FUNCTIONAL ELECTRICAL STIMULATION

Electrical stimulation involves application of electrical current to initiate contraction in muscles through surface electrodes. As a stroke therapy, Functional electrical stimulation (FES) is delivered with the aim of strengthening muscle contraction or improving voluntary motor control.

FES involves stimulation aimed at replacing or assisting a voluntary muscle contraction during an activity (e.g. reaching for and manipulating objects), with the goal of improving the performance of that activity. FES has been shown to improve activity more than no intervention and more than motor training alone (Howlett et al, 2015).

Surface electrodes can be directly applied to the skin or mounted inside an orthoses or glove.

Muscles can be stimulated cyclically, triggered by a switch or EMG triggered (i.e. by initiation of muscle activity within the muscle to be stimulated). EMG triggering attempts to make stimulated muscle contraction coincide with the patients’ own efforts.

Electrical stimulation may be used to support motor relearning, its primary intent is training, such that improved functional use of the affected limb is maintained when the system is not being used. Improved upper limb function that remains after the device has been used is called a therapeutic effect.

### National Stroke Foundation Guidelines

6.3.5 Upper limb activity

| a) People with difficulty using their upper limb(s) should be given the opportunity to undertake as much tailored practice of upper limb activity (or components of such tasks) as possible. | Grade |
| b) Electrical stimulation can be used in addition to routinely recommended upper limb activities. | C |

### IS THIS SUITABLE FOR THE CLIENT?

**TARGET IMPAIRMENT**
- Muscle weakness
- Reduced motor control
- Spasticity

**STAGE OF RECOVERY**
- Efficacy demonstrated at all stages of recovery.
- Larger effect size < 6 months.

**SEVERITY OF IMPAIRMENT**
- Mild to severe weakness or spasticity.
- Patients with some motor activity may benefit more.
WHAT RESOURCES DO I NEED?

- A stimulator and surface electrodes. Clients may need assistance to correctly apply the electrodes and connect to the stimulator.
- A manual for programming the stimulator.
- A series of planned functional tasks the client will perform whilst using the stimulator.

FUNCTIONAL ELECTRICAL STIMULATION RECEIVES AN AMBER LIGHT

The National Stroke Foundation recommends electrical stimulation in conjunction with motor retraining to improve UL impairments and function. Evidence (Howlett et al, 2015) published since the 2010 NSF Guidelines has strengthened the recommendation provided in 2010.

CONSIDERATIONS

- Patients should have intact sensation and the ability to communicate. Patients will need assistance to position the electrodes on their skin and connect the stimulator.
- Electrical stimulation is not a “stand-alone” therapy - it should be partnered with other forms of functional motor retraining to have greatest treatment effect.

ADDITIONAL RESOURCES

Salisbury Clinic - electrode positioning (insert pdf link)


REFERENCES
