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The 8th International Congress on Lasers in Dentistry



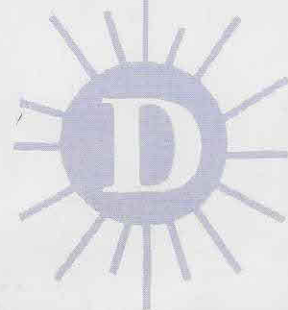
in conjunction with



**The 14th
Annual Meeting
of the Japanese Society
for Laser Dentistry**

**July 31-August 2, 2002
YOKOHAMA, JAPAN**

Program and Abstract



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**Laser Dentistry
— Revolution of Dental Treatment in New Millenium —**

新世紀における歯科治療の革新 “レーザー歯学”

July 31-August 2, 2002
YOKOHAMA, JAPAN

21 Effect of a Diode Laser Irradiation in Root Canals Contaminated with *Enterococcus Faecalis*. "In vitro" Study

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High success rates were achieved in conventional endodontic treatment of vital pulp teeth. However, in non-vital pulp a decrease of success occurs due to difficulties to achieve a complete disinfection of root canal system. Some bacteria, such as *Enterococcus faecalis*, are frequently found in endodontic treatment failure due to their high resistance to the usual process of canal shaping and cleaning. The purpose of this work was to evaluate the effectiveness of a diode laser irradiation in bacterial reduction of contaminated canals as well as to analyze the effect of the laser irradiation associated with the use of calcium hydroxide paste. Eighty two root canals infected with *Enterococcus faecalis* suspension (1×10^6 CFU/ml) were irradiated with a high power diode laser (810nm, Opus 10- Sharplan - Israel) with two different parameters: 2.5W and 3 W (cw), using a 360 μ m fiber at an angle of approximately 5 degrees to the dentine surface during 5 seconds in 5 applications, within 20 seconds intervals between. Temperature was monitored at apex using a K-pipe thermocouple. Maximum temperature was 7.45°C. After these proceedings specimens were vortexed in peptone water and dilutions performed. Aliquots were plated on m-*Enterococcus* agar. Colonies Forming Units (CFU) of all groups was counted. Statistically the results showed a significant reduction of bacteria on all groups after laser irradiation. A high reduction rate was achieved: 98.5% immediately after laser irradiation; 48 hours after, the reduction rate was 96.73% and finally a 100% reduction was achieved with the association of laser irradiation and calcium hydroxide paste. These high rates of bacteria reduction were achieved using the parameter of 3W (cw), 4.24 KW/cm². The use of high power diode laser 810nm is highly efficient and suitable to reduce *Enterococcus faecalis* in infected root canals.

22 Antibacterial Effects of a 830 nm Diode Laser Irradiation within the Root Canals

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This study aimed to examine the bactericidal ability of a 830 nm diode laser. Thirty freshly extracted teeth were used in this study. Root canals were conventionally prepared, randomly assigned to one of the five groups of six teeth each and sterilized (autoclave). Three references aerobic strains (*E. coli*, ATCC 25921, *S. aureus* ATCC 25923, *P. aeruginosa* ATCC 27853) and two anaerobic strains (*P. buccae*, Ni 21, *P. micros* Ni 25) were grown using a previously described protocol (Fosse et al., Oral Microbiol. Immunol, 1999). Bacterial suspensions were adjusted to DO 600 nm for numeration controls and root canal decontamination assays (Hitachi U 2000 spectrophotometer). One hundred μ l of initial and diluted suspensions (10^{-2} and 10^{-4}) were plated onto Petri dishes for CFU numeration: a 10^{-4} reduction corresponded to a bactericidal effect. In parallel teeth were inoculated with 10 μ l of initial bacterial suspension and submitted to laser activations (Opus 10, Sharplan, Lumenis). Two irradiations mode (CW, pulsed) and two output powers (3W, 5W) were used. The irradiation time ranged from 10 sec. (CW, 3W) three times with two resting times (2 sec each) and 10 sec (pulsed, 5W) three times with two resting times of 5 sec. each. The post laser inoculum (90 μ l sterile distilled water) was plated on Petri dishes for CFU numerations and samples were fixed for SEM examination. Results expressed in CFU showed a mean value ranging from 0.0 ± 0.0 to 1.8 ± 2.2 . There was no difference between the two irradiation mode and the two output power. All the negative controls yielded negative results. No entire bacteria could be identified in the root canals SEM observed. The 830 nm diode laser had a bactericidal effect on the five bacterial strains tested in experimentally infected root canals.