

A long-term posttraumatic study in the rat median nerve crush injury model

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The possibility that posttraumatic regeneration may eventually lead rat peripheral nerve fibers back to normal is still under debate. While it has been shown that, after a sufficiently long posttraumatic time, the number of regenerated rat peripheral nerve fibers can return to normal levels and the animal can regain normal pre-lesion function, no information regarding long-term changes in size parameters of regenerated nerve fibers is still available. To fill this gap, 24-week posttraumatic changes in myelinated axon and nerve fiber diameter, myelin thickness and g-ratio (axon diameter/fiber diameter), distal to a nerve crush (axonotmesis lesion) of the rat median nerve were assessed by stereology. Results showed that, while as expected fiber number returned to normal values at week-24, both axon and fiber diameter and myelin thickness were still significantly lower at week-24 in comparison to pre-lesion values. Finally, g-ratio, which persisted unmodified along the regeneration process, eventually resulted to be significantly reduced at week-24 in comparison to pre-lesion value. Based on these results, the hypothesis that regenerated rat peripheral nerve fibers are able to spontaneously return to normal, provided that a sufficiently long time recovery post-axonotmesis is allowed, is rejected.

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