

Low Level Laser Therapy effects on posttraumatic peripheral nerve recovery

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The sought for effective rehabilitation strategies to enhance posttraumatic nerve regeneration is a major challenge of today rehabilitation medicine. Since low-level-laser-therapy (LLLT) has been proposed as a potential physiotherapeutic approach for promoting posttraumatic nerve recovery, we have carried out an in-depth critical analysis of the published papers reporting the results of experimental studies on LLLT effects on nerve regeneration. Results showed that, although relevant differences were found with respect to the experimental protocols adopted, 90% of studies published so far reported the occurrence of a positive effect of LLLT on nerve recovery. In addition, we have investigated the effects of post-operative LLLT on median nerves repaired by means end-to-side neuroorrhaphy in the rat experimental model. Operated animals were divided into four groups: one un-treated control group and three experimental groups that received LLLT 3 times a week, for 3 weeks, starting from day-1 post-operative. Three types of LLLT were used: continuous (808 nm), pulsate (905 nm) and the combination of the two. While no sign of motor function and muscle trophism recovery was detectable in un-treated animals, in laser-treated animals, motor function recovery at the time of nerve withdrawal was $8.8 \pm 8\%$ in the pulsate-group, $35.3 \pm 22\%$ in the continuous-group and $61.6 \pm 20\%$ in the pulsate-continuous-combined-group. Muscle trophism recovery was $71.4 \pm 15\%$ in the pulsate-group, $80.1 \pm 30\%$ in the continuous-group and $100 \pm 10\%$ in the pulsate-continuous-combined-group. Finally, morphological analysis of repaired nerves showed that LLLT accelerates the regeneration process of nerve fibers. Altogether these results, considering also the few known side effects related to the use LLLT, allow suggesting that the time for clinical trials has come.