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Root canal treatment using laser is one of the hottest topics in endodontics. Recently, a fine flexible quartz fiber has been developed to transmit a laser beam and concentrate it on a specific area. It can be inserted into the narrow root canal. However, it is still difficult to irradiate laser to the whole canal walls, because laser beam advances straight. In this study, the fiber tip was preliminarily processed to irradiate Nd: YAG laser to the root canal wall. An optical fiber (diameter 400μm) made of quartz and a Nd:YAG laser system (DENTAL LASER DL-1, Mani Inc.) were used in this study. The fiber tip was processed using a processing pad containing calcium carbonate. Then, Nd:YAG laser was irradiated, and the direction of laser beam was investigated using a power meter. Moreover, the fiber tip was observed by scanning electron microscopy (SEM). Laser beam was irradiated not only at the straight direction but also at the lateral direction. SEM observation indicated that the fiber tip was processed, as intended. Nd:YAG laser irradiation using the processed fiber tip might be useful for root canal preparation and disinfection, although more study is necessary for its clinical application.

P27

Chemical Modification of bovine dental enamel irradiated with holmiun laser .

Eduardo, P.L.P.; Bachmann, L.; Salvador, V.L.; Zezell, D.M.

This study investigated Ho:YLF (2,065 mm) effects on dental enamel with regards to the thermal variations in the pulp chamber during irradiation and resistance to demineralization. Twenty samples of bovine enamel were divided: 1) control- acidulated phosphate fluoride (APF) topic application followed by demineralization treatment with lactic acid; 2) Ho:YLF irradiation (100J/cm2) followed by APF and demineralization; 3) Ho:YLF irradiation (350J/cm2) followed by APF and demineralization; 4) Ho:YLF irradiation (450J/cm2) followed by APF and demineralization. All samples were quantified according to their calcium and phosphorous atoms relative concentrations before and after the treatments. X-Ray fluorescence spectrochemical analysis showed an increase on the calcium and phosphorous atoms concentration ratio and therefore the enamel demineralization reduction as a result of the lactic acid treatment in the samples irradiated with the holmium laser followed by the APF (ANOVA, Tukey $p<0,01$). To evaluate the feasibility of this study for clinical purposes, surfaces morphology were analyzed. Modifications were characterized by melted and re-solidified regions of the enamel, which can changes its permeability and solubility. Temperature changes of ten human pre-molars teeth irradiated with 350 J/cm2 and 450 J/cm2 were also monitored in the pulp chamber in real time. Temperature increases were limited to 4,2° C.

P28

Effects of Nd:YAG and diode laser irradiation of the root surface: Morphological analysis.

Fukuda, M.; Aoki, T.; Suzuki, S.; Sanaoka, A.; Ting, C-C.; Monguchi,T. .

The aim of this study was to evaluate morphological alterations of root surfaces after Nd:YAG and diode laser irradiation. Methods: Root specimens obtained from extracted periodontally involved teeth were sliced and polished. Root surfaces were irradiated by Nd:YAG laser (1064nm) at energy of 2.0W (100mJ/20pps, 200mJ/10pps) or by diode laser (805nm) at energy of 2.0W (10W/20%, 20W/10%). The laser profile microscope was used for evaluation of root surfaces roughness. Results: The roughness of root surfaces was expressed by roughness average (Ra) value. The Ra value of the polished root surfaces was 1.02. The Ra values of the root surfaces which was irradiated using Nd:YAG laser were 1.56, 2.40, and the Ra values of diode laser were 1.37, 1.27. In addition, the Ra value of root planing using a scaler was 1.30. Conclusions: The Ra value of the root surfaces which were irradiated by Nd:YAG laser at 200mJ/10pps was the biggest in all of the test. However, no significant difference was observed between Nd:YAG laser at 100mJ/20pps, diode laser and root planing.

P29

Intrapulpar temperature variation in primary teeth during cavity preparation using: Er:-YAG laser and conventional high-speed drill.

Fernandes, A.S.F.; Navarro, R.S.; Gontijo, I.; Haypek, P. ; Zezell, D.M.; Haddad, A.E. .

Increases of temperatures superior than 5-5.5°C can compromise the pulp vitality. The purpose of this in vitro study was to com-

pare the variation of the pulp temperature in primary teeth during the cavity preparation. Twelve primary lower incisors (Human Tooth Bank-FOUSP) were divided in 4 groups (n=3): cavity preparations were performed at buccal surface, refrigerated by air-water spray, during 20sec, using #1090 diamond burr in high-speed drill in carious-free incisors (G I) and carious incisors (G II); or Er:YAG laser (2.94μm)(KaVo 3)(LELO-FOUSP), with 6Hz repetition rate/ 600mJ energy as orientated by manufacturer, in carious-free incisors (G III) and carious incisors (G IV). The variation of temperature was measured using digital oscilloscope and thermocouple type K placed inside the pulpar chamber, simultaneously the teeth was kept under water thermal bath during the procedures. The temperatures rises were less than 4°C in all cavities preparations in different groups, the variation of temperature in laser and conventional high-speed drill groups showed similar values. The groups of carious teeth showed higher increase of temperature than carious-free teeth. The Er:YAG laser demonstrated be a safe alternative for cavities preparations in primary teeth, since that using effective and safety parameters by qualified and trained professionals.

P30

Nd:YAG laser influence on microtensile bond strength of differemt.

Ferreira, L.S.; Navarro, R.S.; Calheiros, F.C.; Francci, C.E. The aim of this study was to evaluate microtensile bond strength (MTBS) of different adhesive systems to dentin treated with Nd:YAG (1.064nm). Buccal surfaces of twenty-four bovine incisors were grounded with #180-600 grit sandpaper disks to flattened coronal and root dentin surface. Samples were distributed into groups: total etch adhesive (Scotchbond Multipurpose-SBMP, 3M-Espe) or self-etching primer (SE Bond- SEP, Kuraray), light cured, irradiated or not with Nd:YAG laser (ADT-USA), no contact optical fiber (320mm), using energy parameters: (0.8W/10-20Hz, 1.2W/10-20Hz). A composite crown was built over bonded surfaces and stored in water. Specimens were sectioned vertically into slabs, trimmed into a hourglass shape with narrowest portion at bonded interface with a cross-sectional of 0.8mm2. MTBS testing was performed at a crosshead speed of 1mm/min in a Kratos Universal Testing Machine. Mean bond strength (MPa±SD) were analyzed by ANOVA and Tukey test ($p<0.01$) showed that: on control group SEP showed statistically higher value (31.26±15.71) than SBMP (24.3±10.66), on lased groups there were no significant difference between SEP (20.34±10.01) and SBMP (22.43±9.82); control groups (27.81±1.38) showed statistically higher value than lased group (21.37±0.99); on lased groups 0.8W/10 showed the highest value (25.54±11.74). Nd:YAG laser influenced the bond strength of both adhesive systems.

P31

Morphological analysis of resin/dentin interface of different adhesive systems associated with Nd:YAG laser.

Ferreira, L.S.; Navarro, R.S.; Calheiros, F.C.; Francci, C.E. The aim of this in vitro study was to evaluate the morphology of resin/dentin interface after different adhesive systems treatment following or not Nd:YAG (1.064nm) laser radiation. Buccal surfaces of twenty-four bovine incisors teeth were grounded with #180-600 grit sandpaper disks to flattened coronal and root dentin surface. Samples were distributed into different groups in according to dentin surface treatment: total etch adhesive (Scotchbond Multipurpose- SBMP, 3M-Espe) or self-etching primer (SE Bond- SEP, Kuraray), light cured and following or not irradiation with Nd:YAG laser (ADT-USA), scanning surface during 60s with no contact optical fiber (320mm), using different parameters (0.8W/10-20Hz, 1.2W/10-20Hz). A composite crown was built over bonded surfaces and stored in water (24h/37°C), specimens were sectioned vertically into slabs. The samples were fixated, dehydrated in ascending ethanol and immersed in 1%NaOCl and 6N HCl solutions; sputter coating for examination under SEM. The SBMP created thicker smear layer and relatively long resin tags; SEP created thin hybrid layer and short resin tags; Nd:YAG laser radiation promoted thermally changes on resin/dentin interface and under dentin, creating a "modified layer" with melting of hybrid layer. The Nd:YAG laser promoted morphological changes on resin/dentin interface with both adhesive systems evaluated.

P32

Orthodontic brackets placement with ER:YAG laser. a new technical approach.

Fornaine, C.; Semez, G.; Baldissari, A.; Bertrand, M.F.;