

Krukowska et al, 2014 Abstract

Surface EMG And Restoration Of Hand Function In CS Patients

Objective

The study investigated the use of **surface electrostimulation (sEMG)** controlled by muscle contraction on the bioelectric muscle activity and restoration of the hand function in cerebral stroke (CS) patients.

Results

The study concluded that **electrical stimulation (ETS)** controlled/triggered by muscle contractions is an effective method of normalisation of muscle tension in the forearm and hand as well as restoration of the hand function in patients with cerebral stroke.

It found that **ETS** controlled by muscle contractions was of benefit in treating patients with paresis caused by damage of the cerebrum or the spinal cord. It is also the most effective method of “rebuilding” the damaged neural network which is responsible for controlling movements.

Participants and Researchers

The study was conducted on 54 patients aged 28–72 with hemiparesis (26 patients with left-sided hemiparesis and 28 patients with right-sided hemiparesis) who had suffered from cerebral stroke.

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Methods

The participants were divided into two groups. Those in Group 1 were applied bipolar stimulation of forearm muscles (flexors and extensors of the wrist joint and hand) with the use of two flat electrodes. Those in Group 2 used an electrode-glove. The **NeuroTrac ETS** device (Verity Medical) was used for the purpose of the therapy and the study. The excitation threshold was determined once a week with the use of **electromyography (EMG)**.

With the application of **sEMG** and **EMG** biofeedback (biological feedback) the patient can observe the bioelectric activity of the muscle and he/she is able to tense it in

such a way that he/she can exceed the excitation threshold (in paresis) or relieve the muscle tension below the threshold (in spasticity) and regular activity can be restored at any time. The type of applied stimulation electrodes has an influence on successful restoring the bioelectric activity of forearm and hand muscles. The phenomenon of neuronal plasticity is involved in this restoration.

The full abstract can be found at <https://pubmed.ncbi.nlm.nih.gov/25227541/>.