
Abstract
OBJECT: Adhesion formation is a serious problem in peripheral nerve surgery, frequently causing dysfunction and pain. The authors aimed to develop an objective biomechanical method of quantifying nerve adhesions and to use this technique for the evaluation of the efficacy of an autocrosslinked hyaluronic acid (HA) gel as an antiadhesion therapy.

METHODS: Thirty-three female Wistar rats underwent dissection, crush injury, or transection plus repair of the sciatic nerve. The nerves were or were not treated with the HA gel. Six weeks after surgery, the adhesions formed were assessed by measuring the peak force required to break the adhesions over a standardized area. Results of biomechanical measurements demonstrated that the peak force significantly increased as the severity of the injury increased. After using the HA gel to treat the nerve, the peak force was significantly reduced in rats with any of the three types of injuries; peak force decreased by 26% in the animals in the dissection group, 29% in the crush injury group, and 38% in the transection and repair group, compared with the untreated animals.

CONCLUSIONS: The biomechanical method described is an objective, quantitative technique for the assessment of nerve adherence to surrounding tissue. It will be a valuable tool in future studies on antiadhesion therapies. Furthermore, HA gel significantly reduces nerve adhesions after different types of nerve injuries.