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OP70

Model of thermal and optical effects in dental pulp during the neodymium and diode lasers irradiation.

Farhart, P.B.A.; Tanji, E.Y.; Farhat, R.P.; Zezell, D.M.; Miyakawa, W.; Nogueira, G.E.C.

Mestre em Laser em Odontologia pelo IPEN e FOU SP/SP. Applications of high intensity lasers in the enamel and dentine can produce adverse thermal effects into the pulp. Since the evaluation thermal effects into the intact pulp is not a solved problem, extracted teeth models have been used frequently. Current models, however, simulate only tooth thermal properties, not taking the remaining radiation in the pulp chamber into account. The aim of this study was to verify if the remaining radiation from neodymium and diode lasers that reach the pulp chamber, at the models using extracted bovine teeth, can causes local thermal effects. For this purpose, two models were developed using extracted bovine teeth with their pulp chambers filled with: water (model 1) and with an optical absorbent (model 2). Models were radiated with 1 W. The obtained results show that, for both lasers, the temperature rise in model 2 pulp chamber is: i) up to 11% higher than in the model 1 when the enamel is radiated and ii) up to 37% higher than in the model 1 when dentine is radiated (1 mm from the pulp). Thus, remaining radiation into the pulp is relevant for the above mentioned lasers and doses.

OP71

Carbon dioxide laser or cold scalpel on the removal of gingival melanin pigmentation - Comparative Study.

Kogler, V.L. ; Maio, M.; Lage-Marques, J.L.; Zezell, D.M..

Melanin pigmentation is the result of melanin granules produced by melanocytes present in the basal layer of the oral epithelium. Gingival physiological melanin pigmentation is symmetric and persistent, may cause esthetic problems especially in individuals with a gummy smile. Various techniques have been described for the removal of melanin pigmentation from the gingival epithelium and partial thin connective tissue, as chemical agents, cryosurgery, surgery and gingival grafts. Recently, lasers systems have been used to coagulate and vaporize cells, promoting controlled gingival ablation. This study compares clinical efficiency

to removal gingival melanin pigmentation in 20 patients with dioxide carbon laser, and 20 patients with cold scalpel during 30 days after surgery. A dioxide carbon laser (output = 5W; super-pulse = 0,5s; spot size = 2,5mm defocused; focal distance = 5,5cm, Intensity = 102 W/cm²) was irradiated on gingival mucosal surface. Both techniques presented epithelialization in 15 days. Both systems are considered effective for removal melanin pigments. Patient's evaluation with postoperative pain found the carbon dioxide laser technique superior to the cold scalpel one. After 30 days, the repigmentation occurred in 45% of the dioxide carbon laser patients, and 80% of the cold scalpel patients.

OP72

Bacterial reduction in class II furcation after root debridment with or without Nd:YAG laser irradiation.

Andrade, A.K.P. ; Feist, I.S.; Cai, S.; Pannuti, C.; Zezell, D.M.; De Micheli, G..

The use of Nd:Yag laser for bacterial reduction as an adjuvant to nonsurgical periodontal treatment has been approached in several studies. Furcation complex anatomy is responsible for comprised treatment results in this areas due to the lack of proper access for instrumentation showing the persistence of a pathogenic microbial flora. The purpose of this clinical trial, randomized, double-blinded was to evaluated the bacterial reduction achieved with the Nd:YAG associated to conventional treatment on furcation sites of patients with chronic periodontitis. In a split mouth design study, 34 class II furcations that were selected from 17 patients with chronic periodontitis. They received previous full mouth periodontal treatment, except for the experimental sites. The 17 furcations of the Control group underwent twice manual and ultrasonic root debridment in weekly intervals. The Test group received the same treatment as the Control group followed by the Nd:YAG laser application (100mJ/pulse; 1.5W; 15Hz; 60sec). The microbiological parameters total numbers of anaerobic Colony Forming Units(CFU); Black pigmented CFU and the level of *Actinobacillus actinomycetemcomitans*(Aa), *Porphyromonas gingivalis* (Pg) and *Prevotella intermedia*(Pi) were determined at baseline, immediatly and one month after the treatment. The results showed a significant reduction of total CFU for both groups immediatly after the treatment, but it was better for the Test group. After one month the total CFU average increased but

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was still below pretreatment levels for both groups. The black pigmented CFU and the level of Aa, Pg e Pi decreased significantly after the treatment but 30 days after there was an increase almost equal to baseline levels for both groups. The Nd:Yag laser associated with convencional treatment promoted bacterial reduction on class II furcation immediately after its application.

OP73

Ultrashort pulses over bovine dental enamel.

Todescan, C.D.R.; Vieira, Jr., N.D.; Samad, R.E.; Freitas, A. Z.; Eduardo, C. P.
FOUSP - LELO.

The interaction of lasers with the hard structures of the teeth, has found the excess of heat as a problem for its utilization. This study analyzes, in vitro, the interaction of the ultrashort pulse laser of Ti:safire (830 nm) with the bovine dental enamel.

The system consisted in one main oscillator integrated with an amplifier (CPA). The pulses extracted before the temporal compression inside the amplifier had 30ps, 1000Hz and ~1mJ. The pulses extracted after the compression had 60fs, 1000Hz and ~0,7mJ. The M2 was 1,3, the focal lens 2,5 cm, the focal distance 29,7 and a computadorized translation stage x,y,z moved the sample.

We evaluated the amount of tissue removed per pulse, the resulting cavities and the surrounding tissues not irradiated, under OM and SEM.

The fluency was the major factor for differentiating the two regimens studied, therefore, the intensity was not so important as we expected in this process. We found: one ablation region in "cat tongue", one ablation length, one fluency ~0,7J/cm² for 30ps and ~0,5J/cm² for 60fs (50% of high speed burr), smooth edge for 30ps and high precision of the shrp edge cut of submicrometric order for 60fs.

OP74

Bonding of self-etching and total-etch systems to Er:YAG laser-irradiated dentin. Tensile bond strength and scanning electron microscopy - Bonding to lased dentin - Tensile strength and SEM.

Ramos, R.P., Chinelatti, M.A., Chimello, D.T., Borsatto,

M.C., Pécora, J.D., Palma-Dibb, R.G..

Centro de Laser - FORP-USP.

This study investigated the effect of Er:YAG laser on bonding to dentin and the interaction pattern of different adhesive systems with the lased substrate. Tensile bond strength of a self-etching [Clearfil SE Bond(CSEB)] and two total-etch [Single Bond(SB) and Gluma One Bond(GOB)] systems to lased and non-lased dentin was evaluated and the adhesive interface morphology was examined by SEM. Dentin was either treated following the manufacturers' instructions (A) or submitted to Er:YAG lasing (80mJ;2Hz) + adhesive protocol (B). Resin cones were bonded to demarcated dentin site and tested in tensile strength. For SEM, dentin discs were obtained, bisected and the halves were treated as described above (A or B). The adhesive interfaces were examined. TBS means in MPa were: CSEB: (A)20.65(±1.81), (B)14.06(±1.88); SB: (A)18.36(±1.48), (B)16.19(±1.90); GOB: (A)16.58(±1.94), (B)14.07(±2.13). ANOVA and Tukey tests revealed that lasing of dentin resulted in significant decrease in bond strength (p<0.05). In the non-lased subgroups, CSEB had higher bond strength than the total-etch adhesives (p<0.05). Conversely, in laser-ablated specimens, CSEB provided the lowest bond strength, while SB yielded the highest means (p<0.05). Consistent hybrid layers were observed for conventionally treated specimens, whereas either absent or scarce hybridization zones were viewed for lased subgroups. Er:YAG laser irradiation severely undermined the formation of consistent resin-dentin hybridization zones and yielded remarkable lower bond strengths. CSEB self-etching primer appeared to be the most affected by the laser ablation on dentin substrate, resulting in the weakest adhesion.

OP75

Cavosurface angles of Er:YAG laser cavity preparations in deciduous teeth.

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Doutoranda em Odontopediatria pela Faculdade de Odontologia de Araraquara UNESP/ IFSC - USP.

The purpose of this study was to evaluate the rounding of the cavosurface margins and cavity floor. Measurements of cavosurface angles and the angle of cavity concavity were made at the margins and the bottom of the lased deciduous teeth enamel using