Lasers in Dentistry

WHAT SOME LEADING CLINICIANS HAVE TO SAY

Advantages of Diode Lasers:
- Non-Invasive and haemostatic.
- Reduced pain and inflammatory characteristics.
- Enhanced quality of care for patients.
- Decreased post-operative complaints.
- Small in size, extremely portable and ergonomic.

Uses of Diode Lasers in dentistry:
- Periodontology - Bacterial decontamination in periodontal pockets, degranulation and de-epithelialization.
- Endodontics - Bacterial decontamination in endodontic canals.
- Haemostasis and treatment of wounds (LLLT), alleviation of ulcers.
- Incisions, removal of fibromas and hyperplasia and incision of abscesses.
- Gingivo and vestibuloplasty.
- Exposure of retained teeth and implants.
- Frenectomies, excisions and biopsies.
- Clinical crown (Gingival) lengthening.
- Gingival depigmentation.

Limitations of Diode Lasers:
- They are more thermal than the Erbium family with greater depth of penetration and may cause carbonization and thermal damage. Therefore what you can’t see can hurt you.
- Inability to be used on dental hard tissues including bone.

The 5 commandments for successful Diode Laser dentistry:
- Darker the tissue higher is the absorption.
- Start with the lowest possible setting for the given procedure.
- Use pulsed mode in the learning curve to allow for thermal relaxation.
- Avoid carbonization at all costs, so pinks and browns for postoperative tissue colour is the way to proceed.
- Keep moving the tip to and fro and wiping it intermittently to prevent heat buildup.

Therefore, proper education including hands-on and over-the-shoulder mentor initiated training should be undertaken to ensure quality of care.

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Today, the Diode laser in an integral part of my practice. It finds a variety of applications including excisional and incisional biopsies; Periodontal therapy: curettage, sulcular debridement, gingivectomy, gingivoplasty; Operculectomy, implant recovery, vestibuloplasty; Fibroma removals and frenectomies; Haemostasis and treatment of ulcers; Gingival troughing; Pulpotomy and sterilisation of the root canal. It can incise, excise, vaporize, ablate and coagulate oral soft tissue including marginal gingiva and epithelial lining of free gingiva. Claims aside, in my practice, the greatest time and energy savior comes from the most unexpected application - Troughing.

In a busy prosthodontic practice, using retraction cords is a time consuming procedure. Be it a double cord or single cord technique one has to struggle with soft tissue and blood. Bleeding during cord pushing can damage the marginal gingiva and one can have problems continue until the time the crown is fixed. Troughing with the diode laser has changed all that. Troughing exposes finish lines while providing excellent haemostasis. By carefully monitoring heat transfer to the alveolar crest, we now have a possibility of utilizing a technique which simplifies the impression procedure. Following this, the dentogingival complex regenerates to pre-operative levels. The procedure involves using an initiated disposable tip for a depth of 0.5 - 1mm under the gingival sulcus. Brush strokes are used, circumferentially for 45 - 90 seconds. Tags of tissue are removed with a wet cotton pellet. The tissue opens up neatly. A minute later you can take putty and wipe impression. The margins of the preparation are amazingly clear and there is no damage at all to the marginal gingiva. I was a bit skeptical about the marginal integrity of the finished crown but the results are to be seen to be believed. Among other applications which I use frequently is depigmentation of gingiva as a pre-cosmetic procedure for patients with excessive gingival display in smile makeovers.

Lasers have made an irreversible entry into modern clinical practice. On the downside, the machines are very delicate and warrant careful handling. Recurring expenses with the constant need to replace laser tips are inevitable. However, with technology one has to pay the price. After all, it is well worth it!
 USAGE OF LASERS in periodontics has been spoken ad nauseum in our country on various fora and conferences and has been positioned as nothing short of a magic wand.

The literature is replete with studies to suggest it’s limited place in soft tissue applications. There is no one do-all laser so it is prudent to understand the pronounced effect of a Diode, Nd-YAG, Cr-YSGG or a LLLT (low level laser therapy). Patients will always ask for a modern, painless, fast and sometimes economic modality of treatment but the clinician is obligated to deliver scientific and evidence based treatment despite the temptation of getting on to the bandwagon of lasers.

So what am I suggesting?
1. Diodes should not be used to cut soft tissue (especially close to bone), like a CLP procedure or a frenectomy. It could be used very judiciously to excise fibrous tissue like a drug induced hypertrophy.
2. LLLT to be used at 660 to 800nm in cases of pathos ulcers, infected sites, extraction sockets, endodontic disinfection, post surgical healing enhancement etc.
3. NdYAG, CrYSGG lasers to be used for soft tissue excision like a frenectomy, CLP, depigmentation, gingivectomy etc. Podium power for propagating a philosophy is

It is also true that the Er:YAG laser is being used for prepping teeth and for endodontal surgery but the clinician is obligated to deliver scientific and evidence based treatment despite the temptation of getting on to the brandwagon of lasers.

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PART OF THE problem with anything “new” including technology is that expectations also tend to be unrealistic. Dental lasers, too have had their share of "hype” despite that, I believe that lasers have an important role in dentistry and one that will only grow with time.

It is important to distinguish between soft tissue and hard tissue applications. Soft tissue lasers have been around for a while and their applications in ophthalmology are well established. In dentistry as well, the obvious advantages of haemostasis and the avoidance of local anaesthesia are a boon. This has to be weighed against the additional investment in money and in time (every new technology has a learning curve) and unless the practitioner is involved in doing a lot of soft tissue surgery (especially of hypertrophic tissue) it’s value is debatable.

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PROCEDURAL TECHNOLOGIES like lasers often require learning not only how to perform a new procedure, but also the science behind the technology so that it can be applied in a “good” and safe way.

The soft tissue diode laser, used for oral soft tissue procedures, is the easiest to integrate into your practice. According to me, the 980nm wavelength provides the best combination of clean cutting and excellent hemostasis in a wide range of soft tissue indications.

Soft tissue lasers boast a wavelength that is highly absorbable by water and hemoglobin (oxygenating protein in red blood cells), making them more effective for soft tissue management. Commonly used soft tissue lasers include Nd:YAG and diode lasers, which may be used as a component of periodontal treatment and have the ability to kill bacteria and activate the regrowth of tissues. The carbon-dioxide laser minimizes damage to surrounding tissue and removes tissue faster than the fiber optic method.

Soft tissue lasers penetrate soft tissue while sealing blood vessels and nerve endings. This is the primary reason why many people experience virtually no postoperative pain following the use of a laser. Also, soft tissue lasers allow tissues to heal faster. It is for this reason that a growing number of cosmetic dental practices are incorporating the use of soft tissue lasers for gingival sculpting procedures.

Dr. V. S. Mohan is credited with being one of the first dentists in the country to adopt laser technology. He has an MDS from GDC, Mumbai in Conservative Dentistry and Endodontics. He has been in private practice since 1979 and is Head of the Dental Department at the Asian Heart Hospital, Mumbai.

Dr. Vivek Saggar is an MDS from KGMC, Lucknow. He runs the Dental Care and Cure Centre as well as a dental laboratory in Ludhiana. Dr. Saggar has delivered numerous presentations on latest advances in dentistry covering several topics including Lasers.

I AM COMFORTABLE with a wavelength of 810 nm - which I found more efficient at soft tissue interface. The fibre tips diameter from 200, 300 and 400 micron are very important for me mainly in sulcus depth and to a smaller extent in root canal therapy. Technically a higher range of pulse repetition rate upto 25 kHz and power modes are essential features for a diode laser.

Raves: Soft tissue recovery (sulcular) is very satisfying. In 24 hours the crevicular gingival health and colour looks picture perfect giving exact idea of emergence profile.

- Problem of recession of marginal gingiva, has practically become obsolete, in restorative indirect jobs.
- No need of retraction cord and clumsy procedures of cord placement, which at times are time consuming and frustrating.

- Proper selection of power mode, pulse, and tip diameter can be believed and done without LA.

Rants: Disappointment mode starts and stays in first few procedures! Slowly it fades as one uses it more often.

- Without formal technical and scientific know how, it’s use may be problematic.
- Brand of laser - one has to be careful as some of them have tall claims without delivering!
- Not all procedures can be done without LA.

In my practice, soft tissue laser addition was welcomed as procedures like second stage soft tissue exposure over implants, impression making with precise emergence and depigmentation for esthetic reason became “smooth sailing”.

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