

LINGUAL FRENECTOMY WITH ND:YAG LASER (NEODYMIUM: YTTRIUM-ALUMINUM GARNET)

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Aim: lingual frenulum shortness can determine ankyloglossia, consisting in a reduction in lingual movements, causing several problems in pediatric patients, such as: speech impediments in pronouncing certain phonemes (d, l, n, r, s, t, z), orthopedic/dental issues due to muscular pressure imbalances (which can cause malocclusion, cross-bite or open-bite), higher risk of carious or periodontal lesions, gingival recessions and interincisive diastema. Lingual frenectomy is indicated in these instances. This study aims to evaluate the benefits of DM200 Nd:Yag laser frenectomy in pediatric patients.

Methods: the study analyzed the case of an 11-year-old female patient affected by ankyloglossia, in class II, with increased overjet and atypical swallowing. The patient was op-

erated under local anesthesia via lidocaine spray, using DM200 Nd:Yag Laser DMTco, 320-micron fiber, 2/3 mm length, settings at 200Hz, 200us at 3.5 Watt, aspirating the vapors at 1/2 cm and cooling with an air syringe. After the procedure, chlorhexidine spray 0.12% for 7 days and myofunctional rehabilitation therapy with a speech therapist were prescribed.

Results: no pain or signs of psychological trauma were reported by the patient and the intraoperative bleeding was almost absent. The patient was able to speak and eat comfortably the same day of the procedure.

Conclusions: in conclusion, frenectomy using Nd:YAG laser in pediatric patients proves to be an excellent method, not requiring general anesthesia or sedation and ensuring a quick, painless recovery without bleeding, swelling, and stitches.

LASER SURGICAL REMOVAL OF A VOLUMINOUS STONE IN THE ANTERIOR WHARTON'S DUCT: A CASE REPORT

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Aim: sialolithiasis is defined as the presence of a round like calcified structure within the duct of a major/minor salivary gland. In literature, laser surgical techniques have been described in the treatment of sialolithiasis, with several advantages such as enhanced coagulation properties and minimal postoperative symptoms. The aim of this study was to report a case of Wharton's Duct Salivary Stone removal using a diode laser through an intraoral approach.

Methods: a 54-year-old man in good general health was referred to the Odontostomatology Unit by a radiologist after undergoing an ultrasound. The patient was asymptomatic although he reported a solid and enlarged mass in the mouth floor, thus an MRI was prescribed after the clinical examination. The MRI showed an altered intensity area within a dilated

right Wharton's duct, therefore surgery was planned. The surgery was performed using a diode laser 980 nm and after the removal of the sialolith a sutured iodoform gauze was placed to maintain the duct's patency and prevent future relapses.

Results: the patient had a regular post-operative course. Three days after the surgery, the suture and the iodoform gauze were removed and the duct's function recovery was observed, followed by an optimal tissue healing without any swelling, bleeding, infection, or pain. Additional follow-ups at 7 and 30 days showed a complete "restitutio ad integrum".

Conclusions: the absence of intraoperative bleeding in addition to the absence of postoperative complications make the laser-surgery a viable alternative to the traditional scalpel surgery.

IDIOPATHIC GINGIVAL AND BONE HYPERPLASIA TREATED WITH DIODE AND ER:YAG LASER

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Aim: idiopathic gingival hyperplasia is a condition characterized by a progressive overgrowth of the gingiva, that in some cases also involves the underlying bone. Although there are many treatment approaches, laser surgery seems an effective method based on several advantages (e.g. faster wound healing, reduction of bleeding, minimal invasiveness). Here we report a case of idiopathic gingival and bone hyperplasia treated with diode and Er:YAG laser.

Methods: a 55-year-old patient was referred to the University Clinic of Parma because of the presence of an idiopathic gingival and bone hyperplasia, involving both the upper and lower jaws present for 40 years. Osteoreductive surgery was performed using Er:YAG laser, along with concurrent gingivectomy and diode laser gingivoplasty of the upper and lower frontal sectors.

Pieces of bone and gingiva were collected for histopathological analysis.

Results: histopathological evaluation of the excised tissues revealed bone and gingival hyperplasia without potentially malignant alterations. Two years after the initial surgery, a recurrence of gingival hyperplasia in the lower frontal sector occurred. A second gingivectomy was performed using diode laser and the healing was satisfactory. No recurrences were observed 6 months after second surgery.

Conclusions: idiopathic gingival and bone hyperplasia may require surgery for ameliorating function and aesthetics. Laser treatment offers advantages in terms of efficient tissue removal and good healing with minimal post-operative discomfort. Recurrence may be associated to genetic predisposition.

EARLY TONGUE CANCER MANAGED WITH ND:YAG LASER, RESORBABLE MEMBRANE AND HYALURONIC ACID

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Aim: Oral Lichen Planus (OLP) is a chronic inflammatory disease which falls into the group of Oral Potentially Malignant Disorders (OPMD), and the risk of malignant transformation is estimated at 1-3%. Thus, it is important to monitor patients with this condition to intercept any suspicious lesions early. The aim of this study is to assess the efficacy of an innovative approach in the management of early oral cancer through the combined use of Nd:YAG laser, cross-linked hyaluronic acid gel (xHyA), and porcine pericardium resorbable membrane (PPM).

Methods: the case involves a 64-year-old HCV positive male patient with OLP. In December, a nonhomogeneous, thickened, and painful white lesion on the right margin of the tongue was found. Incisional biopsy revealed microinvasive carcinoma, so surgical excision was conducted. After loco-regional

anaesthesia, the edge of the tissue to be removed was outlined, and excision was performed by Nd:YAG laser (3.75W, 75Hz). Then, an xHyA gel (1.6% xHyA, 0.2% native HA) carried by syringe was applied to the bottom of the wound. Lastly, a PPM previously hydrated and shaped following the defect profile was placed and fixed with resorbable sutures.

Results: follow-up shows rapid healing of the surgical site in absence of inflammation: the complete re-epithelialization of the wound occurred in only 3 weeks and no functional impairment was reported.

Conclusions: our approach using Nd:YAG laser, xHyA and PPM after the removal of oral carcinoma shows encouraging results in wound healing. This option is also associated with high patient tolerability.

LASER THERAPY FOR FRENULECTOMY

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Aim: this study aims to assess the impact of abnormal frenulum conditions, particularly in the median superior or inferior labial frenulum and lingual frenulum, on oral function and overall patient wellness.

Materials and Methods: frenectomy procedures were conducted using both traditional surgical techniques with a scalpel and laser-assisted techniques. The use of lasers in frenectomy provides advantages such as hemostatic capacity, decontamination, biostimulation of the cut area, selectivity on the target tissue, reduced need for local anesthetic, and enhanced patient comfort during and after surgery. Clinical cases included in this study were treated with a 970 nm infrared diode laser with continuous emission and 2W power, under plexus anes-

thesia. These procedures must be performed by experienced professionals to reduce the risk of complications such as bleeding or infection.

Results: successful frenectomy has demonstrated significant enhancements in oral appearance and patient well-being.

Conclusions: it is crucial to acknowledge that each frenulum abnormality case is unique and necessitates individualized evaluation by specialists. Additionally, in instances involving a short lingual frenulum, surgical intervention alone may not suffice to restore optimal anatomical and functional states. Therefore, the integration of pre- and post-surgery speech therapy is essential for comprehensive treatment and long-term success.

HISTOLOGICAL *EX-VIVO* EVALUATION OF TWO-WAVELENGTH DIODE LASER IN ORAL SOFT TISSUE BIOPSIES

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Aim: this *ex-vivo* study was conducted to evaluate the thermal effects of an innovative laser device using two different wavelengths (450 nm and 808 nm) on cadaver pig tongue.

Methods: the diode Wiser 3 Laser (Doctor Smile, Brendola (VI), Italy) has three-wavelength options designed for different applications. Combining 450 nm and 808 nm wavelengths with a 300 µm fiber tip produced 36 samples from fresh pig cadaver tongues. Power ranged from 2 to 4 W in both continuous and pulsed wave modes. Specimens were divided into six groups of six samples each. Histological analysis was conducted at 2.5x magnification using an optical microscope.

Results: the findings revealed consistent histological clarity

across all samples exposed to PW at 4 W (average values: 1.4 mm and 1.75 mm). The minor epithelial and connective tissue damages, on the other hand, were observed in samples exposed to CW at 2 W (average values: 1.07 mm and 1.39 mm).

Conclusions: based on the data, connective tissue damage is generally higher than epithelial damage. Laser wavelengths are selectively absorbed by melanin, hemoglobin and water, causing more significant effects on the vascularized and hydrated connective tissue. Pulsed mode led to slightly more damage than continuous mode across all power levels. Further studies with more samples could provide clarity on this.

DIFFERENCES IN SURGICAL OUTCOMES: BLUE LASER 445NM VS DIODE LASER 980 NM: STUDY IN LVP

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Aim: the 445 nm diode laser emerges as an optimal tool for soft tissue surgeries owing to its precise hemoglobin absorption peak. This laser's heightened affinity for hemoglobin results in pronounced hemostatic effects on treated tissues. Additionally, its limited tissue penetration, when appropriately managed, facilitates precise, bloodless incisions, thereby reducing carbonization effects and ensuring effective decontamination. This preliminary study aims to evaluate the efficacy and disparities in healing and postoperative recovery in the treatment of Proliferative Verrucous Leukoplakia (PVL) using diode lasers with two distinct wavelengths.

Methods: 5 patients diagnosed with PVL underwent treatment, 3 receiving a 445 nm wavelength diode laser and 2 undergoing treatment with a 980 nm wavelength. Specimens collected were required to possess a surface area of at least 1

cm². Subsequently, patients were administered ASEPSIS and SWAS questionnaires to assess surgical wound healing, along with the VAS scale to quantify pain levels two weeks post-surgery.

Results: both wavelengths demonstrated effectiveness in lesion excision with minimal bleeding. ASEPSIS and SWAS questionnaires revealed satisfactory wound healing in both groups, with scores <10 and the absence of complications. However, patients treated with the 445 nm diode laser reported lower postoperative pain levels based on the VAS scale.

Conclusions: diode lasers have significant potential in PVL surgery. Further investigations are mandatory to establish the optimal parameters for achieving superior outcomes and understand their interactions with biological tissues.

LLLT IN CANCER PATIENTS AFFECTED BY ORAL MUCOSITIS: A PRELIMINARY REPORT

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Aim: radiotherapy-induced oral mucositis is a severe complication in patient with head and neck cancer, showing mucosal erythema or ulceration, associated with pain variably limiting chewing and swallowing, frequently leading to malnutrition. Aim of this study was to suggest a clinical-diagnostic protocol and to assess radiotherapy-induced oral mucositis outcomes in patients treated with Low Level Laser Therapy (LLLT).

Methods: patients referred to the Unit of Odontostomatology complaining severe oral mucositis as complication of chemio-radiotherapy. Authors collected clinical-diagnostic data and performed LLLT (980 nm) in CW at 1 W, with a dedicated handpiece for photo-biomodulation; each lesion received 2 minutes of defocalized irradiation (150-200 J) every 3 days until complete healing.

Results: we treated 12 patients (cancer of the tonsil in 5, 3 tongue, 2 lip, 1 thyroid, 1 nasociliar carcinoma), 8 undergoing radiochemotherapy, 4 radiotherapy. Multiple ulcers were the manifestations mostly observed, mainly at the tongue. On a Visual Analogue Scale (VAS) only 3 patients referred a score lower than 4 due to adjuvant therapy with painkillers. 5 referred a score of 10 before Laser session. All referred a reduction of 2 points on VAS. 4 patients underwent 3 sessions, 3 patients 8 sessions, 3 patients 5 sessions, 2 patients 6 sessions. 10 patients completely healed and 2 lack control.

Conclusions: LLLT is an easy and not-invasive procedure demonstrating a therapeutical efficacy for pain reduction and tissues regeneration in patients with radiotherapy-induced oral mucositis.

APPLICATION OF PHOTOBIMODULATION FOR PARESTHESIA FOLLOWING SURGICAL EXCISION OF MUCOCELE

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Aim: the study aims to evaluate the recovery of sensitivity to high-intensity stimuli following photobiomodulation therapy (PBMT) in patients with a diagnosis of paresthesia after surgical excision.

Methods: a randomized triple-blind controlled clinical trial was performed. 14 adult patients with a diagnosis of paresthesia in the mucocele area within 90 days after surgery were recruited. Two groups have been set up: a trial group undergoing PBMT and a control group with placebo therapy. At T₀, the Semmes-Weinstein Monofilament, Pinprick, 2-Point Discrimination, Visual Analogue scale, Thermal perception, Anamnestic questionnaire, and Oral Health Impact Profile 14 tests are administered. In the second phase, PBMT is administered in 4 consecutive sessions one week apart (T₁-T₄). The

third phase (T₅) involves the administration of the tests for the second time.

Results: data were on average more positive in the trial group than in the control group. Data analysis following the TPT (p-value 0.0146), and OHIP-14 (0.028) tests shows statistically significant results after PBMT administration in the paresthesia area. Data from the SWMT (p-value 0.074) and the VAS scale (p-value 0.0798) approach significance.

Conclusions: administration of PBMT in the 7 patients achieved on average good results and recovery of sensitivity in the excision zone. Thermal perception in trial patients improves, as does oral health-related quality of life. SWMT shows greater sensitivity to pressure in the trial patients and the VAS scale is scored more positively than in the control group.

PHOTOBIMODULATION WITH DIODE LASER IN PATIENTS DIAGNOSED WITH HYPOSALIVATION

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Aim: the aim is to evaluate the effectiveness of laser photobiomodulation in patients diagnosed with hyposalivation in order to increase salivary gland function by stimulating salivary gland secretion.

Methods: this is a triple-blind randomised clinical trial. Starting from a literature review, the sample size was calculated, the protocol and procedure developed. The sample size was set at 40 patients per group. Patients diagnosed with hyposalivation aged between 18 and 80, patients with diagnosed Sjogren's syndrome but who are not on pilocarpine therapy, and patients with haematochemical tests showing immunoreactivity were enrolled. Application group photobiomodulation treatment using diode laser [Eltech K-Laser] with three alternating wavelengths 450 nm, 660 nm, 970 nm 1 min for each wavelength, 3 min for each spot with scanning move-

ment. Laser tip distance from application site 2 mm. Four laser applications were performed, once a week for 10 application points: 3 extraoral (upper and lower pole parotid gland and submandibular gland) and 2 intraoral (sublingual gland and lower labial glands).

Results: the protocol was applied to 15 patients, 8 of whom were in the photobiomodulation group and 7 in the control group. The differences between the two groups are not significant as the required sample size has not yet been reached. Patients in the PBMT group reported an improvement in discomfort compared to the control group.

Conclusions: although the collected data were not sufficient to conclusively demonstrate the effectiveness of the therapy, they do present positive trends indicating potential benefits of the application of this therapy.

LASER USE BEFORE APPLYING SEALANTS IN ORTHODONTIC PATIENTS

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Aim: since most of the patients undergoing orthodontic treatments are not really responsive to oral hygiene requirements because of their age, the aim is to test an innovative measure, specifically the laser treatment for the conditioning of the enamel, in order to ameliorate the adhesion of sealants on enamel surfaces.

Methods: 60 patients were involved in the study for a total of 180 dental elements treated.

These were divided randomly into three groups: in the first one, the enamel was treated with only 37% orthophosphoric acid, in the second one were used both laser and 37% orthophosphoric acid, in the third one only laser was used.

Periodic checks have been carried out after 3, 6 and 12 months.

Results: the group that showed the best results, with only 4 partial or total sealant losses after 12 months, is the second one, in which both orthophosphoric acid and laser were used. In the third group, in which teeth were treated just with laser, 7 out of 60 had a partial detachment of the sealant and 1 out of 60 lost totally the sealant. The first group, treated just with orthophosphoric acid, stays in the middle with an overall number of losses equal to 6.

Conclusions: the laser treatment gives good results if combined with the use of orthophosphoric acid as it contributes to increase adhesion of the resins used on dental surfaces.

IS THE USE OF PHOTOBIMODULATION IN HEAD AND NECK CANCER PATIENTS A SAFE TREATMENT?

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Objective: although Photobiomodulation Therapy (PBMT) has been proven effective in preventing and treating radiotherapy-induced oral mucositis in Head and Neck Cancer (HNC), its safety and potential adverse effects on malignant or dysplastic cells are still under debate. This study aims to evaluate whether the use of PBMT in the treatment of Oral Mucositis (OM) has an impact on the 5-year survival rate of HNC patients undergoing radiotherapy (RT).

Methods: this retrospective case-control study involved patients diagnosed with HNC who underwent RT between 2013 and 2018. The case group received PBMT to treat radiotherapy-induced oral mucositis, while the control group did not receive PBMT.

Results: 193 patients were included in this study, 40% of them in PBMT-group and 60% in the control group; patient characteristics were comparable in both groups. No statistically significant differences in overall survival rate were observed between the two groups during the 5-years following their diagnosis.

Conclusions: the study suggests that PBMT did not negatively affect the survival rate of head and neck cancer patients treated with radiation over the 5 years following their diagnosis; therefore, this result suggests that PBMT is a safe treatment for radiotherapy-induced oral mucositis. However, due to the limited number of clinical studies on long-term survival rates and the complex nature of tumor response, further research is necessary to confirm these conclusions.