

Functional recovery after the repair of transected cervical roots in the chronic stage of injury.

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Abstract:

The treatment of root injury is typically performed at the more chronic stages post injury, by which time a substantial number of neurons have died. Therefore, before being applied in the clinical setting, a treatment strategy for these lesions should prove to be as effective in the chronic stages of injury as it is in the acute stage. In this study, we simulated the most severe clinical scenarios to establish an optimal time window for repair at a chronic stage. The sixth to eighth cervical roots on the left side of female SD rats were cut at their junction with the spinal cord. One or three weeks later, the wound was reopened and these roots were repaired with intercostal nerve grafts, with subsequent application of aFGF and fibrin glue. In the control group, the wound was closed after re-exploration without further repair procedures. Sensory and motor functions were measured after the surgery. Spinal cord morphology, neuron survival, and nerve fiber regeneration were traced by CTB-HRP. Results showed that both the sensory and motor functions had significant recovery in the 1-week repair group, but not in the 3-week repair group. By CTB-HRP tracing, we found that the architecture of the spinal cords was relatively preserved in the 1-week repair group, while those of the control group showed significant atrophic change. There were regenerating nerve fibers in the dorsal horn and more motor neuron survival in the 1-week repair group compared to that of the 3-week group. It was concluded that treating transected cervical roots at a chronic stage with microsurgical nerve grafting and application of aFGF and fibrin glue can lead to significant functional recovery, as long as the repair is done before too many neurons die. © Mary Ann Liebert, Inc.