Dental lasers: Improving clinical results and patient treatment acceptance

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Over the last 27 years, I have witnessed and implemented many technological advances in dentistry. Some of these advances have included computers throughout the office, digital X-rays, digital intra-oral photography, loupe and microscope magnification and CAD/CAM technology, just to name a few. One of the most significant technological advances that I have witnessed has been the evolution of the dental laser, and this technology is really firing my passion for clinical dentistry.

Lasers have been used in dentistry for several decades, but during the last five years, dental lasers have become widely accepted, and now tens of thousands of dentists in the United States and around the world have implemented lasers into their daily armamentarium. Market acceptance of dental lasers is now at a rapidly growing level, where digital imaging was five to seven years ago. The decision is no longer whether to add a laser (or two) to your practice, it is just a matter of which laser will best fulfill your clinical needs.

In my practice, we have several lasers for both hard- and soft-tissue applications that are used for a wide range of procedures. It is a well-established fact that different dental procedures require different laser wavelengths. Wavelength is important because specific body tissues (chromophores) interact in different ways depending on the particular laser source. Therefore, it is important to use the proper wavelength that is tissue specific for the procedure.

Following are just a few of the laser procedures performed in our office every day and the clinical advantages they offer both our practice and, most importantly, our patients.

The XLase™ (Technology4Medicine) 1,064 nm diode laser has become my diode laser of choice for my hygiene department. It is very effective for hygiene...
procedures such as laser bacterial reduction (LBR) and laser depithelization as a treatment adjunct during scaling and root planing appointments. In addition, because of the 1,064 nm wavelength and the ability to micropulse the laser output, the XLase is an excellent laser for soft-tissue surgical procedures such as frenectomies, gingivectomies, fibroma re- movals and gingival retraction for crown and bridge impressions.

The most versatile laser I have is a dual wave- length Er:YAG (2,940 nm) and Nd:YAG (1,064 nm) all-tissue laser (Lightwalker, Technology4Medicine). Practically all laser-assisted dental treatments can be performed with either the most highly absorbed Er:YAG or the selectively absorbed, deeper penetrat- ing Nd:YAG laser wavelength. I use my Er:YAG several times a day for no shot, no drill cavity preps. My patients love being able to avoid having shots and post-op numbness.

This laser gives me the ability to remove decay quickly and effectively, and often these restorations had not been scheduled but are discovered during hygiene examinations. We are able to complete these procedures in one appointment and avoid the inconvenience of rescheduling the patient. With my Er:YAG laser I am able to perform these procedures fast and most often without anesthesia.

Lasers have allowed me to significantly expand the procedures I perform and one of the most im- portant areas is endodontics. With our Lightwalker Er:YAG laser we now routinely perform even compli- cated molar endo cases using an effective, fast and easy to use procedure called PIPS™ (photon-induced photoacoustic streaming). PIPS is an advanced pat- ented method using the Lightwalker Er:YAG laser for cleaning and debridging the entire root canal system.

PIPS has also been shown to greatly reduce the bacteria found within the canal system. Also, PIPS has allowed us to reduce the treatment time for moral endo by about 30 percent while performing the procedure more effectively and reducing the need for retreatments.

PIPS uses the proprietary designed Er:YAG laser to create a photoacoustic shock wave within the cleaning and debriding solutions introduced in the canal. The containment of the shockwaves thorough- ly streams these solutions three-dimensionally through the entire canal system, enhancing their effectiveness. The canals and subcanals are left clean and the dentinal tubules are free of smear layer. PIPS is equally effective for final water rinsing prior to obturation.

Another important addition to our practice has been Wavelength-optimized Periodontal Therapy™ (WPT). WPT is a minimally invasive method for treating periodontal disease utilizing both the Nd:YAG and Er:YAG wavelengths of the LightWalker. WPT creates the optimal conditions for healing of periodontal disease by removing the diseased epithelial lining of the periodontal pocket using the Nd:YAG laser, then the calculus is removed from the root surface using the Er:YAG laser.

Finally, finishing with the Nd:YAG laser, the pocket is sealed to form a stable fibrin clot. Like we see during PIPS, the Er:YAG laser creates a photoacoustic shock- wave within the periodontal pocket, which is instru- mental for calculus removal and bacterial reduction on the cementum surfaces. WPT has proven to be very effective and has significantly increased the level of patient acceptance of periodontal treatments.

The combination of these two proven wave- lengths in one laser system has enabled our practice to perform not only single wavelength but also dual-wavelength treatments. Utilizing both wave- lengths in many treatments makes optimum use of the unique laser-tissue interaction characteristics of each wavelength.

For example, Nd:YAG laser energy is superior for coagulation and deep disinfection and stimula- tion, while Er:YAG is uniquely efficient at ablating hard and soft tissues, and attacking bacteria and pathogens that lack pigmentation. When combined, they can dramatically improve the outcome of laser assisted treatments._

Anthony R. Cardoza, DDS, is a general dentist in El Cajon Calif. Cardoza first incorpo- rated dental lasers into his practice in 2001 for both hard- tissue and soft-tissue appli- cations. Cardoza is a mem- ber of the Academy of Laser Dentistry, Academy of Clinical Technology and a fellow of the World Clinic Laser Institute. Cardoza lectures extensively throughout the United States and Canada on the topics of both lasers and forensic dentistry.