Influence of low-intensity laser therapy on spatial perception threshold and electroneurographic finding in patients with diabetic polyneuropathy

Authors: Perić Z

Source: Srp Arh Celok Lek, May 2007

Abstract

Low-intensity laser therapy (LILT) can be applied in cases when patients with diabetic polyneuropathy (DPN) suffer from chronic severe neuropathic pain. We wanted to analyse influence of LILT on spatial perception threshold (SPT) and electroneurographic (ENG) parameters in patients with painful DPN. METHOD: We analysed 45 patients (25 males), average age 54.3 years (54.3 +/- 10.9), with clinical and ENG signs of painful DPN. The patients were divided into two groups: A and B. Group A consisted of 30 patients with DPN who had 30 LILT treatments over the period of 12 weeks and group B consisted of 15 patients with DPN who received only vitamin therapy per os within the same period. Prior to and after 12 weeks of treatment, the following ENG parameters were determined using surface electrodes: motor (MCV) and sensory conduction velocities (SCV) values (in m/s) of nervus (n.) peroneus (NP), n. tibialis (NT) and n. medianus (NM) and their motor distal latency (MDL) values (in ms). SPT value (score as number from 1 to 8) was determined with Tactile Circumferential Discriminator on dorsal part of foot's big toe skin. For statistical analysis, we used Student's t-test and Pearson correlation (sig. 2 tailed) study. RESULTS; We registered statistically significant difference between SPT ($p < 0.01$) values prior to (5.25 +/- 1.11) and after (4.87 +/- 0.90) LILT, as well as NMMCV ($p < 0.05$) values prior to (47.18 +/- 5.08) and after (49.12 +/- 3.72) LILT. Besides, we registered, only after LILT, statistically significant correlation between SPT and NMDML ($p < 0.01$) values and also between SPT and NMSCV ($p < 0.05$) values. The differences and correlations between other analysed parameters before and after treatments were not significant ($p > 0.05$).

Conclusion

In this study we registered significant decrease of SPT and increase of NMMCV after LILT and that indicated a favourable effect of this treatment in analysed patients with painful DPN. In our opinion these results need further investigation.

Laser therapy and electric stimulation in rehabilitation treatment of peripheral neuropathy

Authors: Miriutova NF, Abdulkina NG, Luksha LV, Levitskiĭ EF

Source: Vopr Kurortol Fizioter Lech Fiz Kult, Jul 2002

Abstract

3 patients with compression-ischemic myeloradiculopathy received treatment including infrared laser radiation on the paravertebral fields, motor points of the affected nerves and biologically active points Y63, Y67, YB34, YB42, YB43, E34, E42 (1.0-5.0 mW/cm2; 5 and 5000 Hz), electrostimulation of motor nerve points and innervated by them muscles by double square impulses with a fixed gap 5 ms

Conclusion

Impulse infrared laser therapy relieves pain syndrome, stimulates repair processes in the affected nerve structures. Further modified electric stimulation activates a regenerative growth of the nerve fibers, reinnervation

Low-intensity laser therapy for painful symptoms of diabetic sensorimotor polyneuropathy: a controlled trial

Authors: Zinman LH, Ngo M, Ng ET, Nwe KT, Gogov S, Bril V.

Source: Diabetes Care, Toronto General Hospital, April 2004

Abstract

Low-intensity laser therapy (LILT) has been advocated for treatment of chronic pain disorders. Although the mechanism of pain relief is uncertain, this therapy has been suggested for relief of painful symptoms of diabetic sensorimotor polyneuropathy (DSP). The objective of this study was to determine whether LILT relieves the pain of DSP.

We conducted a randomized, double-masked, sham therapy-controlled clinical trial in 50 patients with painful DSP diagnosed with the Toronto Clinical Neuropathy Score. All patients received sham therapy over a 2-week baseline period and were then randomized to receive biweekly sessions of either sham or LILT for 4 weeks. The primary efficacy parameter was the difference in the weekly mean pain scores on a visual analog scale (VAS). RESULTS: The patients had similar baseline characteristics for pain intensity, HbA(1c), and duration of DSP. Both groups noted a decrease in weekly mean pain scores during sham treatment. After the 4-week intervention, the LILT group had an additional reduction in weekly mean pain scores of -1.0 +/- 0.4 compared with -0.0 +/- 0.4 for the sham group (P = 0.07). LILT had no effect on the Toronto Clinical Neuropathy Score, nerve conduction studies, sympathetic skin response, or quantitative sensory testing.

Conclusion

Although an encouraging trend was observed with LILT, the study results do not provide sufficient evidence to recommend this treatment for painful symptoms of DSP.

Diabetic distal symmetric polyneuropathy: effect of low-intensity laser therapy

Authors: Khamseh ME, Kazemikho N, Aghili R, Forough B, Lajevardi M, Hashem Dabaghian F, Goushegir A, Malek M.

Source: Lasers Med Sci, November 2011
Endocrine Research Center (Firouzgar), Institute of Endocrinology and Metabolism (Hemmat Campus), Tehran University of Medical Sciences, Tehran, Iran

Abstract

Low-intensity laser therapy (LILT) has been considered as a treatment modality in diabetic distal symmetric polyneuropathy (DSP). The aim of this study is to determine the effectiveness of LILT on DSP. We examined 107 subjects with type 2 diabetes for detection of DSP using the Michigan Neuropathy Screening Instrument (MNSI). Seventeen subjects were eligible to be enrolled in the study. Nerve conduction studies (NCS) were performed in all eligible subjects as an objective method to confirm neuropathy. The participants received LILT three times a week for ten sessions. NCSs were reevaluated after completion of the treatment. The absolute changes in NCS parameters were considered to establish the effectiveness of the treatment. Baseline demographics were similar in all participants. The mean differences of NCV parameters were considered for comparison. At the end of the study, the subjects showed a significant increase in neural potential amplitudes ($p < 0.05$).

Conclusion

This study clearly demonstrated a significant positive effect of LILT on improvement of nerve conduction velocity on diabetic distal symmetric polyneuropathy (DSP). This finding supports the therapeutic potential of LILT in DSP.

Influence of low-level laser on pain and inflammation in type 2 diabetes mellitus with diabeticdermopathy - A case report

Authors: Hazari A, K N S, K Rao K, G Maiya A.

Source: Cosmet Laser There, May 2017

Abstract

Numerous skin lesions have been commonly observed in individuals with diabetes mellitus. The common skin manifestations of diabetes mellitus are erythrasma, xanthomatosis, xanthelasma, phycomycetes and cutaneous infections like furuncolosis, candidiasis, carbuncle, dermatophytosis, etc. Diabetic dermopathy is the most common skin lesion found in patients with diabetes. It is typically seen in men aged above 50 years. In low-level laser therapy (LLLT), the entire lower limb was illuminated with the frequency of 20 Hz and wavelength of 830 nm for 9 min, and the treatment was divided into four parts. With the continued sessions of LLLT, the skin manifestations and neuropathy conditions improved drastically. On the 21st day, the skin colour was found to be normal.

Conclusion

There were significant changes in clinical findings for diabetic peripheral neuropathy. LLLT with specific exercises can promote healing of skin manifestations in individuals with type 2 diabetes mellitus. It can be used as an effective treatment modality for treating diabetic dermopathy.

Photobiostimulation reverses allodynia and peripheral nerve damage in streptozotocin-induced type 1 diabetes

Authors: Rocha IR, Ciena AP, Rosa A, Martins DO, Chacur M

Source: Lasers Med Sci, April 2017

Abstract

For better evaluation of the efficacy of low-level laser therapy in treating painful diabetic neuropathy and in protecting nerve fiber damage, we conducted a study with type 1 diabetic rats induced by streptozotocin. It is well known that diabetic peripheral neuropathy is the leading cause of pain in those individuals who suffer from diabetes. Despite the efficacy of insulin in controlling glucose level in blood, there is no effective treatment to prevent or reverse neuropathic damage for total pain relief.Male Wistar rats were divided into saline, vehicle, and treatment groups. A single intraperitoneal (i.p.) injection of streptozotocin (STZ) (85 mg/kg) was administered for the induction of diabetes. The von Frey filaments were used to assess nociceptive thresholds (allodynia). Behavioral measurements were accessed 14, 28, 48, and 56 days after STZ administration. Rats were irradiated with GaAs Laser (Gallium Arsenide, Laserpulse, Ibramed Brazil) emitting a wavelength of 904 nm, an output power of 45 mWpk, beam spot size at target 0.13 cm2, a frequency of 9500 Hz, a pulse time 60 ns, and an energy density of 6,23 J/cm2.

Conclusion

The application of four sessions of low-level laser therapy was sufficient to reverse allodynia and protect peripheral nerve damage in diabetic rats. The results of this study indicate that low-level laser therapy is feasible to treat painful diabetic condition in rats using this protocol. Although its efficacy in reversing painful stimuli and protecting nerve fibers from damage was demonstrated, this treatment protocol must be further evaluated in biochemical levels to confirm its biological effects.

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Conclusion

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Infrared laser therapy in distal diabetic polyneuropathy

Authors: Kalinina OV, Alekseeva NV, Burtsev EM.

Source: Zh Nevrol Psikhiatr Im S S Korsakova, 1998

Abstract

A course of laser therapy was applied to 50 patients with diabetic polyneuropathy by laser irradiation of low intensiveness in the nearest infrared spectrum. 20 patients from the group were treated by monotherapy only by laser exposure. Control group consisted of 24 patients treated by conventional therapy without laser exposure. According to the changes of vibratory and algesic sensitivity and electromyographic data the efficiency of therapy was estimated. It was found that laser exposure resulted in more pronounced restoration of functional state of nervous fibers than conventional therapy.

Conclusion

Application of laser irradiation of low intensiveness was effective while in combined