

# Research

It is concluded that both laser and LED light **are capable of stimulating angiogenesis [blood vessel growth]**. *Lasers Med Sci. 2013*

These findings implicate microvascular damage as the basis for toxic neuropathy and suggest that angiogenic growth factors **[blood vessel growth] may constitute a novel treatment for this disorder.** *Journal of Molecular Therapy 2007*

Our study suggests that LEDs [Laser/Light Therapy] are **advantageous to nerve regeneration.** *Journal of Orthopedic Science 2010*

LEDs [Laser/Light Therapy] are light sources releasing energy in the form of photons. They release long wavelengths of light **that stimulate cells to aid in healing.** *Nasa.gov 2011*

In conclusion, the present study investigated the use of [Laser/Light Therapy] to stimulate growth of nerve segments in GGT nerve conduits and demonstrated that this biostimulus **greatly improved peripheral nerve regeneration.** *Evidence Based Complimentary Alternative Medicine 2013*

[Laser/Light Therapy] caused potent dilation in the laser-irradiated blood vessel, which **led to marked increases in the arteriolar blood flow.** *Lasers in Surgery and Medicine. 2000*

The results of this study suggest that infrared light energy [Laser-Light Therapy] may be an **effective intervention to decrease pain, improve function, and increase sensation** in an individual suffering from peripheral neuropathy. *European Journal of Academic Essays 2014.*

Treatment with MIRE [Laser-Light Therapy] was associated with **improved foot sensation.** The extent of this improvement was substantial. Even in patients with advanced loss of protective sensation. *Journal of the American Podiatric Medical Association, 2005.*

After treatment, **[foot sensitivity] showed improvement of 66%.** After MIRE [Laser-Light Therapy] treatment, **the pain level was reduced by 67%.** *J of Diabetes Care & Complications 2006*

Overall, reversal of peripheral neuropathy in a clinician's office and subsequent use of MIRE [Laser-Light Therapy] at home was associated with a **78% reduction in falls, a 79% decrease in balance-related fear of falling.** *Age and Aging, 2006.*

This research suggests that application of NIR light [Laser-Light Therapy] to the lower extremities of those suffering from **restless leg syndrome may improve the symptoms** associated with the condition. *International Journal of Physiotherapy, 2014.*

The results suggest that foot vibration serves to **significantly enhance peripheral and systemic blood flow, peripheral lymphatic flow, and venous drainage.**

*The American Journal of Physiology - Regulatory, Integrative and Comparative Physiology 2005*

The results of this study suggest that in an outpatient setting MIRE [Laser-Light Therapy] consistently has the effect of **improving neural function** in patients with diabetes. *Journal of the American Podiatric Medical Association 2002.*

Acute vibration can induce **significant changes in the blood flow** and skin temperature. *Occupational and Environmental Medicine* 1995

In the electrotherapy group, **symptomatic improvement was seen in (83%) cases**, 3 of which were completely asymptomatic. *Diabetes Care* 1997

Electrical Stimulation should be considered in the treatment of painful diabetic neuropathy. *Neurology* 2010

Electrical therapy was associated with **significant subjective improvement in overall neuropathic symptoms** in 12 weeks follow-up. *Diabetes Research and Clinical Practice* 2010

Evaluation of the efficacy of pulsed electromagnetic field in the management of patients with diabetic polyneuropathy. [Int J Diabetes Dev Ctries.](#) 2009

- Low-frequency PEMF can be used as an adjunct in **reducing neuropathic pain as well as for retarding the progression of neuropathy in a short span of time.**

The use of pulsed electromagnetic fields in treatment of patients with diabetic polyneuropathy. *Neurosci Behav Physiol.* 2003

- Application of PEMF-CM facilitated regression of the main clinical symptoms of DPN, **improved the conductive function of peripheral nerves**, improved the state of Ia afferents, and improved the reflex excitability of functionally diverse motoneurons in the spinal cord. PEMF-CM at 10 Hz was found to have **therapeutic efficacy, especially in the initial stages of Diabetic Peripheral Neuropathy** and in patients with diabetes mellitus for up to 10 years.

Neuropathy Patient Satisfaction High with Infrared LED Care. *Proceedings of The 10th Annual Conference of the North American Association for Laser Therapy.* 2010

- 77 patients were surveyed during a course of multi modal care that included IR therapy
- **90.1% of patients were satisfied with their care.**

Effects of Near-Infrared Low-Level Laser Irradiation on Microcirculation. *Lasers in Surgery and Medicine.* 2000.

- In conclusion, we have shown that laser irradiation [Laser-Light Therapy] at a specific wavelength is a potent dilator of the arteriole and consequently causes a **marked increase in blood flow** in the rat microvascular bed. Nitric oxide seems partly involved in the vasodilation that occurs in the early phase.

Therapeutic angiogenesis inhibits or rescues chemotherapy-induced peripheral neuropathy: taxol- and thalidomide-induced injury of vasa nervorum is ameliorated by VEGF. *Mol Ther.* 2007

- These findings implicate microvascular damage as the basis for toxic neuropathy and suggest that angiogenic growth factors[blood vessel growth] may constitute a novel treatment for this disorder.

Enhancement of Nitric Oxide Release From Nitrosyl Hemoglobin and Nitrosyl Myoglobin by Red/Near Infrared Radiation: Potential Role in Cardio Protection. *Lohr NL et al.*

- The use of far red and near infrared light [Laser-Light Therapy] can reduce infarct size, protect neurons from methanol toxicity and stimulate angiogenesis [grow new blood vessels]

- These data suggest that this light source facilitates the release of nitric oxide from nitrosyl heme proteins.
- In combination these data suggest that the ability of R/NIR light to liberate nitric NO from tissue stores contributes to cardioprotection and that nitrite, by potentially increasing the size of these NO stores.

Photobiomodulation [Laser-Light Therapy] directly benefits primary neurons functionally inactivated by toxins: role of cytochrome oxidase. *J Biol Chem* 2005

- Evidence has indicated that near-Infrared light treatment can prevent cell death (apoptosis) in cultured neuronal cells.
- Recent reports have ascribed the ability of specific wavelengths of light to promote cellular proliferation to the activation of mitochondria, the energy-producing organelles within the cell.
- Near-IR treatment can also augment mitochondrial function and stimulate antioxidant protective pathways in specific neurons that offer protection against neuronal degeneration.

Light-emitting diode treatment reverse the effect of TTX on cytochrome oxidase in neurons.

*Neurochemistry* 2001

- **Light treatment with a LED array at 670 nm (LED) is therapeutic in stimulating cellular events involving increases in cytochrome oxidase activity[Cell Repair].**  
The prolonged effect of a brief LED treatment implies that it induces a cascade of events leading to the stimulation of gene expression, protein synthesis, and oxidative metabolism.

Effect of NASA light-emitting diode irradiation on molecular changes for wound healing in diabetic mice.

*Journal of Clinical Laser Medicine and Surgery* 2003

- **The use of NASA light-emitting diodes (LED) for light therapy will greatly enhance the natural wound healing process, and more quickly return the patient to a preinjury/ illness level of activity.**
- In our study, type 2 diabetic mice with excisional skin wounds were treated with LEDs at individual wavelengths of 680 nm, 730 nm, and 880 nm at 4 J/cm<sup>2</sup> and 50 mW/cm<sup>2</sup>. LED treatment produced increased healing rates, compared to surgical controls.

Effect of NASA LED irradiation on wound healing. *Journal of Clinical Laser Medicine and Surgery* 2001

- LED produced in vitro increases of cell growth of 140–200% in mouse-derived fibroblasts, rat-derived osteoblasts, and rat-derived skeletal muscle cells, and increases in growth of 155–171% of normal human epithelial cells.

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