EMG-triggered neuromuscular electrical stimulation combined with motor point block to improve on hand function in hemiplegic patients with severe spasticity

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This study investigated the effects of EMG-triggered neuromuscular electrical stimulation (NMES) combined with motor point block to improve on hand function in patients with chronic hemiplegic patients with severe spasticity in hand. The subjects were five who had hemiplegic hand with more than MAS scale III spasticity. EMG-triggered NMES was applied to wrist and finger extensor for 1 hour a day, 5 days a week, for 4 weeks after motor point blocks at the spastic finger and wrist flexor muscles. The muscle activities of the extensor carpi radialis longus and extensor digitorum communis, active range of motion of wrist and finger extension, Modified Ashworth Scale, and Fugl-Meyer assessment showed significant immediate improvement. EMG-triggered NMES combined with motor point block improved on hand function in hemiplegic patients with severe spasticity.

Mapping method using a super multi-electrical stimulation device

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There are many kinds of functional electrical stimulation (FES) devices that use surface electrical stimulation (SES). However, most of the devices are unable to reproduce task-oriented motion such as pinching or flexing of individual fingers. We have reported reproduction of such motions by means of SES based on the mapping method which specifies the distribution of the target muscles from the skin surface. The mapping method has some problems such as lack of objective estimation and long processing time. To solve these problems, we developed a new FES system which includes an auto-mapping function using acceleration sensors. We have developed a prototype system and have been able to reproduce some motions using a stimulation device which has 192 stimulation channels.

Polymyography during hemiplegic walking: Implications for control of FES

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We present a method for determining the output for training of artificial neural networks (ANN) for control of hemiplegic walking. Polymyographic analysis serves as a tool for assessing muscle activation patterns of the nonparetic and the paretic leg of hemiplegic subject. We show a substantial difference between the muscle activities of the nonparetic leg and healthy pattern while walking. Based on this, we suggest the use of the nonparetic leg muscle patterns as the target during the training of the ANN. We also show that it is of importance to consider the type of assistance used during the training by comparing the walking with the cane and postural support called Walkaround.

Active Books: A practical way to increase the number of stimulation channels for FES after SCI?

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Progress in FES after spinal cord injury using motor neuron stimulation requires an implant that allows more stimulation channels but will be acceptable to informed volunteers. Stimulation of nerve roots/lets allows more channels, probably with good reliability; much relevant useful clinical information is available from past usage of sacral anterior root stimulators. This paper outlines the main technical challenges presented by rootlet stimulation.

The limits of hermeticity test methods for micro-packages

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Specifications for an updated implantable stimulator designed to allow voluntary bladder and bowel voiding, restoration of some sexual functions, as well as stationary exercise for legs and cyclic exercise is presented in this paper. The study is aimed at developing a micropackage with improved hermeticity. The application of a new package using an updated design promises to achieve in vivo testing.