



Academy of Laser Dentistry

Sixth Annual Conference and Exhibition

February 3-6, 1999

**DoubleTree Resort at Desert Princess Country Club
Palm Springs, California**

Trabalho pertencente à Biblioteca
do Prof. Carlos de Paula Eduardo

Conference Program

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Ongoing experiments and future aspects will be presented. Animal trials have to prove the safety of the application before the laser will be tested in clinical studies. Design of the studies will be shown and the expected outcome will be explained. Finally, the benefits for the patient and for the dentist will be discussed.

Presenter Biography: Dr. Rechmann graduated in dentistry in 1980 and completed his thesis in 1982 at the Heinrich-Heine-University of Düsseldorf, Germany. In 1980 he became a medical staff member at the Department of Oral Surgery and Oral Medicine, Heinrich-Heine-University. Since 1986, in cooperation with the Institute of Laser Medicine, he has continuously investigated the biological corrosion of dental materials and its toxicological relevance. In this field he finished his habilitation in 1991. Since 1989, he has collaborated with the Institute of Laser Medicine on the study of selective ablation of dental hard substances with pulsed lasers. He received his appointment as professor in 1997.

Disclaimer Information: None.

11:25 am - 11:40 am

Observation of Cervical Enamel and Root Dentin After Root Caries Removal Using an Er:YAG Laser

Akira Aoki, DDS, PhD (1); Isao Ishikawa (1); Toshimoto Yamada (2); Masayuki Otsuki (2); Masaaki Katumi (2); Nobuharu Kanemura (2); Hisashi Watanabe, DDS, PhD (1); Junji Tagami (2)

Department of Periodontology (1), Department of Operative Dentistry (2), Tokyo Medical and Dental University, Tokyo, Japan

The purpose of this study was to examine morphological and histological changes in the cervical enamel and root dentin of the prepared cavity after root caries ablation using the Er:YAG laser. Extracted human teeth with root caries were used. Half of the carious lesion in each tooth was ablated using an Er:YAG laser, and the other half was removed using a conventional steel bur. The laser apparatus employed was an ML22 pulsed Er:YAG laser (Erwin: HOYA co., and J. Morita Mfg. Co., Japan). Laser irradiation was carefully performed at 145 mJ/pulse and 10 pps under water spray using a combination of contact and noncontact modes. After the experiment, scanning electron microscopic (SEM) and histological observations were performed for each treatment.

The Er:YAG laser ablated the carious root lesion effectively. Caries removal was completed with laser treatment to the same degree as with bur treatment. Careful performance of the laser irradiation minimized the ruggedness of the cavity surface. Histologically, the superficial change of the lased dentin was generally minimal although a severe change was occasionally noted locally. Under SEM observation, the superficial layer of the lased dentin showed various patterns of microirregularity and various degrees of darkness at a depth of approximately 5 to 15 micrometers. Degradation of the dentin matrix showing micropores and microfissures was observed in the dark layer. On the SEM evaluation of enamel, larger microcracks and microirregularities were evident in the wall part of lased enamel near the dentino-enamel junction and a darkness of the subsurface layer was also observed in the whole area of lased enamel. The margin of the

lased cavity tended to be irregular and unclear. The Er:YAG laser was capable of ablating the carious root lesion effectively without major thermal damage to the prepared cavity surface. However, the surface characteristic of enamel and dentin treated with the laser is completely different from that with the conventional method. Further studies are required to evaluate the suitable surface treatment of the lased cavity for adhesive restorations.

Presenter Biography: Dr. Aoki was awarded his DDS degree from Tokyo Medical and Dental University in 1989 and was a clinical staff member in the Department of Periodontology, Faculty of Dentistry, Tokyo Medical and Dental University from 1989 to 1996. He received his PhD degree in 1996 and has been a Research Associate, Department of Periodontology, Faculty of Dentistry, Tokyo Medical and Dental University since 1996.

Disclaimer Information: None.

11:40 am - 11:55 am

Safe Use of Lasers in Endodontics: Thermal Considerations [Er:YAG]

*Silvia C.M. Cecchini, DDS, MSc; Denise M. Zetzell, PhD; Luciano Bachmann, BSc; Marcos Pinotti, PhD; Gesse E.C. Nogueira, PhD; Carlos P. Eduardo, DDS, PhD
Loma Linda University, Loma Linda, California

The purpose of this study was to determine safe parameters for intracanal laser irradiation, since excessive heat at the root surface may cause damage to the periradicular tissues. The effect of laser treatment irradiation on temperature rise and the morphological-related changes on root canal surfaces were determined using thermocouple probe measurements and scanning electron microscopy, respectively. Single-rooted, extracted teeth were irradiated with the pulsed Er:YAG laser (2.94 μm) using a 375- μm diameter fiberoptic probe placed in the root canal. Teeth were maintained in a 37°C water bath and temperature changes recorded as root canals were lased. Laser parameters were 40 mJ and 80 mJ/pulse, measured at the fiber end, and repetition rate of 10 Hz. The root canals were irradiated for four periods with 20-second breaks in between, slowly moving the laser fiber from the apical to coronal surfaces in a continuous, circling fashion at 2 mm/sec. The range of 2.0°C to 4.0°C temperature rise was measured. Laser parameters that produced temperature rise at the root surface below 10°C were considered safe to the periradicular tissues during intracanal laser irradiation.

Presenter Biography: Dr. Cecchini received a DDS degree from the University of São Paulo School of Dentistry, São Paulo, Brazil, and she has a MSc degree from the Energy and Nuclear Research Institute, São Paulo, Brazil. She worked with lasers with Dr. Joel M. White at the University of California, San Francisco from 1995 to 1996. Currently she is a graduate student in the Endodontic Department at Loma Linda University, Loma Linda, California. She received her Category III Mastership in 1996 and successfully completed the first Educator dental laser educational program in October 1998.

Disclaimer Information: This work was partially supported by CAPES, CNPq, and FAPESP (Brazil). No conflict of interest, nothing to disclose.