

The use of lasers in periodontal treatment

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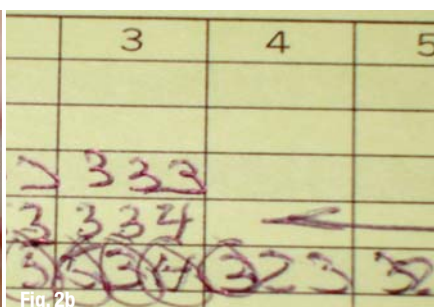


There are some dentists that embrace technology. Technology can improve the delivery of dentistry and also help traditional dental philosophies evolve. For example, a patient presents with an emergency; a broken cusp on an upper bicuspid, bellow the free gingival margin. Technology, lasers and CAD/CAM specifically, allows the clinician to provide endodontics, osseous crown lengthening, an adhesive core build up and a definitive porcelain restoration all in a single appointment.

The advantages to this type of treatment are obvious. However, the dentist must be willing to alter his/her current dental philosophy and many times make an initial financial investment that is larger than what the clinician is used to. The traditional way to provide treatment such as endodontics in 1–2 visits, a post and core, an elastomeric impression, provisional restoration, referral to a specialist, surgical healing time and then definitive cementation of the restoration currently is a valid and overwhelmingly used treatment sequence. Sometimes, however, newer technology can perform these tasks just as well if not better than traditional methods all the

while improving the dental experience for the patient. Lasers have been used in dentistry for the removal of soft tissue for more than two decades. Carbon dioxide, Nd:YAG, and Diode lasers have been very predictable and successful for the removal of oral soft tissue. In the last decade, the erbium lasers have been used for soft tissue and for restorative, endodontic, and surgical procedures. Erbium lasers are efficient in removing enamel, dentin and bone. However, the last five years have seen a tremendous push by the laser manufacturers for the lowest cost and most portable diode lasers. Due to their more approachable price point, and an increasing number of U.S. jurisdictions allowing hygienists to use these tools, the diode lasers have had sort of a renaissance.

One of the most impacted areas of laser use in a general practice has been in the area of periodontal treatment. The treatment of periodontal disease is often a difficult arena for the general dentist to enter. As a chronic disease that so often relies on the host response for success, true treatment success is often never seen. Often times the general dentist chooses not to treat periodontal disease, referring patients to a specialist. As will be shown in subsequent paragraphs, this modality many times results in the patients never getting treated at all. Lasers have allowed me to treat many different periodontal cases. It has introduced patients to periodontal treatment in a minimally invasive way ensuring that almost all patients diagnosed with periodontal disease get treatment. Lasers have allowed me to increase the services that I provide in my practice by adding periodontal procedures that would have not been done before the integration of laser technology. Finally, introducing more and more patients to periodontal treatment has increased my referrals to periodontal specialists.



The controversy: Science vs. Clinical results

I have always been an advocate of evidenced based dentistry. I rely on the results of science more than ever before. From endodontics to adhesive dentistry scientific evidence is important in formulating my treatment decisions and protocols. Periodontal disease has and continues to be researched heavily. Each year the systemic impact of periodontal disease is being uncovered and understood each day. The periodontal community aims to base its treatment decisions on the science. However, there is no absolute cure for periodontal disease. It is a complicated often chronic multi-factorial disease process. Bacteria are just one factor. However, one must also look at patient compliance, environmental factors including the patient's restorative history, and systemic issues. Thus, it is essential that clinicians in evaluating and treatment planning a patient for periodontal disease look at a wide spectrum of factors, many of which might conflict with the scientific literature. Lasers have been controversial because of the claims of the manufacturers that are not solidly backed up by science. There is no question that the lack of multi-center, double blind, and randomized trials inhibits the ability of lasers to gain widespread acceptance in the periodontal community. However, many times each and every day practitioners, general and specialists alike, practice dentistry based on anecdotal evidence. Relying on their own successes and failures to treat their patients. If we as clinicians only practice what and how science tells us to practice then we are many times doing a disservice to the patient. Dentistry is both a science and an art and the individual judgment of the clinician is often as important as a published research article. Thus, we can use lasers and the science that it available. As just one battalion in a large army against the fight against periodontal disease. Lasers provide advantages that traditional therapies do not. When used properly, laser therapy is a big weapon in this fight.

What do lasers have to offer?

Lasers (Light Amplification by Stimulated Emission of Radiation) use light energy to have a clinical



effect of oral tissue. This light energy can be converted to heat and that heat is used to remove tissue and destroy bacteria. However heat can have negative effects on tissue. Hard tissue burning or melting and possible soft tissue necrosis must be avoided or at least minimized. Other lasers use the potential energy of light and convert it to kinetic energy with another substance (e.g. water) to remove or ablate tissue. This allows the effective and efficient removal of infected epithelium and granulation tissue without the necrotic effects of heat. This provides less post-operative issues such as swelling and pain. Lasers are also effective in removing hard tissue including bone and calculus. In fact the U.S. Food and Drug Administration has approved a laser for calculus removal. Furthermore, because of the ability to collimate and bend light, lasers can access areas such as furcation and root anatomy that even surgical access with curettes and ultrasonics could not. Thus many procedures that were once absolute surgical cases can be treated non-surgically. The treatment of periodontal disease requires the proliferation of some cells while excluding other cells. To get re-attachment and regeneration, epithelial cells need to stay away from the healing site while fibroblasts and odontoblasts should be encouraged to enter. Lasers have the ability to assist in both areas.

For exclusion, lasers can de-epithelialize the area, by removing the epithelium to the connective tissue, both on the internal pocket wall and the external pocket wall. The fast growing epithelium is retarded to allow the slower moving fibroblasts and os-

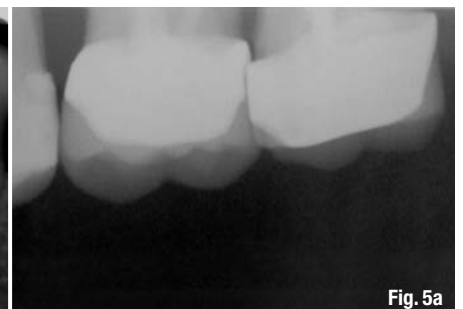


Fig. 5b

Fig. 6a

Fig. 6b

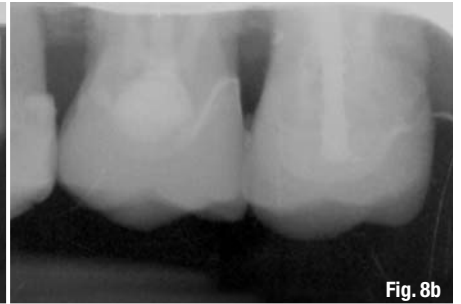
**Fig. 8b**

Fig. 9

Fig. 9

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