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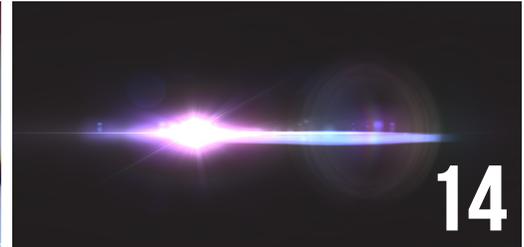
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EDITOR'S DESK



A NOTE FROM OUR
GUEST EDITOR

DR. HUGH FLAX, DDS, AAACD, MICOI, DABAD

Laser technology has become an even bigger rising star in the evolution of appearance and wellness enhancements. Dentistry has seen a huge breakthrough with the introduction of a combination hard-soft tissue CO₂, Erbium, Neodymium, and Diode wavelengths.

The conservative nature of these techniques has created a firm footing in the anti-aging trend that is spanning the globe. Among the many benefits of less invasive care and quicker healing responses:

- Photobiomodulation (PBM) can be used for a wide panorama of uses to accelerate healing in sore muscles, acute pain from ulcers, etc.
- There are new techniques combining Nd:YAG and Er:YAG wavelengths to relieve the effects of Obstructive Sleep Apnea, as well as, smooth and rejuvenate aging skin and acquired blemishes. Many of these will be enhanced with Platelet Rich Fibrin (PRF). This is a huge help to those who refuse to wear CPAP or an appliance, in addition to avoiding the trendy Botox/ fillers injectables.
- In periodontics, with an evidenced based protocol, more teeth are being saved with better protocols that stimulate bone growth.
- In cosmetic dentistry, veneers are being removed more easily and conservatively. The “closed flap technique” allows gingival and osseous contours to be minimally invasively shaped for better symmetry and contour. In addition, gingival retraction with lasers is permitting more predictable impression taking that is less traumatic, as well as more efficient with fewer costly remakes.
- In addition, other uses will be shown that will help patients get treatment for soft tissue anomalies/ biopsies, and removal of decay—often without anesthesia.

Bottom line, the benefits of these enhanced technologies is making use of a more natural approach that patients and professionals are excited to see outstanding results that are matching up with scientific research.

The DDHK team is excited to share these concepts to inform you and stimulate your growth and expansion for greater excellence in serving your patients.

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LASERS IN DENTISTRY: INSTRUMENTS FOR THE MODERN PRACTICE

A wide array of dental lasers have come on the market in the last thirty years. The technology has advanced to the point where they are a critical piece of the dental armamentarium. They can be used in every discipline of dentistry from restorative to oral surgery. The chief advantage of laser dentistry is that many minimally invasive procedures have been developed. Dentists see more predictable outcomes and patients experience far less post-operative discomfort. Healthy tissue is preserved with minimal trauma to the remaining tissues. This article will discuss some unique procedures lasers can perform in operative dentistry, soft tissue, ceramic restoration, and oral medicine.

Lasers work when the light energy is converted to heat in the tissue. Each wavelength is absorbed by molecules known as *chromophores*. A microwave oven is a familiar example of chromophores at work. The microwave photons are absorbed selectively by water molecules heating up the coffee, but the styrofoam cup fortunately does not melt. As there is no water in the foam cup the microwave light passes right through to the liquid. Chromophores in dentistry are specific to each individual wavelength. For example, diodes and Nd:YAG are absorbed by pigments like hemoglobin whereas Erbium (Er:YAG and Er,Cr:YSGG) and CO2 lasers by water and hydroxyapatite.

Restorative Dentistry

Dental lasers allow for minimally invasive restorations with enhanced bonds on disinfected tooth structure.^{1,2} Erbium lasers have been shown to prepare teeth with minimal impact on the remaining enamel and dentin.^{3,4} The erbium photons are absorbed by water in the enamel or dentin causing the water to vaporize rapidly. This sudden expansion of the water ruptures the crystalline matrix mechanically with almost no thermal effect on the tooth. Lasers also kill most of the microorganisms

leaving a smear layer free, highly decontaminated surface. Preparations with the laser aim to preserve as much healthy tissue as possible. Metal burs also pulverize hard tissue, but they leave microfractures and smear layers with bacterial contamination.

Laser diagnostics such as Diagnodent or CariVu can help find lesions sooner than traditional explorer techniques which results in less invasive restorations.⁵ This case (Figure 1) is an example of occlusal lesions detected early. No stick was present with an explorer but the Diagnodent reading of 58 indicated a lesion deep in the distal fissure. The occlusal preparation was done anesthesia free with an Er:YAG laser (LightWalker – Fotona Inc) and restored with a flowable composite.



Figure 1. A minimally invasive preparation of tooth #29. The Diagnodent laser helps plan the ultimate preparation form. Tooth was prepared with the LightWalker Er:YAG laser with no local anesthesia.

This case was a patient who presented with multiple pit and fissure caries after many years of decay free check-ups. He had recently been placed on medications

which were causing xerostomia. Figure 2 shows how the Diagnodent reading predicted the final depth of the preparations. Teeth 2 and 3 were restored with glass ionomer due to high caries risk (Equia Forte – Fuji). All eight molars were restored in a single appointment without local anesthesia. The preservation of the healthy occlusal enamel will help the teeth keep their structural integrity.



Figure 2. A high caries risk patient had caries restored on all molars in a single visit without local anesthesia. Teeth 2 and 3 are shown. Note how the Diagnodent reading was predictive of the depth of the final preparation.

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The soft tissue capabilities of the Er:YAG laser can enhance restorative dentistry as well. A patient presents with subgingival facial caries. The laser was able to precisely create an internal bevel in the marginal gingiva for restorative access without altering the crestal anatomy. Erbium lasers cause almost no heat damage to soft tissue due to their high affinity for water.⁶



Figure 3. Er:YAG lasers allow for atraumatic removal of soft tissue. Note the lack of inflammation and bleeding of the gingival sulcus that was troughed for restorative access during a Class V restoration #10.

Ceramic Restoration Removal

One unique advantage of erbium lasers is their ability to debond ceramic restorations with no damage to the underlying tooth or implant abutment.^{7,8} The erbium photons have a low affinity for ceramic materials and a very high affinity for composites. The laser energy passes through the porcelain or zirconia and is absorbed by the composite. This selective absorption by the composite versus ceramic exhibits how an understanding of laser physics can be leveraged for clinical uses. The resin bond is rapidly degraded facilitating the removal of the veneer, crown, inlay, or onlay. Veneers literally pop off due to their lack of mechanical retention. Figure 4 is a case where cemented zirconia implant crown's abutment became loose. The Er:YAG laser effectively debonded the crown and was also used to clean the abutment and the crown internally. Er:YAG lasers have minimal titanium interaction so there was no danger of damaging the abutment and no heat is generated that could harm the implant.



Figure 4. A loose implant abutment with a cemented zirconia crown. The Er:YAG laser energy passes through the crown to the composite cement where it is highly absorbed. The crown is removed and cleaned internally with the laser.

Photobiomodulation

Photobiomodulation is the use of low-level laser energy to enhance healing and reduce pain. It is a non-thermal and non-surgical stimulation of tissue at the cellular level. The primary mechanism of photobiomodulation is the absorption of laser photons in the mitochondria which creates a cascade of positive cellular effects. Increased gene transcription, protein synthesis, vasodilation, and

anti-inflammatory effects result in enhanced healing and reduced pain. Laser wavelengths in the red and infrared spectrum such as diodes and Nd:YAG are the best as their low water absorption allows for deeper penetration. Photobiomodulation has also been shown to inhibit bacteria, fungus, and viruses.⁹

There is a multitude of uses for photobiomodulation in dentistry. Oral ulcerations, chronic inflammatory conditions such as erosive lichen planus, enhanced postoperative healing, post trauma treatments, and temporomandibular disorder management are among the many uses of this phenomenon. Figure 5 is a case of aphthous stomatitis that was treated with a dual wavelength protocol using the Nd:YAG (LightWalker Laser – Fotona) for photobiomodulation and the Er:YAG to place a “laser band aid” on the lesion. This patient typically suffers from major aphthae that can persist for two weeks. The lesion is pain free immediately and heals in three days.

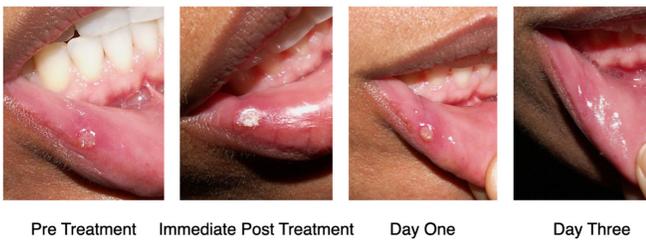


Figure 5. A single aphthous ulcer is treated with Nd:YAG photobiomodulation and an Er:YAG band aid. Lesion is immediately comfortable and is healed in 72 hours.

The next case is a patient who presented with multiple, painful ulcers that had been bothering her for three months. The lower images were after three doses of photobiomodulation using an Nd:YAG laser over ten days. She was mostly free of symptoms and a biopsy at that time indicated “nonspecific ulceration” which was consistent with the clinical diagnosis of aphthous stomatitis. (Figure 6).



Figure 6. 33 y.o. female patient presented with persistent oral ulcerations that were quite bothersome. After three photobiomodulation sessions with an Nd:YAG laser the symptoms and ulcers were mostly gone in ten days.

Conclusion

Dental lasers offer many benefits to the modern practitioner. Minimally invasive procedures in all disciplines result in predictable outcomes for the dentist and a more comfortable patient experience during and after procedures. The combined effects of minimal tissue trauma, photobiomodulation, and disinfection create much better results for both the dentist and patients.

References:

- Akin M, Veli I, Erdur EA, Aksakalli S, Uysal T. Different pulse modes of Er:YAG laser irradiation: effects on bond strength achieved with self-etching primers. *J Ofac Orthop*. 2016 May;77(3):151-9. English. doi: 10.1007/s00056-016-0019-3. Epub 2016 Apr 20. PMID: 27098637.
- Kallis A, Tolidis K, Gerasimou P, Dionysopoulos D. Qualitative evaluation of hybrid layer formation using Er:YAG laser in QSP mode for tooth cavity preparations. *Lasers Med Sci*. 2019 Feb;34(1):23-34. doi: 10.1007/s10103-018-2575-9. Epub 2018 Jul 8. PMID: 29982880.
- Nerushay I, Krejci I, Ryabova A, Bortolotto T. Influence of pulse duration when performing Er:YAG laser irradiation on dental tissues. *Am J Dent*. 2019 Apr;32(2):61-68. PMID: 31094139.
- Nahas P, Nammour S, Serges E, Zeinoun T. Comparison between Shear Bond Strength of Er:YAG and Er,Cr:YSGG Lasers-Assisted Dental Adhesion of Self-Adhering Resin Composite: An Ex Vivo Study. *Dent J (Basel)*. 2020 Jul 1;8(3):66. doi: 10.3390/dj8030066. PMID: 32630313; PMCID: PMC7558720.
- Rashid MF, Karobari MI, Halim MS, Noorani TY. Effectiveness of Visual-Tactile Examination and DIAGNOdent Pen in Detecting Early Enamel Caries and Its Remineralisation: An In Vitro Study. *Biomed Res Int*. 2022 Jan 11;2022:1263750. doi: 10.1155/2022/1263750. PMID: 35059458; PMCID: PMC8766177.
- Kawamura R, Mizutani K, Lin T, Kakizaki S, Mimata A, Watanabe K, Saito N, Meinzer W, Iwata T, Izumi Y, Aoki A. Ex Vivo Evaluation of Gingival Ablation with Various Laser Systems and Electroscalpel. *Photobiomodul Photomed Laser Surg*. 2020 Jun;38(6):364-373. doi: 10.1089/photob.2019.4713. Epub 2020 Mar 12. PMID: 32175812.
- Culhaoglu AK, Kilicarslan MA, Gokdeniz B, Gur G. The efficiency of laser application for debonding laminate restorations manufactured of current CAD-CAM materials with different thicknesses. *Niger J Clin Pract*. 2021 May;24(5):705-711. doi: 10.4103/njcp.njcp_415_20. PMID: 34018980.
- Elkharashi A, Grzech-Leśniak K, Deeb JG, Abdulmajeed AA, Bencharit S. Exploring the use of pulsed erbium lasers to retrieve a zirconia crown from a zirconia implant abutment. *PLoS One*. 2020 Jun 1;15(6):e0233536. doi: 10.1371/journal.pone.0233536. PMID: 32479553; PMCID: PMC7263620.
- Grzech-Leśniak K, Nowicka J, Pajęczkowska M, Matys J, Szymonowicz M, Kuroпка P, Rybak Z, Dobrzyński M, Dominiak M. Effects of Nd:YAG laser irradiation on the growth of *Candida albicans* and *Streptococcus mutans*: in vitro study. *Lasers Med Sci*. 2019 Feb;34(1):129-137. doi: 10.1007/s10103-018-2622-6. Epub 2018 Aug 25. PMID: 30145724; PMCID: PMC6343019.

HARVEY S. SHIFFMAN, DDS

TECHNOLOGIES TO IMPROVE RECOGNITION AND TREATMENT FOR SLEEP RELATED BREATHING DISORDERS

Of the commercially available hard and soft tissue lasers, only the Lightwalker (Fotona, Farmers Branch, Tx.) combines two proven wavelengths, Nd:YAG and Er:YAG, (Figure 1) wavelengths with unrivaled power and precise pulse control resulting in high levels of efficacy for a wide range of procedures. With this advanced level of performance comes significant patient comfort. The following procedure has been developed to take advantage of these attributes.

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Snoring and Sleep Disordered Breathing affects millions of Americans, both adults and children. ^(1,2) The signs and symptoms are the result of partial or complete collapse of the upper airway during sleep. ⁽³⁾ The structures involved in our protocol include the floor of the mouth, soft palate, uvula and the base of the tongue. ⁽⁴⁾ The goal of the treatment is to decrease the amount of blockage of the upper airway. ⁽⁵⁾

Dentists are in a great position to help screen and in many cases treat these problems with airway health management. Helping patients improve their sleep can profoundly improve their health, quality of life and the well being of their loved ones.

The “Gold Standard” for the treatment of sleep disordered breathing is the CPAP type device. Following that in 1981 was the introduction of Mandibular Advancement Devices (MAD). Compliance with both of these treatment modalities shows, a reduction in compliance over time and significant side effects. However, the NIGHTLASE™C3 Snoring and Sleep Apnea Reduction Therapy protocol is a unique approach to treatment using the Fotona Lightwalker dental laser with a proprietary protocol and handpieces. Another positive benefit is the 24 hour a day improvement in nasal breathing vs CPAP and MAD.



Figure 1.

NIGHTLASE™ uses the twin light photothermal and optical capabilities of the Lightwalker laser to liquify hardened and crystallized hyaluronic acid, elicit a neurological response, convert and initiate the formation of new and more elastic collagen. ⁽⁶⁾ The target mucosal tissues are the floor of the mouth, oropharynx, soft palate and uvula and the back of the tongue. The proprietary “Smooth Mode” pulse characteristics of the erbium: YAG laser creates a non-ablative heat generation or “Heat Shock” that initiates the conversion of existing collagen to more elastic and organized forms and also initiates “neocollagenesis” the creation of new collagen.

The effect of the laser energy as it penetrates (by transmission) deeper into the tissues is a low level photobiomodulation that directly affects the fibroblast cells and has been found to stimulate protein production from quiescent cells. ⁽⁹⁾

This process results in a visible elevation of the soft palate and uvula and tightening of the oropharyngeal tissues resulting in an improvement in the upper airway volume. Following the Nightlase protocol we are able to tighten up the facia and mucosa over the following muscles: palatoglossus, palatopharyngeus, elevator veli palatini, tensor veli palatini. For the soft palate, palatoglossus, and palatopharyngeus muscles, their fixed hard origins are at the hard palate. When they are tightened up with laser energy, they will move toward the hard palate. When the soft palate shrinks from the laser energy, it will shrink upward and forward to the hard palate which in turn will open up the nasopharyngeal airway and reduce snoring. The palatopharyngeus muscle, which is attached to the soft palate, also moves upward and forward with the contraction of the soft palate. Some believe that the palatopharyngeus muscle has a role in upper airway dilation. When we tighten up the palatoglossus muscle, the posterior part of the tongue will elevate upward and slightly forward to the hard palate which in turn will improve the oropharyngeal airway, the posterior tongue posture and seal the mouth-to-pharynx air passage. As a result of all these actions, the nose-to-pharynx air passage will be enlarged and the mouth-to-pharynx air passage will be reduced.

Nightlase treatment helps patients to sleep better and breathe better through their noses. Nasal breathing has many documented health benefits related to daytime airway and sleep. However, if the nasal cavity and airways are small and inadequate due to an underdeveloped maxilla and premaxilla, then over time

the body will lower the tongue posture to occupy the lower arch in order to reopen the mouth-to-pharynx air passage for better air supply. We feel the Nightlase treatment for these patients with restricted maxilla and nasal cavity will need more frequent touch up treatments. Jaw development treatments such as ALFs, DNA Appliances, and other functional appliances will work well with the Nightlase treatment. The jaw development with these functional appliances has been shown to help to increase the bony opening of the nasal cavity. There's an ALF article in the 2009 IAO (International Association of Orthodontics) journal that documented the nasal cavity improvement on the PA cephalometric radiographs. Myofunctional exercises on correct swallowing are also essential to prevent long term relapse. In some cases, lingual and labial frenectomies are also indicated to facilitate correct facial mobility, swallowing, and correct tongue posture at rest, and should always be evaluated as part of our clinical exam.

The Nightlase protocol has many promising values. It will help patients with breathing issues and craniofacial pain. I also think that tightening up the levator veli palatini and tensor veli palatini with laser energy through the soft palate helps to open up the Eustachian tube and reduces the pressure in the middle ear which may have an effect on some forms of tinnitus. Diaphragmatic nasal breathing is very important, as is tongue position to help patients maintain their health, and myofunctional therapy is indicated for this as well.

The results can be seen in figure 2.



Figure 2.

NIGHTLASE™ therapy is indicated for cases when the patient has been diagnosed with chronic snoring, UARS or mild to severe sleep apnea and either cannot or chooses not to wear a MAD appliance or CPAP device. It can also be used in co-therapy with those devices and represents a less invasive alternative to current surgical, chemical, or radiosurgical options that may require hospitalization, general anesthesia, or soft tissue removal.

NIGHTLASE™ has a significant success rate in producing a positive change in sleep patterns. Research published by Miracki and Visintin ⁽⁷⁾ has shown that it can reduce and attenuate snoring, and provides an effective non-invasive modality to lessen the effects of Obstructive Sleep Apnea. As with any treatment, there are potential risks with laser treatment. However, the risks are minimal and certainly less than alternative therapies if the protocol is followed correctly. NIGHTLASE™ therapy is not a permanent alteration and lasts anywhere from 6-12 months and is easily touched up at follow up appointments. ⁽²⁰⁾

In 2013 we completed a pilot study that addressed snoring only with 12 patients. Twelve month follow up

showed a 30-90% reduction in snoring tone and volume. (figure 3) The lower percentages were smokers, obese patients and those with severe OSA. Follow up studies with polysomnography using HST are in process as are pharyngometer studies. Both of which have shown significant positive changes in the early results.

A published pilot research study by Lee and Lee ⁽⁸⁾ has shown through colorized 3D CT imaging, that the volumetric positive changes after Nightlase™ treatment. This has helped support the clinical results, and the authors have follow up studies with 3D CT, polysomnography and a larger group of patients in process. In 2018 we published a paper discussing the “Twinlight” Nightlase protocol “Nightlase: Minimally Invasive Laser Assisted Uvulopalatoplasty” discussing in detail the procedure ⁽¹⁰⁾. We followed this with a clinical study published in 2021 titled “Minimally Invasive Combined Nd:YAG and Er:YAG Laser Assisted Uvulopalatoplasty for Treatment of Obstructive Sleep Apnea” ⁽¹¹⁾ This paper reviews the protocols and results with statistical analysis, showing an average of over 63% reduction in AHI, with no compliance issues of devices.

Clinical study results

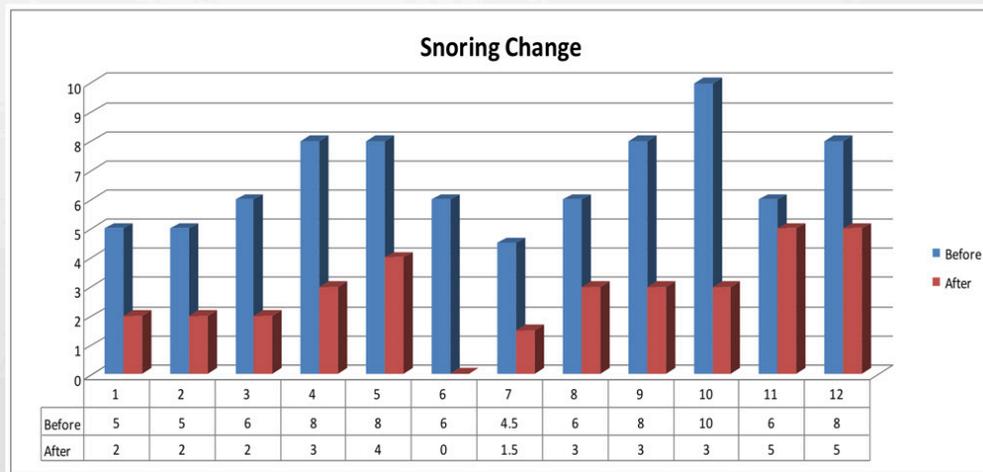


Figure 3.

We consider Nightlase to be another tool in our treatment “toolbox” giving us more options and the possibility of better results when used alone or in combination with MAD’s and CPAP for those patients that may not get adequate improvements from those therapies alone. Nightlase is also an interim therapy for children, adolescents, teenagers, and even adults while they undergo craniofacial development to enlarge their airways.

We are excited to present these modern, minimally invasive, and more natural treatment modalities to the dental community. Using the Lightwalker laser, we can now offer our patients health improvements that reach beyond restorative and rehabilitative dentistry. We are excited to give you some insight into the future of airway management with a modification of Nightlase to our procedure for cardio intensive athletics called PerfoMlase™. This is due to our ability to create non-surgically improved nasal breathing 24 hours a day through the laser protocol.

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References:

1. A report of the National Commission on Sleep Disorders Research (1995) Wake Up America: A National Sleep Alert. Washington, D.C.: U. S. Government Printing Office.
2. Young T, Peppard PE, Gottlieb DJ (2002) Epidemiology of obstructive sleep apnea: a population health perspective. *Am J Respir Crit Care Med* 165: 1217-1239.
3. Lattimore JD, Celermajer DS, Wilcox I (2003) Obstructive sleep apnea and cardiovascular disease. *J Am Coll Cardiol* 41: 1429-1437.
4. Courey MS, Fomin D, Smith T, Huang S, Sanders D, et al. (1999) Histologic and physiologic effects of electrocautery, CO2 laser, and radiofrequency injury in the porcine soft palate. *Laryngoscope* 109: 1316-1319.
5. Fomin D, Nicola E, Oliver C, Farci M, Dibbern R, et al. (2007) Collagen type analysis in the soft palate after surgical intervention with CO(2) laser and radiofrequency ablation. *Photomed Laser Surg* 25: 449-454.
6. Liu H, Dang Y, Wang Z, Chai X, Ren Q (2008) Laser induced collagen remodeling: a comparative study in vivo on mouse model. *Lasers Surg Med* 40: 13-19.
7. Miracki K, Vizintin Z (2013) Nonsurgical minimally invasive Er: YAG laser snoring treatment. *J Laser and Health Academy* 1:36-41.
8. **Cameron Y. S. Lee and Cameron C. Y. Lee** Evaluation of a non-ablative Er: YAG laser procedure to increase the oropharyngeal airway volume: A pilot study. *Dent Oral Craniofac Res*, 2015, Volume 1(3): 56-59
9. Christopher Spock, Adrei Metelitsa et al. Lasers and Lightsources to Activate Fibroblasts; *Cosmet Dermatology* 2012; 25:27-33
10. Shiffman H and Lukac M; Nightlase: Minimally invasive Laser Assisted Uvulopalatoplasty; *Journal of Laser and Health Academy*, 2018, Volume 1
11. Shiffman H, Khorsandi J, Cauwels N.M.; Minimally Invasive Combined Nd:YAG and ER:YAG Laser Assisted Uvulopalatalplasty for Treatment of Obstructive Sleep Apnea; *Photobiomodulation, Photomedicine, and Laser Surgery*, 2021 Vol.39, No. 8



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RON KAMINER, DDS, FAGD

DIODE LASERS AND THEIR IMPACT ON DIGITAL DENTISTRY

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The road for laser penetration into general Dental practices has been very slow albeit steady. Costs, learning curve, and the lack of understanding of value have all been a hindrance to widespread adoption. Of all the lasers in Dentistry, the diode laser has shown to be the laser most purchased by general dentists and specialists alike. ⁽¹⁾ The lower cost, the smaller footprint and the lack of a complicated learning curve have all contributed to making the diode laser as popular as it is.

Diode laser energy is preferentially absorbed by pigment and hemoglobin making them ideal soft tissue cutters and soft tissue coagulators. ⁽²⁾ Before diode lasers became so prevalent, dentists used electrocautery to remove tissue. Like a diode, electrocautery uses high heat to remove tissue. As the technology is totally different, electrocautery produces far more thermal damage than a diode which could lead to more post operative discomfort and possibly tissue recession. ⁽³⁾ Because of this phenomenon, dentists in the past often refrained from using electrocautery in areas where aesthetics would be a major concern.

The most common diode wavelengths fall between 810 and 980 nm on the electromagnetic spectrum. At 810 nm the coagulation is much higher than at 980 and at 980 the cutting efficiency in theory is much higher at 810. ⁽⁴⁾ Some laser manufacturers have made lasers at an in between wavelength to try and maximize each

wavelength's properties while one Dental manufacturer has recently made a laser that has both wavelengths in one unit which can be combined at a touch of a button maximizing their inherent properties. The laser is also super pulsed allowing for higher peak powers but maintaining a low average power. In the author's opinion, this revolutionary technology allows the dentist to experience outstanding smoother cutting with excellent coagulation.

Diodes are used in day-to-day practice in a variety of ways. As the diode is a cutting tool, the excision of a small and large amount of tissue is made easier by using a diode. As diode energy also kills bacteria, diodes can also be used in Peri Implant therapy and Dental hygiene for the control of periodontal disease. ⁽⁵⁾ The diode with special handpieces can also be used to administer low level laser energy which increases blood flow and lymphatic flow to help promote tissue healing. And reduce post-op discomfort. The technology called low level laser therapy, works wonders when used following many general dental procedures.

A basic skill that for many has not been perfected is taking an ideal dental impression. For an impression to be an exact replica of the tooth preparation, the dentist must retract the tissue and control bleeding and salivary impurities. The dentist will often use retraction cord that is placed and allowed to sit in the tissue to move the

gingiva away from the margin of the preparation. Studies show that retraction cord can be more traumatic and uncomfortable than using a diode for tissue retraction. The dentist will also often apply a hemostatic agent onto the cord to prevent any bleeding. Alternatively, manufacturers have developed pastes, and gels that when placed into the tissue (sometimes with assistance of a retraction cap) will displace that tissue without cord and also prevent bleeding. While these techniques do work, dental laboratories still complain that impressions are not clean, and the margin isn't always clear. A large dental laboratory has shared statistics that up to 50% of dental impressions do not show the entire margin needed for manufacturing an ideal restoration. This could make sense as when the cord is removed or the paste or gel is rinsed off, tissue bleeding could occur, and the impression material may not flow into all areas to capture the margin.

As digital scanning further penetrates the market ideal tissue retraction becomes even more of an arduous task. While impression materials can flow past a margin that may not be fully retracted, a digital scanner needs to see the entire retracted margin, for it to record an exact replica of the preparation.

There is a learning curve for laboratories as they delve deeper into the digital space as well. Once receiving an impression in the laboratory, laboratory technicians would pour a model and hand ditch dies as they have done for a very long time. The strong dental skill set of the technician and their experience reading margins all contribute to a well-fitting final restoration. Today, when we send digital impressions to many laboratories, non or a less experienced "digital designer" will interpret the digital scan and digitize the margin on the screen. For that crown to fit, a clearly retracted margin must exist, and this

is where diode lasers are truly indispensable.

There is a short learning curve for the proper use of a diode laser in crown and bridge. Following a few simple rules and understanding basic laser science, will allow the practitioner to achieve high success with little post op pain and no tissue recession. We must first understand that diode energy as previously mentioned is absorbed by pigment and hemoglobin. Highly pigmented tissue will be cut faster than non-pigmented tissue and ideally, lower energy levels should be used to avoid post op pain and tissue recession. Conversely, fibrotic tissue in someone who is a smoker will need more energy to achieve an ideal cut. Secondly, it is important to note that manufacturers' presets are merely safe suggestions and due to a variation in tissue response, a dentist must use the lowest amount of energy to efficiently cut that tissue.

Understanding that lateral retraction of tissue is the final goal is the last key to proper diode use. Like all lasers, diodes are end cutting, meaning they do not cut with the side of the tip. Positioning the tip perpendicular to the sulcus will only create a deep hole around the tooth and may do more in reducing tissue height and creating thermal damage, than actual retraction. Angling the tip in the inner sulcus towards the tissue being removed will create space between the finish line and the gingival margin and allow the laboratory technician or digital designer to clearly visualize the margin of the preparation. Retraction paste can be used in combination with a diode to absorb crevicular fluid which is also necessary to achieve a perfect scan. The rule of thumb should be that if the dentist can't clearly see the margin on the screen, then the tissue is not retracted well enough to produce an ideal final restoration. Figures 1, 2, and 3 depict ideal tissue retraction with little to no thermal damage.



Fig. 1A Post-Op



Fig. 1B Pre-Op



Fig. 1C Scanned Prep

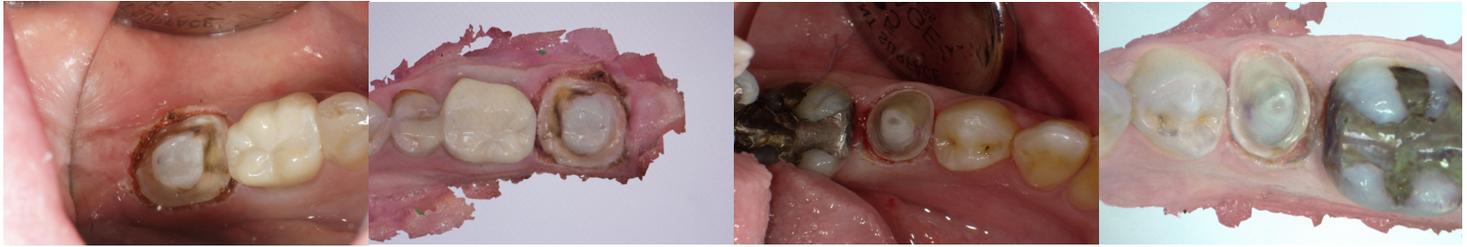


Fig. 2A Prep After Laser Retraction

Fig. 2B Scanned Prep

Fig. 3A Clear Margins

Fig. 3B Scanned Crown

Many dentists fear the “dreaded tissue tag” that can appear around the margin after using a diode laser. Using a brush on a syringe with hydrogen peroxide or chlorhexidine in a scrubbing motion will effectively remove the tissue tags. Furthermore, creating an ideal provisional restoration will enhance the speed in which that tissue will heal. Studies show that bacteremia following laser use is rare and far less than what is seen when using electrosurgery. It is because of this phenomenon that antibiotics need not be prescribed after using a diode laser.

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Technology additions in the practice can be daunting for many practitioners. The good news is as far as lasers go, diodes are relatively inexpensive and offer a great bang for the buck. Once properly trained, most dentists never go back to retraction cord and achieve more predictable results with far less stress. Everyone can learn to use a diode laser and the results speak for themselves!

References:

1. Knowledge and practices of dental lasers among dental professionals in India: A survey-based study
Sudha Yadav, Sarika Chaudhry, Sangeeta Talwar, Mahesh Verma
Department of Conservative Dentistry and Endodontics, Maulana Azad Institute of Dental Sciences, New Delhi, India, 2018;12 (2) 5055
2. Natl J Maxillofac Surg. Sanjeev Kumar Verma, Sandhya Maheshwari, Raj Kumar Singh, and Prabhat Kumar Chaudhari
2012 Jul-Dec; 3(2): 124–132 Laser in Dentistry: An innovative tool in modern Dental practice
Comparison of Healing Period after Frenectomy Using Scalpel, Electrocautery & Diode Laser Asian Archive 2017 ;21(12)
3. The Use of Laser Diodes Superpulses in Implantology G. Caccianiga, A. Cambini, G. Rey, ... Sage Journals 2012
4. Bacteremia following laser and conventional surgery in hamstersR. Kaminer, C. Liebow DMD, PhD†J.E. Margaroni DDS‡J.J. Zambon DDS, PhD§ Journal of Oral and Maxillofacial Surgery Volume 48, Issue 1, January 1990, Pages 45-48



AUTHOR
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Dr. Ron Kaminer is a 1990 graduate of the State of New York (SUNY) Buffalo School of Dental Medicine. Dr. Kaminer has always been passionate about technology and was one of the first 100 dentists in the country to include a hard tissue Dental laser in his practice. Over the years Dr. Kaminer has taught Dental Lasers, technology, and minimally invasive Dentistry to thousands of dentists worldwide. He sits on the Board of Catapult Education, is a frequent contributor to *Mentor* magazine, sits on the editorial board of *Dental Product Shopper*, and acts as a clinical consultant to numerous dental manufacturers. While doing all of the above, Dr. Kaminer practices full time in both his offices in Hewlett and Oceanside N.Y. focusing on Minimally Invasive and Digital Dentistry. He is a Fellow of The Academy of General Dentistry, a member of the American Dental Association, and a member of The Academy of Laser Dentistry.

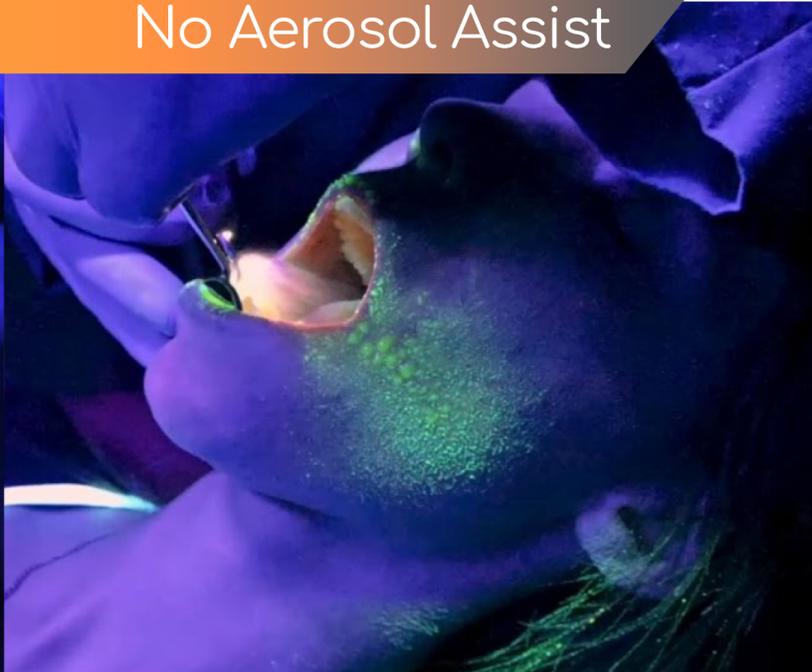


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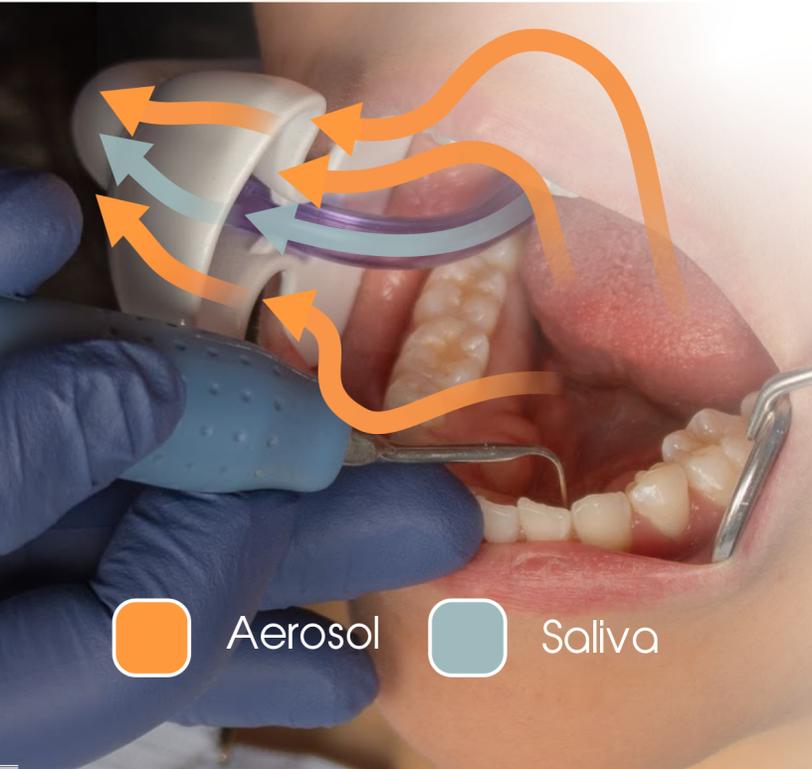
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INTERNATIONAL DENTAL EVENT AND MEETING (IDEM) 2022 RETURNS

The biennial IDEM trade fair and convention returns with its 12th edition this year. Themed “Building Resilience in Dentistry”, the physical event will be held from 7 – 9 October at Sands Expo and Convention Centre, Marina Bay Sands. After the in-person hiatus caused by the pandemic, participants will now be able to come together again to explore more and better business opportunities, and network with likeminded professionals face-to-face to learn about the latest trends and updates in dentistry. In addition to conferences conducted by renowned speakers, there will also be hands-on and interactive workshops for delegates, showcases and exhibits for visitors to experience and learn about new technologies and the latest innovations in the dental sector.

Participants can look forward to a curated series of programmes:

- **Full-day SDA Masterclass** conducted by leading clinical researcher in Periodontology, Dr Maurizio Tonetti, on the topic— “Implants in Stage III and IV Periodontitis Patients: Benefits and Risks”. Dr Tonetti will present key concepts for attendees to understand the importance of appropriate periodontal therapy before implant placements, benefits, and risks of biological complications in Stage III and IV periodontitis patients. He will also share on specific approaches to decrease the risk of peri-implantitis in these high-risk subjects.
- **Trade Exhibition** in a 14,000sqm all-encompassing exhibition hall showcasing close to 500 international exhibiting brands from more than 30 countries. Participants can meet manufacturers and cornerstone brands in person, speak directly with the producer of a product, and learn about the finer nuances of a tool and how it can enhance their business or practice. Participants can also look to build international partnerships with exhibitors from countries such as Brazil, France, Germany, Italy, Japan, Korea, Switzerland, China, USA and more.
- **AOHTS@IDEM** (Association for Oral Health Therapists (Singapore) Symposium in collaboration with IDEM) brings together the AOHTS’ flagship event with IDEM’s Dental Hygienist and Therapist Forum (DHTF) providing hygienists, therapists, and oral health therapists a central platform to network and learn about the latest developments in their field of practice. There will be 10 conferences conducted by notable speakers to cover topics such as Dental Care for the Elderly with Neurological Diseases, Child protection for Dental Professionals, Oral Health Care Responsibility for the Dental Profession and more.
- **Singapore Speaker Series** is a brand-new programme featuring local speakers who will cover specialised topics on comprehensive, conservative approaches to dentistry. Participants can look forward to learning about a multidisciplinary approach to aesthetic rehabilitation, contemporary techniques on perio-restorative outcomes, patient-centric orthodontics and treating ameloblastomas.
- **Innovation Arena** is a first-of-its-kind initiative curated for young companies and start-ups in the dental and non-dental sectors to showcase the latest innovations and products targeting the dental market. The Innovation Arena aims to bridge start-ups with participants in order to promote cross-sector collaborations between the dental sector and businesses at large.

IDEM360+, a digital community platform supplements IDEM 2022 in providing participants with a holistic experience:

- Watch conference content shared by industry experts after the event has ended
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Delegate registrants will be able to attend all on-site activities and have full access to the digital platform - IDEM360+. Registration is ongoing, Pre-show rates will be available at a discounted price before 2 October 2022. Register via <https://www.event-reg.biz/RegistrationIDEM/LandingIDEM>, for more information, visit www.idem-singapore.com.

An Interview with **Sammy Noubissi,** **DDS, MS**



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Dr. Noubissi obtained his Doctorate in Dental Surgery from Howard University in Washington DC. He applied to and was selected to attend the prestigious Loma Linda University full-time Graduate Program in Implant Dentistry. There he received three years of formal training in dental implantology which culminated with a certificate in Implant Dentistry and a Master of Science in Implant Surgery. He is a clinical and experimental researcher, author and has published book chapters and articles in implant dentistry with a focus on ceramic implants in peer reviewed dental journals.

He is a visiting professor at the University of Milan, adjunct professor at the University of Chiety-Pescara in Italy, and a visiting researcher in the ceramic materials department at INSA Lyon in France. Dr. Noubissi is the founder and current president of the International Academy of Ceramic Implantology which is an independent association focused on metal

free and bioceramics in dental implantology. He is a fellow and Ambassador at the Clean Implant Foundation whose mission is to assess production quality and purity of commercially available dental implant surfaces.

Dr. Noubissi has been practicing and educating dentists on metal free implantology since 2009. He has extensive experience with ceramic implants and his opinions and expertise are often sought both by clinicians and manufacturers. His practice is located in Silver Spring, Maryland USA.

Q What made you go into dentistry?

A I became interested in dentistry as a teenager when I was taken to an orthodontist for treatment. The time of treatment and frequency of visits just spiked my interest and like for dentistry.

Q Tell us about the International Academy of Ceramic Implantology (IAOCI). How long has the organization been active?

A The International Academy was founded in 2010. The organization is in its 12th year of existence and has been active for the past 11 years.

Q What vision did you have when creating this organization?

A To bring together a group of forward thinking dental professionals who shared the vision of a less invasive and more biological and biocompatible approach to teeth replacement.

interview

Q What influenced you to start this organization?

A You have to remember that initially ceramic implants were and to some degree remain poorly understood so the idea to create the IAOCI came from the need to have a platform where early adopters could exchange and also where education and training in metal free implantology could be available.

Q What is the process to join the IAOCI organization?

A Joining the IAOCI is very simple and comes with great benefits. One just needs to visit our website and the process is pretty streamlined and simple. Membership benefits include and are not limited to access to the latest and most relevant clinical and scientific articles and literature on ceramic implants and bioceramics, recorded lectures, and preferential rates to all our educational events. The membership link is: <https://www.iaoci.com/membership/>.

Q How can our readers learn more about the history and future events of the organization?

A Visit our website at: <https://www.iaoci.com/events/>. Past and future national and international ceramic implant events are listed on the event section of our website.

Q What are some of the goals you would like to accomplish for the organization in years to come?

A We would like to increase our membership, host more educational and live training events throughout the year. We are proud of the fact that we now support a live patient surgical training course in North Carolina quarterly every year. We would like to see ceramic implants become more mainstream. In the last 6 years, we have seen rapid growth in the interest for ceramic implants both by patients and dentists. The industry has also responded and we now have over half a dozen FDA-approved and commercially available ceramic implant systems in the United States.

Q What keeps you moving forward when times get rough?

A Staying focused and focusing on the goals and constantly learning from the outcomes.

Q It can be challenging when choosing a partner in business, what types of characteristics do you look for?

A Driven and motivated individuals with the right attitude. To me attitude and disposition outweigh talent.

Q What types of practices do you perform to mentally and physically disconnect from work?

A Meditation, travel, and sports.

Q Is there anyone who stands out that has inspired you through this journey?

A My parents.

Q What advice can you give to dentists wanting to take the next steps towards implementing ceramic implantology in their practice?

A Even if you have experience with conventional metal implants, take some time to educate yourself on the technology, the material, and how bioceramics behave in the oral environment both biologically and biomechanically.

Q Do you have advice for dentists skeptical of performing ceramic implants?

A Be open-minded and willing to learn. Understanding the material in terms of its benefits and limitations is most important. Also, they need to realize and accept the fact that the demand for ceramic implants is mainly patient-driven at the moment, and implementing them in their practices is a unique opportunity to differentiate their practices. A recent survey of patients showed that when given the choice over 80% of patients would rather have a metal free implant.

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DIODE LASER FRENECTOMY: Case Report



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FRENUM is a fold of mucous membrane, usually with enclosed muscle fibers that attaches the lips and cheeks to the alveolar mucosa and/or gingiva and underlying periosteum. According to Miller the frenum should be characterized as pathogenic when it is unusually wide or there is no apparent zone of attached gingiva along the midline or the interdental papilla shifts when the frenum is extended. These pathogenic frenums can lead to midline diastema, gingival recession, interference with retention of denture, and compromised gingival health because of poor plaque control. The management of such abnormal frenum includes frenectomy or frenotomy. In this paper, we present a case of diode laser frenectomy.

Case Report

A 17-year-old female patient undergoing orthodontic treatment for spacing in the maxillary anterior teeth was referred for the evaluation of maxillary labial frenum. On intraoral examination, midline diastema and high frenal attachment were observed. Also the labial frenum was thick and wide (Figures 1-2-3). The patient was advised frenectomy. Frenectomy was performed using diode laser of 980 nm. The labial frenum was sprayed with topical spray and infiltration anesthesia was given to the frenum. The laser was activated before performing the procedure. Surgical tip at 400 μ m was used with a power of 3,5 W and was applied in contact mode.



Fig. 1



Fig. 2



Fig. 3

The incision was started with the frenum from the attached gingiva and interdental papilla on the labial surface between the central incisors extending upward from inner side of upper lip to the depth of vestibule ending in a rhomboidal area causing separation of the fibers. Hemostasis was optimal and no sutures were given (Figure 4). The patient was given verbal instructions to avoid taking hot and spicy food for a few days and to maintain meticulous oral hygiene. Postoperative analgesics were given to the patient.



Fig. 4

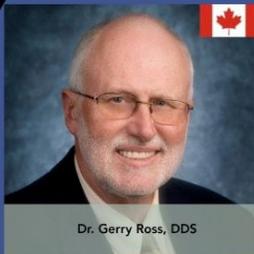
After few months later the healing and the orthodontic result is excellent. (Figures 5-6-7)



References:

1. Bergstrom K, Jensen R, Martensson B. The effect of superior labial frenectomy in cases with midline diastema. *Am J Orthod* 1973;63:633-638.
2. BojJ,GalofreN,EspanaA,EspasaE.Painperceptioninpaediatricpatients undergoing laser treatments. *J Oral Laser Applications* 2005;2:85-89. Edwards JG. The diastema, the frenum, the frenectomy: A clinical study. *Am J Orthod* 1977;71(5):489-508.
3. Genovese MD, Olivi G. Laser in pediatric dentistry: Patient acceptance of hard and soft tissue therapy. *Eur J Paed Dent* 2008;9:13-17.
4. Genovese MD, Olivi G. Use of laser technology in orthodontics: hard and soft tissue laser treatments. *Eur J Paediatr Dent* 2010 Mar;11(1):44-8.
5. Gontijol,NavarroRS,HaypekP,CiamponiAL,HaddadAE.Th eapplications of diode and Er:YAG lasers in labial frenectomy in infant patients. *J Dent Child (Chic)* 2005 Jan-Apr;72(1):10-15.

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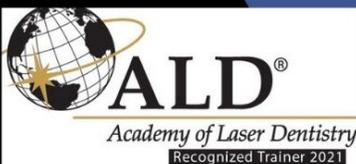
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ALFRED WYATT, JR., DMD

LASERS..... A SOLUTION FOR MANY DILEMMAS FACED IN DENTISTRY

The use of lasers in the practice of dentistry can no longer be considered a novelty. It has been 30+ years now that laser devices have been cleared by the FDA for use in certain procedures performed by dentists. Over this time, many strides have been made in the manufacturing, wavelength options, procedure protocols, and training. In the hands of well-trained clinicians, lasers have become one of the most useful, versatile, and efficient components of their armamentarium. Properly trained dental professionals that incorporate lasers in treatments have benefitted with superior clinical results and use their laser(s) practically every day. Consequently, lasers have yet to evolve into a device that is commonplace in dental practices. There are many reasons for this which include costs and unfamiliarity of purpose. Also, many dental practitioners have failed to obtain the sufficient training necessary to become proficient to perform procedures effectively. Unfortunately, poorly trained and untrained laser users have experienced clinical challenges and view lasers in a more negative light. To this end, a few of the commonly encountered clinical and functional dilemmas will be presented with corresponding solutions. Each of these scenarios are factual occurrences and hopefully will enlighten and enhance a clinician's laser experience.

To obtain the best results from lasers, it is imperative to understand how they function. Lasers are not just "tissue burners." These devices emit specific wavelengths of light that can be absorbed by specific components of tissue (chromophores) to elicit a response. The action may be photothermal, photophysical, photochemical, photoacoustic, or an amalgamation of these. The combination of wavelength, emission energy and chromophore determine how the tissue will benefit from the process. The following examples will hopefully provide a sense of clarity to some questions and concerns.

Functional Dilemma

Dr. Z. has just purchased an 810nm diode laser. The laser is assembled per instructions, safety precautions are taken, and the fiber is directed to the tissue that is to be removed. Upon emitting 2W of energy to the target area, there is no response. An increase in power to 4W also exhibits no response. Dr. Z calls the laser supplier to obtain another device that works.

Functional Solution

Thermal energy is transferred to a source via conduction (contact), convection (gas or liquid delivery), or radiation (the light itself). The 810 nm wavelength in diodes is not well absorbed by many of the primary chromophores in the soft tissue to perform surgery with radiation. To create a photothermal response, the end of the fiber should be "initiated" or minimally coated with a pigment such that when the laser energy is emitted, absorption of the applied chromophore occurs at the end of the tip. This "hot tip" provides sufficient photothermal energy to perform surgical procedures via conduction. Even when initiated, a varying smaller percentage of the light energy will pass into the tissue. Procedures for healing, pain reduction, and bacterial decontamination are not best performed with initiated tips since the presence of the marking impedes the light energy from reaching the target. These interactions are photophysical and photochemical and depend on the light particles being absorbed. There is no visual physical change that should occur during this process.

This is one of the primary foci of diode laser training.

To obtain the best results from lasers,
it is imperative to understand how they function.



Clinical Dilemma

The patient presents with a defective crown that has been trapping food for months. Upon removing the crown, excessive hemorrhage from the sulci must be controlled prior to taking a digital impression. Astringents have provided some control, but not enough yet to obtain a clear scan.

Laser Solution

Laser tissue troughing is an alternative to other retraction techniques that clearly exposes crown margins and dramatically reduces sulcular hemorrhaging. Due to the high absorption of hemoglobin by diode laser wavelengths, these devices are excellent for performing this procedure. The objective is not to reduce the height of the gingival margin, but to open the inner lining of the sulcus. As the tissue is removed, the photothermal response from the energy emission results in more effective hemorrhage controls than other methods.



Clinical Dilemma

Patient presents to the office for continuation of dental treatment. Unfortunately, they are experiencing trismus and can barely open to have the dental procedure performed.

Laser Solution

Photobiomodulation therapy is a form of light therapy that utilizes non-ionizing forms of light sources, including lasers, LEDs, and broadband light, in the visible and infrared spectrum. It is a nonthermal process involving endogenous chromophores eliciting photophysical (i.e., linear and nonlinear) and photochemical events at various biological scales. This process results in beneficial therapeutic outcomes including but not limited to the

alleviation of pain or inflammation, immunomodulation, and promotion of wound healing and tissue regeneration.²

The use of lasers as a primary device for the administration of Photobiomodulation Therapy (PBMT) in dentistry is becoming more widespread. Dentists are discovering new ways of incorporating this treatment in many phases of their practices. Recently, the Multinational Association of Supportive Care in Cancer (MASCC) and the International Society of Oral Oncology (ISOO) have recommended PBMT for the prevention of Oral Mucositis prior to chemotherapy.³ Whether treating trismus, aphthous ulcers, or alveolar osteitis, there are many options that a clinician can choose with this therapy that will enhance their ability to facilitate healing.



Clinical Dilemma

A dental implant has been submerged for over six months and the patient is ready to have it restored prior to leaving the country in a month. Conventional exposure surgical procedures require about 3 weeks of healing time before it is recommended to take an impression.

Laser Solution

An implant can be exposed to the oral cavity with certain laser wavelengths and an impression can be taken the same day with a predictable tissue response. Once the tissue has been removed from over the implant using a laser, an impression coping can be placed. Upon taking the impression, a healing cap can be placed to aid in very predictable healing prior to insertion of the prosthesis. Care should be taken to use the proper protocols. Studies have shown the Nd: YAG laser causes pitting in the integrity of implant bodies and therefore is contraindicated for use in this procedure. Also, extra concern should be taken with all other lasers to minimize the amount of heat that is generated in the area. This magnifies the necessity of appropriate training to increase successful clinical outcomes and control the potential of complications.⁴

Clinical Dilemma

A patient presents to the office with a mouth sore that appeared right before her wedding. Upon examination, it is determined to be an aphthous ulcer. The practitioner chooses to use their new laser to treat the lesion. The laser 980nm fiber is initiated at 1.5W and the lesion is cauterized. Two days following the procedure, the patient presents with a lesion that is larger and more painful.

Laser Solution

Aphthous ulcers as well as other mouth sores can be remedied with properly emitted laser energy. Some have recommended cauterization of these lesions but in most instances, this prolongs healing and can often lead to a more painful experience. Very low non-ablative (non-vaporizing, non-surgical) energies should be used over the lesion for about a minute and a half to two minutes. The fiber should not be initiated as is the case with surgical diode laser techniques. This procedure should be done without local anesthesia so the patient can sense if the energy is too much. In most cases, the patient will experience immediate relief. Similar results can be achieved with patients suffering from oral mucositis after chemotherapy for cancer.

Clinical Dilemma

A patient presents 2 weeks prior to her wedding highly concerned.

She stated that one of her friends had mentioned that her teeth are short. She wants to do something to enhance them for her wedding pictures.



Laser Solution

A laser soft tissue gingivectomy offers several advantages over conventional scalpel techniques. Some of those benefits include minimal to no bleeding, no sutures, and a much faster healing period. Also, those who have had the procedure via both methods state that

there is much less post op pain with the laser. As with all laser procedures, the key is using the minimum amount of power that will get the job done. Of equal importance is a constant observation of the tissue during vaporization so that the possibility of collateral heat damage is minimized.

Each of the aforementioned examples were performed with diode lasers which are utilized on soft tissue only. There are other laser wavelengths that can be used on hard and soft tissue but operate differently. All lasers are beneficial for performing services that cannot be done otherwise. Those who wish to understand how lasers can be an asset to their practice should do the following:

1. Do Your Research

Prior to making a laser purchase, find out what lasers are available and what their capabilities are. There are several wavelengths that are manufactured with varying energies, settings, and designs. A clinician should choose a device based on their practice philosophy as well as how much they may be willing to increase the services they offer.

2. Learn How To Operate the Laser Safely

Lasers have very few contraindications, but the clinician should be aware of the precautions that need to be taken when in operation. Some of these include protective eyewear, proper laser settings, surgical exhaust (plume) control, and patient and staff protection. If a clinician has taught themselves, they should make sure that

they are familiar with all laser protocols prior to treating patients

3. Get Hands-On Live Training

The very best way to fully understand the safe and effective way of operating lasers is by attending courses from knowledgeable experienced laser users. There are many courses at different levels of complexity for different wavelengths. The Academy of Laser Dentistry is one entity that not only has many experienced laser users of multiple wavelengths but also has certification programs that help to improve clinical skills of all levels

Lasers are the solution for many dental dilemmas.....but only if the clinician has sufficient knowledge of how their respective device can be operated optimally.

References:

1. Selting, W
Challenging the Basic Concepts of Diode Laser Use in Dentistry
Presented at the 17th Annual Conference of the Academy of Laser Dentistry; Miami, FL; April 16, 2010
2. Juanita J. Anders, PhD, Raymond J. Lanzafame, MD, MBA, Praveen R. Arany, DDS, PhD
Low-Level Light/Laser Therapy Versus Photobiomodulation Therapy *Photomed Laser Surg*, 2015 Apr 1; 33(4): 183-184
3. Sharon Elud DMD, MSc, Karis Kin, Fong Cheng RN, PhD, Rajesh V. Lalla DDS, PhD, Noam Yarom DMD et al
MASCC/ISOO Clinical Practice Guidelines for the Management of Mucositis Secondary to Cancer Therapy *Cancer* 2020 Oct 1; 126(19): 4423-4431
4. Romanos, Georgios E. DDS, PhD*; Gupta, Bhumiya DDS†; Yunker, Mike DDS‡; Romanos, Enisa Begic DDS§; Malmstrom, Hans DDS
Laser Use in Dental Implantology *Implant Dentistry*; June 2013 - Volume 22 - Issue 3 - p 282-288



Alfred Wyatt, Jr., DMD

Dr. Alfred Wyatt, Jr. has been in the private practice of dentistry for over 37 years and has studied lasers and light technologies in dentistry for over 20 years. He received his DMD degree from the Medical College of Georgia (School of Dentistry) in

1984. He presently serves at his alma mater (now the Dental College of Georgia at Augusta University) as an Associate Professor of Oral Rehabilitation. Dr. Wyatt is also a member of the Academy of Laser Dentistry (ALD) where he has served on the board of directors and attained Advanced Proficiency and Educator Status. He is past chair of the Education Committee of the ALD and is presently serving on the certification testing committee. He has used several types of lasers in his practice and has been the author or co-author of several publications related to the clinical use of light technologies. Over the years, he has trained dentists internationally on the use of various light technologies as well.

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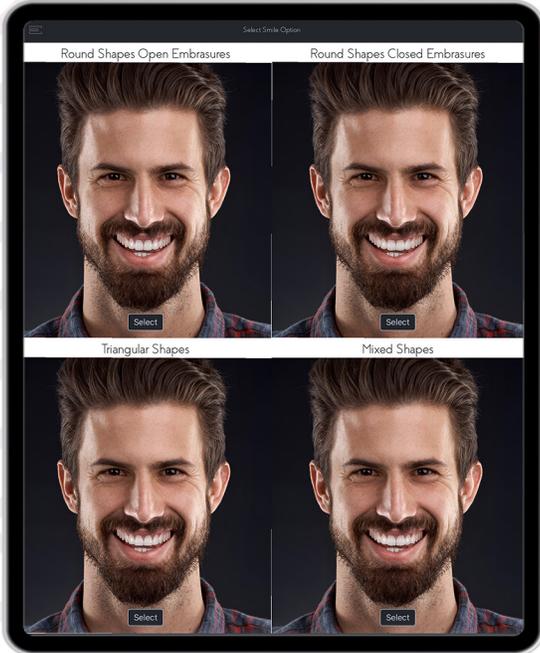
OSA Orthotic Appliances Now Easier to Obtain Medical Coverage With CBCT Diagnosed Airway Anomalies In Addition To Other Oral Surgery

Most dentists are under the misconception, for varying reasons, that medical plans can only be accessed in cases involving trauma. This cannot be farther from the truth. Current medical plans on the market cover a wide variety of procedures, including examinations/consultations and treatment for such simple problems as Exostoses of the Jaw (Tori) to more complex ones, such as Chronic Periodontitis and Alveolar Atrophy.

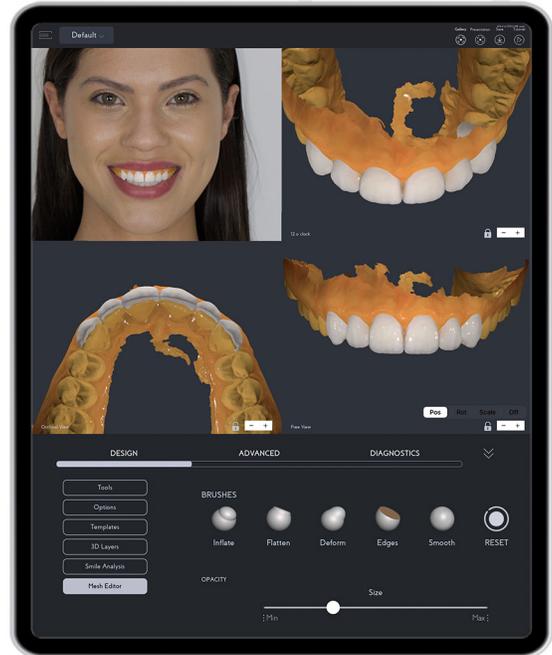
In addition, a myriad of other infectious, inflammatory, and pathological problems are covered, including periodontal surgical services, Implant Stage I and II Surgery, TMD, as well as oral and dental procedures related to traumatic injury.

831-297-3083 - Chris Nevarez

Smile Simulation



3D Design



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Smile Design The Next Generation



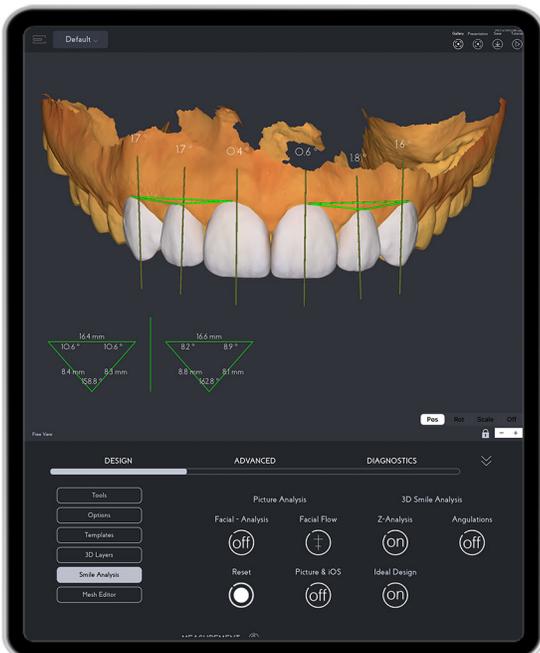
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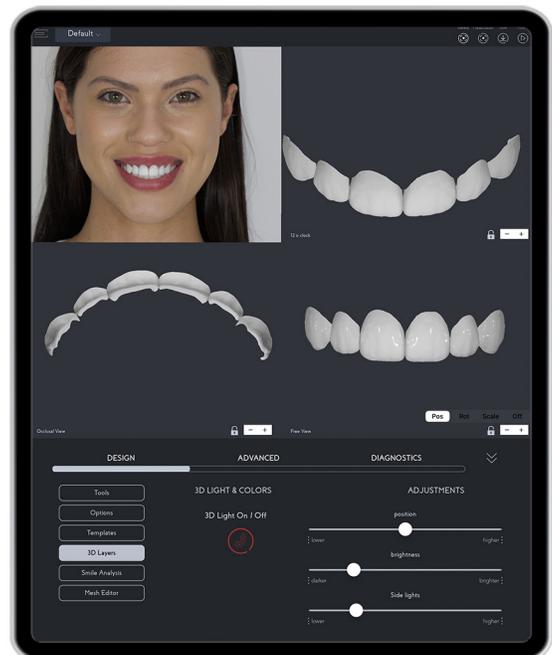
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Smile Analysis



CAD Features

ALAN DALESSANDRO, DDS

A CASE REPORT ON PERIODONTAL LASER SURGERY

ABSTRACT

This case report describes the treatment of a moderate periodontitis using Nd:YAG and Er:YAG laser light technology. The article will describe the technique and benefits of using this technology for improved clinical outcomes.

INTRODUCTION

We all have those patients that have completed traditional thorough scaling and root planning, whose homecare is good, but the tissues are still inflamed with bleeding upon probing in multiple areas. Localized or generalized bone defects may be forming. The patient has 4-7 mm pockets and is not responding to traditional therapy. What is the best course of action to take with such patients?

Thirty years ago, if you were to do advanced periodontal therapy to treat such a patient, you were probably planning surgery that involved a periodontal flap procedure for access and possibly bone reshaping. The surgery could include anything from flap curettage to full osseous surgery, and could result in sensitivity, recession, and large spaces between the teeth where food could collect. As our knowledge of the biology of healing advanced, bone grafting and the use of barrier membranes came to the forefront of periodontal technology. Use of these tools helps to ensure less recession, less gaps between the teeth and that bone grafts stay viable and are able to achieve full regeneration potential.

The next advancement in periodontal therapy appeared in the late 1990's: Nd:YAG laser treatment. Progress was at first slow due to the absence of any human histologic studies to support this new procedure. Ray Yukna in 2007, and Myron Nevins in 2012^{1,2} provided the first histological studies that proved this technology actually worked, paving the way for this new procedure to take

the place of traditional flap surgery. Basic biological principles of disease and treatment of these periodontal lesions are always the guiding principles, and the laser was used as a tool that made treatment less invasive and more comfortable for the patient. It is always important to follow treatment protocols and not assume that treatment with a laser will be the "magic wand" that just passes through the gingival pocket. This will be illustrated in the following case.

CASE REPORT

A 39-year-old nonsmoking, relatively healthy patient who is on Plaquenil medication for Lupus and has allergies to Penicillin and Sulfa. Though Mrs. Smith has had routine dental visits to include an implant placed in another office in the #18 area, her tissues had become swollen, her gums were bleeding and were unresponsive to traditional treatment. Four sessions of scaling and root planing were done with local anesthesia. Oral hygiene instructions were given and reinforced at every visit and her homecare was good. Three months after her last scaling appointment she came in for a routine hygiene visit. Her tissues were quite inflamed with generalized 4-7mm pockets and bleeding upon probing in multiple areas. She was getting frustrated as her efforts to maintain her oral health seemed to not be working. Radiographs revealed several small vertical bone defects forming. Advanced periodontal therapy was indicated to prevent further breakdown. Though flap surgery was the norm in past years, I decided to use lasers to treat this case.

Three months after scaling and root planning Mrs. Smith came in with bleeding gums, pocketing and areas of vertical bone loss. Pocket depths ranged from 4-7mm with bleeding upon probing in several areas. She was getting frustrated as her efforts to maintain her oral health seemed to not be working. (Figs 1,2,3)

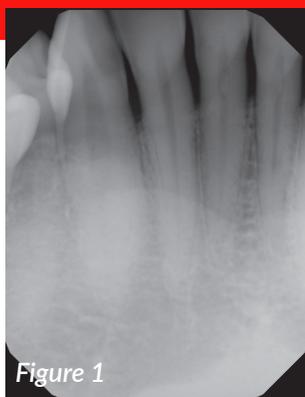


Figure 1

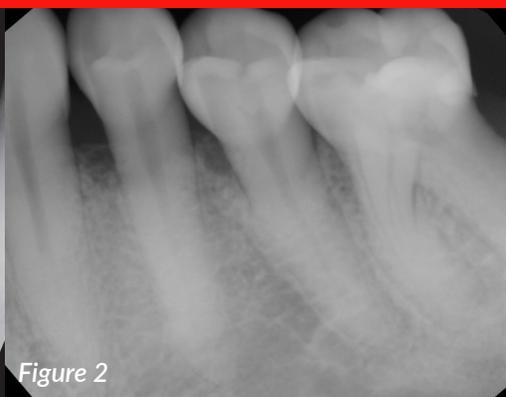


Figure 2



Figure 3

Laser therapy was selected as the mode of treatment because it is proven to have excellent results while being minimally invasive and comfortable for the patient with very little post-operative recession and sensitivity. A combination of Nd:YAG and Er:YAG lasers were used in Mrs. Smith's case to achieve an optimal result.

The patient was prepped and draped, local anesthesia was used to numb the areas and then a periodontal probe was used to sound the pockets to the depth of bone. The Nd:YAG laser (heat laser that targets pigment) was first used to disinfect and de-epithelialize the periodontal pockets, selectively removing inflamed tissue (Fig 4). This also gave us the advantage of disinfecting the periodontal pocket before there was bleeding from instrumentation that could allow bacteria into the systemic circulation. This disinfection and de-epithelialization is done by a gentle sweeping motion of the laser tip going into the pocket 2-3mm at a time and moving around the teeth so as not to accumulate heat until the depth of the pockets is reached.

The next step was using an Er:YAG laser (water laser) with a radial firing tip that looks like a sharpened pencil—85% of its energy comes out laterally. This tip was used in a sweeping motion inside the pocket helping in removing the calculus and toxins from the root surfaces and further relaxing the pockets and creating space for better visualization (Fig 5). This was followed by ultrasonic or piezo scalers and hand instruments to further debride the root surfaces. To help with regeneration, the Er:YAG was used one more time at a greater hertz (pulses per second) to remove the smear layer that was created during root instrumentation.^{8,9} The photoacoustic effects of this water laser not only removes the smear layer and toxins, but also creates a micro roughness on the root surfaces that facilitates a quicker connective tissue and fibroblast

attachment.^{15,21} Normally fibroblasts are slow to attach allowing epithelium a chance to grow down into the healing pocket. Quicker fibroblast attachment gives us a better chance of regeneration rather than repair.

The last step in treatment returns to use of the Nd:YAG, but this time the pulse duration is longer creating more heat to promote a fibrin clot that protects and seals the area. It's necessary that blood is present in the sulcus in order to coagulate. Smokers and others with fibrous tissue may lack this presence of blood and may require decortication of the bone with either an end cutting Er:YAG fiber or a sharp endodontic explorer to promote bleeding. This fibrin clot is the matrix for healing and helps delay the downgrowth of epithelium until the fibroblasts can catch up. If biologics or bone grafts are used, they are placed after the establishment of this clot.



Figure 4: Nd:YAG



Figure 5: Er:YAG

Patients like Mrs. Smith are instructed to eat on the opposite side of their mouth and are placed on a soft food diet. Little or no post-op bleeding or pain is usually seen after surgery and healing is usually uneventful. Bone regeneration is not expected for 6-12 months so no aggressive probing is allowed during this regeneration period.

The biological principles for treating periodontal disease were all followed, but in Mrs. Smith's case, new tools for treating periodontal disease were used: Nd:YAG and Er:YAG lasers. The healing for Mrs. Smith was exceptional. Four weeks post-surgery, the tissues were pink and healthy.

4 Weeks, Post-surgery

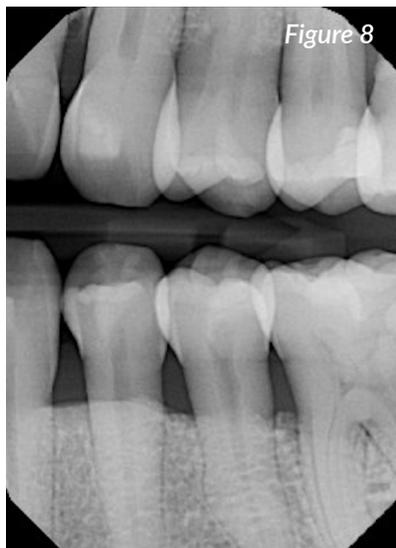


CONCLUSIONS

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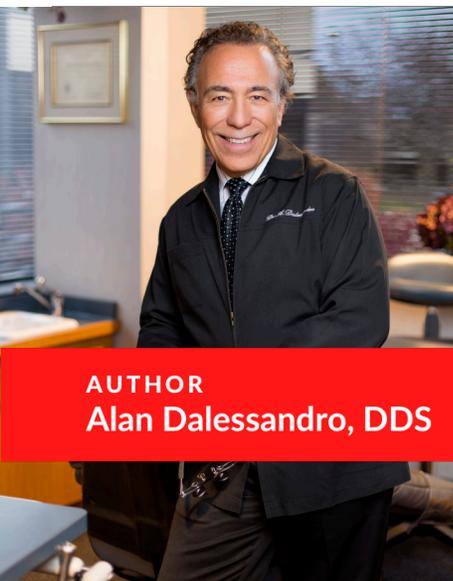
This case describes an active periodontitis and how it was treated with Nd:YAG and Er:YAG lasers. Postoperative x-ray images 9 months later show how the bone responded.²⁹ (Figs 8,9) The bony defects have leveled out and filled in and the tissue is stable and the patient is now undergoing orthodontic treatment with Invisalign®. Mrs. Smith's case is a prime example of how laser technology can enhance the treatment of periodontitis.

9 month post-op



References:

1. Yukna RA, Carr RL, Evans GH. Histologic evaluation of an Nd:YAG laser-assisted new attachment procedure in humans. *Int J Periodontics Restorative Dent.* 2007;27:577-587
2. Nevins ML, Camelo M et al. Human Clinical and Histological Evaluation of Laser Assisted New Attachment Procedure. *Int J Periodontics Restorative Dent.* 2012;32:497-507
3. Schulz RJ, Harvey GP, Fernandez-Beros ME, Krishnamurthy S, Rodriguez JE, Cabello (1986) Bactericidal effects of the Neodymium:YAG laser in vitro study. *Laser in Surgery and Medicine* 6(5):445-8.
4. Harris DM, Yessik M (2004) Therapeutic ratio quantifies laser antiseptics: ablation of *Porphyromonas gingivalis* with dental lasers. *Lasers in Surgery and Medicine* 35(3):206-13.
5. Birang R, Yaghini J, Nasri N, Nooredeh N, Iranmanesh P, Saeidi A, Naghsh N. *J Lasers Med Sci* 2017 Winter; 8(1):51-55. Doi: 10.15171/jlms.2017.10. Epub 2017 Jan 8. Comparison of Er:YAG lasers and Ultrasonic Scaler in the Treatment of Moderate Chronic Periodontitis: A Randomized Clinical Trial. *J Lasers Med Sci* 2017 Winter; 8(1):51-55. Doi: 10.15171/jlms.2017.10. Epub 2017 Jan 8.
6. Lopes, B.M., Theodoro, L.H., Melo, R.F., de Thompson, G.M., & Marcantonio, R.A. (2010). Clinical and microbiologic follow-up evaluations after non-surgical periodontal treatment with erbium:YAG laser and scaling and root planing *Journal of Periodontology*, 81(5), 682-91.
7. Schwarz, F, Sculean, A, Georg, T, & Reich, E (2001). Periodontal treatment with an Er:YAG laser compared to scaling and root planing. A controlled clinical study *Journal of Periodontology*, 72(3), 361-7.
8. Schwarz, F, Sculean, Berakdar, M, Georg, T, Reich, E & Becker, J (2003). Periodontal treatment with an Er:YAG laser or scaling and root planing. A two-year follow-up split-mouth study *Journal of Periodontology*, 74(5), 590-6, doi:10.1902/job.2003.74.5.590.
9. Badran, Z, Boutigny, H, Struillo, X, Weiss, P, Laboux, O & Soueidan, A (2012). Clinical Outcomes After Nonsurgical Periodontal Therapy with an Er:YAG laser Device: A Randomized Controlled Pilot Study *Photomedicine and Laser Surgery*, 30(7), 347-53.
10. Tomasi, C, Schander, K, Dahlén, G & Wennström, JL (2006). Short-term clinical and microbiologic effects of pocket debridement with an Er:YAG laser during periodontal maintenance *Journal of Periodontology*, 77(1), 111-8.
11. Sculean A, Schwarz F, Berakdar M, Romanos GE, Arweiler NB, & Becker J (2004). Periodontal treatment with an Er:YAG laser compared to ultrasonic instrumentation: a pilot study. *Journal of Periodontology*, 75(7), 966-73.
12. Kioezm BM, Theodoro LH, Melo, RF, de Thompson, GM, Marcantonio RA (2010). Clinical and microbiologic follow-up evaluations after non-surgical periodontal treatment with erbium:YAG laser and scaling and root planing. *Journal of Periodontology* 81(5):682-91.
13. Cekici A, Maden I, Yildiz S, San T, Isik G. Evaluation of blood cell attachment on Er:YAG laser applied root surface using scanning electron microscopy. *Int J Med Sci.* 2013; 10(5):560-6.
14. Bolortuya G, Ebihara A, Ichinos S, Watanabe S, Anjo T, Kokuzawa C, Saegusa H, et al (2012). Effects of dentin surface modifications treated with Er:YAG and Nd:YAG laser irradiation on fibroblast cell adhesion. *Photomedicine and Laser Surgery*, 30(2), 63-70.
15. Ando Y, Aoki A, Watanabe H, Ishikawa I. Bactericidal effect of erbium YAG laser on periodontopathic bacteria. *Lasers Surg Med* 1996;19:190-200.
16. Folwaczny M, Mehl, Aggstaller H, Hickel R. Antimicrobial effects of 2.94 micron Er:YAG laser radiation on root surfaces: an in vitro study. *J Clin Periodontol* 2002; 29:73-78.
17. Folwaczny M, Mehl, Aggstaller H, Hickel R. (2003) Removal of bacterial endotoxin from root surface with Er:YAG laser *American Journal of Dentistry*, 16(1), 3-5.
18. Aoki A, Ando Y, Watanabe H, Ishikawa I. In vitro studies on laser scaling of subgingival calculus with an erbium:YAG laser. *J Periodontol* 1994;65:1097-1106.
19. Folwaczny M, Aggstaller H, Hickel R. Department of Operative Dentistry and Periodontology, Ludwig-Maximilians University: Goethestr. 70, 80336 Munich, Germany, mfowa@dent.ned.uni-muenchen.de
20. Gaspirc B, Skaleric U. Morphology, chemical structure and diffusion processes of root surface after Er:YAG and Nd:YAG laser irradiation. *J Clin Periodontol* 2001; 28:508-516.
21. Schwarz F, Putz N, Georg T, Reich E. Effect of an Er:YAG laser on periodontally involved root surfaces: an in vivo and in vitro SEM comparison. *Lasers Surg Med* 2001; 29:328-335.
22. Ando Y, Aoki A, Watanabe H, Ishikawa I (1994). In Vitro Studies on Laser Scaling of Subgingival Calculus With an Erbium:YAG Laser. *Journal of Periodontology*. 65(12), 1097-1106.
23. Stock K, Hibst R. Experimental removal of subgingival calculus with an Er:YAG laser. *Proc SPIE* 1995;2623:189-198.
24. Aoki A, Miura M, Akiyama F, Nakagawa N, Tanaka J, Oda S, Watanabe H, Ishikawa I. In vitro evaluation of Er:YAG laser scaling of subgingival calculus in comparison with ultrasonic scaling. *J Periodontol Res* 2000;35:266-277.
25. Aoki A, Miura M, Akiyama F, Nakagawa N, Tanaka J, Oda S, Watanabe H, Ishikawa I. In vitro evaluation of Er:YAG laser scaling of subgingival calculus in comparison with ultrasonic scaling. *J. Periodontol* 2000;71:147-155.
26. Gaspirc B, Skaleric U. Morphology, chemical structure and diffusion processes of root surface after Er:YAG and Nd:YAG laser irradiation. *J Clin Periodontol* 2001; 28:508-516.
27. Schwarz F, Putz N, Georg T, Reich E. Effect of an Er:YAG laser on periodontally involved root surfaces: an in vivo and in vitro SEM comparison. *Laser Surg Med* 2001; 29:328-335.
28. *J. Periodontol Res.* 2017 Oct;52(5):853-862. Doi: 10.1111/jre.12454. Epub 2017 Mar 23. Combined application of Er:YAG and Nd:YAG lasers in treatment of chronic periodontitis. A split-mouth, single-blind, randomized controlled trial. Sağlam M, Köseoğlu S, Taşdemir I, Erbak Yılmaz H, Savran L, Sütçü R.



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Dr. Dalessandro received his DDS from Loyola, Chicago in 1979; residency at Rush Presbyterian in General Practice and Anesthesia; and periodontal fellowship at University of Illinois. For over 35 years, he has practiced periodontics in the Northwest suburbs of Chicago and began placing dental implants in the early 1980s.

Dr. Dalessandro was one of the early adopters of CBCT scanning and uses this successfully in his practice with every implant case. He has also extensively studied lasers and their use in periodontics and peri-implantitis. Most recently, he has implemented intraoral scanning and 3D printing implant surgical guides in-house. His teaching experience goes back to the 1990s on a wide range of topics including leadership, practice management, 3D scanning and guided surgery. His goal is to pass along knowledge and information to his colleagues to help them become educated on current trends in dentistry. He now teaches groups of periodontists and dentists on a regular basis around the world regarding his topics of expertise, which are the physics of laser technology, laser surgical procedures and the current research in peri-implantitis.

CONTRIBUTOR **SPOTLIGHT**

PHOTOBIO-MODULATION IN DENTISTRY – AN INVALUABLE TOOL

Dr. Arun Darbar BDS, DGDP (UK), Dr. Gerry Ross DDS, Dr. Mel Burchman DDS

These authors are a special group of laser friends with over 75 years of collective experience with PBMT in clinical management in general dental practice from three different parts of the world.

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PhotoBioModulation Therapy (PBMT)

Over the years many terms have been used to describe Photobiomodulation: Low Level Lasers, Soft Lasers, Cold Lasers, Biostimulation, and Photostimulation, to name a few.

In 2016, fifteen leaders in the field met in Washington at a NAALT-WALT meeting to create one word that would best describe this treatment: Photobiomodulation (PBM). This is the MeSH (Medical Subject Headings) term contained in the National Library of Medicine's controlled vocabulary thesaurus by which all terms will be grouped.

The term Photobiomodulation is derived from the following:

- Photo - it is light
- Bio - it is a biological process that occurs at the cellular level
- Modulation- the effect can have either stimulatory or inhibitive effects based on the dose applied

Definition of PBM: A form of light therapy that uses non-ionizing forms of light sources, including Lasers, LEDs, and broadband light, in the visible and infrared spectrum. It is a nonthermal process involving endogenous chromophores

eliciting photophysical (i.e., linear, and nonlinear) and photochemical events at various biological scales. This process results in beneficial therapeutic outcomes, including but not limited to, the alleviation of pain or inflammation, immunomodulation, and promotion of wound healing and tissue regeneration. ⁽¹⁾

History of Light as a Therapeutic Modality

The use of light as a form of therapy dates back centuries. In ancient Egypt physicians prescribed different colors of light for different ailments. In ancient Greece, light was so important that a therapeutic center named Heliopolis, or the City of Light, was built specifically so people could be exposed to filtered light for the treatment of different ailments. The ancient Chinese also used light to treat skin disorders and a variety of health problems.

In the late 18th century Niels Ryberg Finsen pioneered the use of red and blue light to treat various human ailments, especially Lupus Vulgaris. In 1903 he was awarded the Nobel Prize in Medicine and Physiology for his pioneering work which demonstrated that concentrated chemical rays from the sunlight could be bactericidal as well as stimulate healing in the surrounding tissue.

In the 1930s several sanatoria were created in Europe and

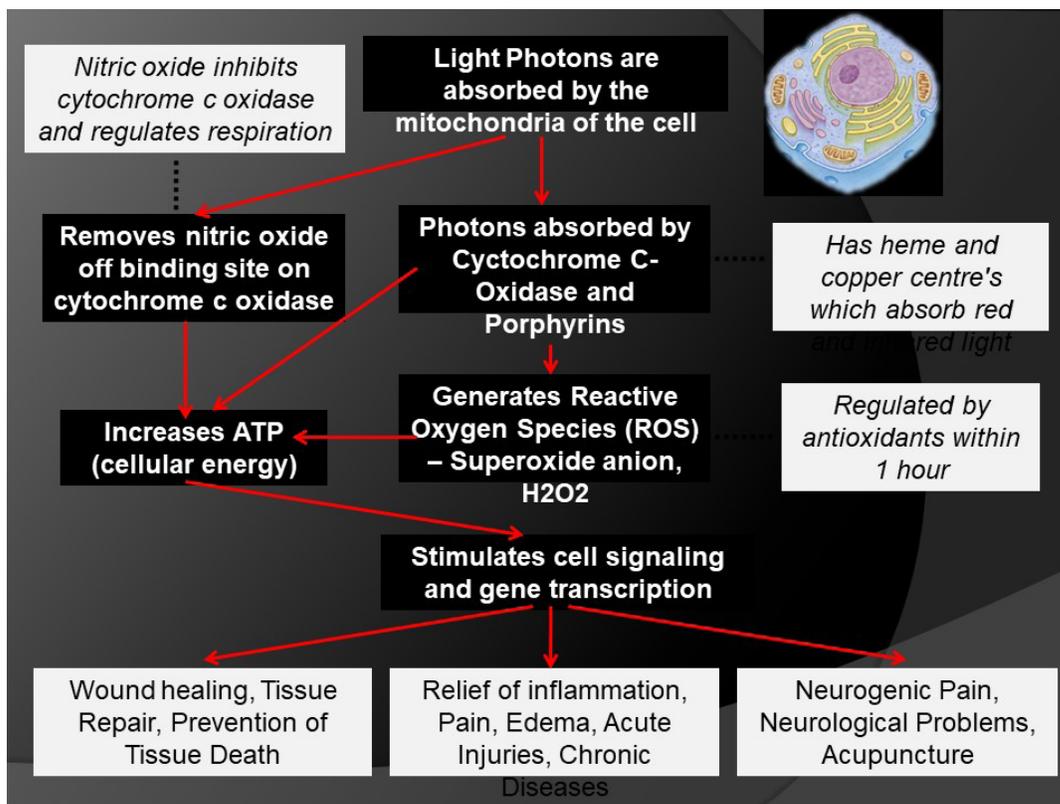
North America, which used Light Therapy to treat tuberculosis (TB). This form of treatment continued until the 1950s when antibiotics were found that could effectively treat TB.

In the mid-1960s, Andre Mester used a Ruby laser to demonstrate that PBM can be used to improve healing and provide pain control. The work that he did for PBM research has made him considered the father of PBM Therapy (PBMT).

Mechanism of Action

The light in the red and infrared spectrum is absorbed in the mitochondria of the cell by Cytochrome C oxidase. This causes several biological reactions, including the production of ATP (adenosine triphosphate) in the electron transport chain. These reactions in the mitochondria elicit cell signaling which creates downstream reactions.⁽²⁾

Figure 1 Mechanism of Action



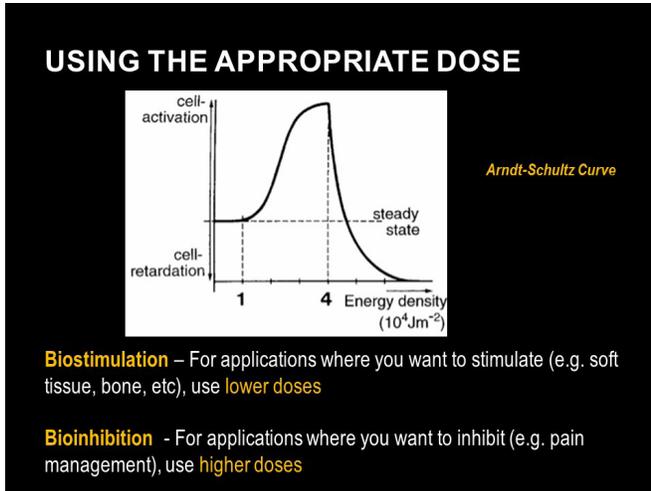
Below are some of the downstream reactions:

Decrease in inflammatory mediators (bradykinins, substance p, histamine and other inflammatory cytokines)	Reduces pain and edema
Increased production of growth factors	Stimulates healing
Increased lymphatic flow	Decreases edema and brings white blood cells to the site for improved healing
Stimulation of angiogenesis (creation of new blood vessels)	Stimulates healing
Stimulation of fibroblasts, osteoblasts and odontoblasts	Healing of tissue, bone and teeth, respectively
Reduced depolarization of c-fibers (lightly myelinated nerve fibers that carry pain impulses from the dental pulp)	Reduces pain sensations (analgesia)
Increased production of endorphins	Reduced pain sensations

Dosing

One of the keys to success in PBM is using the correct dose to elicit the desired outcome. This is best illustrated in the Arndt-Schultz curve: at low doses Stimulation occurs whereas at higher doses Inhibition is the result. Understanding this principle is key to using the correct dosage in clinical practice. ⁽²⁾

Figure 2 Arndt Schultz curve



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PBM and the opioid crisis

It will come as no surprise that we are currently experiencing an opioid crisis. In 2017, 72,300 Americans died from a drug overdose; of those 47,600 were a result of an opioid overdose. Approximately 19,000 patients became addicted to opioids as a result of pain prescriptions written by Physicians and Dentists. ⁽³⁾

The CDC estimates the total economic burden of prescription opioid misuse is \$78.5 Billion per year.

From a clinical perspective, using PBMT in our practices has allowed us to eliminate the prescription of opioids/narcotics for surgical and pain management patients. ⁽⁴⁾

Clinical Applications

Post-Surgical and /or Trauma

Following surgery or dental extractions, an inhibiting dose is used to reduce post-op pain and swelling. Ideally, the PBM device is placed directly into the surgical area; however, even applying an inhibition dose extra orally has proven to be more effective than a placebo. ⁽⁵⁾ In addition to pain reduction, faster healing of the surgical area also occurs. ^(6, 7, 8)

The key factor is to apply PBMT as soon as possible after trauma or surgery to avoid all latent complications.

Trauma case 1

Acute lip damage prior to dental treatment could have compromised the patient's well being and worsened the condition of existing trauma to the lips. Preconditioning before the start of the dental procedure not only reduces this concern for the patient but this case also shows almost healed tissue in about 90 minutes

Figure 3 Cracked lip on day of the dental appointment



Figure 4 Cracked lip appears almost healed in 90 minutes



Trauma case 2

Case with a child bike accident who was brought to our surgery within 30 mins of the accident with considerable damage and mobile and extruded central incisor luckily the orthodontic appliance acted as a splint but was deactivated into a passive mode for the first week. The patient was treated several times with stimulation and

inhibition over the two weeks and later once weekly for maintenance and stimulation and regeneration of pulpal tissue which recovered completely, and the case was followed for 4-5 years, and the tooth was vital.

Figure 5 Trauma with soft and hard tissue damage close up



Figure 6 Trauma facial view



Figure 7 Post-op 3 days later



Figure 8 3 weeks later



Dental infections

The dose used in PBMT is not bactericidal, but the management of dental infections can be dramatically improved through stimulation of the body's immune system, the lymphatic system. In dentistry, it is the application of a stimulatory dose that is applied to the submandibular lymph glands that is used for this application. ⁽⁹⁾

Restorations

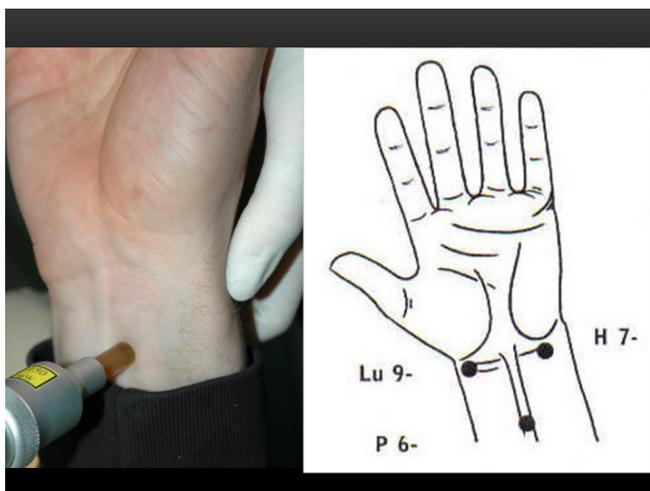
PBMT in an inhibiting dose can give pulpal analgesia by reducing the depolarization of the c-fibers that carry pain from the dental pulp, in addition to the release of systemic opioids which affects the pain threshold centrally. ^(10, 11)

It is important to note that it is analgesia and not anesthesia that occurs. This effect allows for smaller restorations and cementing crowns to be performed without the use of local anesthetics. ^(12,13)

Nausea and Gagging

Many patients suffer from nausea and gagging when having dental procedures. Applying an inhibition dose bilaterally to the P6 acupuncture point can dramatically reduce this reaction. ⁽¹⁴⁾ P6 is 3 finger widths below the lower crease in the wrist in the midline of the arm.

Figure 9a Using P6



Other points such as the LI4 and Ren 22 are also used in some cases.

Figure 9b Gag reflex using LI4 acupoint

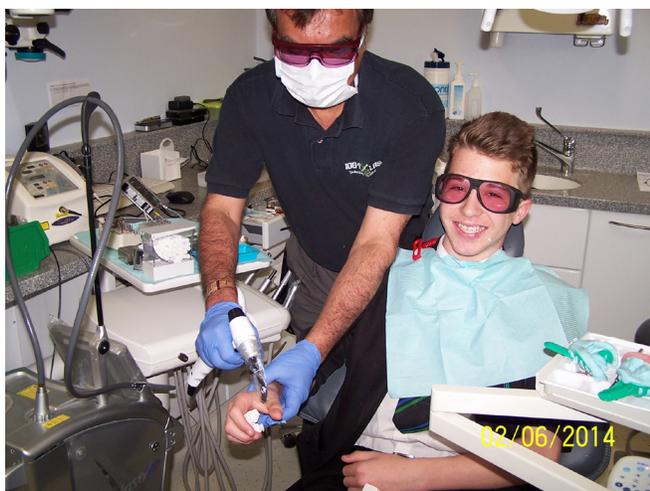


Figure 10 Happy compliant patient



Dentin Hypersensitivity

PBMT can be useful in reducing Dentin Hypersensitivity due to a loss of enamel covering or exposure of root cementum due to recession. An inhibitory dose is first applied to the apex of the tooth to give some pulpal analgesia, followed by the application of a desensitizing agent, such as Glumma or G5, to the CEJ or exposed dentin. By using both PBMT and a desensitizing agent, the effect is magnified. ^(15, 16)

Soft Tissue Lesions

Using a stimulatory dose has shown to be effective in the treatment of several soft tissue lesions, including Herpes Simplex lesions, Aphthous Ulcers and Lichen Planus. The dose is applied to the submandibular lymphatics on the affected side and in close approximation to the lesions. It has also been shown that in herpetic lesions, PBM can also reduce the frequency of recurrence. ^(17,18, 19)

It is very important that a detailed history is obtained regarding ulceration and herpetic lesion which can be chronic and recurrent in nature and need more frequent treatment and assessment as the body's immune response kicks in to reduce the frequency and intensity.

Figure 11 Herpetic lesion Day one



Figure 12 Herpetic lesion next Day



Figure 13 Very painful recurrent ulceration of long duration



Figure 14 Healed ulcer after multiple treatments



Oral Mucositis

During chemotherapy, many patients suffer from this malady and in oral radiation cases, 100% of the patients suffer from this debilitating condition. It presents as numerous sores all around the mouth and inside the mouth and pharynx. This limits the patient's ability to eat and drink, and, in many cases, requires hospitalization so the patients can be fed by IV fluids. In more severe cases, it requires the cessation of treatment which reduces the patient's prognosis for survival. Currently, medicine has no effective treatment for this problem.

PBMT has proven to be an effective treatment of oral mucositis.^(20, 21, 22) PBMT can reduce the severity of mucositis by modulating the inflammatory response and stimulating soft tissue healing. In addition, the release of endogenous opioids and decreased conduction of nerve transmission significantly decrease pain.

In June 2019, the Multinational Association of Supportive Care in Cancer/ International Association of Oral Oncology (MASCC/ISOO), the leading association of oncologists made the following recommendation:

PBM is recommended for the prevention of OM and related pain in cancer patients treated with one of the following modalities: hematopoietic stem cell transplantation, head and neck radiotherapy without chemotherapy, head and neck radiotherapy with chemotherapy. This was led on findings by a group led by Dr. Praveen Arany.⁽²³⁾

Nerve Regeneration

PBMT has been shown to be effective in the regeneration of nerves that may have been completely or partially severed or compressed. A stimulating dose is applied to the nerve at the site of the injury and along the path of the nerve to its terminus. It is recommended to treat the patient 3 times a week for 3 weeks. The treatment is then stopped and reassessed after 3 weeks. If sensations have returned, the treatment should stop. Another course of treatment can be done if more improvement is expected; however, if there has been no change, the treatment should cease.^(24, 25, 26, 27)

Implant Treatment

PBMT has shown to be effective if the success rate of implant treatment.^(28, 29)

At the time of surgery, an inhibition dose is applied to reduce pain and swelling. If a flap has been performed, a stimulating dose is applied along the flap after suturing. If the quality of the bone is questionable, the patient is brought back, and a stimulation dose is applied twice a week for 2 weeks.

Treatment of Facial Pain

PBMT has been shown to be effective as one of the tools in treating many facial pain/ TMD problems. (30, 31, 32, 33, 34,35,36) A stimulating dose is applied to the submandibular lymph nodes and an inhibiting dose to the painful areas and trigger points. The most common effect noticed by the patient almost immediately is muscle relaxation and the ability to open wider with a reduction of pain, enabling us to manage the complex issues.

Figure 15 Acute TMD case pain and unable to open wide

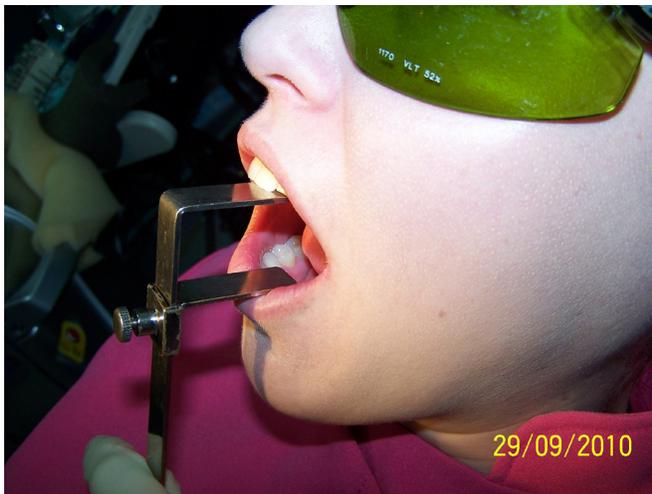


Figure 16 Reduced pain and wider opening within 10 minutes of PBMT



Conclusion

PBMT has shown to be an invaluable tool in dental practice. It is a win/win for both the practitioner as well as the patient. There are several thousand articles in the peer reviewed literature that illustrate the science and effectiveness of this treatment. Fortunately for dentistry, it is the field that has the greatest number of articles showing the effectiveness of PBMT.

References:

- Huang YY., Chen A.C.H., Carroll J., and Hamblin M. (2009). Biphasic dose response in low-level light therapy. *Dose Response*, 7(4), pp. 358–383.
- Juanita J Anders, Raymond J Lanzafame, Praveen Arany (2015) : Low-Level Light/Laser Therapy vs Photobiomodulation Therapy *Photomedicine and Laser Surgery* Volume 33(4) pp183-184
- NIH-National institute on Drug abuse published online revised Jan. 2019
- Ross Gerald (2019) Photobiomodulation Therapy-A Possible Answer to the Opioid Crisis *Photobiomodulation, Photomedicine and Laser Surgery* Vol 37 Issue 11, Nov. 2019 pp 667-668
- Markovic A.B. and Todorovic L. (2006). Postoperative analgesia after lower third molar surgery: Contribution of the use of long-acting local anesthetics, low-power laser, and diclofenac. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 102, pp. e4–e8.
- Hawkins D. and Abrahamse H. (2006). Effect of multiple exposures of low-level laser therapy on the cellular responses of wounded human skin fibroblasts. *Photomed Laser Surg*, 24(6), pp. 705–714.
- Fahimipour F., Mahdian M., Houshmand B., Asnaashari M., Sadrabadi A.N., Farashah S.E.N., Mousavifard S.M., and Khojasteh A. (2013). The effect of He-Ne and Ga-Al-As laser light on the healing of hard palate mucosa of mice. *Lasers Med Sci*, 28, pp. 93–100.
- Aras M.H. and Gungormus M. (2009). The effect of low-level laser therapy on trismus and facial swelling following surgical extraction of a lower third molar. *Photomed Laser Surg*, 27(1), pp. 21–24.
- Lopes L.A., Lopes A., Tuner J., and Calderhead R.G. (2003) The use of laser therapy in the treatment of inflammation through lymphatic drainage. *Lasers Med Sci*, 18, pp. O2–O8.
- Ren K. and Dubner R. (2010). Interactions between the immune and nervous systems in pain. *Nat Med*, 16(11), pp. 1267–1276.
- Carroll JD, Milward MR, Cooper PR, Hadis M, and Palin WM. (2014). Developments in low-level light therapy (LLLT) for dentistry. *Dent Mater*, 30(5), pp. 465–475.
- Tanbogo I., Eren F., Altinok B., Peker S., and Ertugral F. (2011). The effect of low-level laser therapy on pain during dental tooth-cavity preparation in children. *Eur Arch Paediatr Dent*, 12(2), pp. 93–95.
- Chow R., Armati P., Laakso E.L., Bjordal J.M., and Baxter G.D. (2011). Inhibitory effects of laser irradiation on peripheral mammalian nerves and relevance to analgesic effects: A systematic review. *Photomed Laser Surg*, 29(6), pp. 365–381.
- Ezzo J., Streitberger K., and Schneider A. (2006). Cochrane systematic reviews examine P6 acupuncture-point stimulation for nausea and vomiting. *J Altern Complement Med*, 12(5), pp. 489–495.
- Pesevska S., Nakova M., Ivanovski K., Angelov N., Kesic L., Obradovic R., Mndova S., and Nares S. (2010). Dentinal hypersensitivity following scaling and root planning: Comparison of low-level laser and topical fluoride treatment. *Lasers Med Sci*, 25, pp. 647–650.
- He S., Wang Y., Li X., and Hu D. (2011). Laser therapy may be better than topical desensitizing agents for treating dentin hypersensitivity. *J Oral Rehabil*, 38(5), pp. 348–358.
- Sanchez P.J.M., Fernenias J.L.C., Tejeda A.D., and Tuner J. (2012). The effect of 670-nm low laser therapy on Herpes Simplex Type 1. *Photomed Laser Surg*, 30(1), pp. 37–40.
- Anand V., Gulati M., Govila V., and Anand B. (2013). Low-level laser therapy in the treatment of aphthous ulcer. *Indian J Dent Res*, 24(2), pp. 267–270.

19. Caputo B.V., Filo G.A.N., dos Santos C.C., Okida Y., and Giovani E.M. (2012). Laser therapy of recurrent aphthous ulcer in patient with HIV infection. *Case Reports Med*, 2012, 695642.
20. Antunes H.S., Herchenhorn D., Small I.A., Araujo C.M.M., Viegas C.M.P., Cabral E., Rampini M.P., Rodrigues P.C., Silva T.G.P., Ferreira E.M.S., Dias F.L., and Ferreira C.G. (2013). Phase III trial of low-level laser therapy to prevent oral mucositis in head and neck cancer patients treated with concurrent chemoradiation. *Radiother Oncol*, 09, pp. 297–302.
21. Bjordal J.M., Bensadoun R., Tuner J., Frigo L., Gjerde K., and Lopes- Martins R.A.B. (2011). A systematic review with meta-analysis of the effect of low-level laser therapy (LLLT) in cancer therapy-induced oral mucositis. *Support Care Cancer*, 19, pp. 1069–1077.
22. Campos L., Simoes A., Nogueira P.H.R., and Eduardo C.D.P. (2009). Improvement in quality of life of an oncological patient by laser phototherapy. *Photomed Laser Surg*, 27(2), pp. 371–374
23. Yehuda Zadik, Praveen Aranyi, Eduardo Fregnani, Paolo Bossi, Heliton Spindola Antunes, Rene-Jean Bensadoun, Luiz Alcino Gueiros, Alessandra Majorana, Raj Nair, Vinisha Ranna, Wilim Tessing, Anusha Vaddi, Rachel Lubart, Cesar Migliorati, Rajesh Lalla, Karis Kim Fong Chen, Sharon Elad. On behalf of the Mucositis Study Group of the Multinational Association of Supportive Care in Cancer/ International Society of Oral Oncology. (MASCC/ISOO) (July 8 2019) Systematic review of Photobiomodulation for the management of oral mucositis in cancer patients and clinical practice guidelines. Published online- Springer
24. Akgul T., Gulsoy M., and Gulcur H.O. (2014). Effects of early and delay laser application on nerve regeneration. *Lasers Med Sci*, 29, pp. 351– 357.
25. Ozen T., Orhan K., Gorur I., and Ozturk A. (2006). Efficacy of low-level laser therapy on neurosensory recovery after injury to the inferior alveolar nerve. *Head Face Med*, 15, pp. 2–3.
26. Miloro M. and Repasky M. (2000). Low-level laser effect on neurosensory recovery after sagittal ramus osteotomy. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*, 89, pp. 12–18.
27. Gasperini G., de Siqueira I.C.R., and Costa L.R. (2014). Lower-level laser therapy improves neurosensory disorders resulting from bilateral mandibular sagittal split osteotomy: A randomized crossover clinical trial. *J Craniomaxillofac Surg*, 42(5), pp. e130–133.
28. Lopes C.B., Pinheiro A.L.B., Sathaiah S., Duarte J., and Martins M.C. (2005). Infrared laser light reduces loading time in dental implants: A Raman spectroscopic study. *Photomed Laser Surg*, 23(1), pp. 27–31.
29. Lopes C.B., Pinheiro A.L.B., Sathaiah S., Da Silva N.S., and Salgado M.A.C. (2007). Infrared laser photobiomodulation (λ 830 nm) on bone tissue around dental implants: A Raman spectroscopy and scanning electronic microscopy study in rabbits. *Photomed Laser Surg*, 25(2), pp. 96– 101.
30. Ferreira L.A., de Oliveira R.G., Guimaraes J.P., Carvalho A.C.P., and De Paula M.V.Q. (2013). Laser acupuncture in patients with temporo- mandibular dysfunction: A randomized controlled trial. *Lasers Med Sci*, 28, pp. 1549–1558.
31. Carvalho C.M., de Lacerda J.A., Neto F.D.D.S., Cangussu M.C.T., Marques A.M.C., and Pinheiro A.L.B. (2010). Wavelength effect in temporo- mandibular joint pain: A clinical experience. *Lasers Med Sci*, 25, pp. 229– 232.
32. O'z S., Go'kc, en-Ro' hlig B., Saruhanoglu A., and Tuncer E.B. (2010). Management of myofascial pain: Low-level laser therapy versus occlusal splints. *J Craniofac Surg*, 21(6), pp. 722–728.
33. Simons D.G., Travell J.G., and Simons L.S. (1999). *Travell & Simons' Myofascial Pain and Dysfunction: Upper Half of Body*, 2nd Ed. (Lippincott Williams & Wilkins, USA).
34. Bradley P.F. and Reblini Z. (1996). Low intensity laser therapy (LILT) for temporomandibular joint pain: A clinical, electromyographic and thermographic study. *Laser Therapy*, pp. 47–48.
35. Fikackova H., Dostalova T., Navratil L., and Klaschka J. (2007). Effectiveness of low-level laser therapy in temporomandibular joint disorders: A placebo-controlled study. *Photomed Laser Surg*, 25(4), pp. 297– 303.
36. Fikackova H., Dostalova T., Voscicka R., Peterova V., Noavratil I., and Lesak J. (2006). Arthralgia of the temporomandibular joint and low-level laser therapy. *Photomed Laser Surg*, 24(4), pp. 522–527.

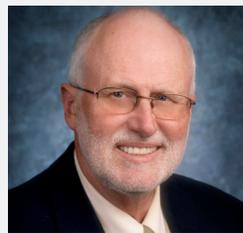


Dr. Arun Darbar

Founder and director of Smile Creations® Innovations Limited and has been practicing in Leighton Buzzard U.K. for over 35 years

Dr. Arun Darbar is a multi-award-winning Laser and Aesthetic Dentist dedicated to providing cutting edge dentistry to his patients for over 35 years. An Accredited Member of the British Academy of Cosmetic Dentistry (BACD) he is the director of accreditation, a board member and an examiner. A pioneer in Laser dentistry since 1989 he is currently the president of the ALD (Academy of Laser Dentistry) and holds a Masters, Certified Educator and Certification Course Trainer status. He is also a founder member of the WCLI (World Clinical Laser Institute). He is the recipient of numerous smile awards and in 2017 the prestigious “The John G. Sulewski Distinguished Service Award”.

An invited speaker internationally, a published author, involved in research and development he is instrumental in advocating the use of Photobiomodulation in General Dental Practice. Over the last decade he has introduced the concept of preconditioning with various wavelengths to achieve quicker, better outcomes for compromised and routine patients in dentistry. His data has been presented and published as proceedings of SPIE IN 2006, 2007, and 2009/10 in San Francisco U.S.A., WALT (World Association for Laser Therapy) 2008 South Africa, and 2012 Australia. He is also a reviewer for peer reviewed journals such as LIMS and JBO.



Dr. Gerry Ross

Dr. Gerry Ross has been practicing General Practice Dentistry with a special interest in Lasers Facial Pain in Tottenham Ontario since 1971. He has been using Lasers

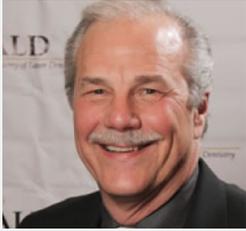
in his practice since 1992. He has given over 250 hands-on courses, lectures and workshops on both Surgical lasers as well as photobiomodulation treatment both nationally and internationally. He has published 15 articles and has written chapters for 2 textbooks. He also does Peer Review for 4 Laser Journals and is on the editorial board of Photobiomodulation, Photomedicine and Laser Surgery and has written 2 guest editorials for the Journal.

He is a past president of NAAAL North American Association of Photobiomodulation is a member of the Board of Directors of the Academy of Laser Dentistry (ALD) and currently chairs the membership committee and has also served as chair of

the Certification Committee. He was the Scientific Chair of the 2019 ALD annual Meeting.

Dr. Ross holds Advanced Certification from ALD and is a member of Speakers Bureau of the Academy of Laser Dentistry. In 2016 he was awarded the Leon Goldman Award from ALD as the year's outstanding laser clinician.

An article that Dr. Ross wrote for Dental Products report on treating Facial Pain with PBMT was just name as one of the top 5 technique articles published in 2020.



**Dr. Mel A. Burchman
DDS, MALD**

Dr. Burchman has maintained a general dentistry practice in Bucks County, Pennsylvania since 1976.

He began using lasers in 1998 and now has eight lasers in his practice. In 2001 he received Advanced Proficiency in Nd:YAG from the A.L.D. In November 2003 He received the "The Science Behind the Clinic of Laser Dentistry" award for his presentation on, "Nd:YAG and Diode Laser Therapy in the Medically Compromised Patient". Also in 2003 his office was written up in Men's Health Magazine in an article titled, "The Drill Is Gone." In 2005 he received "Certified Laser Educator" status from the Academy. He received his "Certificate of Mastership" from the Academy in 2008. He has been published twice in the laser academy journal "Wavelengths" on "Lasers in the Medically Compromised Patient" and in 2012 received the "Leon Goldman Award" for laser clinical excellence the ALD for this work. He has presented on this topic over a 70 times both nationally and internationally and it is his passion. He has served the academy as: Mentor, Examiner, and Chairman of many committees, a member of the Academy Board of Directors, Executive Committee, Secretary, Treasurer and Vice President. In 2014 he was the Keynote Speaker at the OCMIS Laser Conference and in 2019 he was the Keynote speaker for the ALD-BAIRD laser conference in Qatar and in 2020 he will be the Keynote Speaker for the ALD conference in San Diego. In 2015 he was the General and Scientific Chairman of the A.L.D conference and in 2016 was the Co-Program Chair of the ASLMS conference. In 2016 he received his, "Recognized Course Provider" certification and was the Chairman of the 2019 academy conference. In 2018 he had the honor to testify before a Congressional Subcommittee on, "Using Dental Lasers to Help Control Opioid Abuse". He was the President of the Academy of Laser Dentistry in 2020 and also help found GMA Laser Education. In 2020 he was also the Keynote Speaker for the Baird-ALOD Conference in Qatar. 1, 20121 Previously he has lectured for: Sirona Dental, Benco Dental and Henry Schein Dental, Advanced Dental Hygiene, Kerber USA and MedX Laser Health Systems.

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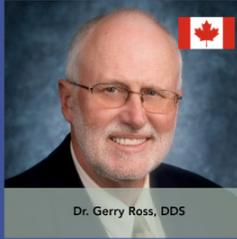
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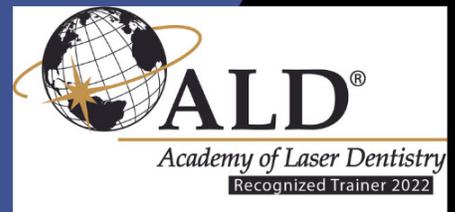
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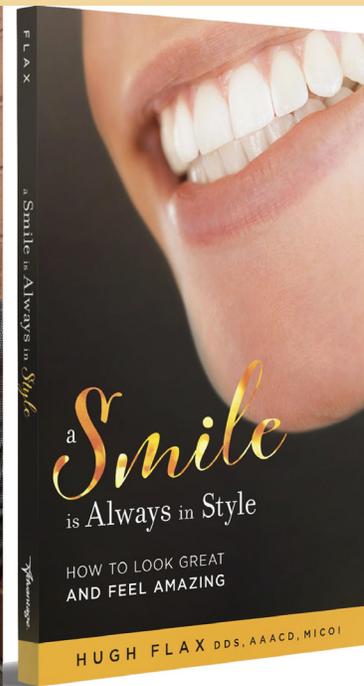
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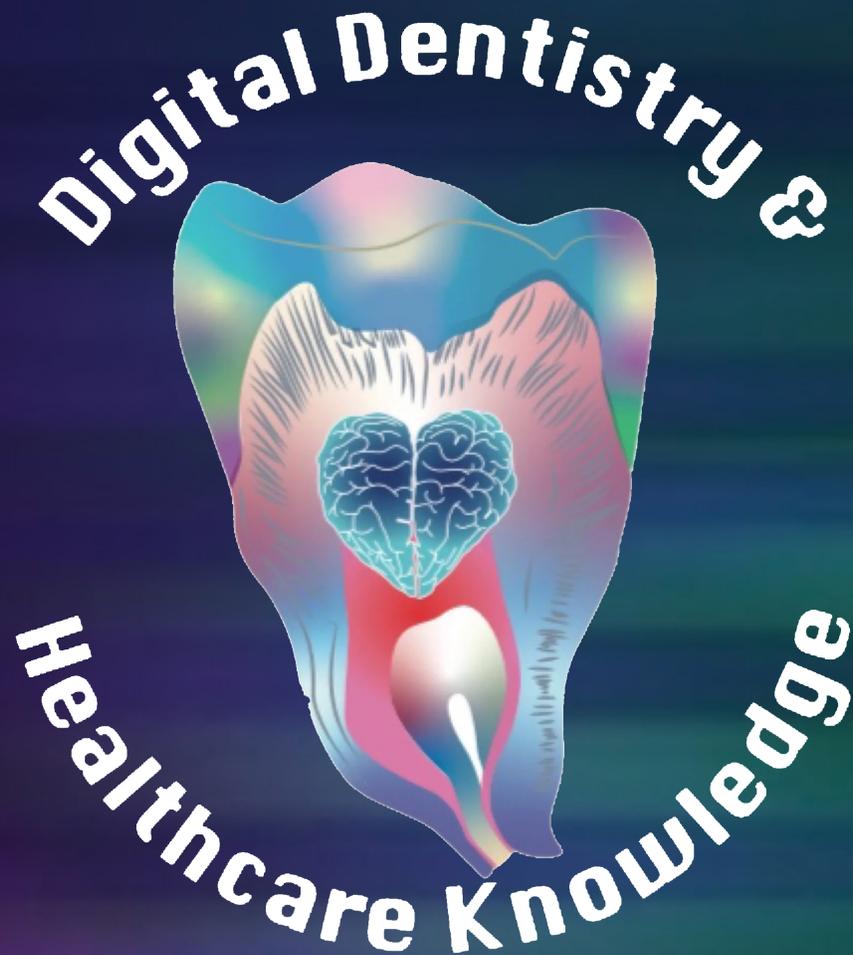
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