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Congress Program

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dgl. Deutsche Gesellschaft für Laser Zahnheilkunde e.V.

27th DGL ANNUAL MEETING

AALZ World Academy for Laser Education in Dentistry

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16TH LASER DENTISTRY WORLD CONGRESS

AACHEN

THREE DECADES OF LASER INNOVATION

1-3 OCTOBER 2018

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Tuesday 2 October HALL 5 (Hörsaal 5) 11:30 - 13:30

P27

Clinical analysis of the new laser analgesic management protocols of an Er,Cr:YSGG 2780nm lasers in the treatment of dental caries.

Marta Navarro Bassil*

INTRODUCTION
According to the International association for the study of pain, pain is an unpleasant sensory and emotional experience, secondary to current or potential tissue damage, or described in relation to such damage.
The conventional treatment for the elimination of caries has made use of mechanical means, often accompanied by fear and pain. Although the pain can be reduced with local anesthesia, the fear of the needle, the noise and the vibration of the mechanical preparation remain a cause of discomfort.
With the advent of Er, Cr: YSGG laser technology of 2780 nm, the level of pain perception has shown a high reduction compared to the perception of pain in procedures performed with conventional high/speed turbine handpice.
SUMMARY
In this study we used an Er, Cr: YSGG laser that emitted at a wavelength of 2.78 µm (waterlase MD from BIOLASE) applied clinically to eliminate cavities and prepare for restorations further evaluating the clinical result.
An effective clinical application of the Er, Cr: YSGG laser was expected from previous studies.
This study included 250 patients with caries from a inicial list of 536 patients between men and women, aged between 3 and 58 years old with a total of 330 cavitary preparations performed with Er, Cr: YSGG laser with powers between 6-8 watts; water levels between 80% and 90%; air levels between 60% and 80%; pulse duration of 140µs in 250 patients. Patient acceptance and pain perception were evaluated.
OBJECTIVES
1. Assess the level of acceptance of patients to the Er, Cr: YSGG laser, and the need of infiltrative analgesia when performing dental procedures in hard tissues.
2. Determine the factors causing discomfort in patients treated with Er, Cr: YSGG laser when removing decayed dental tissue.
3. Assess the response of patients to the laser analgesia protocols implemented, and the need or not to modify them according to each individual case.
4. Carry out a preliminary evaluation of pain perception during cavity preparation comparing the mechanical removal and the Er, Cr: YSGG laser for the elimination of enamel and dentin caries.
MATERIALS AND METHODS:
Patients of both sexes: female and male.
Ages between 3 and 58 years old.
All patients were treated with Er, Cr: YSGG laser of 2780 nm.
All the cavities were restored with composite resin, after application of the one-step dental adhesive light-cured with LED light of 490 nm.
The patients were instructed to answer a simple survey where their level of perception of pain, discomfort and acceptability to the implemented technology was measured.
Patients treated between december 2017-july 2018
Parameters used to manage laser analgesia in hard and soft tissues®
Parameters used in dental cavitary preparation
Survey applied to patients to evaluate the sensory perception level in the evaluated patients
Photographic support of clinical cases
CONCLUSIONS
-The control of pain and hypersensitivity in dental caries removal with a repetition rate of 20-25 pps increases the relaxation time of nerve fibers when accompanied by an adequate irrigation with water which prevents heating and consequent thermal stimulation of the nerve endings of the tissue.
-The Er, Cr: YSGG 2780 nm laser system is an efficient, effective and safe device for the elimination of cavities and the preparation of the cavity, which allows us to perform procedures with a low level of discomfort and little pain.
- 100% cases were performed without infiltrative anesthesia, 99.2% of patients did not feel pain and only 0.8% reported feeling pain.
-Adverse reaction was not observed in any of the cases, and patient acceptance for this system was favorable.

P29

Dental Pulp Stem Cell Sheets and Photobiomodulation Therapy in Bone Regeneration.

Ana Clara Fagundes Pedroni, Giovanna Sarra, Natasha Kalline de Oliveira, Maria Cristina Zindel Deboni, Maria Stella Moreira, Emanuela Prado Ferraz, Marcia Martins Marques*

1) Introduction
Diabetes Mellitus (DM) compromises bone repair, generating the need for new therapeutic strategies. Cell Sheets (CSs) cultures and photobiomodulation therapy (PBMT) may induce beneficial effects favoring cell therapy. The objective of this study was to evaluate the effect of the use of CSs of human dental pulp SCs, associated or not to PBMT, on the regeneration of bone defects in the calvaria of rats with DM.
2) Material and Methods
The undifferentiated status and osteogenic differentiation capacity of human dental pulp stem cells (hDPSCs) when arranged in cell sheets (CSs) were analyzed. DM was induced in 72 rats using Streptozotocin. The diabetic rats received critical size bone defects on the parietal bone, treated with transplant of CS or placement of commercial collagen membrane both associated or not to PBMT. PBMT was applied with infrared laser (780nm, 40mW, 1W/cm2, 0.04cm2, CW, 3s, 3J/cm2, 0.12J per point), immediately, 48 and 96 hours after surgery. Four and eight weeks after surgery, the animals were euthanized and the skulls analyzed by computerized microtomography. The data was treated statistically (p≤0.05).
3) Results
The preliminary results showed differences in the percentage of bone formation amongst the groups, mostly in 60 days after treatment. The most promising results were those of cell sheet group that showed bone formation similar to that of healthy rats. The PBMT did not interfere in the bone regeneration.
4) Conclusion
The association of cell sheet technique and PBMT seems promising as cell therapy to improve bone regeneration of diabetic rats.

P30

Shear bond strength of lingual brackets on enamel surface submitted to acid-etching or Nd:YAG laser irradiation.

Monica S. Lopes, Daísa L. Pereira*, Claudia C. B. O. Mota, Patricia A. Ana, Denise M. Zezell, Anderson S. L. Gomes

The patient demand for aesthetic orthodontic solutions is driving for use of lingual brackets and laser irradiation can prevent dental caries in this region. This in vitro study is the first one in literature that aimed to quantify the shear bond strength (SBS) on direct lingual brackets bonding after different enamel surface pre-treatments. 75 bovine incisor teeth were randomized in 5 groups (n=15): G1- untreated; G2- treated with acidulated phosphate fluoride gel (APF-gel, [F-] =1.23%, pH=3.3 to 3.9); G3- conditioned with 37% phosphoric acid (Condac 37%, FGM, Brazil) and treated with APF-gel; G4- irradiated with Nd:YAG laser (1064nm, 0.6W, 10Hz- Laser Research) and treated APF-gel; G5- irradiated with Nd:YAG laser + conditioned with 37% phosphoric acid + treated with APF-gel. The positioning of the brackets was standardized during the bonding procedure using a positioner and Transbond XT adhesive (3M Unitek, USA) was used. After bonding, all samples were thermocycled (500 cycles between 5°C and 55°C) and submitted to a 48h cariogenic challenge. After cycling, the samples were tested for shear bond strength (SBS) in a universal testing machine (0.5mm/min). SBS test values were statistically higher ($p<0.05$) in the G3 and G5 groups when compared to the other groups. This study showed that the Nd:YAG laser irradiation improved dental adhesion and increased the mechanical resistance of the enamel because the heating promoted by Nd:YAG laser irradiation changed the morphological and crystallographic properties of enamel; in this way, this treatment also offers the advantage to prevent caries around brackets.

P31

Effectiveness of the use of lasers or chlorexidine on the microbiall reduction in artificial carious lesions.

Fernanda Cristina Nogueira Rodrigues*, Renan Felip Neres Santos, Luciana Kfouri Siriani, Adriana Bona Matos, Anderson Zanardi de Freitas, Andrea Dias Neves Lago, Patricia Moreira De Freitas, Costa E Silva

1) Introduction: In order to preserve the dental structure, remnants of dentin afected by caryes can be left after removal of carious tissue. The use of disinfectant solutions is an alternative to reduce or eliminate bacterias after the cavity preparation. In the context of microbial reduction, antimicrobial photodinamic therapy (aPDT) plays an importante role. The aim of this in vitro study was to evaluate the use of aPDT or chlorhexidine in microbial reduction in artificially developed carious lesions. 2) Materials and Methods: 60 disc of human dentin affected by carious were analyzed according to surface treatment (n=10): G1 â€" no treatment; G2 â€" 2% chlorhexidine digluconate; G3 â€" antimicrobial photodynamic therapy 1 (low power laser 660 nm + 0.01% methylene blue); G4 - antimicrobial photodynamic therapy 2 (low power laser 660 nm + 0.005% methylene blue). It was used an artificial model of affected dentin developed with S. Mutans, with depth of lesion of 500 Î¼m. Carious dentin samples were collected before and after treatments using a sterile carbide spherical drill positioned at the greatest depth of the lesion (500 Î¼m). The results of colony forming units (CFU) were compared between groups. The ANOVA and Tukey test were used for statistical analysis of data, with significance level of 5%. 3) Results: The counts of CFU revealed diferences between the treatment groups, with the groups submitted to aPDT the most effective, regardless of the concentration of the photosensitizer. 4) Conclusion: The aPDT can be considered an effective alternative to microbial reduction.