

The role of Laser Phototherapy in nerve tissue regeneration and repair: Research development with perspective for clinical application □SHIMON ROCHKIND

Laser phototherapy induces nerve cell activation, affects nerve cell metabolism and induces nerve processes sprouting. Our previous studies investigating the effects of low power laser irradiation 632.8 and 780nm on injured peripheral nerves of rats have found protective immediate effects which increase the functional activity of the injured peripheral nerve, maintain functional activity of the injured nerve over time, decrease or prevent scar tissue formation at the injured site, prevent or decrease degeneration in corresponding motor neurons of the spinal cord and significantly increase axonal growth and myelination. Moreover, direct laser irradiation of the spinal cord improves recovery of the corresponding injured peripheral nerve. A clinical double-blind, placebo-controlled randomized study was performed to measure the effectiveness of laser phototherapy on patients who had been suffering from incomplete peripheral nerve and brachial plexus injuries for 6 months up to several years. This study shows that in long-term peripheral nerve injured patients low power laser irradiation can progressively improve peripheral nerve function, which leads to significant functional recovery. Recently, biodegradable composite transplant based on cell tissue-engineering technology was used for the treatment of complete peripheral nerve and spinal cord injury in rats. The laser phototherapy was applied as a supportive factor for accelerating and enhancing axonal growth and regeneration after reconstructive peripheral nerve and spinal cord procedures. The significance of this innovative methodology will be the provision of new nerve tissue-engineering modality and laser technology for treatment of complete peripheral nerve and spinal cord injury.