

Temporomandibular Joint Disorder

[Cranio](#). 2007 Jul;25(3):186-92.

Low intensity laser application in temporomandibular disorders: a phase I double-blind study.

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The purpose of this study was to evaluate the effectiveness of low intensity laser therapy (LILT) for the control of pain from temporomandibular disorder (TMD) in a random and double-blind research design. Forty-eight (48) patients presenting temporomandibular joint (TMJ) pain were divided into an experimental group (GI) and a placebo group (GII). The sample was submitted to the treatment with infrared laser (780 nm, 70 mW, 10 s, 89.7 J/cm²) applied in continuous mode on the affected temporomandibular region, at one point: inside the external auditory duct toward the retrodiskal region, twice a week, for four weeks. For the control group, two identical probes (one active and one that does not emit radiation) were used unknown by the clinician and the subjects. A tip planned for laser acupuncture was used and connected to the active point of the probe. The parameter evaluated was the intensity of pain after palpation of the condylar lateral pole, pre-auricular region and external auditory duct, according to the Visual Analogue Scale (VAS). Four evaluations were performed: Ev1 (before laser application), Ev2 (after 4th application), Ev3 (after 8th application) and Ev4 (30 days after the last application). Data were submitted to statistical analysis. The results showed a decrease in the pain level mainly for the active probe. Among the evaluations, the Ev3 exhibited lower sensitivity to palpation. In conclusion, the results show that low intensity laser is an effective therapy for the pain control of subjects with TMD.

[Photomed Laser Surg](#). 2007 Aug;25(4):297-303.

Effectiveness of low-level laser therapy in temporomandibular joint disorders: a placebo-controlled study.

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Objective: Low-level laser therapy (LLLT) treatment for pain caused by temporomandibular joint disorders (TMD) was investigated in a controlled study

comparing applied energy density, subgroups of TMD, and duration of disorders. Background Data: Although LLLT is a physical therapy used in the treatment of musculoskeletal disorders, there is little evidence for its effectiveness in the treatment of TMD. Methods: The study group of 61 patients was treated with 10 J/cm² or 15 J/cm², and the control group of 19 patients was treated with 0.1 J/cm². LLLT was performed by a GaAlAs diode laser with output of 400 mW emitting radiation wavelength of 830 nm in 10 sessions. The probe with aperture 0.2 cm² was placed over the painful muscle spots in the patients with myofascial pain. In patients with TMD arthralgia the probe was placed behind, in front of, and above the mandibular condyle, and into the meatus acusticus externus. Changes in pain were evaluated by self-administered questionnaire. Results: Application of 10 J/cm² or 15 J/cm² was significantly more effective in reducing pain compared to placebo, but there were no significant differences between the energy densities used in the study group and between patients with myofascial pain and temporomandibular joint arthralgia. Results were marked in those with chronic pain. Conclusion: The results suggest that LLLT (application of 10 J/cm² and 15 J/cm²) can be considered as a useful method for the treatment of TMD-related pain, especially long lasting pain.

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to palpation. In conclusion, the results show that low intensity laser is an effective therapy for the pain control of subjects with TMD.

[Photomed Laser Surg.](#) 2006 Aug;24(4):522-7

Arthralgia of the temporomandibular joint and low-level laser therapy.

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OBJECTIVE: This case report describes the treatment of a patient with arthralgia of the temporomandibular joint (TMJ) caused by disc displacement. **BACKGROUND DATA:** The goal of the treatment of TMJ arthralgia is to decrease pain by promotion of the musculoskeletal system's natural healing ability. **METHODS:** This report describes the complex treatment of TMJ arthralgia. Low-level laser therapy (LLLT) was chosen for its antiinflammatory and analgesic effects. Laser therapy was carried out using the GaAlAs diode laser with an output power of 400 mW, emitting radiation with a wavelength of 830 nm, and having energy density of 15 J/cm²; the laser radiation was applied by contact mode on four targeted spots in 10 sessions. Physiotherapy was recommended to this patient to prevent the injury of intraarticular tissue caused by incorrect movement during opening of the mouth. Splint stabilization and prosthetic treatment were used to reduce overloading of the TMJ, resulting from unstable occlusion and to help repositioning of the dislocated disc. **RESULTS:** Five applications of LLLT led to decrease of pain in the area of the TMJ on the Visual Analog Scale, from 20 to 5 mm. The anti-inflammatory effect of the laser was confirmed by thermographic examination. Before treatment, the temperature differences between the areas of the normal TMJ and TMJ with arthralgia was higher than 0.5 degrees C. However, at the conclusion of LLLT, temperatures in the areas surrounding the TMJ were equalized. **CONCLUSION:** This study showed the effectiveness of complex non-invasive treatment in patients with arthralgia of the TMJ. The analgesic and anti-inflammatory effects of LLLT were confirmed by infrared thermography.

[Photomed Laser Surg.](#) 2006 Oct;24(5):637-41

Evaluation of low-level laser therapy in the treatment of temporomandibular disorders.

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Objective: The purpose of this study was to assess the effectiveness of low-level laser therapy (LLLT) in the treatment of myogenic originated temporomandibular disorders

(TMD). Background Data: Limited studies have demonstrated that LLLT may have a therapeutic effect on the treatment of TMD. Methods: Thirty-nine patients with myogenic TMD-associated orofacial pain, limited mandibular movements, chewing difficulties, and tender points were included in this study. Twenty-four of them were treated with LLLT for 10 sessions per day excluding weekends as test group, and 15 patients with the same protocol received placebo laser treatment as a control group. These parameters were assessed just before, just after, and 1 month after the treatment. Results: Maximal mouth-opening improvement, and reductions in pain and chewing difficulty were statistically significant in the test group when compared with the control group. Statistically significant improvements were also detected between two groups regarding reduction in the number of tender points. Conclusion: Based on the results of this placebo-controlled report, LLLT is an appropriate treatment for TMD and should be considered as an alternative to other methods.

Scand J Rheumatol. 2003;32(2):114-8.

Effectiveness of low-level laser therapy in temporomandibular disorder.

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OBJECTIVE: To investigate the effectiveness of low-level laser therapy in the treatment of temporomandibular disorder and to compare treatment effects in myogenic and arthrogenic cases. **METHODS:** Thirty-five patients were evaluated by magnetic resonance imaging and randomly allocated to active treatment (n=20) and placebo treatment (n= 15) groups. In addition to a daily exercise program, all patients were treated with fifteen sessions of low-level laser therapy. Pain, joint motion, number of joint sounds and tender points were assessed. **RESULTS:** Significant reduction in pain was observed in both active and placebo treatment groups. Active and passive maximum mouth opening, lateral motion, number of tender points were significantly improved only in the active treatment group. Treatment effects in myogenic and arthrogenic cases were similar. **CONCLUSION:** Low-level laser therapy can be considered as an alternative physical modality in the management of temporomandibular disorder.

Laser Med Surg Abstract issue, 2002: 18.

Clinical evaluation of the low intensity laser antialgic action of GaAlAs (wavelength=785 nm) in the treatment of the temporomandibular disorders.

Sanseverino N T M, Sanseverino C A M, Ribeiro M S et al.

The improved outcome of laser therapy, if higher doses are given, is documented in the study by Sanseverino 10 patients with pain and limitation of movements of the jaw were treated by 785 nm GaAlAs laser, dose 45 J/cm². The joint and tender points in the masticatory and otherwise involved muscles was applied three times per week during three weeks. A control group of 10 patients was given sham laser therapy. The evaluation was performed through subjective pain assessment and measurement of the movements of the jaw. There was a significant improvement in the laser group only.

Clinical evaluation of the low intensity laser antialgic action of GaAlAs in the treatment of the temporomandibular disorders. 2001.

SANSEVERINO, N. T. M.

Dissertation (Professional Master's Degree "Lasers in Dentistry") - Nuclear and Energy Research Institute / School of Dentistry, University of São Paulo, São Paulo. Advisor: Eduardo De Bortoli Groth, DDS, PhD, Martha Simões Ribeiro, DDS, PhD

The therapy with laser emitting low intensity has been currently used in the most diverse fields of medicine as therapeutic conduct for pain. It is a non-invasive, painless, non-thermal and aseptic type therapy, without any collateral effects, having a good cost/benefit relationship. However, for the therapy with low-intensity laser to result in positive effects, a correct diagnosis is fundamental, as well as a protocol of adequate application. In odontology, the majority of patients diagnosed with temporomandibular disorders (TMD), present pain and limitations in the movements of the jaw. In this work, a GaAlAs laser emitting low intensity, $\lambda=785\text{nm}$, in patients having a dysfunction of the temporomandibular joint with a complaint of pain. Twenty patients were divided into two groups. The group treated received laser treatment in the temporomandibular articulations and in the muscles affected. The dose applied was 45J/cm², while the ten patients in the control group received 0J/cm², in a total of nine applications, carried out three times a week, during three weeks. The evaluation of the patients was made through clinical examinations of manual palpation of the masseter, temporal, cervical, posterior neck and sternocleidomastoid muscles, and measurements of opening and laterality of the mouth. The results obtained showed a diminishing of the pain and an increase of the mandibular mobility in the patients treated, when compared to the control group. These results point to this therapy as being an important tool in the treatment of pain in patients with a dysfunction in the TMJ, indicating this therapeutic modality as a co-adjutant in these treatments.

LOW INTENSITY LASER THERAPY (LILT) IN THE MAXILLOFACIAL REGION

Paul Bradley The Royal London School of Medicine and Dentistry, London, England

The region of the face and mouth is well suited to Low Intensity Laser Therapy (LILT) in view of ease of access. It is also an area associated with a variety of painful conditions and intractable ulcers which have proved amenable to LILT in a total of around 500 cases. Our practice is based on several postgraduate research projects:

1. Studies of depth penetration of 820nm. These have been undertaken using a CCD camera to demonstrate penetration depths in non vital tissue specimens augmented by observations in the living subject with isotropic detectors.
2. Investigation of vascular response. A thermographic camera has been used for local heating effects while laser doppler has been employed to measure microcirculatory flux. Ultrasound doppler allowed monitoring of arterial status. A variety of wavelengths and fluxes have been investigated.
3. Double blind clinical trial in temporomandibular joint disorder pain. Methods have included algometry for pressure point thresholds, electromyography for muscular activity and sensor tracking for mandibular movement.
4. Study of effect on osseointegration of implants in jaw and femur. Research methods have involved mechanical push out testing, radiovisiography, x-ray microtomography and histomorphometry in the rabbit experimental model. On the basis of the data acquired clinical practice has been undertaken particularly in the following conditions:
 1. Post Herpetic Neuralgia,
 2. Temporomandibular Joint Disorder Pain
 3. Trigeminal Neuralgia
 4. Atypical Facial Pain,
 5. Pain from Acute Maxillofacial Trauma
 6. Palliation of Pain from Unresectable Orofacial Cancer,
 7. Intractable Oral Ulcerations, 8. Nerve Lesions,
 9. Cavernous Haemangiomas Of the Facial Region in Infants

The results of this clinical practice are described and analyzed.

J Clinical Laser Med & Surg. 1998; 16 (4): 223-226.

Low-level laser therapy is an important tool to treat disorders in the maxillofacial region.

Pinheiro A et al.

241 patients with different disorders in the maxillofacial region were treated with LLLT. Indications were temporomandibular disorders, trigeminal neuralgia, muscular pain, aphtae etc. Lasers of 633, 670 and 830 nm were used. Most treatments consisted of a series of 12 applications (twice a week). Average dose was 1.8 J/cm². At the end of treatment 154 patients were asymptomatic, 50 improved considerably and 37 were symptomatic.

PhD dissertation on TMD problems

Dr Sajee Sattayut of The Department of Oral & Maxillofacial Surgery, St Bartholomew's and the Royal London School of Medicine and Dentistry (professor Paul Bradley) has put forward his PhD thesis on the effect of 820 nm low level laser on patients with TMD (temporo-mandibular-joint-disorders). In a double blind study on 30 female TMD patients one group was given placebo laser, one a low dose from a 60 mW laser and the

third a high dose from a 300 mW GaAlAs laser. Three treatments were given during one week. The patients in the high energy density group had significantly increases in Pressure Pain Threshold and EMG amplitude, recorded from voluntary clenching. A significantly greater number of patients recovered from myofascial pain and TMJ arthralgia as assessed clinically in the higher energy group. At a period of 2 to 4 weeks review after LLLT, there was an average 52% reduction of pain as assessed by Symptom Severity Index pain questionnaire. In an in vitro study laser was observed to reduce IL-1 stimulated PGE2 production.

Australian J Physiother. 2003; 49: 107-116.

A systematic review of low level laser therapy with location-specific doses for pain from chronic joint disorders.

Bjordal J M, Couppè, C, Chow R, Tunér J, Ljunggren A E.

The authors investigated if low level laser therapy of the joint capsule can reduce pain in chronic joint disorders (CJD). A literature search identified 88 randomised-controlled trials, of which 20 trials included patients with CJD. Six trials had to be excluded for not irradiating the joint capsule. Three trials used doses lower than a denominated a priori dose range for reducing inflammation in the joint capsule. These trials found no significant difference between active and placebo treatments. The remaining 11 trials, including 565 patients, were of acceptable methodological quality with an average PEDro score of 6.9 (range 5-9). In these trials, LLLT within the suggested dose-range was administered to the knee, temporomandibular and zygapophyseal joints. The results showed a mean weighted difference in change of pain on VAS by 45.6 % (95 % CI 35.0 to 56.2) in favour of LLLT. Global status was improved for 33.4 % (95% CI 20.9 to 45.9) more patients in the LLLT group. LLLT with the suggested dose range significantly reduces pain in CJD, but the heterogeneity in patient samples, treatment procedures and trial design calls for cautious interpretation of the results.

Cranio. 1997 Apr;15(2):144-9.

Low level laser therapy in the treatment of temporomandibular disorders (TMD): a double-blind pilot study.

Conti PC.

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The aim of this paper was to evaluate the efficacy of a Low-Level Laser therapy in patients with Temporomandibular Disorders (TMD) using a double-blind design. A sample of 20 patients with a chief complaint of pain was divided into myogenous and arthrogenous groups. The sample was also divided on the basis of the treatment rendered: real versus placebo treatment. An 830 nm Ga-Al-As Laser device with a energy power of 4 joules was used (OMNILASE, LASERDYNE PTY LTD.) in three treatment sessions.

To evaluate the effectiveness of laser treatment, a Visual Analogue Scale (VAS) was used for pain and active range of motion (AROM) was used to measure changes in mandibular function. Using real laser treatment, the author found that there was a reported improvement in pain only for the myogenous pain patients ($p < \text{or} = 0.02$). For the arthrogenous pain patients, real laser treatment resulted in an improvement in Total Vertical Opening (TVO) ($p < 0.05$), Protrusive excursion (PROT) ($p < 0.02$) and Left lateral excursion (LATLEF) ($p < 0.02$). The placebo control group showed improvement in TVO and PROT for those patients having myogenous pain and LATLEF for those patients having arthrogenous pain. A repeated measurement one-way ANOVA demonstrated no significant differences between real and placebo groups. Considering the non-invasive and harmless characteristics of this modality, more research is recommended, using higher power and increased frequency of laser applications.