

Problem Solvers 43 Dental Lasers are here to stay!

Synonyms: Laser, ND-Yag laser, LANAP periodontal laser therapy, CO2 lasers,

A technology that has captured the imagination of patients and dentists alike is the laser. Patients think of laser guns from their childhood and are in awe of the word and what it represents. Laser stands for Light Amplification by Stimulated Emission of Radiation. Using a laser is using light to remove tissue. There are different types of lasers and there are increasing applications for use of a laser in dentistry. The costs of this technology are coming down so it is a technology that is being incorporated into more dental practices.

How do lasers work?

Lasers use a special wavelength of light to deliver energy to an area of the mouth to vaporize tissue (soft and hard).

What are lasers being used for in dentistry?

1. Soft tissue lasers and hard tissue lasers.

Soft tissue lasers have a wavelength that is absorbable by water and hemoglobin. This makes them more effective for cutting tissues that are filled with water and the oxygen-containing protein found in blood, gum tissues.

Types of soft tissue lasers are the Neodymium YAG or ND:YAG and diode lasers.

The Nd:YAG lasers (neodymium-doped yttrium aluminum garnet lasers) are used for soft tissue surgeries in the mouth. They can be used to cut the gums in a manner in which there is little to no bleeding. Dental procedures they are used for include removing gum, cleaning of deep periodontal pockets, and removal of diseased tissue to promote more tissue attachment, (Laser Assisted New Attachment Procedure), biopsy (tissue removal), and frenectomy (removal of flaps of tissue in the mouth).

The soft tissue laser also helps prevent infection because the laser disinfects the areas it touches. Some laser dentists also claim that people undertaking laser treatment will not require anesthetic, as the laser energy is painless.

2. Hard tissue lasers are very different from soft tissue lasers.

These lasers have a wavelength that is absorbed by the crystals of the hydroxyapatite, which makes them more appropriate for cutting tooth structure.

With the hard tissue laser, dentists can remove some types of old fillings, prepare cavities, and teeth for bonding. Lasers can be used to remove small amounts of tooth structure and place composite restorations. This type of laser can be used on teeth but is not a substitute for a dental drill, as lasers cannot remove everything a dental drill can. Hard tissue lasers can be used for crown lengthening procedures (removal of bone so the gum tissue has at least 2mm of root to attach to) where bone is removed without opening a flap but it is less accurate and is not suitable for all surgical situations. So while soft tissue lasers have been shown to be a definite value in dentistry today, the hard tissue laser is far less popular for every day use in dental offices today.

What are the types of hard tissue lasers?

Erbium YAG and Erbium chromium YSGG are two types of hard tissue lasers used today.

Can my dentist use a laser to do my root canal?

Lasers have been used to perform root canals but due to the size of the laser fiber and the variation of root canal systems, they are not practical in most situations.

What are lasers advantages over traditional drills in dentistry?

- 1.They can be used without anesthetic in some small cavities and gum tissue surgeries.
2. Lasers look and sound different from drills so they may cause less apprehension.
3. The use of a dental laser can help minimize bleeding during crown preparations so that better impressions can be made, resulting in better fitting crowns.
4. Lasers may allow for smaller tooth preparations, which would result in a more minimally invasive procedure.
5. They can seal sensitive teeth to provide a sealing of the dentinal tubules and decrease sensitivity.
6. Lasers can be used for biopsies of questionable lesions.

What are the disadvantages of lasers in dentistry?

- Cost: Both the cost of the laser and the cost of the procedures they are used for.
- They cannot be used around old fillings.
- They cannot be used to remove old crowns or veneers.
- Lasers cannot be used to prepare teeth with cavities between the teeth.
- Most of the time traditional drills are needed for final preparation and finishing of the fillings.

Lasers penetrate tissues to different depths. The CO2 laser penetrates from .03-.1mm into tissue to provide a depth that is suitable for sealing blood vessels and nerve endings. A ND:YAG laser penetrates from 2-5 mm so it can deliver more energy to the area for deeper cutting.

Since some of the laser energy by the Nd:YAG laser can penetrate deeper than a CO2 laser, there is some concern that the nerve of a tooth may be effected from inability to control the deeper laser energy.

Argon lasers can be used for curing tooth colored fillings and tooth bleaching. They can also be used for soft tissue applications.

So it is important to remember that not all lasers are the same, they don't all produce superior results to existing technologies and they are constantly being improved. The American Dental Association does not endorse lasers and while research is promising, there are many aspects to laser use that require further study.

Are lasers better for bleaching procedures?

The ADA Council on Scientific Affairs has reviewed laser bleaching and has found that laser assisted bleaching has no benefit compared to traditional bleaching with regard to the lasers use as a photo initiator. Only 3.3 percent of dentists that own lasers use them for activating bleaching solutions.

Do lasers improve the outcome of periodontal treatment?

While there is a large movement that attest to using lasers to kill microorganisms, the gold standard for treating gum disease is still scaling and root planing-“deep cleaning.” The use of lasers to create new clinical attachment of the gums after debridement has not been proven in the literature according to an article by Dederich and Bushick in the Journal of the American Dental Association. In this paper it states that there is no benefit and a significant risk of damage to the bone and underlying tissues as a result of laser curettage and it not identified as better than traditional periodontal treatment in an extensive literature review to date.

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