FES Referral Criteria

OML | Leading FES Rehabilitation

Cause and functional deficit:

Neurological deficit due to an upper motor neurone lesion

- An upper motor neurone lesion is defined as one that occurs in the brain or spinal cord at or above the level of T12. This is normally but not exclusively associated with spasticity.

- Upper motor neurone lesion resulting in dropped foot occur in conditions such as stroke, multiple sclerosis, spinal cord injury at T12 or above, cerebral palsy, familial/hereditary spastic paraparesis, head injury and Parkinson's disease.

Nature of functional deficit:

Dropped foot defined as a deficit of dorsiflexion and/or eversion of the ankle

- While this will be frequently associated with lack of heel strike, FES can be successfully used to correct inversion at first contact to significantly improve the stability of the ankle in the stance phase, improving the safety of gait.
- A dropped foot can be unilateral or bilateral.
- In addition to drop foot, deficits in knee flexion or extension, hip extension, flexion and abduction and push off at terminal stance can be addressed. FES can be used to strengthen and/or control other muscles used in gait such as hamstrings, quadriceps, gluteal and calf muscles.

Functional ability:

- Able to passively achieve a neutral (or near neutral) angle of the ankle. A resistance due to spasticity of the calf muscles can be overcome, but fixed contracture preventing plantagrade is a contraindication.
- Able to obtain standing from sitting unaided. Use of aids such as sticks, frame or crutches is acceptable. In supervised gait re-education, less standing ability may be acceptable.
- Able to walk a minimum distance of about 5-10m. Use of aids such as ankle foot orthosis (AFO), sticks, frame or crutches is acceptable. In supervised gait re-education, less mobility may be acceptable.
- There is no maximum walking distance limit. FES devices have been successfully used in cases where a dropped foot only becomes a significant problem when the device user is tired or when the deficit is relatively mild.
- A reasonable exercise tolerance is required for treatment sessions. However, FES often reduces the effort of walking therefore poor exercise tolerance is only an exclusion criteria in extreme cases.

Motivation, understanding and independence:

- Able to understand the aims of the treatment and be motivated to comply with treatment protocols. Where appropriate, carer support can assist in using the equipment.
- Where patients live alone and do not have carer assistance, they must be able to place electrodes and operate the equipment independently. If family or carer support is present, less independence is required.

Precautions:

- Poor skin condition is a contraindication as sores or irritation prevents the use of self-adhesive electrodes.
- Poorly controlled epilepsy. Where epilepsy is controlled by drugs or there has been no fits experienced for a reasonable period (approx. 3 months), FES can be used.
- A history of significant autonomic dysreflexia in spinal cord injury above T6.
- The effect of FES on the unborn child in pregnancy is not known.
- Active medical implants such as cardiac pacemakers or other devices must be treated with caution and information sought from the device supplier about the use of electrical stimulation in their presence. An additional clinical test may be required to determine the safety of FES.
- Patients with a cancerous tumour in the area of the electrical stimulation should be excluded as increased local blood flow may increase tumour growth.
- Patients with exposed orthopaedic metal work in the area of electrical stimulation should be avoided.

While the majority of our patients fit the above criteria, patients outside these criteria can be considered. Please contact the OML team for more information.

FES Exercise to improve hand and arm function:

Stroke and cerebral palsy:
- Patients should have some functional ability, typically being able to produce a grip but may not be able to release, or reduced ability to extend the elbow.
- Main treatment aim is to increase the strength of the extensor muscles while reducing the spasticity in the flexor muscles.
- Repetition of exercises may lead to neuroplastic changes resulting in improved function.

Spinal cord injury:
- Patients should have some functional ability, typically a weak tenodesis grasp in C6 tetraplegia or general weakness in incomplete C5/6/7 tetraplegia.
- The main treatment aim is to increase the strength and therefore function of the effected muscles.

Non-functional group:
- FES can be used to relieve spasticity with the aim of loosening an over tight grip or elbow flexion.
- The main treatment aims are to reduce the pain associated with shoulder subluxation or spasticity, assist with hygiene by enabling better access to the palm, elbow or shoulder crease, and assist with 'passive' activities of living such as dressing and self-care.

Contraindications and precautions:
Cardiac pacemaker users should not use FES in the hand, arm or torso. The other precautions are the same requirements as for the lower limb applications of FES (see overleaf).

11-005-0048 v1

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