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Electrostimulation for Promoting Recovery of Movement or Functional Ability After Stroke : Systematic Review and Meta-Analysis

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Electrostimulation for Promoting Recovery of Movement or Functional Ability After Stroke Systematic Review and Meta-Analysis

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Alison Baily-Hallam, BSc; Peter Langhorne, PhD

The aim of this review was to determine whether electrostimulation to provide neuromuscular retraining improved motor ability and the ability to undertake activities of daily living. This review did not investigate the use of electrostimulation as a neuroprosthesis/orthosis.¹

Search Strategy

We searched the Cochrane Stroke Group Trials Register, the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library Issue 1, 2004*), MEDLINE (1996 to January 2004), EMBASE (1980 to January 2004), CINAHL (1982 to January 2004), AMED—Allied and Complementary Medicine Database (1985 to January 2004), Physiotherapy Evidence Database (PEDro), REHABDATA, and the ISI Science Citation Index (1981 to 2003). We placed a request on the PHYSIO e-mail discussion list and contacted authors of relevant studies to elicit any unpublished or ongoing studies, searched the reference lists of included trials, and contacted trialists.

Selection Criteria

We included controlled trials with adult participants randomly or quasi-randomly assigned to treatment groups, one of which was a form of electrostimulation delivered to the peripheral neuromuscular system to improve voluntary movement control, functional motor ability, and/or activities of daily living.

Main Results

Of the 2077 references identified, 24 trials were included (888 participants). Mean age of participants ranged from 52 to 77 years. Mean time after stroke ranged from 9 days to 4 years.

Electrostimulation Compared With No Treatment (15 Trials)

Statistically significant differences were found in favor of electrostimulation for the Box and Blocks Test (functional motor ability) and motor reaction time (Figure), isometric torque (Figure), and active joint range of movement (motor impairment). In addition, there was a significant difference in favor of no treatment for the upper extremity drawing test (functional motor ability).

Electrostimulation Compared With Placebo (5 Trials)

Statistically significant differences were found in favor of electrostimulation for the Jebsen Hand Function Test (functional motor ability) and for cocontraction ratio of agonist and antagonist muscles (motor impairment). In addition, there was a significant difference in favor of no treatment for the Timed Up and Go Test (functional motor ability).

Electrostimulation Compared With Conventional Physical Therapy (4 Trials)

Statistically significant differences were found in favor of electrostimulation for the Fugl-Meyer Assessment (motor impairment).

Interpretation

These results need to be interpreted with reference to the following:

1. The majority of analyses only contained 1 trial (eg, Figure).
2. Variation was found between included trials in time after stroke, level of functional deficit, and dose of electrostimulation.

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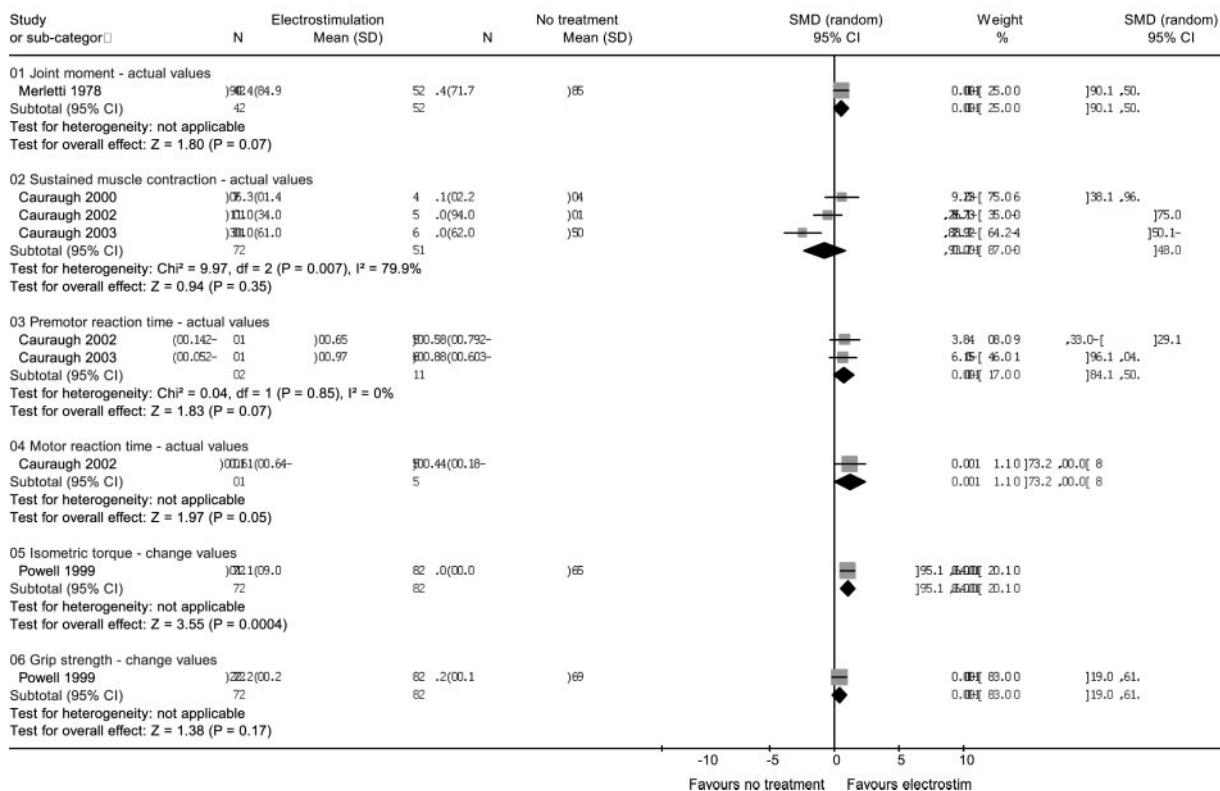
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Review: Electrostimulation for promoting recovery of movement or functional ability after stroke (Final version)
 Comparison: 01 Electrostimulation versus no treatment
 Outcome: 02 Motor impairment - muscle function



Example of data analysis.

- The possibility of selection and detection bias existed in the majority of included trials.

Implications for Clinical Practice

Whether or not electrostimulation should be used for neuromuscular retraining after stroke cannot be answered with the data available at present. Although data suggest some benefits, most of these occurred when electrostimulation was compared with no treatment. Intensity of treatment might therefore have influenced the findings.

Implications for Research

This review identified 16 different types of electrostimulation and an apparent lack of an experimental basis for the dose of

electrostimulation investigated in included trials. Trials are needed that investigate well-defined types of electrostimulation that have biological plausibility and are delivered in doses shown in phase I studies to be efficacious in enhancing the recovery of motor impairment, functional motor ability, and/or activities of daily living.

Reference

- Pomeroy VM, King L, Pollock A, Baily-Hallam A, Langhorne P. Electrostimulation for promoting recovery of movement or functional ability after stroke (Cochrane review). *Cochrane Database Syst Rev.* 2006;(2): CD003241.pub2. DOI:10.1002/14651858.CD003241.pub2.

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