Oral Presentation

HYPERPLASIA: A RETROSPECTIVE STUDY OF 22 YEARS

Aim: To evaluate the prevalence of Inflammatory Fibrous Hyperplasia (IFH) diagnosis, respective clinical variables, types of high-power lasers, and parameters used. The IFH is a benign traumatic reaction due to chronic, low-intensity local irritation, the treatment is based on conservative surgical removal, local irritant removal, and performing a biopsy. Using high-power lasers in IFH surgical excision has several advantages. This retrospective study evaluated 102 lesions of IFH in a sample of the Brazilian population whose medical records met the inclusion criteria.

Material and methods: The medical records of patients diagnosed with IFH who underwent a high-power laser procedure between 2000 and 2022 at the Special Laboratory of Laser in Dentistry (LELO-FOUSP) were analyzed. The inclusion criteria were histopathological diagnosis and records containing the Informed Consent Form (ICF). The data extracted from records were: age, sex, race, duration size, and location of the lesion, need for prescription of postoperative medication, and the laser used in the procedure. The data were tabulated and analyzed using descriptive analysis.

Results: There was a prevalence of the lesion in white female patients over the age of 40 (84.8%) and a duration of more than one year (64.3%). Most lesions were bigger than 1cm in size (61.3%) and developed in the alveolar ridge and deep sulcus regions (68%). The most used laser was the CO_2 laser (70.6%) - Union Medical Engineering Coo UM-L30 (Seul, South Korea), 10.600nm, CW, 2-6W, beam diameter 0.3 mm. In most cases, medication after the surgical procedure was not necessary (63%).

Conclusion: The IFH lesions had a predominance of white female patients over the age of 40. The most common location was the alveolar ridge and deep sulcus regions with a size bigger than 1cm and a duration of more than 1 year. The CO_2 laser was the most used due to the good hemostasis transoperative and higher biopsy speed.

Valeria Mendes, Denise Maria Zezell, Luciane Hiramatsu Azevedo (Brazil)
Category: Clinical human studies
Title: NEW LASER TREATMENT PROTOCOL FOR SNORING AND OBSTRUCTIVE SLEEP APNEA – A CONTROLLED RANDOMIZED DOUBLE-BLIND CLINICAL TRIAL

Aim: The goal of this study is to clinically evaluate the effect of non-ablative treatment with Nd:YAG (1064 nm) and Er:YAG lasers (2940 nm) in sleep breathing disorders (SBD), in a longitudinal, interventional and prospective study.

Material and methods: After approval from the Research Ethics Committee thirty volunteers, in the city of São Paulo, Brazil, with clinical condition ranging from snoring to moderate OSA, both sexes, 25 to 65 years, BMI < 40 kg/m^2 were blinded and randomized into control and laser groups. Patients received three sessions of treatment, 14 days apart. In the control group (12 volunteers), only a guide light was used without providing laser energy. 18 volunteers from the laser group were treated with high-intensity non-ablative combination of Nd:YAG and Er:YAG lasers irradiation. The entire soft palate, uvula, palatoglossal and palatopharyngeal arches were punctually irradiated with four to five shoots per point and six scans in each line. Parameters were chosen to efficiently and safely deliver energy in a five-step sequence that allows for gradual thermal sensitization of the tissue. Outcome measures including photographic records, type IV polysomnography, and snoring sound analysis were performed at pre-treatment, post-treatment, and 3- and 6-month follow-up visits. The main outcome of the study, the analysis of the upper airway lumen variation based on to Modified Mallampati Index was performed independently and in a blinded manner, as well as the statistical analysis. The oxyhemoglobin desaturation index (IDO), snoring sleep duration and the maximum snoring sound amplitude were also analyzed. Observing the variability in each outcome allowed us to analyse the differences between the experimental periods compared to the baseline for each variable, as well as the behavior of the laser group compared to the control group. Fisher's corrected chi-square test was used with a significance level of $\alpha = 5\%$.

Results: The main clinical outcome is the enlargement of the upper airway lumen after irradiation in all study periods analyzed. Therefore, the improvement in oxyhemoglobin desaturation index (ODI) and snoring. No major adverse events or side effects were observed.

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Conclusion: Non-ablative laser treatment is effective for rehabilitation of patients with Sleep Breathing Disorder. Under the protocol used in this study, the intervention is carried out in outpatient basis, without medication or anesthesia. Enlargement of the upper airway lumen by reducing tissue flaccidity improves oxyhemoglobin desaturation index, snoring sleep duration and peak amplitude of snoring sound.

Vanessa Moredo Alonso, Anderson Zanardi de Freitas, Lucas Ramos de Pretto (Brazil)
Category: In vitro
Title: ASSESSMENT OF PULPAL BLOOD FLOW WITH OPTICAL COHERENCE TOMOGRAPHY SIGNAL SPECKLE ANALYSIS

Aim: The aim of this study was to diagnose, ex vivo, the flow within the dental pulp chamber in a non-invasive manner using the speckle pattern in Optical Coherence Tomography (OCT) images. In dentistry, OCT is an established technique for diagnosing early carious lesions, evaluating remaining dentin thickness, and analyzing the quality of restorations. In Endodontics, its use has been described for in vitro analysis of root anatomical structures, quality of obturation, presence of accessory canals, and cracks.

Material and methods: This project, approved by the Research Ethics Committee used two ex vivo maxillary central incisors in a pulp microcirculation system with a 5% intralipid solution (B.Braun) and controlled flows ranging from 1 to 100 µL/min via a microfluidic pump. OCT images were acquired from the buccal surface of the dental crown at three depth profiles, using the Swept Source OCT Vega 220 system (Thorlabs Inc), with a laser diode of 1300 nm central wavelength, 16.1 mW power, and an axial and lateral resolution of 14 and 20 µm respectively, the total acquisition time was 1 s. The speckle analysis in OCT allowed us to observe that the pattern varies with the movement of internal scatterers, and faster flows result in greater intensity changes, leading to faster temporal decorrelation, enabling flow quantification.

Results: The results showed that autocorrelation values decrease as the lag increases, varying according to the flow rate. The maximum penetration depth was 2.6 mm in sample A and 3 mm in sample C, with the system detecting flows at 1.54 mm ranging from 10 µL/min to 80 µL/min and 55 µL/min, respectively. A flow map was generated with 65 B-scan acquisitions, and a flow rate of 30 µL/min to show the distribution within the tooth sample.

Conclusion: This study validates pulp flow analysis using speckle OCT as an innovative and promising approach for real-time pulp vitality testing in a non-invasive, non-ionizing, and painless manner.

Vinícius Ganzaroli, João Paulo Soares Franciscon, Tiago Esgalha da Rocha, Leticia Helena Theodoro, Edilson Ervolino, Valdir Gouveia Garcia (Brazil)
Category: Preclinical
Title: EFFECTIVENESS OF ACTIVE OXYGEN GEL COMBINED WITH ANTIMICROBIAL PHOTODYNAMIC THERAPY IN PREVENTING MEDICATION-RELATED OSTEONECROSIS OF THE JAWS IN SENESCENT FEMALE RATS

Aim: The aim of this study was to evaluate the effect of active oxygen (AO) gel (Blue®M) associated with antimicrobial photodynamic therapy (aPDT) on the alveolar repair process in senescent female rats treated with zoledronate and to analyze its effectiveness in preventing of medication-related osteonecrosis of the jaws (MRONJ).

Material and methods: Twenty-eight senescent rats were divided into the following groups: NLT, AO, aPDT, and AO+aPDT. On day 0, a ligature was placed around the first lower molar to induce experimental periodontitis. From day 1 to day 50, the rats received 0.45 ml of zoledronate (100 µg/Kg) every 3 days. After 3 weeks, the first lower molar was extracted. In the NTL group, no treatment was performed. In the AO and aPDT groups, the alveoli underwent three sessions of local application of Blue®M gel or aPDT. In the AO+aPDT group, the alveoli underwent three sessions of both therapies. For aPDT, 500µl of methylene blue (100 µg/ml; 60s) was deposited on the dental extraction site followed by irradiation with low-level laser (Thera lase, DMC Equipments Ltda; InGaAIP; 660 nm; 35 mW; 74.2 J/cm^2; 2.1 J; 60 s). Treatments were performed on postoperative days 0, 2, and 4. Euthanasia was performed 28 days post-extraction. The hemimandibles were processed for clinical, histological, and immunohistochemical analyses, including the percentage of newly formed bone