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Effect of Ga-as laser on the regeneration of injured sciatic nerves in the rat.

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Laser irradiation is one of the therapeutic methods for the recovery of degenerated peripheral nerves. The aim of the present study was to determine if low-power laser treatment stimulates the regeneration process of damaged nerves. A standardized crush to the sciatic nerve was applied to cause extensive axonal degeneration. After this procedure, low-power infrared laser irradiation was administered transcutaneously to the injured sciatic nerve, 3 minutes daily to each of four treatment groups for 1, 3, 5 and 7 weeks, respectively. A nerve conduction study was done, and a morphological assessment was performed using both light and electron microscopy. With trauma of the nerve, both amplitude of compound motor action potential and nerve conduction velocity decreased significantly compared to the pre-trauma state. Morphologically, the numbers of myelinated axons and degenerated axons were decreased and increased, respectively, compared with the control. Typical aspects were of onion skin-type lamellation, fragmentation, edematous swelling and rarefaction in the myelin sheath. All these parameters recovered almost to the level of the pre-trauma state with laser irradiation, in direct proportion to the time spent for treatment. These results suggest that low-power infrared laser irradiation can relieve the mechanical damage of sciatic nerves and stimulate the regeneration of peripheral nerves.