Functional Electrical Stimulation
Rehabilitation after a brain injury

What is functional electrical stimulation?

Functional electrical stimulation (FES) is a treatment that helps paralyzed or partly paralyzed muscles to move again. It uses electrical current to cause a muscle to contract. Therapists use it to help improve the strength, movement, and function of a limb.

It is also known as neuromuscular electrical stimulation (NMES) or electrical muscle stimulation (EMS).

A therapist (physiotherapist or occupational therapist) should always oversee this treatment.

Anyone who has never had this treatment should check with their doctor before using it.

Can I do this treatment at home?

Your therapist feels you can do functional electrical stimulation at home for these reasons:

- You have done this treatment before with your therapist.
- You can tolerate the treatment.
- You or a support person can follow the directions for using it at home.
- You have agreed to do this treatment every day for at least the next 6 weeks.

Is this the same as transcutaneous electrical nerve stimulation (TENS)?

No, this is different. TENS uses electrical current to block pain signals to the brain. Some devices can do both: functional electrical stimulation and transcutaneous electrical nerve stimulation. These are often labelled as TES/EMS devices. If using a device that has both, make sure it has a setting for EMS only and that you use it on the correct setting.

How often do I need to do this treatment?

To work well, you need to do the treatment for 30 to 45 minutes each day for at least 6 weeks.

What do I need to do this treatment?

You will need to buy a device. If cost is a concern for you, speak to your therapist.

Look for a device that is Health Canada approved. To find approved devices, search the Medical Devices Active Licence Listing (MDALL) online. Select the **device name** search option. Then search for "muscle stimulation" or "muscle stimulator".

You also need to look at the electrodes and the frequency, pulse width, and cycling settings. See page 2 for the specifics of what to look for.

What to look for in a device

- **Electrodes**
  Devices can have either semi-permanent, self-adhesive electrodes or reusable electrodes.

  We suggest choosing semi-permanent electrodes. They are easy to use and don't need added gel. Depending on the quality you will need to replace them after a few uses or after a few months.

  Reusable electrodes need added gel each time, along with straps or tape to keep the electrode in place.

- **Frequency**
  Choose a device where you can adjust the frequency. This is the number of pulses in a second.

  Frequency is measured in units of Hertz (Hz). Choose a device that can produce from 20 to 50 Hz.

- **Pulse width** (pulse duration)
  Choose a device where you can adjust the pulse width. The pulse width is the length of time each group of pulses is set to.

  Pulse width is measured in microseconds (uS). A common setting for treatment is 300uS.

- **Cycling**
  This is how long the electricity comes on and off. Choose a device where you can adjust the cycle, such as 10 seconds on and 20 seconds off.

- **Amplitude or Intensity**
  Choose a device where you can adjust the amplitude. This refers to the strength or intensity of the current.

  Amplitude is measured in milliamperes, or milliamps (mA). Usually, we don't use more than 40mA. Higher than this can be very uncomfortable.

Want to learn more about functional electrical stimulation?

Check under "stroke interventions" at strokeengine.ca.

Look for Functional Electrical Stimulation – Upper Extremity.