

Efficacy of 904 nm gallium arsenide low level laser therapy in the management of chronic myofascial pain in the neck: a double-blind and randomize-controlled trial.



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Source: Lasers in Surgery and Medicine 35:229–235 (2004)

Abstract

A prospective, doubleblind, randomized, and controlled trial was conducted in patients with chronic myofascial pain syndrome (MPS) in the neck to evaluate the effects of infrared low level 904 nm Gallium-Arsenide (Ga-As) laser therapy (LLLT) on clinical and quality of life (QoL).

The study group consisted of 60 MPS patients. Patients were randomly assigned to two treatment groups: Group I (actual laser; 30 patients) and Group II (placebo laser; 30 patients). LLLT continued daily for 2 weeks except weekends. Follow-up measures were evaluated at baseline, 2, 3, and 12 weeks. All patients were evaluated with respect to pain at rest, pain at movement, number of trigger points (TP), the Neck Pain and Disability Visual Analog Scale (NPAD), Beck depression Inventory (BDI), and the Nottingham Health Profile (NHP).

In active laser group, statistically significant improvements were detected in all outcome measures compared with baseline ($P < 0.01$) while in the placebo laser group, significant improvements were detected in only pain score at rest at the 1 week later of the end of treatment. The score for self-assessed improvement of pain was significantly different between the active and placebo laser groups (63 vs. 19%) ($P < 0.01$).

Conclusion

This study revealed that short-period application of LLLT is effective in pain relief and in the improvement of functional ability and QoL in patients with MPS.

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Efficacy of low-level laser therapy in the management of neck pain: a systematic review and meta-analysis of randomised placebo or active-treatment controlled trials



Authors: Roberta T Chow, Mark I Johnson, Rodrigo A B Lopes-Martins, Jan M Bjordal

Source: www.thelancet.com Published online November 13, 2009 DOI:10.1016/S0140-6736(09)61522-

Abstract

Background Neck pain is a common and costly condition for which pharmacological management has limited evidence of efficacy and side-effects. Low-level laser therapy (LLLT) is a relatively uncommon, non-invasive treatment for neck pain, in which non-thermal laser irradiation is applied to sites of pain. We did a systematic review and meta analysis of randomised controlled trials to assess the efficacy of LLLT in neck pain.

We searched computerised databases comparing efficacy of LLLT using any wavelength with placebo or with active control in acute or chronic neck pain. Effect size for the primary outcome, pain intensity, was defined as a pooled estimate of mean difference in change in mm on 100 mm visual analogue scale.

We identified 16 randomised controlled trials including a total of 820 patients. In acute neck pain, results of two trials showed a relative risk (RR) of 1.69 (95% CI 1.22–2.33) for pain improvement of LLLT versus placebo. Five trials of chronic neck pain reporting categorical data showed an RR for pain improvement of 4.05 (2.74–5.98) of LLLT. Patients in 11 trials reporting changes in visual analogue scale had pain intensity reduced by 19.86 mm (10.04–29.68). Seven trials provided follow-up data for 1–22 weeks after completion of treatment, with short-term pain relief persisting in the medium term with a reduction of 22.07 mm (17.42–26.72). Side-effects from LLLT were mild and not different from those of placebo.

Conclusion

We show that LLLT reduces pain immediately after treatment in acute neck pain and up to 22 weeks after completion of treatment in patients with chronic neck pain.

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Low-level laser therapy for acute neck pain with radiculopathy: a double-blind placebo-controlled randomized study.



Authors: Ljubica M. Konstantinovic, MD, PhD, Milisav R. Cutovic, MD, PhD, Aleksandar N. Milovanovic, MD, PhD, Stevan J. Jovic, MD, PhD, Aleksandra S. Dragin, MS, Milica Dj. Letic, MS, Vera M. Miler, MS

Source: Pain Medicine 2010; 11: 1169–1178 Wiley Periodicals, Inc.

Abstract

The objective of the study was to investigate clinical effects of low-level laser therapy (LLLT) in patients with acute neck pain with radiculopathy. Double-blind, randomized, placebocontrolled study. The study was carried out between January 2005 and September 2007 at the Clinic for Rehabilitation at the Medical School, University of Belgrade, Serbia.

Sixty subjects received a course of 15 treatments over 3 weeks with active or an inactivated laser as a placebo procedure. LLLT was applied to the skin projection at the anatomical site of the spinal segment involved with the following parameters: wavelength 905 nm, frequency 5,000 Hz, power density of 12 mW/cm², and dose of 2 J/cm², treatment time 120 seconds, at whole doses 12 J/cm². The primary outcome measure was pain intensity as measured by a visual analog scale. Secondary outcome measures were neck movement, neck disability index, and quality of life. Measurements were taken before treatment and at the end of the 3-week treatment period.

Statistically significant differences between groups were found for intensity of arm pain ($P = 0.003$, with high effect size $d = 0.92$) and for neck extension ($P = 0.003$ with high effect size $d = 0.94$).

Conclusion

The suitability of LLLT (wavelength of 905 nm and dose of 2 J per point) as a monotherapy for the treatment of acute neck pain with radiculopathy was examined. Patients treated with LLLT showed a greater improvement in local neck movements, a more significant reduction of pain intensity and related disability, and a greater improvement in quality of life, in comparison with patients treated with a placebo LLLT procedure. In addition, no major side effects were observed.

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Efficacy of low power laser therapy and exercise on pain and functions in chronic low back pain



Authors: Ljubica M. Konstantinovic, MD, PhD, Milisav R. Cutovic, MD, PhD, Aleksandar N. Milovanovic, MD, PhD, Stevan J. Jovic, MD, PhD, Aleksandra S. Dragin, MS, Milica Dj. Letic, MS, Vera M. Miler, MS

Source: Pain Medicine 2010; 11: 1169–1178 Wiley Periodicals, Inc.

Abstract

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Conclusion

The suitability of LLLТ (wavelength of 905 nm and dose of 2 J per point) as a monotherapy for the treatment of acute neck pain with radiculopathy was examined. Patients treated with LLLТ showed a greater improvement in local neck movements, a more significant reduction of pain intensity and related disability, and a greater improvement in quality of life, in comparison with patients treated with a placebo LLLТ procedure. In addition, no major side effects were observed.

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In chronic low back pain, low level laser therapy combined with exercise is more beneficial than exercise alone in the long term: a randomised trial



Authors: Gholamreza Esmaeeli Djavid¹, Ramin Mehrdad², Mohammad Ghasemi², Hormoz Hasan-Zadeh², Akbar Sotoodeh-Manesh² and Gholamreza Pouryaghoub²

Source: Australian Journal of Physiotherapy 52: 155–160

Abstract

Question: Is low level laser therapy an effective adjuvant intervention for chronic low back pain? Randomised trial with concealed allocation, blinded assessors and intention-to-treat analysis. **Participants:** Sixty-one patients who had low back pain for at least 12 weeks. **Intervention:** One group received laser therapy alone, one received laser therapy and exercise, and the third group received placebo laser therapy and exercise. Laser therapy was performed twice a week for 6 weeks.

Outcomes were pain severity measured using a 10-cm visual analogue scale, lumbar range of motion measured by the Schober Test and maximum active flexion, extension and lateral flexion, and disability measured with the Oswestry Disability Index on admission to the study, after 6 weeks of intervention, and after another 6 weeks of no intervention.

There was no greater effect of laser therapy compared with exercise for any outcome, at either 6 or 12 weeks. There was also no greater effect of laser therapy plus exercise compared with exercise for any outcome at 6 weeks. However, in the laser therapy plus exercise group pain had reduced by 1.8 cm (95% CI 0.1 to 3.3, $p = 0.03$), lumbar range of movement increased by 0.9 cm (95% CI 0.2 to 1.8, $p < 0.01$) on the Schober Test and by 15 deg (95% CI 5 to 25, $p < 0.01$) of active flexion, and disability reduced by 9.4 points (95% CI 2.7 to 16.0, $p = 0.03$) more than in the exercise group at 12 weeks.

Conclusion

In chronic low back pain, low level laser therapy combined with exercise is more beneficial than exercise alone in the long term.

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Laser therapy applications for osteoarthritis and chronic joint pain – A randomized placebo-controlled clinical trial



Authors: Nelson Marquina, Roger Dumoulin-White, Arkady Mandel and Lothar Lilge

Source: Photon Lasers Med 2012; 1(4): 299–307

Abstract

A randomized placebo-controlled clinical trial to evaluate an adjunctive treatment modality for pain associated with knee disorders was conducted utilizing a therapeutic laser system (low energy, non-surgical).

The therapeutic laser system utilized a dual wavelength, multiple diode laser cluster probe with five super-pulsed 905 nm near-infrared (NIR) laser diodes, each emitting at 40 mW average power and four continuous wave 660 nm visible (VIS) red laser diodes, each emitting at 25 mW. It was used as an adjunctive modality providing 12 treatments, three times a week to a homogeneous patient population (n = 126), in combination with standardized chiropractic techniques, to evaluate effectiveness on subjects presenting with osteoarthritis and knee pain. The primary endpoint was measured by the visual analog scale (VAS) to assess pain levels on a scale of 0 – 10. The success criteria for an individual patient in this study were identified as an improvement of 30 % or more in the VAS from baseline to 12th treatment and/or an improvement of 20 % or more in the VAS from baseline to 30-day follow-up evaluation.

The data obtained in the study demonstrated that the present therapeutic laser system provided significant pain relief and osteoarthritic improvements in all primary evaluation criteria, with a statistical and clinical significance of $p < 0.01$ in VAS from baseline to the 30-day follow-up. The data obtained in the study demonstrated that the present therapeutic laser system provided significant pain relief and osteoarthritic improvements in all primary evaluation criteria, with a statistical and clinical significance of $p < 0.01$ in VAS from baseline to the 30-day follow-up.

Conclusion

The management of chronic pain in patients with OA will always present therapeutic challenges. Anti-inflammatory agents, pharmaceutical painkillers and corticosteroids offer only temporary pain relief with hardly any mid to longterm benefits. Therefore, because of the excellent safety and efficacy profile of the therapeutic laser system under evaluation in this clinical study, it can be stated that noninvasive, super-pulsed laser therapy represents a promising therapeutic alternative for patients with chronic knee pain.

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Short-term efficacy of low-level laser therapy in patients with knee osteoarthritis: a randomized placebo-controlled, double-blind clinical trial



Authors: Vanessa Ovanessian Fukudal; Thiago Yukio Fukudall; Márcio GuimarãesIII; Silvia ShiwallI; Bianca Del Cor de LimaIII; Rodrigo Álvaro Brandão Lopes MartinsIV; Raquel Aparecida CasarottoV; Patrícia Pereira AlfredoVI; Jan Magnus BjordalVII; Patrícia Maria Moraes Barros FucsVIII

Source: Rev Bras Ortop. 2011; 46(5):526-33

Abstract

This study was designed to evaluate the short-term efficacy of low-level laser therapy (LLLT) for improving pain and function in patients with knee osteoarthritis.

Forty-seven patients with knee osteoarthritis (79 knees), of both genders, participated in this randomized controlled double-blind clinical trial. They were randomly allocated to two groups: laser group with 25 patients (41 knees) and placebo group with 22 patients (38 knees). LLLT was performed three times a week, totaling nine sessions, using a AsGa 904 nm laser with mean power of 60 mW and beam area of 0.5 cm². Nine points were irradiated on the knee, with energy of 3.0 J/point. The placebo group was treated with the same laser device, The authors declare that there was no conflict of interest in conducting this work but with a sealed probe. Evaluations using Lequesne, visual numerical scale (VNS), Timed Up and Go (TUG), goniometry and dynamometry were conducted before the treatment started and after the nine sessions of LLLT.

A significant improvement in pain and function was found in all the assessments applied to the laser group. On comparing the laser group with the placebo group, significant differences were found in the VNS-resting and Lequesne evaluations. Conclusion: Treatment with LLLT improves pain and function over the short term in patients with knee osteoarthritis

Conclusion

After assessment of the data obtained in this study, we can conclude that the treatment with low-level laser alleviated pain and improved functional ability over the short term, among patients with knee OA.

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Low-level laser treatment can reduce edema in second degree ankle sprains

Authors: Stergioulas A.

Source: J Clin Laser Med Surg., April 2004

Abstract

Low-level laser therapy (LLLT) has been used for the last few years to treat sports injuries. The purpose of this study was to compare three therapeutic protocols in treating edema in second degree ankle sprains that did not require immobilization with a splint, under placebo-controlled conditions.

Forty-seven soccer players with second degree ankle sprains, selected at random, were divided into the following groups: The first group (n = 16) was treated with the conventional initial treatment (RICE, rest, ice, compression, elevation), the second group (n = 16) was treated with the RICE method plus placebo laser, and the third group (n = 15) was treated with the RICE method plus an 820-nm GaAlAs diode laser with a radiant power output of 40 mW at 16 Hz. Before the treatment, and 24, 48, and 72 h later, the volume of the edema was measured.

A three by three repeated measures ANOVA with a follow up post hoc test revealed that the group treated with the RICE and an 820-nm GaAlAs diode laser presented a statistically significant reduction in the volume of the edema after 24 h (40.3 +/- 2.4 mL, p < 0.01), 48 h (56.4 +/- 3.1 mL, p < 0.002), and 72 h (65.1 +/- 4.4 mL, p < 0.001).

Conclusion

LLLT combined with RICE can reduce edema in second-degree ankle sprains.

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Effects of 904-nm low-level laser therapy in the management of lateral epicondylitis: a randomized controlled trial



Authors: Lam LK1, Cheing GL.

Source: Photomed Laser Surg. 2007 Apr;25(2):65-71

Abstract

The aim of this study was to evaluate the effectiveness of 904-nm low-level laser therapy (LLLT) in the management of lateral epicondylitis. Lateral epicondylitis is characterized by pain and tenderness over the lateral elbow, which may also result in reduction in grip strength and impairment in physical function. LLLT has been shown effective in its therapeutic effects in tissue healing and pain control.

Thirty-nine patients with lateral epicondylitis were randomly assigned to receive either active laser with an energy dose of 0.275 J per tender point (laser group) or sham irradiation (placebo group) for a total of nine sessions. The outcome measures were mechanical pain threshold, maximum grip strength, level of pain at maximum grip strength as measured by the Visual Analogue Scale (VAS) and the subjective rating of physical function with Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire.

Significantly greater improvements were shown in all outcome measures with the laser group than with the placebo group ($p < 0.0125$), except in the two subsections of DASH.

Conclusion

This study revealed that LLLT in addition to exercise is effective in relieving pain, and in improving the grip strength and subjective rating of physical function of patients with lateral epicondylitis.

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The short-term efficacy of laser, brace, and ultrasound treatment in lateral epicondylitis: a prospective, randomized, controlled trial



Authors: Oken O, Kahraman Y, Ayhan F, Canpolat S, Yorgancioglu ZR, Oken OF

Source: J Hand Ther. 2008 Jan-Mar;21(1):63-7; quiz 68.

Abstract

The aims of this study were to evaluate the effects of low-level laser therapy (LLLT) and to compare these with the effects of brace or ultrasound (US) treatment in tennis elbow. The study design used was a prospective and randomized, controlled, single-blind trial.

Fifty-eight outpatients with lateral epicondylitis (9 men, 49 women) were included in the trial. The patients were divided into three groups: 1) brace group-brace plus exercise, 2) ultrasound group-US plus exercise, and 3) laser group-LLLT plus exercise. Patients in the brace group used a lateral counterforce brace for three weeks, US plus hot pack in the ultrasound group, and laser plus hot pack in the LLLT group. In addition, all patients were given progressive stretching and strengthening exercise programs.

Grip strength and pain severity were evaluated with visual analog scale (VAS) at baseline, at the second week of treatment, and at the sixth week of treatment. VAS improved significantly in all groups after the treatment and in the ultrasound and laser groups at the sixth week ($p < 0.05$). Grip strength of the affected hand increased only in the laser group after treatment, but was not changed at the sixth week. There were no significant differences between the groups on VAS and grip strength at baseline and at follow-up assessments.

Conclusion

The results show that, in patients with lateral epicondylitis, a brace has a shorter beneficial effect than US and laser therapy in reducing pain, and that laser therapy is more effective than the brace and US treatment in improving grip strength.

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The effects of low level laser in clinical outcome and neurophysiological results of carpal tunnel syndrome



Authors: Shooshtari SM, Badiee V, Taghizadeh SH, Nematollahi AH, Amanollahi AH, Grami MT.

Source: Electromyogr Clin Neurophysiol. 2008 Jun-Jul;48(5):229-31.

Abstract

Carpal tunnel syndrome (CTS) is the most common neuropathy that can be diagnosed with confidence by the nerve conduction study (NCS). One of the recent treatments of CTS is the application of low power laser (LPL) therapy. The present study evaluates the effects of LPL irradiation through NCS and clinical signs and symptoms.

A total of 80 patients were included in this study. Diagnosis of CTS was based on both clinical examination and electromyographic (EMG) findings. Patients were randomly assigned into two groups. Test group (group A) underwent laser therapy (9-11 joules/cm²) over the carpal tunnel area. Control group (group B) received sham laser therapy. Pain, hand grip strength, median proximal sensory and motor latencies, transcarpal median sensory nerve conduction (SNCV) were recorded. After fifteen sessions of irradiation (five times per week), parameters were recorded again and clinical symptoms were measured in both groups. Pain was evaluated by Visual Analog Scale (VAS; day-night). Hand grip was measured by Jamar dynamometer. Paired t-test and independent sample t-test were used for statistical analysis.

There was a significant improvement in clinical symptoms and hand grip in group A ($p < 0.001$). Proximal median sensory latency, distal median motor latency and median sensory latencies were significantly decreased ($p < 0.001$). Transcarpal median SNCV increased significantly after laser irradiation ($p < 0.001$). There were no significant changes in group B except changes in clinical symptoms ($p < 0.001$).

Conclusion

Laser therapy as a new conservative treatment is effective in treating CTS paresthesia and numbness and improves the subjects' power of hand grip and electrophysiological parameters.

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