

Functional electrical stimulation (FES)

Fact Sheet



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We hope you find the information in this factsheet helpful. If you would like to speak with someone about any aspect of MS, contact the MS Trust information team and they will help find answers to your questions.

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1. What is functional electrical stimulation?

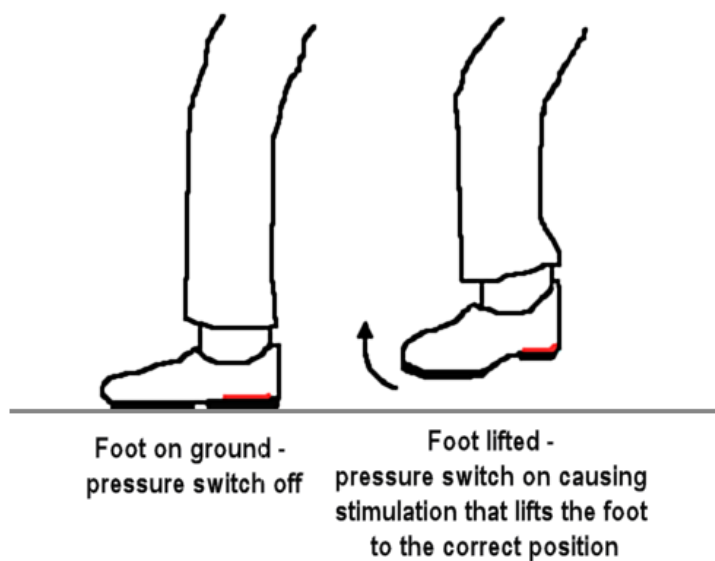
Functional electrical stimulation (FES) is a treatment that uses the application of small electrical charges to improve mobility in a number of conditions. It was first used in 1961 in people following a stroke and has been used with people with MS since 1977.

In MS, FES is particularly used as a treatment for dropped foot. Dropped foot occurs when damage to nerve pathways means someone experiences weakness or poor coordination in their leg or ankle which affects the way that they walk. The foot may drag along the ground or the toes hang down when walking, which makes the individual more vulnerable to tripping and falling. Walking also uses more energy and people may alter the way that they walk to compensate, commonly lifting their leg higher. In time, this can lead to further problems such as pain in the hips or lower back, a tightening of muscles and poor balance.

As dropped foot is caused by disruption in the nerve pathway to and from the brain, rather than in nerves within the leg muscles, FES applies small electrical impulses directly to the nerves in affected muscles. This produces basic but useful movement.

Several different FES devices are available. Each has a control box, about the size of a pack of cards, that is either worn on the leg or at the waist. Odstock Medical and Bioness both have devices that apply charges through electrodes attached to the skin. A surgically implanted version called STIMuSTEP has also been developed by Odstock Medical.

The impulse is activated by a pressure sensitive switch in the shoe, causing the foot to tilt to the correct angle when lifted. When the foot is placed on the ground again, pressure is reapplied to the switch and the stimulation ceases.



2. Who may benefit from FES?

As FES applies stimulation along the existing nerves, the nerve fibres between the spinal cord and the muscles they supply must be undamaged. In practice this means that the individual needs to be able to walk, even if only a few metres with a stick or crutch.

Electrical stimulation to correct dropped foot produces a more normal walking pattern. It can enable people to walk faster, further and with less effort. It also reduces the risk of falls and leads people to become more confident and independent in their walking.

As FES allows renewed movements in weakened muscles, it is used to complement physiotherapy exercises and to allow people to build up strength and range of movement.

Although FES can be used to make the most of a person's abilities, it does not protect the nerve pathways from further deterioration. For some people this will mean that there will come a point when FES is no longer effective.

3. Are there any risks or side effects?

Electrical stimulation causes a tingling 'pins and needles' sensation on the skin. Although most people do not find this a problem, some people with MS are quite sensitive to changes in sensory input and find the effect uncomfortable. A short period of stimulation at a low intensity usually overcomes this problem.

Even though people are carefully assessed before treatment, some find they get no benefit from FES or they find it difficult to use the stimulator effectively. Very occasionally people find that the stimulation or the electrodes cause irritation of the skin. This can usually be addressed by using hypoallergenic electrodes or changing the type of stimulation used.

4. FES research

The MS Trust has funded two research trials at Salisbury District Hospital. The first investigated the effect of FES on walking and quality of life. This found that FES is effective in improving walking, particularly in enabling greater distance to be achieved. However, exercise alone also made a significant difference to walking and it was concluded that the combination of these treatments may prove to be a more effective means of improving mobility¹.

A second study involved 64 people with secondary progressive MS assigned to either a group using FES or a group who received physiotherapy exercises. The FES group showed better results on the Canadian Occupational Performance Measure, a scale that measures how well people perform activities of daily living. During the 18 week study, the FES group also experienced fewer falls than the exercise group².

5. How do people get FES treatment?

In January 2009, NICE (National Institute for Health and Clinical Excellence) issued guidance that said "Current evidence on the safety and efficacy of functional electrical stimulation (FES) for drop foot of central neurological origin appears adequate to support the use of this procedure"³.

The use of FES is growing, with an increasing number of centres offering the treatment. An assessment by a physiotherapist trained in the use of FES is required to ensure that the treatment will be suitable for the individual. The physiotherapist will also make sure that the pads are placed properly and that the equipment is being used most effectively.

Suppliers

- Odstock Medical Limited, the NHS company that was formed by the department of Salisbury District Hospital that developed the treatment, has a map of UK centres on their website at www.odstockmedical.com

Alternatively, write to: Odstock Medical Limited, The National Clinical FES Centre, Salisbury District Hospital, Salisbury, SP2 8BJ

- Bioness are an American company who make several FES devices - http://uk.bioness.com/United_Kingdom.php / 0800 411 8100
- WalkAide is an American FES device that is available in the UK from Trulife - <http://tinyurl.com/walkaide-fes> / 0114 2618 100

6. References

1. Barrett CL, Mann GE, Taylor PN, Strike P. A randomized trial to investigate the effects of functional electrical stimulation and therapeutic exercise on walking performance for people with multiple sclerosis. *Multiple Sclerosis* 2009;15(4):493-504.
2. Esnouf JE, Taylor PN, Mann GE, Barrett CL. Impact on activities of daily living using a functional electrical stimulation device to improve dropped foot in people with multiple sclerosis, measured by the Canadian Occupational Performance Measure. *Multiple Sclerosis* 2010;16(9):1141-1147.
3. National Institute for Health and Clinical Excellence. IPG278 Functional electrical stimulation for drop foot of central neurological origin: public information. London: NICE; 2009.

Please contact the MS Trust Information Team if you would like any further information about reference sources used in the production of this publication.