

Treatment of periodontal pockets with a diode laser.

AN 98335718 19981020. AU Moritz-A, Schoop-U, Goharkhay-K, Schauer-P, Doertbudak-O, Wernisch-J, Sperr-W. IN Department of Conservative Dentistry, Dental School of the University of Vienna, Austria. TI

SO Lasers-Surg-Med 1998, VOL: 22 (5), P: 302-11, ISSN: 0196-8092. AB 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. CONCLUSION: The diode laser reveals a bactericidal effect and helps to reduce inflammation in the periodontal pockets in addition to scaling. The diode laser therapy, in combination with scaling, supports healing of the periodontal pockets through eliminating bacteria. Author.

Histometrical Evaluation of the Healing of the Dental Alveolus in Rats After Irradiation with a Low-Powered GaAlAs Laser

Rosane F. Z. Lizarelli*; Tereza L. Lamano-Carvalho**; Luis G. Brentegani** *Physics Institute of São Carlos, University of São Paulo, São Carlos, SP, Brazil. 13560-970 **College of Dentistry of Ribeirao Preto, University of São Paulo, Ribeirao Preto, SP, Brazil. 14.040-000 LIZARELLI, R. F. Z.; LAMANO-CARVALHO, T. L.; BRENTEGANI, L. G.

Histometrical evaluation of the healing of the dental alveolus in rats after irradiation with a low-powered GaAlAs laser. in Lasers in Dentistry V, John D. B. Featherstone, Peter Rechmann, D.D.S., Daniel Fried, Editors, Proceedings of SPIE Vol. 3593, p. 49-56, 1999. ABSTRACT The aim of the present work was to evaluate histometrically the effect of the irradiation with semiconductor diode GaAlAs 790 nm low-powered laser in the chronology of alveolar repair of rats.

Lasers of low intensity possesses an eminently analgesic, anti-inflammatory and bioestimulant effect, producing an increase of the local micro-circulation and in the speed of healing. Groups of five animals had their upper right incisors extracted under anesthesia and the mucous sutured; three groups received 1.5 J/cm² of irradiation immediately after the extraction with laser for sweeping on the operated area. After that, the animals were sacrificed in the periods of 7, 14 and 21 days after the dental extraction. The material was decalcified and processed for inclusion in paraffin. Longitudinal sections of 7 micrometers in the alveolus were made and stained with HE.

The histometric analysis was performed with the Merz grid, and 2000 points were counted in each cervical, middle and apical thirds of the alveolus, assessing the percentage of the bone tissue. The results shows that low-powered intensity laser produced acceleration in osseous formation (10%) in some periods. The influence of low-powered laser on the

healing process is more significant when we can apply the laser light just after the tissue trauma. Cells with a lower than normal pH, where the redox state is shifted in the reduced direction, are considered to be more sensitive to the stimulate action of light than those with the respective parameters being optimal or near optimal. The proposed redox-regulation mechanism may be a fundamental explanation for some clinical effects of irradiation, a consequence of this was the difference between the groups of 7 days is more significant than between the other groups.

A study of the application of Ga-As semiconductor laser to endodontics.

Kurumada F. The effect of laser irradiation on the activation of inflammatory cells and the vital pulpotomy. *J Clinical Pediatric Dentistry*. 1995; 19: 232.

The effects of GaAs on the activation of macrophages and fibroblasts were examined by determining the rate of glucose utilization into the cell and the activity of lactate dehydrogenase in culture supernatant. The irradiated macrophages that had been prepared from the peritoneal exudate cells, did not show any enhancement of activity, whereas the fibroblast cell line was activated by laser irradiation.

These findings suggest that GaAs irradiation was effective for the growth of fibroblasts and induced suppressive effects for macrophages. Further, the effects of laser on the vital pulpotomy were investigated. It was observed that irradiation induced enhancement of calcification in the wound surface and stimulated formation of calcified tissue. These observations indicate that laser irradiation is a useful method for the vital pulpotomy.

LLLT in the dental clinic

Pinheiro A et al. Low-level laser therapy is an important tool to treat disorders in the maxillofacial region. *J Clinical Laser Med & Surg*. 1998; 16 (4): 223-226.

241 patients with different disorders in the maxillofacial region were treated with LLLT. Indications were temporomandibular disorders, trigeminal neuralgia, muscular pain, aphthae 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.

LLLT improves nerve injuries

Dr. Shelley M Khullar of the Department of Oral Surgery, Faculty of Dentistry, Oslo, Norway presented her dissertation in February 1997. The title of the dissertation is "Reinnervation after nerve injury: The effects of low level laser treatment". The conclusion of the five published studies are: *A course of 20 LLL treatments using a GaAlAs laser (=820 nm) on an area of long-standing paraesthesiae in the orofacial region induced an objectively evaluated significant improvement in fine mechanosensory perception and a decrease in the area of paraesthesiae. *The significant improvement in mechanosensory perception was also perceived as a subjective improvement by the patients. *A course of 20 LLL treatment with a GaAlAs laser (=820 nm) induced no change in thermoperception in an area of paraesthesiae. *Daily LLL treatment over a 28 day period, with a GaAlAs laser accelerated motor nerve reinnervation as assessed by return of motor function subsequent to a standardised axonotmesis injury in the rat sciatic nerve. *LLL treatment with a GaAlAs (=820 nm) laser enhanced sensory reinnervation of peripheral target tissues subsequent to an IAN axotomy injury in the rat model. The findings are demonstrated immunohistochemically by the presence of CGRP positive neurones.