

Electrical Stimulation on Rat Sciatic Nerve Regeneration

Date and Time: Tuesday, Sep 27, 11:12 AM to 11:20 AM

Location: Room 304A

Category: Otology/Neurotology

Authors

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Abstract

Problem Addressed: The present investigation proposed an examination of peripheral nerve recovery following transection and surgical reanastomosis with and without the application of electrical stimulation. The experimental hypothesis predicted improved recovery after nerve transection and repair followed by electrical stimulation.

Methods and Measures: Thirty-two Sprague Dawley male rats underwent an operation that exposed a 1 cm segment of their sciatic nerve. One group (n=12) served as the control, a second group (n=11) underwent sciatic nerve transection followed by immediate suture repair, and a third group (n=9) underwent sciatic nerve transection followed by immediate suture repair and electrode implantation. This third group then was electrically stimulated with suprathreshold pulses in a continuous train at 20 Hz for a duration of 1 hour a day for 8 weeks. Functional recovery of the rat sciatic nerve after complete transection and repair was evaluated using the Sciatic Functional Index (SFI), a well established quantitative measure of gait, and electromyography (EMG) at 0 (baseline), 2, 4, 6, and 8 weeks.

Results: The control group showed no change in their SFI or EMG following the sham surgery when compared to baseline measures. The rats in the second group all had abnormal SFI and no recordable EMG after surgery during the 8 week period. Five of the rats in the third group (56%) had significantly improved SFI and six (67%) had recordable EMG at the end of the 8 week period.

Conclusions: Electrical stimulation of the rat sciatic nerve immediately following transection and repair shortens and/or improves functional recovery.

Clinical Significance of Study: This study can serve as a model for facial nerve injury and its results can be applied to the development and application of implantable devices that deliver electrical stimulation to peripheral nerves following injury.

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