Sciatic Nerve Repair by Microgrooved Nerve Conduits
Made of Chitosan-Gold Nanocomposites

Abstract

Peripheral nerve injury affects up to 2.8% of trauma patients. The gold standard for repairing peripheral nerve injury gaps is the nerve autograft 1. However, if the nerve injury gap is too long to repair, an artificial nerve conduit is needed. The nerve conduit can provide the structural support and facilitate tissue repair. The conduits with microgrooved inner lumen and seeded with aligned Schwann cells were known to accelerate the peripheral nerve repair 2. In this study, microgrooved films made of chitosan-gold nanocomposite were found to align cells better than the microgrooved pristine chitosan. The microgrooved conduits made by the chitosan-gold nanocomposite films seeded with mouse neural stem cells were implanted into the 10 mm rat sciatic nerve defects. After 6 weeks, the repair in the nanocomposite microgrooved conduits was superior to that in the chitosan microgrooved conduits or the conduits without neural stem cells. Myelination was found inside the nanocomposite microgrooved conduits by histological examination.

References