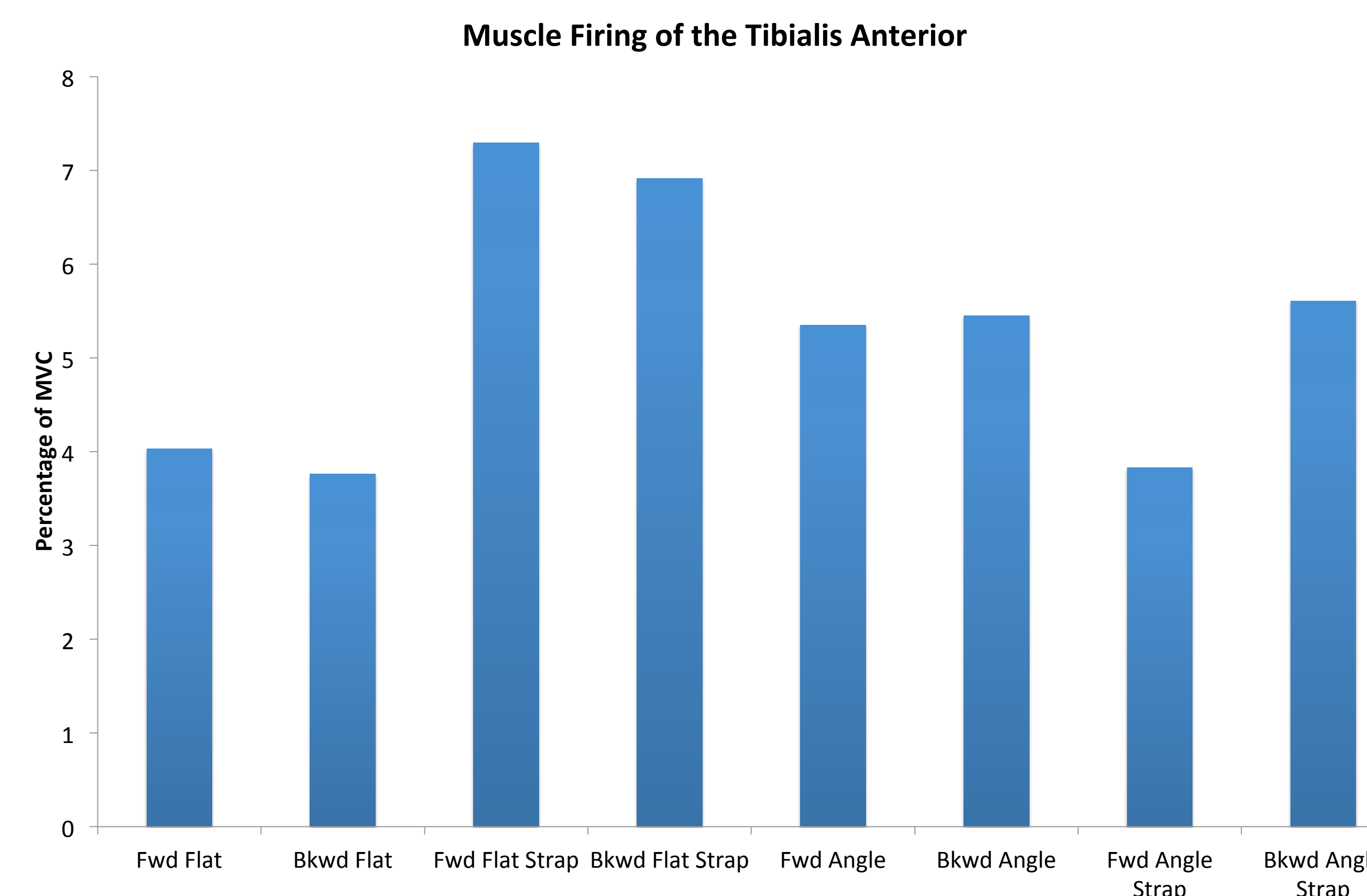
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## Background and Purpose

Neurological disorders such as stroke, Parkinson's disease, and multiple sclerosis are leading causes of long-term disability and can often lead to a decrease in physical function and mobility. The purpose of this study was to identify the most effective use of an inexpensive lower extremity exercise device (compact elliptical trainer) that can be used in the home setting to further the physical rehabilitation and fitness of persons with chronic neurological disorders.

## Methods

Ten individuals without neurological deficit were tested. The subjects used the elliptical trainer under eight different conditions in a randomized order for 30 seconds each. During each condition, muscle activity of the tibialis anterior and lateral gastrocnemius was measured using surface electromyography (EMG).



## Results

**Table 1.** Mean muscle activation as % of maximum voluntary isometric contraction

Condition	Tibialis Anterior	Gastrocnemius
Forward flat	4.03	6.31*
Backward flat	3.76	4.78
Forward flat with strap	7.30*	3.52
Backward flat with strap	6.92	3.37
Forward 30° angle	5.35	5.83
Backward 30° angle	5.45	2.94
Forward 30° angle with strap	3.83	3.98
Backward 30° angle with strap	5.61	3.19

\* Indicates highest recorded value for the muscle

Maximum muscle activation of the tibialis anterior occurred when pedaling forward with a foot strap with the device flat on the ground. Maximum muscle activation of the gastrocnemius occurred when pedaling forward without a foot strap with the device flat on the ground.

## Conclusion

A compact elliptical trainer may be a useful device to further muscular rehabilitation for individuals with neurological disorders. However, clinicians should understand the different ways that the device can be used to maximize muscular function.