

## Maxillofacial

### **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.

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

**Pinheiro AL, Cavalcanti ET, Pinheiro TI, Alves MJ, Miranda ER, De Quevedo AS, Manzi CT, Vieira AL, Rolim AB.**

Laser Center, School of Dentistry, Universidade Federal de Pernambuco, Brazil.

**OBJECTIVES:** The authors report on the effects of low-level laser therapy (LLLT) in the treatment of maxillofacial disorders. **SUMMARY AND BACKGROUND DATA:** Further to our previous studies, this paper reports the results of the use of LLLT on the treatment of several disorders of the oral and maxillofacial region. This paper presents LLLT as an effective method of treating such disorders. **METHODS:** Two hundred and five female and 36 male patients ages between 7 and 81 years old (average 38.9 years old), suffering from disorders of the maxillofacial region, were treated with 632.8, 670, and 830 nm diode lasers at the Laser Center of the Universidade Federal de Pernambuco, Recife, Brazil (UFPE). The disorders included temporomandibular joint (TMJ) pain, trigeminal neuralgia, muscular pain, aphatae, inflammation, and tooth hypersensitivity postoperatively and in small hemangiomas. Most treatment consisted of a series of 12 applications (twice a week) and in 15 cases a second series was applied. Patients were treated with an average dose of 1.8 J/cm<sup>2</sup>. **RESULTS:** One hundred fifty four out of 241 patients were asymptomatic at the end of the treatment, 50 improved considerably, and 37 were symptomatic. **CONCLUSIONS:** These results confirm that LLLT is an effective tool and is beneficial for the treatment of many disorders of the maxillofacial region.

### **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 PGE<sub>2</sub> production.

J Clin Laser Med Surg. 1997;15(4):181-3.

## **Low-level laser therapy in the management of disorders of the maxillofacial region.**

**Pinheiro AL, Cavalcanti ET, Pinheiro TI, Alves MJ, Manzi CT.**

School of Dentistry, Universidade Federal de Pernambuco, Recife, Brazil.

**OBJECTIVE:** The authors analysed the effects of low-level laser therapy (LLLT) on the treatment of maxillofacial disorders. **SUMMARY BACKGROUND DATA:** Pioneer work published by Mester et al. opened a new frontier in the clinical treatment of many disorders with the use of LLLT. Although LLLT is not well accepted in many places, its use is growing steadily in others, including Europe and more recently in Brazil.

**METHODS:** One hundred forty-one female and 24 male patients, between 7 and 81 years of age (average = 39.2 years old), suffering from disorders of the maxillofacial region were treated with 632.8-nm, 670-nm, and 830-nm diode lasers at the Laser Center of the Universidade Federal de Pernambuco. The disorders included temporomandibular joint pain, trigeminal neuralgia, muscular pain, aphatae, inflammation, and tooth hypersensitivity both postoperatively and in small hemangiomas. Most treatment consisted of a series of 12 applications (twice a week), and in eight cases a second series was applied. Patients were treated with an average dose of 2.5 J/cm<sup>2</sup>. **RESULTS:** One hundred twenty out of 165 patients were asymptomatic at the end of the treatment, 25 improved considerably, and 20 were symptomatic. **CONCLUSIONS:** These preliminary results indicate that LLLT is an important tool and brings many benefits for the treatment of many disorders of the maxillofacial region.

## **CAN LOW REACTIVE-LEVEL LASER THERAPY BE USED IN THE TREATMENT OF NEUROGENIC FACIAL PAIN? A DOUBLE-BLIND, PLACEBO CONTROLLED INVESTIGATION OF PATIENTS WITH TRIGEMINAL NEURALGIA**

**ArneEckerdal and and Lehmann Bastian**

Department of Oral and Maxillofacial Surgery and Oral Medicine, Odense University Hospital, Denmark

Neurogenic facial pain has been one of the more difficult conditions to treat, but the introduction of laser therapy now permits a residual group of patients hitherto untreatable to achieve a life free from or with less pain. The present investigation was designed as a double-blind, placebo controlled study to determine whether low reactive-level laser therapy (LLLT) is effective for the treatment of trigeminal neuralgia. Two groups of patients (14 and 16) were treated with two probes. Neither the patients nor the dental surgeon were aware of which was the laser probe until the investigation had been completed. Each patient was treated weekly for five weeks. The results demonstrate that of 16 patients treated with the laser probe, 10 were free from pain after completing treatment and 2 had noticeably less pain, while in 4 there was little or no change. After a one

year follow-up, 6 patients were still entirely free from pain. In the group treated with the placebo system, i.e. the non-laser probe, one was free from pain, 4 had less pain, and the remaining 9 patients had little or no recovery. After one year only one patient was still completely free from pain. The use of analgesics was recorded and the figures confirmed the fact that LLLT is effective in the treatment of trigeminal neuralgia. It is concluded that the present study clearly shows that LLLT treatment, given as described, is an effective method and an excellent supplement to conventional therapies used in the treatment of trigeminal neuralgia.

Addressee for Correspondence: Arne Eckerdal DDS DOS Consultant, Department of Oral and Maxillofacial Surgery & Oral Medicine, Odense University Hospital, DK-5000 Odense' Denmark.

12/96 Rep. US X 8-10-12

LASER THERAPY, 1996:: 8: 247-252

Stomatologia (Mosk). 2003;82(3):32-7.

**[Treatment of inflammatory pyodestructive processes of the oral cavity, maxillofacial area, and neck by laser and magnetic-laser exposure of the carotid sinus using the Optodan laser apparatus]**

[Article in Russian]

**Zhizhina NA, Prokhonchukov AA, Vakhtin VI, Geniuk VIa.**

This paper presents the priority original methods (patent No. 2101046, Russia) for the treatment of inflammatory pyodestructive processes in the oral cavity, maxillofacial area, and neck (odontogenic abscesses and phlegmons including those complicated by mediastinitis and sepsis), sinusitis, carbuncles and furuncles of face and neck skin, parotitis, sialadenitis, adenophlegmons, lymphadenitis, periotitis, alveolitis, arthritis, arthrosis of the temporomandibular joint, odontogenic and traumatic osteomyelitis, infected purulent traumas (including gunshot ones), fractures of the jaws, etc. making use of Optodan laser (patent No. 2014107, Russia) for laser and magnetic-laser therapy.

Stomatologia (Mosk). 2001;80(6):52-5.

**[New potentialities of laser therapy and electrostimulation after cheilorhinoplasty]**

[Article in Russian]

**Gerasimenko MIu, Filatova EV, Nikitin AA, Spiridonova NZ.**

A method for stimulation of the central regulation mechanisms has been used in 53 patients during the early period after cheilorhinoplasty. Electrostimulation by the flickering reflex method is a nonspecific method stimulating sanogenesis which can be used for repair of the neuromuscular function after correction of secondary deformation

of the upper lip and palate. Transcerebral laser stimulation indirectly affected the reparative processes in the maxillofacial area by improving metabolism in the cerebrocortical projection zones.

J Clin Laser Med Surg. 2003 Dec;21(6):363-7.

### **Usefulness of low-level laser for control of painful stomatitis in patients with hand-foot-and-mouth disease.**

**Toida M, Watanabe F, Goto K, Shibata T.**

Department of Oral and Maxillofacial Sciences, Gifu University School of Medicine, Gifu, Japan. toida@cc.gifu-u.ac.jp

**OBJECTIVE:** The aim of this study was to evaluate the usefulness of low-level laser therapy (LLLT) for the control of painful stomatitis in patients with hand-foot-and-mouth disease (HFMD). **BACKGROUND DATA:** LLLT has been successfully applied to various painful oral mucosal diseases, although there have been few reports on LLLT for HFMD patients. **MATERIALS AND METHODS:** Through a randomized double-blind placebo controlled trial, the painful period of HFMD stomatitis was compared between the LLLT group (n=11) and the placebo LLLT one (n=9), which had similar clinical backgrounds. The LLLT parameters supplied were as follows: wavelength of 830 nm, power of 30 mW, frequency of 30 Hz, and energy output of 1.1 J/cm<sup>2</sup>. Acceptability and safety of the treatment were also evaluated. **RESULTS:** The painful period was shorter in the LLLT group (4.0 +/- 1.3 days) than in the placebo LLLT one (6.7 +/- 1.6 days) with a statistically significant difference (p<0.005). The treatment was judged acceptable for 90.0% (18 of 20) of patients. No adverse events were observed in any cases. **CONCLUSION:** LLLT is a useful method to control HFMD stomatitis by shortening the painful period, with its high acceptability and lack of adverse events.

[Stomatologia \(Mosk\)](#). 1989 Sep-Oct;68(5):42-5.

### **[The use of the Uzor laser apparatus for treating inflammatory diseases of the maxillofacial area]**

[Article in Russian]

[Kireev AK](#), [Evstigneev AR](#), [Voroshnin PA](#), [Aleksandrov MT](#).

This is a report on the first results of application of "Uzor" laser device in dentistry. Semiconductor lasers are used in it. Bioeffective regimens of magneto-laser therapy were established to treat maxillofacial pathology. A series of techniques is offered to treat some particular diseases: arthritis, alveolitis, sialoadenitis, pericoronitis, jaw fractures.