



CADTH Reference List

# Plantar Surface Devices for Neurological Conditions, Vascular Conditions, and Chronic Pain

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## Key Messages

- We did not find any studies on the clinical effectiveness of plantar surface neuromuscular electrical stimulation devices for the treatment of neurological and vascular conditions in adults.
- We did not find any studies on the clinical effectiveness of plantar surface neuromuscular electrical stimulation devices for the treatment of chronic pain in adults.

## Research Questions

1. What is the clinical effectiveness of plantar surface neuromuscular electrical stimulation devices for the treatment of neurological and vascular conditions in adults?
2. What is the clinical effectiveness of plantar surface neuromuscular electrical stimulation devices for the treatment of chronic pain in adults?

## Methods

### Literature Search Methods

An information specialist conducted a literature search on key resources including MEDLINE, the Cochrane Database of Systematic Reviews, the International HTA Database, the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search approach was customized to retrieve a limited set of results, balancing comprehensiveness with relevancy. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine's MeSH (Medical Subject Headings), and keywords. Search concepts were developed based on the elements of the research questions and selection criteria. The main search concepts were neuromuscular electrical stimulation devices, plantar, and neurological conditions, vascular conditions or chronic pain. [CADTH-developed search filters](#) were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, or indirect treatment comparisons, and any types of clinical trials or observational studies. The search was completed on June 5, 2023, and limited to English-language documents published since January 1, 2018. Internet links were provided, where available.

### Selection Criteria and Summary Methods

One reviewer screened literature search results (titles and abstracts) and selected publications according to the inclusion criteria presented in [Table 1](#). Full texts of study publications were not reviewed. The Overall Summary of Findings was based on information available in the abstracts of selected publications.

**Table 1: Selection Criteria**

Criteria	Description
<b>Population</b>	Q1: Adults with neurological or vascular conditions (e.g., peripheral neuropathy, cerebral palsy, Charcot-Marie-Tooth disease) Q2: Adults with chronic pain
<b>Intervention</b>	Plantar surface neuromuscular electrical stimulation devices
<b>Comparator</b>	Usual care (e.g., no use of plantar surface neuromuscular electrical stimulation devices)
<b>Outcomes</b>	Clinical benefits (e.g., pain, swelling, function, circulation, mobility, quality of life, patient satisfaction) and harms (e.g., adverse events)
<b>Study designs</b>	Health technology assessments, systematic reviews, randomized controlled trials, nonrandomized studies

## Results

No relevant health technology assessments, systematic reviews, randomized controlled trials, or non-randomized studies were identified about the clinical effectiveness of plantar surface neuromuscular electrical stimulation devices for the treatment of neurological, vascular, or chronic pain conditions in adults.

References of potential interest that did not meet the inclusion criteria are provided in [Appendix 1](#).

## Overall Summary of Findings

No relevant literature was found regarding the clinical effectiveness of plantar surface neuromuscular electrical stimulation devices for the treatment of neurological, vascular, or chronic pain conditions in adults; therefore, no summary can be provided.



## References

### Health Technology Assessments

No literature identified.

### Systematic Reviews

No literature identified.

### Randomized Controlled Trials

No literature identified.

### Nonrandomized Studies

No literature identified.

## Appendix 1: References of Potential Interest

### Systematic Reviews

#### ***Unclear Intervention – Plantar Surface NMES Not Specified***

Jéhannin P, Craughwell M, Omarjee L, et al. A systematic review of lower extremity electrical stimulation for treatment of walking impairment in peripheral artery disease. *Vasc Med*. 2020;25(4):354-363. [PubMed](#)

### Randomized Controlled Trials

#### ***Alternative Population***

Takino K, Kameshima M, Asai C, et al. Neuromuscular electrical stimulation after cardiovascular surgery mitigates muscle weakness in older individuals with diabetes. *Ann Phys Rehabil Med*. 2023;66(2):101659. [PubMed](#)

Sumin AN, Oleinik PA, Bezdenezhnykh AV, Ivanova AV. Neuromuscular electrical stimulation in early rehabilitation of patients with postoperative complications after cardiovascular surgery: a randomized controlled trial. *Medicine*. 2020;99(42):e22769. [PubMed](#)

#### ***Alternative Comparator – Contralaterally Controlled NMES***

Shen Y, Chen L, Zhang L, et al. Effectiveness of a novel contralaterally controlled neuromuscular electrical stimulation for restoring lower limb motor performance and activities of daily living in stroke survivors: a randomized controlled trial. *Neural Plast*. 2022;2022:5771634. [PubMed](#)

#### ***Unclear Intervention – Plantar Surface NMES Not Specified***

Ravikummar R, Lane TR, Babber A, Onida S, Davies AH. A randomised controlled trial of neuromuscular stimulation in non-operative venous disease improves clinical and symptomatic status. *Phlebology*. 2021;36(4):290-302. [PubMed](#)

### Nonrandomized Studies

#### ***Unclear Population – Health Condition Not Specified***

Langeard A, Bigot L, Loggia G, Chastan N, Quarck G, Gauthier A. Plantar flexor strength training with home-based neuromuscular electrical stimulation improves limits of postural stability in older adults. *J Phys Act Health*. 2020;17(6):657-661. [PubMed](#)

### Review Articles

Greve KR, Joseph CF, Berry BE, Schadh K, Rose J. Neuromuscular electrical stimulation to augment lower limb exercise and mobility in individuals with spastic cerebral palsy: a scoping review. *Front Physiol*. 2022;13:951899. [PubMed](#)

### Additional References

#### ***Adverse Event Report***

U.S Food & Drug Administration. MAUDE Adverse Event Report: Actegy Ltd Revitive Circulation Booster. 2018; [https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/detail.cfm?mdrfoi\\_id=8041500&pc=NGX#:~:text=However%2C%20it%20is%20important%20to,your%20leg%20below%20the%20knee](https://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfmaude/detail.cfm?mdrfoi_id=8041500&pc=NGX#:~:text=However%2C%20it%20is%20important%20to,your%20leg%20below%20the%20knee). Accessed 2023 Jun 06.