Functional Electrical Stimulation

Odstock Dropped Foot Stimulator

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FES Overview

Functional Electrical Stimulation (FES) is a clinical application of small electric currents. These currents are used to enact nerves in the body which can trigger muscle contractions in organs and extremities that are affected by paralysis. This can allow a handicapped person to stand, walk, and to even reach out for something. And can also assist with breathing, blood flow, and bladder and bowel function of a paralyzed person. FES applied near the muscle or nerve can substitute artificial electrical signals for the missing normal motor signals and as a result cause a muscle to contract in a controlled fashion.

It is important to note the FES does not work for everyone with a nerve related injury or disease. In cases that involve breaks in the nerve to muscle connection stimulation the nerve through FES will not cause a muscle to contract. These electrical signals will face the same barrier as the signals sent from the brain. Also Multiple Sclerosis sufferers may not be affected by an electrical signals due to the fact that MS causing degeneration of the natural insulation of nerves in the body.

Although similar in many ways Therapeutic Stimulation and FES are slightly different. Both treatments have similar long term effects such as improved mobility and strength. However Therapeutic Stimulation works on its own while the patient is relaxed and is used for rehabilitation from surgery. FES is incorporated into everyday activity such as walking, standing, and reaching for things. And where as therapy may only last for an hour only a few times a week, FES is designed to be used for the whole day, seven days a week.

Dropped Foot

This is a disorder caused by motor nerve damage, specifically cause by damage the Anterior Tibial Nerve. That is the nerve that controls dorsi flexion of the foot. This damage can be caused by swelling, blunt force, paralysis, ECT. As a result the foot flops forward and can not be controlled, thus inhibiting walking. FES allows for a new treatment to this disorder as apposed to a brace or surgery.

Odstock Dropped Foot Stimulator

This is a single channel device about the size of a deck of cards. It sends signals through the skin via self adhesive pads placed on the lower leg. The signals control contractions of the muscles that lift the foot, and they are timed with the patient's gate by a switch placed inside of the shoe. The patient must be trained to use this device and must make follow up appointment every 6 months.

Odstock Two Channel Stimulator

This device is very similar the single channel device however it is only prescribed in certain cases and only after a patient has had regular use of the single channel device. It is typically used for spinal cord injuries and Multiple Sclerosis sufferers. The two channels allow for the coordination of two muscle groups. These are the combinations that have been implemented:

- Bilateral dropped foot stimulation
- Dropped foot with Calf stimulation
- Dropped foot with Hamstring stimulation
- Dropped foot with Quadriceps stimulation
- Dropped foot with Gluteal stimulation
- Bilateral Quadriceps stimulation

These combinations allow for movements like the initiation of the swing-phase by contracting the hamstrings, or improve hip protraction in the stance-phase of walking by stimulating the gluteal muscles.

Sources

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