Oral Presentation

Conclusion: It can be concluded that the therapies evaluated had synergistic effects in preventing MRONJ, increasing the amount of newly formed bone and reducing the amount of non-vital bone.

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Category: Clinical human studies
Title: Er:YAG LASER IN THE AESTHETIC TREATMENT OF SMILE: CLINICAL CROWN LENGTHENING AND VENEERS

Aim: The aim of this study is to present a clinical case report of crown lengthening and veneers using high-power laser Er:YAG

Material and methods: A female patient with excessive gingival display sought LELO (Special Laboratory of Laser Dentistry) at the University of São Paulo for complete aesthetic smile treatment. Bolton analysis and Chu's proportion gauge were used to define the width-length relationship of the maxillary anterior teeth. The analysis performed by two observers indicated the need for surgical correction of the maxillary central and lateral incisors, canines, first premolars and second premolars. The clinical examination showed defects in the development of the enamel throughout the maxillary arch, and composite resin veneers were also indicated to correct teeth color and shape. Once the desired dimensions of the teeth were determined by the gauge, a gingivectomy was performed to obtain the ideal gingival margin. The chosen protocol used the Lite Touch (Light Instruments) Er:YAG (2940 nm) laser under a pulse of 100mJ/cm^2, 2W/cm^2, 20Hz with a AS7069(x) 0.8/17mm laser tip and a water spray. The gingival correction treatment was performed in a single 30 minutes session (300s each tooth). After three weeks, with correct tissue healing, composite resin veneers were performed on dental units 11, 12, 13, 14 and 21, 22, 23, 24.

Results: Er:YAG laser assisted esthetic dental crown lengthening offers a quick surgical time, decreases the painful sensation and bleeding, promotes greater precision in the construction of the flap, reduces the chances of cross-infection, are considered less psycho traumatic by patients than the traditional technique and ensures healthy healing of periodontal tissues.

Conclusion: The integration of laser-assisted techniques in dental aesthetics decreases complications and improve the overall patient experience. Future research and clinical practice should continue to explore the potential of laser in several applications, reinforcing its role in modern dental treatments.

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Category: In vitro
Title: EVALUATION OF ENAMEL DEMINERALIZATION SUBJECTED TO Nd:YAG LASER TREATMENT COMBINED WITH FLUORIDE UNDER CRITICAL PH CONDITIONS

Aim: This in vitro study assessed the impact of combining Nd:YAG laser with fluoride in reducing enamel demineralization under various critical pH conditions. The Nd:YAG laser is effective in preventing caries by promoting chemical, crystallographic, and morphological changes in the superficial enamel that enhance its acid resistance. When combined with fluoride, it amplifies its effect by increasing the contact surface area.

Material and methods: The 180 samples were divided into four groups: Negative Control, Fluoride, Laser, and Laser+Fluoride, each further subdivided for pH cycling at: pH 5, pH 4.5, and pH 4. The analyses performed included: mineral loss, Fourier-Transform Infrared Spectroscopy (FTIR) for phosphate and carbonate quantification, Optical Coherence Tomography (OCT) to determine optical attenuation coefficient, and Scanning Electron Microscopy (SEM). We used 12,300 µgF-/g Acidulated Phosphate Fluoride (Biodinâmica, Brazil), applied for 4 minutes. It was used a solid-state Nd:YAG laser (Smarty-A10, Deka Laser Technologies, Italy) with λ= 1064 nm, pulse duration of 100 µs, repetition rate of 10 Hz, and quartz optical fiber with a diameter of 365 µm. Before irradiation, a charcoal solution was applied as a photoabsorber. Irradiation was performed in a single session, with measured mean power of 0.6 W, corresponding to a power density of 573.4 W/cm^2 (the mean power on display was 1 W, demonstrating a power loss at the fiber end), and energy per pulse of 60 mJ (energy density 57.3 J/cm^2), applied for 30 seconds using continuous motorized stage. The energy per pulse was

measured before each irradiation with an optical power meter.

Results: Results showed that even under conditions where fluoride loses its physicochemical effect (pH = 4), the Laser+Fluoride treatment presented less demineralization. Mineral loss was reduced by 56.6% in the Laser+Fluoride group compared to the Negative Control group, and by 36.2% compared to the Fluoride group. Additionally, the Laser+Fluoride group showed a greater area under the phosphate band, lower optical attenuation coefficient, and less demineralization in morphological observations.

Conclusion: In conclusion, the Laser+Fluoride combination was more effective in reducing enamel demineralization under critical pH conditions than fluoride alone, representing a promising approach, especially for patients at high risk for caries and with compromised salivary flow.

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Category: preclinical study
Title: THE USE OF 810 AND 1064 nm LASERS ON DENTAL IMPLANTS: IN VITRO ANALYSIS OF TEMPERATURE, SURFACE ALTERATIONS, AND BIOLOGICAL BEHAVIOR IN HUMAN GINGIVAL FIBROBLASTS

Aim: The primary objective of this study was to evaluate the safety of 810 and 1064 nm laser treatment on dental implants. Peri-implantitis is a challenge for clinicians and researchers.

Material and methods: A pig mandible model was used to evaluate temperature increases during laser irradiation . Surface alterations on processed pure titanium discs were analyzed via scanning electron microscopy and measurement of surface contact angles. Processed titanium discs were cocultured in vitro with human gingival fibroblasts; subsequently, cell proliferation was measured.

Results: The maximum temperature and time to reach each threshold were comparable. No surface alterations were detected after 810 nm laser irradiation, whereas surface cracks were observed after 1064 nm laser irradiation under the parameter setting of 31.84 W/cm^2. Compared with unaltered processed pure titanium discs, the proliferation of human gingival fibroblasts was significantly greater on altered processed pure titanium discs.

Conclusion: The use of either 810 or 1064 nm laser treatments may increase the risk of thermal damage in terms of increased temperature if the parameter setting is not warranted. In addition, the use of 1064 nm laser treatment could lead to changes in pure titanium discs that do not negatively affect cell proliferation. Further investigations of laser-assisted therapy are necessary to improve guidelines concerning the treatment of peri-implantitis.

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Category: Clinical human studies
Title: PHOTODYNAMIC THERAPY AS ADJUVANT IN MICROBIAL REDUCTION OF THE TONGUE IN INTUBATED PATIENTS IN THE INTENSIVE CARE UNIT

Aim: The objective of this study was to determine the impact of antimicrobial photodynamic therapy (aPDT) as an adjunct to oral care, evaluating the reduction of tongue microbiota in adult patients with mechanical ventilation admitted to the intensive care unit (ICU), after a standard operating procedure for oral hygiene (SOP-OH).

Material and methods: Thirty adult patients admitted to the ICU and intubated participated in the study. Oral hygiene was performed with the aid of a toothbrush with an attached suction device (Power Clean®, Impacto, São Paulo) and with a 0.12% chlorhexidine digluconate gel solution. For aPDT, 0.01% methylene blue was used, which remained on the tongue for 5 min before irradiation. Afterwards, the tongue was irradiated at 2 points (left and right) with a red-emitting InGaAlP semiconductor diode laser (660 ± 10 nm, TherapyEC, DMC, São Carlos, Brazil), 100 mW, 9 J per point, for 180 s, totaling 18 J. Biofilm samples were collected from the tongue region of the patients in 3 moments: before SOP-OH, after SOP-OH and after aPDT. The samples were placed in Petri dishes containing specific culture media for the growth of microorganisms, taken to the laboratory, and left in an incubator for 48 h. Scores were assigned to the plates (1 to 3), depending on the microbial growth (lowest to highest, respectively).