

Repair of peripheral nerve transections with fibrin sealant containing neurotrophic factors.

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Abstract:

Peripheral nerve injury is often followed by incomplete recovery of function and sometimes associated with neuropathic pain. There is, therefore, need for therapies which improve the speed of recovery and the final functional outcome after peripheral nerve injuries. In addition, neuropathic pain is not easily dealt with clinically and should preferably be eliminated. Neurotrophic factors have well-documented abilities to support neuron survival and stimulate neurite outgrowth, making them excellent candidates for use in repairing injured nerves. We investigated the possible beneficial effects of repairing the transected rat sciatic nerve by local application of a fibrin sealant containing nerve growth factor (NGF), glial cell line-derived neurotrophic factor (GDNF), or acidic fibroblast growth factor (aFGF). Fibrin sealant was used in conjunction with sutures. Evaluation of motor and sensory function, autotomy, and histological parameters was carried out from 1 to 12 weeks after injury. We demonstrate that NGF cotreatment decreased the occurrence of autotomy, suggesting a reduction of neuropathic pain, and improved the performance in motor and sensory tests. In addition, the number of regenerating motoneurons was significantly increased after NGF administration. GDNF increased the speed of sensory recovery, but also markedly increased autotomy, indicating an increased degree of neuropathic pain. aFGF did not alter the outcome of the motor or sensory tests. Fibrin sealant could easily be used in conjunction with sutures to deliver neurotrophic substances locally to the damaged nerve and to enhance recovery of nerve function. © 2003 Elsevier Science (USA). All rights reserved.