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Diode laser in daily dental practice

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Introduction

In the last 10 years all dental procedures have reached a standard higher and higher, both for therapeutic and aesthetic results, obtained for the minor procedural invasiveness and reduced discomfort for the patient. All this is possible by the advent of high technological tools, such as laser equipment, which allow to simplify all procedures, significantly increasing the predictability of the results.

Aim

The aim of this work is to show how the diode laser can improve the clinical protocols in endodontics, periodontics, oral surgery and in the management of perimplantitis.

Material and Methods

Diode laser is an equipment that can give several advantages to every dental specialties, thanks to its capacity to obtain deep decontamination, good hemostasis, and efficient bio-stimulation.

We used laser in these fields:
In endodontics: deep decontamination of root canals in combination with hypochlorite, safe pulpotomy, pulp capping laser assisted;
In periodontology: gingivolplasty, removal of gingival aberrations and tumors, deep decontaminations and bio-stimulation in non-surgical perio-therapy and in perio-surgery;

In Oral Surgery: easy hemostatic control for each surgical treatment, and better tissues healing process induced by laser bio-stimulation;

In Implantology: surgical and non-surgical management of perimucositis and perimeplantitis defects.

Conlusions

Scientific literature and several clinical cases showed how diode laser permit to get excellent clnical results easily and with much less invasive procedures. Its several advantages transform this equipment from a clinical support in a first choice device especially in patient with disabilities, such as coagulation problems, diabetic, complex syndromes.

Diode laser: a great help in special needs patients treatment in private office

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Aim

Patients with consciousness and functional problems, patients taking drugs as antidepressants, antiepileptics, or patients with severe heart problems or systemic diseases can treated in private office with the correct precautions and correct instruments.

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Material and Methods

Three patients with drugs induced hypertrophic and hyperplastic gingiva and a patient with cognition and functional problems treated with antidepressants, anti-epileptics drugs were treated in our private office.

Pathological anamnesis, clinical examination and complete pharmacological anamnesis allow a correct diagnosis and a correct therapeutic plan.

Diode laser, Fotona XDII (Fotona – Slovenia), wavelength 980 nm, surgical parameters, endodontics parameters were used to treat this patients.

Results and Conclusion

Patients treated in our private office didn't need to stop drugs therapies, healing times and discomfort were reduced and improved.

Dental treatments using diode laser assure us minimal invasiveness, reducing intra and post operatory morbidity; hemostatics and decontaminating properties of diode laser reduce clinical risks, number of clinical treatments, giving us a better approach with patients and a better compliance.

Laser low intensity and mucositis: the experience in pediatric onco-hematology

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Introduction

The oral mucositis is one of the complications that affects approximately 30-40% of patients receiving chemo-radiotherapy and up to 80 % of patients undergoing hematopoietic stem cell transplantation. It is a multifactorial disease defined as an epithelial thinning associated with intense erythema, ulcers, pain, bleeding and increased risk of infection.

Aim

The use of diode laser therapy is a painless and non-invasive alternative mucositis in the acute phase of pediatric cancer patients. Younger patients experience rapid relief from pain during swallowing and nutrition. You can obtain the maintenance of good oral health in both acute and stable and prevention of diseases to dentistry before chemotherapy.

Materials and Methods

It was a planned organizational model of care between dentistry and pediatrics in two phases.

Acute phase. The diode laser is used (6 Watt, 819/980 nm).
Power: 1.5 W in continuous non-contact;
Distance: about 2-4 mm ;
Movement: reticular for about 1 min, 1 min pause and repeat 2/3 times per session; Seating : 2/3 , you can go on a 3 ° / 4 ° with an interval of 2 days, if healing, re-epithelialization and attenuation of symptoms did not occur.

Stable phase. A prevention plan is implemented through dental appointments with self-managed and planned preferential access .

Results and Conclusions

Leveraging tissue biostimulation laser has been achieved rapid remission of painful symptoms of mucositis , resulting in improved swallowing and feeding of the patient.

This is a valid treatment of mucositis pain therapy as an alternative to traditional drug therapy.

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Er:YAG Laser: therapeutic choice for patients affected by Epidermolysis Bullosa in preventive and conservative treatments

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Backgroud

Epidermolysis bullosa (EB) is a heterogeneous group of rare genetic disorders characterized by marked fragility of the skin and mucous membranes, with occurrence of vesiculobullous lesions in response to trauma and heat or without any apparent cause. The main intra-oral manifestations of EB are generalized enamel hypoplasia, fragility and ulcerations of oral and perioral mucosa, ankyloglossia, absence of lingual papillae, microstomia.

Aim

The purpose of this study was to evaluate the efficacy of Er:Yag laser used for preventive and conservative treatments in patients with EB.

Materials and method

We report two cases of EB in which Er:Yag laser (Hoya ConBio Delight, Sweden&Martina, Padova, Italy) was used for preventive and conservative treatments. In the first case, we treated a 26-years-old female patient, affected by Junctional EB, with generalized enamel hypoplasia. Er:Yag laser (2940 nm, 265 mJ, 25 Hz) was used to remove the damaged enamel on maxillary lateral incisors, then the teeth were restored with direct composite reconstructions. In the second case, the Er:Yag laser (2940 nm, 265 mJ, 25 Hz) was used to treat caries on deciduous maxillary canine in an 8-years-old male patient, affected by Dystrophic EB and presenting with vesiculobullous lesions, ankyloglossia and microstomia.

Results

Er:Yag laser allowed to improve hard tissue treatment (minimally invasive nature, decontamination of dental structure) with respect of soft tissues. During the treatments, the patients required fewer interruptions than conventional treatment. This result showed an improvement of their compliance for the absence of pain, vibration and noise.

Conclusion

Laser treatment of dental hard tissues is a valid instrument for a more comfortable and minimally invasive intervention, with positive psychological effect in patients affected by EB.

A comparative prospective study on intra-operative and post-operative course of 118 oral surgical interventions: the advantages of the Nd:YAG laser

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Aim

The aim of the study is to evaluate the differences in intra-operative and post-operative course associated to the use of Nd:YAG laser and to cold blade after oral soft tissue surgery.

Material and Methods

A total of 118 surgical interventions performed at Center of Oral Laser Surgery and Oral Medicine of Parma were analyzed. The group 1 (G1) included 77 interventions performed with Nd:YAG laser, the group 2 (G2) 41 with cold blade.

Intra-operative parameters analyzed were: incision velocity, total intervention time, bleeding and need for suture. The post-operative ones were pain and health-related quality of life (HRQoL). Pain was evaluated with 3 scales: visual analogue scale (VAS), numeric rating scale (NRS) and verbal rating scale-6 (VRS-6). Each patient was instructed to fill in the questionnaire at the day of surgery (0), and at 1, 3 and 7 days after surgery. The HRQoL was evaluated on day 7 using a 0-45 score range questionnaire. Data were analyzed using the software STATA 12 (StataCorp LP, College Station, Texas, USA).

Results

The mean incision velocities were 0.54mm/s in G1 and 1.58mm/s in G2 ($p<0.0001$). The total intervention times were not statistically different among the groups. There was intra-operative bleeding in 29.9% of the interventions in G1 and 97,6% in G2 ($p<0.0001$). The number of stitches in G1 was statistically lower than G2 ($p<0.0001$). VAS and NRS scores did not result statistically different among the groups. For VRS-6 scores the comparison resulted statistically significant at day 1 ($p<0.005$) and 3 ($p=0.001$). In particular at day 1, 47.14% of patients in G1 and 13.16% in G2 had no pain; at day 3, 62.86% of patients in G1 and 21.05% in G2 had no pain. The HRQoL in G1 was statistically better than G2 ($p=0,0044$).

Conclusion

The data confirm several advantages associated to Nd:YAG laser for both the operator and the patient.

The modern approach in the "Special Needs Dentistry": role of the new technologies

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Aim

The Special Needs Dentistry is researching new and new operative procedures to achieve the therapeutic goals in patients with difficulties in the contact and increasing risk of complications during and after the treatments. In this route to the clinic and therapeutic quality improvement, the specialized teams may be helped by the technology to choose the best possibility for treating the different oral and maxillary diseases, often related to systemic disorders which may interfere with the therapy itself.

The aim of this study is to remark the role of the new technology, laser in particular, to facilitate the work of the "special needs" dental teams.

Material and Methods

The Dental and Maxillo-Facial Surgical Operative Unit

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"Disabilità e progetti speciali" , is the structure where all the patients with congenital and acquired disorders (cognitive, physical, psychiatric and medical) come to receive particular cares by special competent teams using technological devices able to work in this specific field. Several laser wavelengths (CO2, diodes, Er:YAG), demonstrated to own a high therapeutic capability in many dental fields such surgery, conservative and prosthetics and this allows to treat all the particular problems arising in this kind of patients.

Results

The possibility to make a real "minimally invasive dentistry" allowed by di utilization of the laser devices, permits the obtaining of better clinical results on a great number of different kinds of disabled patients, in particular with a better cooperation in patients with behavioural problems, a low number of complications in patents with haemorrhagic and infectious risks and a better quality of life in patients in chemio- and radio-therapy due to head and neck cancer.

Conclusion

The use of laser in all the dental specialities represents today a valid alternative to the conventional treatments and the units able to upgrade and renew the therapeutic programs by investing in new technologies makes a real transformation of their mission by giving to their patients better results with lower discomfort, in particular in the field of "Special Needs" dentistry.

Laser therapy for cystic fibrosis-associated infection

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Introduction

One of the major hallmarks in cystic fibrosis epithelium is exacerbated inflammation, accompanied by suppressed ability to clear pathogens. Indeed, the vast majority of these patients become infected with opportunistic pathogens, such as Pseudomonas Aeruginosa, that often become resistant to multiple antibiotics. Chronic bacterial pulmonary infections, combined with exaggerated inflammation, cause a progressive decline in lung function, which represents the main cause of morbidity and mortality in cystic fibrosis patients.

Aim

To assess the anti-microbial activity of different blue laser protocols on Pseudomonas Aeruginosa biofilms.

Materials and Methods

Pseudomonas Aeruginosa were grown as biofilms, on both glass slides and plastic plates, with a liquid layer covering the biofilm. Subsequently the bacterial biofilms were irradiated with a blue laser using two different protocols: 300mW/cm^2, 100J, 300sec (Tr1) and 600mW/cm^2, 200J, 600sec (Tr2).

Bacterial growth was assessed in Tr1, Tr2 and control groups 6 hours later.

Moreover, we have also largely worked on the technological aspect, developing a new prototype of diode laser specifically, created by K-Laser Company, equipped with a mechanical machine, conveniently designed to

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provide uniform irradiation to different multiwall plates (12, 24 and 96 plates).

Results

Both Tr1 and Tr2 treatments significantly reduced cell viability and bacterial growth compared to the control group. The new prototype used for the present study allowed a uniform irradiation, with a minimum difference, in term of standard deviation, between wells belonging to the same group.

Conclusion

Both Tr1 and Tr2 blue laser protocols showed a marked and reproducible anti- microbial effect on Pseudomonas Aeruginosa biofilms. Due to its anti-microbial activity, the blue laser could facilitate the penetration of antibiotic drugs into a bacterial biofilm in cystic fibrosis patients.

Laser surgical approach in the treatment of Graft-versus-host disease induced buccal mucosal sclerosis: a case report

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Background

Graft-versus-host disease (GVHD) is an immune-mediated disease resulting from a complex interaction between donor and recipient adaptive immunity after allogeneic bone marrow transplantation. GVHD often involves oral mucosal tissues, causing discomfort and impairing patients' quality of life.

Case presentation. We present a case of a 57 year old caucasian woman suffering from B-cell acute lymphoblastic leukemia who underwent allogeneic bone marrow transplantation in May 2006 and was diagnosed with chronic GVHD in 2008. The patient had diffuse oral reticular lichenoid lesions, erythema and ulcerations.

She was treated with topical applications of clobetasol, nystatine and hyaluronic acid (Immunogel ®).

After stabilization of GVHD, the patient developed diffuse reactive hyperplastic lesions and fibrous bands of the buccal mucosa that severely limited mouth opening, impairing oral hygiene and thus reducing overall quality of life.

Treatment. The patient underwent bilateral surgical disruption of fibrous bands and surgical excision of hyperplastic areas using diode blue laser, wave length 435nm (K-laser, Treviso, Italy). After surgery, mouth opening increased from 11mm to 20mm. Subsequently, dental impressions were made and an intraoral device was specifically developed to create an open bite, avoid fibrosis of the surgical areas and to maintain the surgically achieved opening. Moreover, the patient was instructed to perform mouth opening exercises on a daily basis.

Results

In the postoperative period, the patient reported limited pain and discomfort (VAS<5) and didn't need to assume pain killers. After 4 months follow up, surgical areas had healed and the mouth opening increased to 23mm improving the patients' ability in oral hygiene maintainment, overall comfort and quality of life.

Conclusion

Laser-assisted surgery is helpful in managing GVHD-related mucosal sclerosis. Thanks to biostimulating properties, healing can be obtained ensuring limited pain and improved functional capacity.

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Role of photodynamic therapy in pre-malignant lesions and in oral cancer

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Introduction

Photodynamic therapy (PDT) is a medical treatment that uses light to activate a photosentizing agent (photosensitizger) in the presence of oxygen. The exposure of the photosensitizer to light result in the formation of oxygen spices, such as singlet oxygen and free radicals, causing localized photodamage and cell death. Clinically, this reaction is cytotoxic and vasculotoxic. Photodynamic therapy is a minimally invasive technique and, unlike ionising radiation, can be applied repeatedly at the same site. It has particular appeal in oncology because the use of chemotherapy, ionising radiation, or surgery does not preclude the use of PDT, and all of these approaches can be used in a patient who has received PDT.

Review methods

The literature search was carried out using MEDLINE (1996-2013), EMBASE (1996-2013). The search query used for the Pub-med database was: ("photodynamic therapy"[All Fields], "oral cancer" [All Fields], "photodynamic therapy and oral cancer" [All Fields], "photosentizers" [All Fields], "head and neck cancer" [All Fields], "Therapy, Photodynamic"[MeSH Terms], Photochemiotherapy"[MeSH Terms]). Other studies were identified through the references of previous articles we had found. Because of the limits in resources, all article were selected.

Conclusion

The studies we have cited in this review indicate that PDT for the treatment of oral cancer and premalignant lesions may have a significant potential for clinical applications. Photodynamic therapy for early stage head and neck cancer (T1-T2 N0M0) had shown, in almost all the study found in literature, a complete response of 80%. In all studies, patients who didn't response favourable to PDT went under conventional therapies. Photodynamic therapy for premalignant lesions of the oral cavity has been studied for leukoplakia, erythroplakia, oral verrucous hyperplasia. From the results of these clinical studies we found that PDT is very effective for oral verrucous hyperplasia (100% complete response) and less for erythroplakia and leukoplakia.

A preventive tooth extraction protocol supported by low level laser therapy for patients exposed to bisphosphonates

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Introduction

Different surgical protocols to prevent bone osteonecrosis after a tooth extraction in patients exposed to bisphosphonates have been proposed, although sound evidence-based validation is still lacking. The preventive strategies share antibiotic regimen, minimally traumatic

surgical procedures, measures for plaque control and soft tissue primary closure of the socket.

Aim

To propose a surgical protocol supported by Nd:YAG low level laser therapy and to report the positive results of 638 tooth extractions in patients who received oral and/or endovenous bisphosphonates therapy.

Material and Method

The protocol includes a professional oral prophylaxis one week before surgery in the presence of clinically evident plaque and calculus. Amoxicillin plus clavulanate (2 grams per day) is administered 3 days before and for 2 weeks after tooth extractions until suture removal. To reduce surgical trauma an excessive manipulation of the soft tissues surrounding tooth roots is avoided. When ostectomy is necessary, access flap is projected limiting lateral incisions to reduce bone exposure and vascular supply impairment.
After careful debridement, the socket is irrigated with povidone iodine solution and then irradiated with low level laser light (Nd:YAG laser, 1064 nm, Fidelis Plus, Fotona®, Slovenia – power: 1.25 W; frequency: 15 Hz; diameter of the fibre: 320 µm) which is delivered in non-focused mode, at 2 mm of distance from the tissues, for 1 minute (power density: 1562.5 W/cm2, total fluence 7 J/cm2), repeated 5 times.
Before suturing, a pocket flap is elevated if necessary to achieve a primary closure of the socket.
Mouthwashes with chlorhexidine 0,12% 3 times per day are recommended until complete mucosal healing.
Weekly applications of LLLT for the first 4 weeks are planned and then patients are evaluated monthly for 2 months and then every 4 months.
Radiological examination (OPT) is recommended after six months.

Results

Using this protocol we did not observe any osteonecrosis of the jaw, but only 7 cases (1,1%) of difficult healing which were managed with conservative procedures.

Conclusions

LLLT supported preventive strategy demonstrated effectiveness also in high-risk patients, how observed in 49 extractions in patients already affected by bisphosphonate-ralated osteonecrosis of the jaws.

Advantages of laser in the surgery of oral soft tissues

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Introduction

Over the past twenty years, the scalpel blade, in oral and maxillofacial surgery, has been progressively complemented by equipment that use different sources of energy to get the incision of soft tissue and skin. The laser devices represents one of these. The main applications of the laser is soft tissue surgery of the oral cavity. Thanks to their physical characteristics, so called laser effects, we can have three different effects: photomeccanical, photothermal and photochemical. In the clinical practice the most used is the photothermal effect, that is the effect used for cutting the oral soft tissues during the surgery (biopsy).

Patients and Methods

The Author, through the descriptions of some clinical cases, shows the ability to make better use of different

laser devices in some diseases of the oral mucosa (e.g. fibroma, papilloma, mucocele, reactive inflammatory hiperplasia, mioblastoma etc.). The surgical technique consists of different steps: pre-surgical phase (clinical history, anesthesia etc), surgical phase (immobilization of the lesion and incision) and microscopic examination.

Discussion and Conclusions

In oral pathology there are controversies concerning the possibility to perform clear tissutal examinations with laser devices, especially in diagnosis and treatment of potential dysplastic or neoplastic lesions. Some laser devices like diode, KTP and CO2 are better, than others, to cut the soft tissues of the oral cavity, others like erbium laser for the vaporisation and other wavelengths for the biomodulation and photodinamic therapy. The complete resolutions of some clinical cases permit to afferm that there are many advantages of performing surgery of oral soft tissues: a completely bloodless surgical area, absence of sutures with a good healing by secondary intention, almost complete absence of post-operative pain or sweelling.

Furthermore, the Author, points out the advantages using the diodi and KTP laser for the treatment of benign oral vascular lesions (e.g. capillary and venous malformations) showing, with two different techniques, the transmucosal thermocoagulation and the intralesional photocoagulation, the resolution of some clinical cases.

Laser in surgical and non surgical parodontal treatments

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Treatments of hard and soft tissues in dentistry and oral surgery could be performed with different types of lasers. Wavelengths may have different degree of affinity for water. For each wavelength there is an active element. The active element is what that, if stimulated by an energy source, emits photons characteristic of what their specific element. In relation to the clinical needs, we have some laser able to induce bleeding, other able to induce hemostasis. We can use laser having a superficial action, that are very absorbed by the tissues and laser instead act deeply, that are transmitted through a lot of tissues. Important clinical purposes is therefore learn the different behavior of the different wavelengths in relation to the depth of penetration of the laser light.

Potentialities and limits of Lasers in oral oncology

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Potentially malignant disorders (PMDs) of the oral mucosa include leukoplakia (OL), lichen planus (OLP) and erythroplakia. Such entities may undergo malignant transformation with an annual transformation rate of

approximately 1% for OL and OLP. Diagnosis of PMDs is based on clinical evaluation followed by histopathological assessment. Biopsy is a crucial procedure in order to obtain a sound specimen suitable for microscopic evaluation. Different type of lasers, including CO2, Nd:YAG, diode and Er:Yag have widely been employed for collecting bioptic specimens. However, several artifacts may be present when the oral mucosa specimen is collected through these devices. Such artifacts may create problems with regards to diagnosis as well as the assessment of the of surgical margins status. Management of PMDs is complex and includes a variety of approaches such as medical therapy, surgical excisions and the "wait and see" policy. Among these, surgical treatment seems to be a good option for local control of the diseases. Lasers may be used either as surgical tools (cut, excision, vaporization and coagulation) and for biomodulative purposes (low level laser therapy-LLLT).

Potentialities of Er:YAG laser for conservative dentistry in special needs patients

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The main aim of a care giver working in a public dental service must to be to ensure that the oral health needs of individuals and groups who have a physical, sensory, intellectual, medical, emotional or social impairment or disability are met. Patients with a disability often have poorer oral health, poorer health outcomes and lower levels of compliance for dental procedures in surgical, conservative and other dental specialties. Er:YAG laser is highly absorbed in water and, to a lesser extent, in tooth mineral. This device can be used on soft tissues after intense hydration, and on mineralized tissues such as bone, enamel and dentine, and is comparable in terms of cutting efficiency with conventional rotary tools. Because a carious lesion contains significantly more water than healthy enamel or dentin, the laser can offer some selectivity in removing the diseased material. Furthermore, this laser can offer some degree of anesthesia and this allow, particularly for not deep caries, to eliminate the need for local anesthesia, thereby providing optimal patient comfort and compliance.

There are no side effects of erbium lasers with water cooling and used with respect for correct power setting: one advantage of the use of Er:YAG laser, compared with rotary instruments, is that this laser, thanks to the superficial action related to its absorption spectrum, is safe during procedure without risk for patient, and this gives some advantage in patients with disabilities.

The restorative dentistry performed with laser in absence of vibration, of pressure and of tissue damage, was preferred by 82% of the patients . Erbium laser tooth preparation is now one of the options in the minimal invasive approach specially in special need patients.

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Importance of the lingual frenulum anomalies correction for a proper and equalized neuro-skeletal- muscular growth

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In patients with short lingual frenulum is often evident a protrusion of the head and a retrusion of the shoulder blade. By the neuromuscular point of view, this posture results in an activation of the anterior muscle chain, starting from the frontal portion of the tongue, compared to the muscular rear kinetic chain, with an advancement of the head to the body and the straightening of the cervical vertebras. This imbalance causes an excessive anterior positioning of the gravity center of the person which, with the purpose of recovering the centrality, activates the posterior muscles of the lumbar chains leading to an increasing of the physiological curvature and, consequently, to causing low back and neck pain. This is often correlated to a 2nd class malocclusion, sometimes associated with an underdeveloped jaw while a 3th class malocclusion is present in lower percentage. The diagnostic management of the snallow-postural syndrome utilizes a topic anesthesia of the frenulum surface (Lidocaine spray or ointment or cold intake) in order to eliminate the postural afferent input originating from the latter. After performing a postural assessment with the patient in the initial conditions, the patient is then observed without the afferent influences of the frenulum. It may be observed, in presence of snallow-postural syndrome, an improvement of the posture with the recovery of physiological curvatures and also the absence of any dystonias. The elimination of the interference of the frenulum may be easily performed, with a low discomfort for the patient, by the utilization of the new surgical technologies such laser and quantic resonance blade.

Laser in Dentistry and Special Needs

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Laser technology is today used in many fields of medicine and surgery: some wavelengths are employed in ophthalmology, others in oncology representing the modern “minimally invasive” efficient therapy and, since 90’s, also in all dental specializations. Inside the treatment plan, laser may be used, also associated to the conventional therapies, during the periodontal decontamination, thanks to its antimicrobial, biostimulating and detoxifying effects on the tissues.

Due to it doesn’t yet exist an universal protocol, the clinician must decide the procedures, considering the clinical conditions, the cooperation and psycologic profile of the patient. This approach allows to treat oral pathologies in “integrate ways” and permits to treat complex diseases, also in the surgical field, in patients with critical vulnerabilities. Results are in function of many factors: the operator ability, the choose of effective devices, the patient compliance, the individual biological response and so on. The aim of this study is to show the advantages of the use of several laser wavelengths (Nd:YAG, Er:YAG and CO2) on particular kinds of patients, belonging to the St.Patrignano Community.

We may consider these patients such a homogeneous group, by the point of view of the life style and risk factors abolition (food, smoke and alcohol) and also considering their dental prostheses wearing. We must also take in consideration the general health conditions, often related to metabolic and immunity deficits, resulting by a past

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experience of drug addiction. The laser technology demonstrated to represent the modern way to treat dental patients, in particular "special needs" patients, with a minimally invasive approach, better cooperation, long-term stability and good results in term of quality of the treatment.

Lasers vs traditional techniques in the treatment of bone necrosis

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The usefulness of laser for oral hard tissue procedure such as caries treatment, impacted teeth extraction, periodontal therapy, peri-implantitis management, sinus lifting is reported by several Authors. Recently are described in the literature great advantages of laser (LLLT and surgery) in the management of osteonecrosis of the jaws in patients under bisphosphonates in comparison to traditional techniques for increased infection control, for bone and soft tissue healing.

Erbium laser technique provides the opportunity to perform bone resection of the upper and lower jaw affected by BRONJ even under local anaesthesia. Surgical debridement can also be performed, gradually evaporating the portion of necrotic bone at increasing depths close to the healthy bone. The minimally invasive technique of evaporation allows the sectioned bone surfaces to be made regular and can be used to create micro-perforations at the base for renewed vascularization.

The bactericidal effect of Er:YAG laser against periodontopathogens forms such as Actinomyces and anaerobes is well reported in the literature. The efficacy of erbium laser, in comparison to other wavelength, is described also for Candida spp. In biofilm models.

Er:YAG laser could be use also for oral mucosa incision without thermal damage to the surrounding and underlying tissues inducing less pain and better healing than traditional scalpel. One undoubted advantage of laser applications is the biostimulatory activity as reported frequently in literature with different wavelength. Low Level Laser Therapy (LLLT) is used extensively in medicine and dentistry to treat both hard and soft tissue injuries with healing processes improvement and pain management. The usefulness of LLLT, is reported for treatment of bisphosphonate-related osteonecrosis of the jaws (BRONJ). The combination of neodimium laser (Nd:YAG) LLLT with medical or surgical treatment, appears to improve vascularisation of the coating mucous membrane, regeneration of the bone, reduction of pain and signs of inflammation inducing xomplete mucosal healing.