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OP34

Micro-shear bond strength of resin to Er-YAG laser treated dentin.

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Er:YAG laser is claimed to improve the bonding properties of dentin. It was tested if dentin adhesion is affected by Er:YAG laser. Ninety dentin disks were divided in groups (n=10): G1 - control; G2 - Er:YAG laser 150 mJ, 90o contact (38.8 J/cm2); G3 - Er:YAG laser 70 mJ, 90o contact (18.1 J/cm2); G4 - Er:YAG laser 150 mJ, 90o non-contact (1.44 J/cm2); G5 - Er:YAG laser 70 mJ, 90o non-contact (0.67 J/cm2); G6 - Er:YAG laser 150 mJ, 45o contact (37.5 J/cm2); G7 - Er:YAG laser 70 mJ, 45o contact (17.5 J/cm2); G8 - Er:YAG laser 150 mJ, 45o non-contact (1.55 J/cm2); G9 - Er:YAG laser 70 mJ, 45o non-contact (0.72 J/cm2). Then, bonding procedures were carried out and the micro-shear-bond test was performed. The adhesive surfaces were analyzed under Scanning Electron Microscopy. Two-way ANOVA revealed that the treatment of dentin surface with different parameters of the Er:YAG laser can influence micro-shear bond strength values. The Er:YAG laser constitutes an alternative tool for bonding procedures.

OP35

Changes in chemical composition and collagen structure of dentin tissue after erbium laser irradiation.

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The erbium laser light has a great affinity to the water molecule, which is present in great quantity in biological hard tissues. The objective of this work is to identify chemical changes by infrared spectroscopy of irradiated dentin by an Er:YAG - 2.94μm laser. The irradiation was performed with fluences between 0.365 J/cm2 and 1.94 J/cm2. For the infrared analysis a Fourier transform infrared spectrometer was used. After the irradiation were observed: loss of water, alteration of the structure and composition of the collagen and increase of the OH- radical. These alterations can be identified by a decrease of the water and OH- band between 3800-2800 cm-1, bands ascribed to collagen structure between 1400-1100 cm-1. The results show that the erbium laser changes the structure and composition of the organic matrix, OH-radical and the water composition in the irradiated dentin.

OP36

Conservative and minimal intervetion in caries lesions with Er:YAG and Er,Cr:YSGG lasers in Pediatric Dentistry.

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Pediatric and Restorative Dentistry/LELO- FOUSP.

The Er:YAG (2.94μm) and Er,Cr:YSGG (2.79μm) lasers wavelengths are highly absorbed in both water and hydroxyapatite, promoting effective ablation of caries and dental hard tissues in primary and permanent teeth. Previous studies showed efficient microbiological reduction of remains dentin, increase of acid resistance and potential reduction of secondary caries after removal of carious tissue and cavity preparation by laser. Restoratives clinical procedures were performed in children (3-9 years old) with active carious lesions from Pediatric Dentistry/LELO FOUSP, after inform consent and respected security rules, using Er:YAG (KaVo 3)(2Hz/150-250mJ/ 24ml/min air-water spray) and Er,Cr:YSGG (Millenium)-(20Hz/3-6W, air 40%, water 75%) lasers to minimal and selective caries tissues removal creating minimal cavities or conservative removal with decontamination and maintenance of dental substrate in extended lesions to atraumatic restorative treatment modified (ARTm) reducing possibility of accidental pulpal exposures. These procedures demonstrated noise reducing as vibration and pain, no contact, high acceptance and comfort by children during procedures. Conclude that Er:YAG and Er,Cr:YSGG lasers are useful and applicable to clinical procedure in Pediatric Dentistry, promoted ablation of carious tissues with minimal intervention, leading to conservative cavities and maintenance of hard tissues.

OP37

Imagin carious human dental tissue with three-dimensional optical coherence tomography.

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Researcher of "Centro de Lasers e Aplicações-Ipen" .

Optical Coherence Tomography (OCT) used in this study, is a new non invasive optical detection technique. The OCT system is based on a Michelson interferometer, that generates a cross-sectional image of the teeth with resolution up to 2 microns. The buccal surface from the third molar teeth was used to induce caries like lesions. This surface was coated with an acid resistant nail varnish except a small window. The pH demineralization-remineralization cycling model was used to produce the lesions. This cycle was repeated for 9 days and remained in the remineralizing solution for 2 days. The OCT system was implemented by using an ultrashort pulse laser (Ti:Al2O3@830nm) with 50fs of pulse width and average power of 80mW. The laser beam was focused into the teeth providing a lateral resolution of 10 microns. Image was produced with a lateral and axial scans steps of 10 microns. After analyzing the surface by OCT it was possible to produce a tomogram of dentine-enamel junction and it was compared with the histological image. This OCT system accurately depicts dental tissue and it was able to detect early caries in its structure, providing a powerful contactless high resolution 3D images of lesions. Grants: PROCAD/CAPES, 00/15135-9/FAPESP.

OP38

The influence of the Er-YAG laser application in the reduction of periodontalpathogenic bacterias.

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Estagiário do Laboratório Especial de Laser em Odontologia LELO - FOUSP.

The proposal of this study was to evaluate the influence of the Er:YAG laser application in the reduction of the periodontalpathogenic bacteria before and after periodontal treatment. The sample were consisted with 10 patients carried of chronic periodontitis, 20 uniradicular teeth, bone loss 50%, PCS 6mm and divided in two groups. The control group have received the conventional periodontal treatment and the test group have received the same treatment conventional in additional of the Er:YAG laser application (periodontal point 1,65 X 0,50mm; 60mJ/pulse; 10Hz, continuous irrigation) to the radicular surface. The samples were collected at baseline and after 4 weeks with sterile paper cone and stored in eppendorf tubes. All samples were identified by DNA probes: A. actinomycetemcomitans; B. forsytus; P. gingivalis and P. intermedia. and the quantification were made by Real Time PCR and have demonstrated remaing of 2,03% of A. actinomycetemcomitans; 9,52% of B. forsytus; 16,70% of P. gingivalis and 15,70% of P. intermedia with relationship to the initial sample. Through of those results the study could demonstrate that there was a periodontalpathogens reduction in the periodontal treatment associated to the Er:YAG laser.

OP39

Angiogenesis and inflammatory cell infiltration in healing laser and scalpel wounds.

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The proliferation of capillaries and the infiltration of inflammatory cells were microscopically evaluated in healing laser and scalpel wounds in 40 Sprague Dawley rats under a healing period of 28 days. The incisions were made parallel on both sides of the midline of the tongue. The laser wounds were made with a 6W CO2 laser by using the laser in a continuous mode and by moving the beam in focus manually 2 mms-1 with an exposure time of approximately 0.5 s per mm. The scalpel wounds were made with an ordinary surgical scalpel. Specimens for microscopic inspection were cut perpendicular to the wound sites immediately, 6h, 2, 11, and 28 days after surgery. Both wound sites were obtained into the same specimen. Each specimen was divided into two parts. The first part of each specimen was quick-frozen, fixed in methanol and further processed for immunohistochemical staining. These specimens were exposed to factor VIII related antigen antibodies (factor VIIIR:Ag), a marker for endothelial cells, washed with PBS and overlaid with peroxidase-conjugated immunoglobulin antibodies. The specimens were then inspected under a light microscope using an objective lens of 40 x and the relative amount of capillary profiles was counted from an equal area of each specimen.

The immunostaining showed a smaller amount of capillaries in the immediate specimens and during the early healing at the laser wound sites. The proliferation of the capillaries during healing seemed to be somewhat slower in the laser than the scalpel wounds. The amount of vessel profiles reached its peak value of 11 days in scalpel and at 28 days in laser wounds. At that time