MASSACHUSETTS

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Medical Policy

Functional Neuromuscular Electrical Stimulation

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Policy Number: 201

BCBSA Reference Number: 8.03.01 (For Plan internal use only)

Related Policies

- Microprocessor Controlled Prostheses for the Lower Limb, #133
- Myoelectric Prosthetic Components for the Upper Limb, #227
- Powered Exoskeleton for Ambulation in Patients with Lower-Limb Disabilities, #718

Policy

Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity

Neuromuscular stimulation is **INVESTIGATIONAL** as a technique to restore function following nerve damage or nerve injury. This includes its use in the following situations:

- To provide upper extremity function in individuals with nerve damage (eg, spinal cord injury or post-stroke), or
- To improve ambulation in individuals with foot drop caused by congenital disorders (eg, cerebral palsy) or nerve damage (eg, post-stroke, or in those with multiple sclerosis), or
- As a technique to provide ambulation in individuals with spinal cord injury.

Functional electrical stimulation devices for exercise in individuals with spinal cord injury is considered **INVESTIGATIONAL**.

Prior Authorization Information

Inpatient

- For services described in this policy, precertification/preauthorization **IS REQUIRED** for all products if the procedure is performed **inpatient**.

Outpatient

- For services described in this policy, see below for products where prior authorization **might be required** if the procedure is performed **outpatient**.

	Outpatient
Commercial Managed Care (HMO and POS)	This is **not** a covered service.
Commercial PPO and Indemnity	This is **not** a covered service.

CPT Codes / HCPCS Codes / ICD Codes

Inclusion or exclusion of a code does not constitute or imply member coverage or provider reimbursement. Please refer to the member's contract benefits in effect at the time of service to determine coverage or non-coverage as it applies to an individual member.

Providers should report all services using the most up-to-date industry-standard procedure, revenue, and diagnosis codes, including modifiers where applicable.

The following codes are included below for informational purposes only; this is not an all-inclusive list

The following HCPCS codes are considered investigational for <u>Commercial Members: Managed Care (HMO and POS), PPO, and Indemnity:</u>

HCPCS Codes

HCPCS codes:	Code Description
E0764	Functional neuromuscular stimulation, transcutaneous stimulation of sequential muscle groups 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

Description

Functional Electrical Stimulation

There are 2 broad categories of neuromuscular electrical stimulation (NMES) devices: one targets muscle atrophy during rest, and the other enhances functional activity in neurologically impaired patients. These devices use electrical impulses to activate weak or paralyzed muscles in precise sequences. The technology often referred to as functional electrical stimulation (FES) is used for both upper and lower extremity rehabilitation, with a specific focus on enhancing mobility and independence.[1,]Functional electrical stimulation is an approach to rehabilitation that applies low-level electrical current to stimulate functional movements in muscles affected by nerve damage and ocuses on the restoration of useful movements, like standing, stepping, pedaling for exercise, reaching, or grasping.

Functional electrical stimulation devices consist of an orthotic and a microprocessor-based electronic stimulator with 1 or more channels for delivery of individual pulses through surface or implanted electrodes connected to the neuromuscular system. Microprocessor programs activate the channels sequentially or in unison to stimulate peripheral nerves and trigger muscle contractions to produce functionally useful movements that allow patients to sit, stand, walk, cycle, or grasp. Functional neuromuscular stimulators are closed-loop systems that provide feedback information on muscle force and joint position, thus allowing constant modification of stimulation parameters, which are required for complex activities (eg, walking). These systems are contrasted with open-loop systems, which are used for simple tasks (eg, muscle strengthening alone); healthy individuals with intact neural control benefit the most from this technology.

Applications, described in more detail in the Rationale section, include upper-extremity grasping function after spinal cord injury (SCI) and stroke; lifting the front of the foot during ambulation in individuals with foot drop; and ambulation and exercise for patients with SCI. Functional electrical stimulation devices vary in size and design based on the treatment area and goals. These devices typically include a neuromuscular electrical stimulator unit, wires or wireless connectors, and electrodes, which may attach to the skin, be inserted under the skin, or be inputted through surgery to target specific muscles or nerves.[2,]Some devices are used primarily for rehabilitation rather than home use. This evidence review focuses on devices intended for home use.

Summary

Functional electrical stimulation (FES) involves the use of an orthotic device or exercise equipment with microprocessor-controlled electrical muscular stimulation. These devices are being developed to restore function and improve health in individuals with damaged or destroyed nerve pathways (eg, spinal cord injury [SCI], stroke, multiple sclerosis, cerebral palsy).

Summary of Evidence

For individuals who have loss of hand and upper-extremity function due to spinal cord injury (SCI) or stroke who receive functional electrical stimulation (FES), the evidence includes a few small case series and a randomized controlled trial (RCT). Relevant outcomes are functional outcomes and quality of life. Interpretation of the evidence is limited by the low number of patients studied and lack of data demonstrating the utility of FES outside the investigational setting. It is uncertain whether FES can restore some upper-extremity function or improve the quality of life. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have chronic foot drop who receive FES, the evidence includes RCTs, meta-analyses, and a longitudinal cohort study. Relevant outcomes are functional outcomes and quality of life. For chronic poststroke foot drop, 2 RCTs comparing FES with a standard ankle-foot orthosis (AFO) showed improved patient satisfaction with FES but no significant differences between groups in objective measures such as walking. Another RCT found no significant differences between use versus no use of FES on walking outcomes. Similarly, one meta-analysis found no difference between AFO and FES in walking speed, and another meta-analysis found no difference between FES and conventional treatments. The cohort study assessed patients' ability to avoid obstacles while walking on a treadmill using FES versus AFO. Although the FES group averaged a 4.7% higher rate of avoidance, the individual results between devices ranged widely. One RCT with 53 subjects examining neuromuscular stimulation for foot drop in patients with multiple sclerosis showed a reduction in falls and improved patient satisfaction compared with an exercise program but did not demonstrate a clinically significant benefit in walking speed. Another RCT showed that at 12 months, both FES and AFO had improved walking speed, but the difference in improvement between the 2 devices was not significant. Another study found FES (combined with postural correction) and neuroproprioceptive facilitation and inhibition physiotherapy did not differ in walking speed or balance immediately or 2 months after program end. A reduction in falls is an important health outcome. However, it was not a primary study outcome and should be corroborated. The literature on FES in children with cerebral palsy includes 3 systematic reviews of small studies with within-subject designs. All included studies only measure short-term results; it is unclear what the long-term effects of FES may be in this population. Further study is needed. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have SCI at segments T4 to T12 who receive FES, the evidence includes case series. Relevant outcomes are functional outcomes and quality of life. No controlled trials were identified on FES for standing and walking in patients with SCI. However, case series are considered adequate for this condition because there is no chance for unaided ambulation in this population with SCI at this level. Some studies have reported improvements in intermediate outcomes, but improvements in health outcomes (eg, ability to perform activities of daily living [ADL], quality of life) have not been demonstrated. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

For individuals who have SCI who receive FES exercise equipment, the evidence includes prospective comparisons. Relevant outcomes are symptoms, functional outcomes, and quality of life. The evidence on FES exercise equipment consists primarily of within-subject, pretreatment to posttreatment comparisons. Evidence was identified on 2 commercially available FES cycle ergometer models for the home, the RT300 series and the REGYS/ERGYS series. There is limited evidence on the RT300 series. None of the within-subject studies showed an improvement in health benefits; however, improvement in body fat with RT300 was found in a small group of patients when FES high intensity interval cycling was added to nutrition counseling compared to nutritional counseling alone. One analysis of use for 314 individuals over 20,000 activity sessions with a Restorative Therapies device showed that a majority of users used the device for 34 minutes per week. Two percent of individuals with SCI used the device for an average of 6 days per week, but caloric expenditure remained low. Compliance was shown in 1 study

to be affected by the age of participants and level of activity prior to the study. Studies on the REGYS/ERGYS series have more uniformly shown an improvement in physiologic measures of health and in sensory and motor function; however, a small comparative study found arm cycling to improve exercise energy expenditure and cardiorespiratory fitness to a greater extent than FES leg cycling. A limitation of these studies is that they all appear to have been conducted in supervised research centers. No studies were identified on long-term home use of ERGYS cycle ergometers. The feasibility and long-term health benefits of using this device in the home is uncertain. The evidence is insufficient to determine that the technology results in an improvement in the net health outcome.

Policy History

Date	Action
5/2025	Annual policy review. Description and references updated. Policy statements unchanged.
5/2024	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
5/2023	Annual policy review. Minor editorial refinements to policy statements; intent unchanged.
4/2022	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
4/2021	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
1/2021	Medicare information removed. See MP #132 Medicare Advantage Management for local coverage determination and national coverage determination reference.
7/2020	Annual policy review. Description, summary, and references updated. Policy statements unchanged.
10/2019	Annual policy review. New investigational indications described. Functional electrical stimulation devices for exercise in patients with spinal cord injury. Clarified coding information. Effective 10/1/2019.
9/2017	New references added from Annual policy review.
10/2016	Annual policy review. New references added
3/2015	Annual policy review. New references added
5/2014	Updated Coding section with ICD10 procedure and diagnosis codes, effective 10/2015.
5/2014	Annual policy review. New references added.
8/2013	Annual policy review. New investigational indications described. Effective 8/1/2013.
11/2011-4/2012	Medical policy ICD 10 remediation: Formatting, editing and coding updates. No changes to policy statements.
6/2011	Reviewed - Medical Policy Group – Orthopedics, Rehabilitation and Rheumatology. No changes to policy statement.
1/2011	Reviewed - Medical Policy Group – Neurology and Neurosurgery. No changes to policy statements.
7/2010	Reviewed - Medical Policy Group – Orthopedics, Rehabilitation and Rheumatology. No changes to policy statements.
7/1/2010	Medical Policy 201 effective 7/1/10 describing ongoing coverage and non-coverage.

Information Pertaining to All Blue Cross Blue Shield Medical Policies

Click on any of the following terms to access the relevant information:

Medical Policy Terms of Use
Managed Care Guidelines
Indemnity/PPO Guidelines
Clinical Exception Process
Medical Technology Assessment Guidelines

References

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