
Abstract
OBJECT: Extradural and intraneural scar formation after peripheral nerve injury frequently causes tethering and compression of the nerve as well as inhibition of axonal regeneration. Regenerating agents (RGTAs) mimic stabilizing and protective properties of sulphated glycosaminoglycan toward heparin-binding growth factors. The aim of this study was to assess the effect of an RGTA known as OTR4120 on extraneural fibrosis and axonal regeneration after crush injury in a rat sciatic nerve model.

METHODS: Thirty-two female Wistar rats underwent a standardized crush injury of the sciatic nerve. The animals were randomly allocated to RGTA treatment or sham treatment in a blinded design. To score neural adhesions, the force required to break the adhesions between the nerve and its surrounding tissue was measured 6 weeks after nerve crush injury. To assess axonal regeneration, magnetoneurographic measurements were performed after 5 weeks. Static footprint analysis was performed preoperatively and at Days 1, 7, 14, 17, 21, 24, 28, 35, and 42 postoperatively.

RESULTS: The magnetoneurographic data show no significant difference in conduction capacity between the RGTA and the control group. In addition, results of the static footprint analysis demonstrate no improved or accelerated recovery pattern. However, the mean pullout force of the RGTA group (67 +/- 9 g [mean +/- standard error of the mean]) was significantly (p < 0.001) lower than that of the control group (207 +/- 14 g [mean +/- standard error of the mean]).

CONCLUSIONS: The RGTAs strongly reduce nerve adherence to surrounding tissue after nerve crush injury.