[COMPRENDIUM OF PUBLISHED CLINICAL LITERATURE]

EZLASE & ILASE
5400340 Rev. B
TABLE OF CONTENTS

Cleared indications for use

Suggested Reading

1.8. Hakki S, Bozkurt B. Effects of different setting of diode laser on the mrna expression of growth factors and type I collagen of human gingival fibroblasts. Lasers in Medical Science 2011

Part No. 5400340
DENTAL SOFT TISSUE INDICATIONS

USE OF EZLASE & ILASE IS INDICATED FOR:

Incision, excision, vaporization, ablation and coagulation of oral soft tissues including marginal and inter-dental gingival and epithelial lining of free gingiva and the following specific indications:

- Excisional and incisional biopsies
- Exposure of unerupted teeth
- Fibroma removal
- Frenectomy
- Frenotomy
- Gingival troughing for crown impressions
- Gingivectomy
- Gingivoplasty
- Gingival incision and excision
- Hemostasis and coagulation
- Implant recovery
- Incision and drainage of abscess
- Leukoplakia
- Operculectomy
- Oral papillectomies
- Pulpotomy
- Pulpotomy as an adjunct to root canal therapy
- Reduction of gingival hypertrophy
- Soft tissue crown lengthening
- Treatment of canker sores, herpetic and aphthous ulcers of the oral mucosa.
- Vestibuloplasty
- Tissue retraction for impression

PERIODONTAL INDICATIONS

USE OF EZLASE & ILASE IS INDICATED FOR:

- Laser soft tissue curettage
- Laser removal of diseased, infected, inflamed and necrosed soft tissue within the periodontal pocket
- Sulcular debridement (removal of diseased, infected, inflamed and necrosed soft tissue in the Periodontal pocket to improve clinical indices including gingival index, gingival bleeding index, probe depth, attachment loss and tooth mobility.)
Use of diode laser 980 nm as adjunctive therapy in the treatment of chronic periodontitis. A randomized controlled clinical trial

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SUMMARY

The primary goal of periodontal therapy is the removal of supra and subgingival bacterial deposits by mechanical debridement consisting in scaling and root-planing (SRP) using manual or power-driven instruments. The complete removal of bacteria and their toxins from periodontal pockets is not always achieved with conventional mechanical treatment. The use of lasers as an adjunctive therapy for periodontal disease may improve tissue healing by bactericidal and detoxification effects.

The aim of this study was to compare the effectiveness of Diode laser used as adjunctive therapy of SRP to that of SRP alone for non surgical periodontal treatment in patients with chronic periodontitis. Nineteen pairs of teeth with untreated chronic periodontitis were selected in 13 patients and randomly treated by SRP alone (control group) or by SRP + laser irradiation (test group). Clinical measurements (PPD, CAL, BOP, GI, PI) were performed before treatment at baseline (TO) and at T1 (after 4 weeks), T2 (8 weeks), T3 (12 weeks), T4 (6 months). Subgingival plaque samples were taken at baseline and after treatment and examined for 8 periopathogens bacteria using PCR technique.

The present study showed that the additional treatment with diode laser may lead to a slightly improvement of clinical parameters, whereas no significant differences between test and control group in reduction of periodontopathogens were found.

KEYWORDS: Chronic periodontitis, Laser, Non surgical periodontal therapy

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Part No. 5400340
Evaluation of Low-Level Laser Therapy in the Treatment of Temporomandibular Disorders

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and ŞULE YÜCETAŞ, D.D.S., Ph.D.

ABSTRACT

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.

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Part No. 5400340

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

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We investigated if low level laser therapy (LLLT) of the joint capsule can reduce pain in chronic joint disorders. A literature search identified 88 randomised controlled trials, of which 20 trials included patients with chronic joint disorders. Six trials were excluded for not irradiating the joint capsule. Three trials used doses lower than a dose range nominated a priori 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 or zygapophyseal joints. The results showed a mean weighted difference in change of pain on VAS of 29.8 mm (95% CI, 18.9 to 40.7) in favour of the active LLLT groups. Global health status improved for more patients in the active LLLT groups (relative risk of 0.52; 95% CI 0.36 to 0.76). Low level laser therapy with the suggested dose range significantly reduces pain and improves health status in chronic joint disorders, but the heterogeneity in patient samples, treatment procedures and trial design calls for cautious interpretation of the results. [Bjordal JM, Couppé C, Chow RT, Tunér J and Ljunggren AE (2003): A systematic review of low level laser therapy with location-specific doses for pain from joint disorders. Australian Journal of Physiotherapy 49: 107-116]

Key words: Inflammation; Joint Diseases; Lasers; Meta-Analysis
Pain reduction by infrared light-emitting diode irradiation: a pilot study on experimentally induced delayed-onset muscle soreness in humans

Received: 19 July 2005 / Accepted: 12 December 2005 / Published online: 15 March 2006

Abstract The present pilot study investigated the analgesic efficacy of light-emitting diode (LED). In view of a standardised and controlled pain reduction study design, this in vivo trial was conducted on experimentally induced delayed-onset muscle soreness (DOMS). Thirty-two eligible human volunteers were randomly assigned to either an experimental (n=16) or placebo group (n=16). Immediately following the induction of muscle soreness, perceived pain was measured by means of a visual analog scale (VAS), followed by a more objective mechanical pain threshold (MPT) measurement and finally an eccentric/concentric isokinetic peak torque (IPT) assessment. The experimental group was treated with infrared LED at one of both arms, the other arm served as control. Irradiation lasted 6 min at a continuous power output of 160 mW, resulting in an energy density of 3.2 J/cm². The subjects of the placebo group received sham irradiation at both sides. In post-treatment, a second daily assessment of MPT and VAS took place. The treatment and assessment procedure (MPT, VAS and IPT) was performed during 4 consecutive days. Statistical analysis (a general linear model followed by post hoc least significant difference) revealed no apparent significant analgesic effects of LED at the above-described light parameters and treatment procedure for none of the three outcome measures. However, as the means of all VAS and MPT variables disclose a general analgesic effect of LED irradiation in favour of the experimental group, precaution should be taken in view of any clinical decision on LED. Future research should therefore focus on the investigation of the mechanisms of LED action and on the exploration of the analgesic effects of LED in a larger randomised clinical trial and eventually in more clinical settings.

Keywords Light-emitting diode · Infrared · Analgesic effect · Delayed-onset muscle soreness · Musculus biceps brachii

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Part No. 5400340
Gingival curettage study comparing a laser treatment to hand instruments

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Abstract The purpose of this clinical study was to examine nonsurgical treatments of periodontal disease comparing a diode laser to subgingival curettage with conventional hand instruments. The study group comprised 18 patients with moderate periodontal degradation who were treated without local anesthesia. Each quadrant was randomly allocated in a split-mouth design either to treatment with a 810-nm diode laser using an energy of 2 W (test group) or to gingival curettage using hand instruments (control group). Clinical data, including plaque index (PI), gingival index (GI), sulcus bleeding index (SBI), pocket depth (PD), clinical attachment level (CAL) and visual analog scale (VAS) score were acquired prior to and 4 weeks after treatment. The treatment time for each tooth was also recorded. The results demonstrated a statistically significant reduction of the GI, SBI and PD and a significant gain in CAL in both groups after 4 weeks. However, there were no significant differences between the test and control groups for the above data. The score for the degree of treatment discomfort was significantly lower and the average treatment time was significantly less in the test group than in the control group. Diode laser subgingival curettage resulted in statistically significant improvements in PD, SBI, GI and CAL with less discomfort and treatment time compared to treatment with the hand instruments.

Keywords Gingival curettage - Diode laser - Periodontal disease

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Part No. 5400340
Measurements of Jaw Movements and TMJ Pain Intensity in Patients Treated with GaAlAs Laser

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The aim of this study was to evaluate the effectiveness of low-level laser therapy (LLLT) on the improvement of the mandibular movements and painful symptoms in individuals with temporomandibular disorders (TMD). Forty patients were randomly divided into two groups (n=20): Group 1 received the effective dose (GaAlAs laser λ 830 nm, 40 mW, 5J/cm²) and Group 2 received the placebo application (0 J/cm²), in continuous mode on the affected condyle lateral pole: superior, anterior, posterior, and posterior-inferior, twice a week during 4 weeks. Four evaluations were performed: E1 (before laser application), E2 (right after the last application), E3 (one week after the last application) and E4 (30 days after the last application). The Kruskal-Wallis test showed significant more improvements (p<0.01) in painful symptoms in the treated group than in the placebo group. A significant improvement in the range of mandibular movements was observed when the results were compared between the groups at E4. Laser application can be a supportive therapy in the treatment of TMD, since it resulted in the immediate decrease of painful symptoms and increased range of mandibular movements in the treated group. The same results were not observed in the placebo group.

Key Words: jaw movements, GaAlAs laser, articular pain.

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Part No. 5400340
Treatment of Periodontal Pockets With A Diode Laser

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Background and Objective: The aim of this study is to examine the long-term effect of diode laser therapy on periodontal pockets with regard to its bactericidal abilities and the improvement of periodontal condition.

Study Design/Materials and Methods: Fifty patients were randomly subdivided into two groups (laser-group and control-group) and microbiologic samples were collected. There have been six appointments for 6 months following an exact treatment scheme. After evaluating periodontal indices (bleeding on probing, Quigley-Hein) including pocket depths and instruction of patients in oral hygiene and scaling therapy of all patients, the deepest pockets of each quadrant of the laser-group’s patients were microbiologically examined. Afterwards, all teeth were treated with the diode laser. The control-group received the same treatment but instead of laser therapy were rinsed with H₂O₂. Each appointment also included a hygienic check-up. After 6 months the final values of the periodontal indices and further microbiologic samples were measured. The total bacterial count as well as specific bacteria, such as Actinobacillus actinomycetemcomitans, Prevotella intermedia, and Porphyromonas gingivalis, were assessed semiquantitatively.

Results: The bacterial reduction with diode laser therapy was significantly better than in the control group. The index of bleeding on probing improved in 96.9% in the laser-group, whereas only 66.7% in the control group. Pocket depths could be more reduced in the laser group than in the control group.


Key words: root; scaling; microbiology

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Low-level laser therapy for pain caused by placement of the first orthodontic archwire: A randomized clinical trial

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Introduction: The purpose of this study was to clinically evaluate the effect of low-level laser therapy (LLLT) as a method of reducing pain reported by patients after placement of their first orthodontic archwires. Methods: The sample comprised 60 orthodontic patients (ages, 12-18 years; mean, 15.9 years). All patients had fixed orthodontic appliances placed in 1 dental arch (maxillary or mandibular), received the first archwire, and were then randomly assigned to the experimental (laser), placebo, or control group. This was a double-blind study. LLLT was started in the experimental group immediately after placement of the first archwire. Each tooth received a dose of 2.5 J per square centimeter on each side (buccal and lingual). The placebo group had the laser probe positioned into the mouth at the same areas overlying the dental root and could hear a sound every 10 seconds. The control group had no laser intervention. All patients received a survey to be filled out at home describing their pain during the next 7 days. Results: The patients in the LLLT group had lower mean scores for oral pain and intensity of pain on the most painful day. Also, their pain ended sooner. LLLT did not affect the start of pain perception or alter the most painful day. There was no significant difference in pain symptomatology in the maxillary or mandibular arches in an evaluated parameter. Conclusions: Based on these findings, we concluded that LLLT efficiently controls pain caused by the first archwire. (Am J Orthod Dentofacial Orthop 2009;136:662-7)
Maximising gingival aesthetics using lasers

By Professor Laurence J. Walsh

For optimal health, function and aesthetics, the appearance and form of the gingival tissues must be free of inflammation, symmetrical (with correct heights of contour and heights of the zeniths) and be harmoniously balanced with the dentition and peri-oral tissues. The gingival height of contour of the maxillary central incisors is the same as maxillary canines, with the maxillary lateral incisors being 1mm lower. When planning any veneer or crown work in the aesthetic zone, attention must be given to maximising tissue health so that a predictable aesthetic result is obtained. This requires that the preparation, temporary restoration and final restoration does not infringe the biological width, so that subsequent attachment loss through pocket formation (in thick tissue biotypes) or gingival recession (in thin tissue biotypes) does not occur. It is also necessary to avoid physical damage and chemical insult to the gingivae during tooth preparation and to employ a well-adapted and correctly contoured provisional restoration.

Careful and systematic evaluation of the baseline clinical situation will include an assessment of oral hygiene habits, periodontal attachment levels, mucogingival architecture and tissue biotype, gingival tissue thickness and consistency, papilla form, occlusion including guidance during protrusive and lateral excursions, incisor relationships and tooth mobility. This is normally supplemented with radiographs to assess crestal bone levels and crown/root ratios. From these factors, the decision regarding choice of technique can be made, with the fundamental questions being will there be infringement of the biological width and thus is resection of bone required? Once a decision is made regarding the type of procedure (Table 1), the next question is whether a conventional or laser approach will be used (Table 2). Erbium and diode lasers allow a very conservative approach to many common clinical situations, including gingivoplasty when outside the biological width (Figure 1).

Lasers have been used for periodontal surgery since the mid 1960’s, with an extensive literature on the processes of tissue ablation and wound healing, as well as on surgical outcomes. Over the past decade, considerable interest has been directed to diode lasers as a niche tool for minor periodontal surgical procedures and troughing, as a direct replacement for electrosurgery and other conventional approaches. Lasers of various types offer major advantages in terms of increased precision, invasiveness of the procedure and patient post-operative experience (Table 3).

Compared with scalpel surgery, both electrosurgery and lasers reduce or eliminate bleeding during procedures, which improve visibility of the site and reduces operating time. Lasers can be used to create open wounds which rapidly undergo sec-
Effects of different setting of diode laser on the mRNA expression of growth factors and type I collagen of human gingival fibroblasts

Sema S. Hakki & S. Buke Bozkurt

Received: 22 July 2010 / Accepted: 29 December 2010

Abstract The aim of this study was to analyze the influence of non-surgical applications of diode laser (940 nm) on the cell proliferation and mRNA expressions of type I collagen and growth factors in human gingival fibroblasts (GF). Gingival fibroblasts were isolated from human gingival connective tissue of systemically healthy individuals. Cells were treated with different laser parameters as follows; (1) Infected pocket setting (power: 2 W, pulse interval: 1 ms, pulse length: 1 ms, 20 s/cm²); (2) Perio-pocket setting (power: 1.5 W, pulse interval: 20 ms, pulse length: 20 ms, 20 s/cm²); and (3) Biostimulation setting (power: 0.3 W in continuous wave, 20 s/cm²). Proliferation of GF was evaluated after different laser applications using a real-time cell analyzer. Total RNA was isolated on day 2 and cDNA synthesis was performed. Type I collagen, insulin-like growth factor (IGF), vascular endothelial growth factor (VEGF) and transforming growth factor-beta (TGF-β) mRNA expressions were determined with quantitative RT-PCR. In a proliferation experiment, no significant differences were observed in the different laser applications when compared to the control group. Statistically significant increases in IGF, VEGF, and TGF-β mRNA expressions were noted in the laser groups when compared to the untreated control group (p < 0.05). A significant increase in collagen type I mRNA expression was noted in only biostimulation set-up of diode laser (p < 0.05). The results of this study demonstrate that non-surgical laser applications modulate behavior of gingival fibroblasts inducing growth factors mRNA expressions and these applications can be used to improve periodontal wound healing.

Keywords Diode laser · Low-level laser therapy · Gingival fibroblasts · Growth factors · Type I collagen · Proliferation

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Diode-laser Management of Puberty-induced Gingivitis and Grade II Gingival Enlargement in a Female Patient: A Case Report

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Abstract:
Although gingival curettage is the conventionally recognized procedure for management of inflamed tissue, readily available and economical diode lasers - the most commonly used lasers – help in nonsurgical management of gingival inflammatory changes. A case report is described here in which diode laser is used to treat puberty-induced gingival enlargement. The case report shows a new approach to managing puberty gingivitis, which commonly shows inflammatory enlargement that does not completely regress after puberty is over. The enlargement is usually an exaggerated response to local plaque due to high amount of hormones, such as estrogen and testosterone. The changes are relatively nonspecific, with color and contour changes, and are associated with bleeding on mild stimulation. Diode lasers are the best option to eradicate bacteria from gingival pockets and achieve reliable long-term results.

Keywords: diode laser, puberty gingivitis, gingival enlargement, pocket disinfection, curettage.

J Oral Laser Applications 2010; 10: 135-138. Submitted for publication: 19.10.10; accepted for publication: 12.11.10.
Surgical Lengthening of the Clinical Tooth Crown by Using Semiconductor Diode Laser: A Case Series

Sanjay B. Lagdive, Sushma S. Lagdive, P. P. Marawar, Aruna J. Bhandari, Abhishek Darekare, Veena Saraf

Abstract: Surgical crown lengthening procedures are performed to aid in the retention of prostheses by allowing proper tooth preparation, impression procedures, and placement of restorative margins. A healthy periodontium is a key to a successful prosthesis. It is necessary to prepare periodontal tissues properly before restorative treatment to ensure good form, function, and esthetics of the masticatory apparatus as well as patient comfort. There are different surgical techniques used for crown lengthening, e.g., gingivectomy, apically displaced flap, crown lengthening with ostectomy, and lasers. The success of such procedures depends on the biological width.

Keywords: diode laser, crown lengthening, biological width, gingivectomy, gingivoplasty.

Submitted for publication: 31.12.09; accepted for publication: 11.03.10

Effect of the Diode Laser on Bacteremia Associated with Dental Ultrasonic Scaling: A Clinical and Microbiological Study

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ABSTRACT

Objective: The purpose of this study is to evaluate the potential use of diode lasers (DLs) to reduce bacteremia associated with ultrasonic scaling (US). Furthermore, the clinical efficacy of DLs as an adjunct to US in the treatment of gingivitis was investigated. Background Data: Recently, lasers have found new applications in dental practice. The benefits of the use of DLs as an adjunct to US have not yet been determined. Methods: Twenty-two gingivitis patients were treated using a split-mouth study design in which each side was randomly treated by US alone or DL followed by US (DL + US). Blood samples were drawn just before and during US in each treatment step to detect induced bacteremia. Clinical parameters including plaque index, sulcus bleeding index, probing depth, and relative attachment level were recorded at baseline and 4 weeks postoperatively. Results: Bacteremia was detected in 15 patients (68%) after US alone, and in 8 patients following DL + US (36%). The reduction of the incidence of odontogenic bacteremia during US after the application of DL was statistically significant ($p < 0.05$). Clinical signs improved eventually, with no significant differences between the two treatment regimens ($p > 0.05$). Conclusions: Application of DL energy can reduce bacteria in gingival crevices which may reduce bacteremia following US. The use of DL did not show additional clinical influence on gingival healing after treatment of gingivitis with US.
Diode Laser (980 nm) as Adjunct to Scaling and Root Planing

J.L. LEYES BORRAJO, M.D., Ph.D., D.D.S., L. GARCÍA VARELA, M.D., Ph.D., D.D.S.,
G. LÓPEZ CASTRO, D.D.S., I. RODRÍGUEZ-NÚÑEZ, Ph.D., D.D.S., and
M. GALLAS TORREIRA, Ph.D., D.D.S.

ABSTRACT

Objective: The aim of this study was to evaluate clinical efficacy of InGaAsP diode laser as adjunct to traditional scaling and root planing. Background Data: The use of laser is one of the most recent methods in nonsurgical periodontal treatment. Efficacy and side effects of each type of laser treatment have yet to be determined. Methods: Thirty patients suffering from moderate periodontal disease have been considered. They were randomly selected to undergo either scaling and root planing with curets, or scaling and root planing combined with InGaAsP laser (980 nm and 2 W). The papilla bleeding index (PBI), bleeding on probing (BOP), and clinical attachment level (CAL) were registered at the beginning and end of treatment. Results: At the end of treatment, PBI average in the group treated with laser was 0.24 versus 0.43 in the group under conventional treatment (p = 0.014). In the group undergoing scaling and root planing, BOP decrease is 19.55% less (p < 0.0001) than in the group also treated with laser. Nevertheless, CAL differences cannot be considered significant between both groups (p = 0.67). Conclusions: Scaling and root planing in combination with laser produce moderate clinical improvement over traditional treatment.