

Functional Electrical Stimulation (FES) and Neuromuscular Electrical Stimulation (NMES)

DME.ST.113.A

v1.0.2026

Introduction

Functional electrical stimulation (FES) and neuromuscular electrical stimulation (NMES) devices are addressed in this guideline.

Health Equity Consideration

Health equity is the highest level of health for all individuals; health inequity is the avoidable difference in health status or distribution of health resources due to the social conditions in which individuals are born, grow, live, work, and age. Social determinants of health are the conditions in the environment that affect a wide range of health, functioning, and quality of life outcomes and risks. Examples include the following: safe housing, transportation, and neighborhoods; racism, discrimination, and violence; education, job opportunities, and income; access to nutritious foods and physical activity opportunities; access to clean air and water; and language and literacy skills.

Criteria

NMES for the Treatment of Disuse Muscle Atrophy

An **NMES device** and related supplies are considered medically necessary as part of a treatment plan for disuse atrophy when the nerve to the atrophied muscle is intact.

FES for use with Spinal Cord Injury (SCI)

An **FES device** and related supplies are considered medically necessary as part of a treatment plan to enable individuals with spinal cord injury (SCI) to ambulate when **all** of the following criteria apply:

- The individual has intact lower motor units (L1 and below).
- The individual demonstrates brisk muscle contraction to NMES and has sensory perception of electrical stimulation for muscle contraction.
- The individual can transfer independently.

- The individual demonstrates independent standing tolerance with or without assistance for at least three minutes.
- The individual is at least six months post-recovery from spinal cord injury and restorative surgery.
- The individual does not have severe hip or knee degenerative disease.
- The individual does not have a history of long bone fracture secondary to osteoporosis.
- The individual has completed a physical therapy program over a three month period.
- The individual has had training with the device and is able to control the device.
- The individual does not have any contraindications to device use.

FES for Foot Drop

An **FES device** and related supplies are considered medically necessary to achieve ambulation for individuals with a history of stroke with hemiplegia or hemiparesis and foot drop when **all** of the following criteria apply:

- The individual has the passive ankle range of motion to achieve a functional gait.
- The individual is able to safely use the device.
- The individual does not have any contraindications to device use.

FES for Heart Failure

An **FES device** and related supplies are considered medically necessary for individuals with New York Heart Association grade III or IV heart failure when **both** of the following criteria apply:

- The individual is able to safely use the device.
- The individual does not have any contraindications to device use.

Conductive Garment

A **conductive garment** for use with an NMES or FES device is considered medical necessary if **all** of the following conditions are met:

- The garment has been prescribed by the treating practitioner for use in delivering covered NMES or FES treatment.
- There is a medical indication that precludes application of conventional electrodes, adhesive tapes, and lead wires including **any** of the following:
 - There is a large treatment area or many sites to be stimulated.
 - The individual has a documented medical condition, such as a skin condition.
 - The individual requires electrical stimulation beneath a cast to treat chronic intractable pain.

Special Considerations and Safety

NMES/FES devices should not be used in individuals with **any** of the following contraindications and clinical scenarios, including, but not limited to:

- Electronic implants (e.g., cardiac pacemakers, electronic implants, or an implantable cardioverter defibrillator)
- Severe scoliosis or severe osteoporosis
- Skin disease or cancer in area of stimulation
- Irreversible contracture
- Autonomic dysreflexia
- Individuals who are pregnant
- Individuals who have epilepsy

FES and NMES are considered experimental, investigational, or unproven for all other indications other than those listed in the criteria, including, but not limited to, **any** of the following:

- General muscle strengthening in healthy individuals
- Treatment of knee osteoarthritis
- Treatment of upper extremity hemiplegia
- Treatment of oropharyngeal dysphagia

Not Medically Necessary

- Implanted neurostimulators are not considered durable medical equipment (DME).
- A disposable NMES device is not considered DME.

Supplies

- During the rental of an NMES/FES unit, supplies for the unit are included in the rental allowance.
- There is no additional allowance for items such as electrodes, lead wires, and batteries.
- If an NMES/FES unit is purchased, separate allowance will be made for replacement supplies when they are reasonable and necessary and are used with a covered NMES/FES device.

Definitions

- **Neuromuscular electrical stimulation (NMES)** is a transcutaneous modality that involves the use of a device to generate a functional muscle contraction and increase muscle strength. NMES may be used after a period of muscle disuse, such as after surgery, when the nerve to the muscle is intact, and is most effective if combined with exercise. NMES can be grouped into two categories (Ackerman et al., 2024):

- Stimulation of muscles while in a resting state to treat muscle atrophy
- Enhancement of functional activity in neurologically impaired individuals
- **Functional electrical stimulation (FES)** is a transcutaneous modality that involves the use of an NMES device to restore function to a paralyzed muscle(s) after neurologic injury, typically during a functional task. The terms FES and NMES are often used interchangeably in the literature. FES may be used while walking on treadmill (e.g., The Parastep I System), pedaling a stationary bicycle ergometer, or during voluntary rowing movements of the upper limbs (Cleveland Clinic, n.d.).
- The New York Heart Association (NYHA) has established a functional classification system for heart failure based on the timing of symptom onset for an individual.
 - **Class I heart failure** is characterized by symptom onset with strenuous activity.
 - **Class II heart failure** is characterized by symptom onset with an ordinary level of activity.
 - **Class III heart failure** is defined as symptom onset with minimal activity, and is further broken down into:
 - **Class IIIa**, in which an individual has no shortness of breath at rest, or
 - **Class IIIb**, in which an individual has recent onset of shortness of breath at rest.
 - **Class IV heart failure** is characterized by symptom onset at rest.
- Assisted or modified standing tolerance may include the use of a mobility device (e.g. cane or walker), harness, or other tool to support the individual while attempting to stand/

Evidence Discussion

A 2024 review (Ackermann et al.) synthesized emerging evidence on modern NMES technologies as portable and potentially wearable devices. Studies cited showed that NMES combined with voluntary contractions increased functional measures, including up to 10% greater jump height in young adults and 15–20% improved walking test times after a 9-week program in older or untrained individuals. Additional findings included that low-intensity NMES was linked to increased venous and arterial blood flow, suggesting potential thromboembolism prevention. The authors concluded that NMES had transformed from a clinical adjunct to a versatile tool suitable for home or wearable applications, capable of maintaining or improving muscle strength, metabolic control, and vascular health in individuals unable to perform conventional exercise. However, they noted limitations, including inconsistent electrode placement practices, discomfort during high-intensity stimulation, risk of muscle soreness or rare rhabdomyolysis, and variability among studies in stimulation protocols and outcome measures.

A 2025 integrative review (Kim et al.) evaluated the therapeutic effects of FES and related rehabilitation technologies in individuals with spinal cord injury by examining outcomes that reflected recovery beyond device-dependent function. Across 56

interventional studies, FES was examined in 23 studies, with an additional 2 studies combining FES and powered exoskeleton use. A total of 38 distinct clinical outcome assessments were reported, including 24 performance-based measures and 7 patient-reported outcome measures. While FES was consistently associated with improvements in functional performance during active use, most commonly used outcome measures were unable to distinguish neurologic recovery from compensatory strategies once stimulation was removed. Only three outcome measures demonstrated the ability to differentiate recovery-based improvements from compensation, highlighting a methodological limitation across the literature. The authors concluded that FES demonstrated potential therapeutic effects beyond immediate task assistance, supporting its role as an active rehabilitation intervention rather than solely a compensatory device. However, interpretation was limited by heterogeneity in study design, intervention protocols, outcome selection, and relatively small sample sizes across included studies.

Codes

The inclusion of any code in this table does not imply that the code is under management or requires prior authorization. Refer to the applicable health plan for management details. Prior authorization of a code listed in this table is not a guarantee of payment. The Certificate of Coverage or Evidence of Coverage policy outlines the terms and conditions of the member's health insurance policy.

HCPCS Code	Description
A4556	Electrodes (e.g., apnea monitor), per pair
A4557	Lead wires (e.g., apnea monitor), per pair
A4558	Conductive gel or paste, for use with electrical device (e.g., TENS, NMES), per oz.
A4560	Neuromuscular electrical stimulator (nmes), disposable, replacement only
A4595	Electrical stimulator supplies, 2 lead, per month, (e.g. TENS, NMES)
E0731	Form-fitting conductive garment for delivery of TENS or NMES (with conductive fibers separated from the patient's skin by layers of fabric)
E0745	Neuromuscular stimulator, electronic shock unit
E0762	Transcutaneous electrical joint stimulation device system, includes all accessories

HCPCS Code	Description
E0764	Functional neuromuscular stimulator, transcutaneous stimulation of muscles of ambulation with computer control, used for walking by spinal cord injured, entire system, after completion of training program
E0770	Functional electrical stimulator, transcutaneous stimulation of nerve and / or muscle groups, any type, complete system, not otherwise specified

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