

The new soft-tissue handpiece in laser dentistry

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• Dr Fay Goldstep

While dental lasers have been commercially available for several decades and their popularity among patients is unparalleled, the dental profession has taken to this treatment modality rather slowly—although lasers have been thoroughly documented in the dental literature. The laser is an exciting technology, widely used in medicine, kind to tissue, and excellent for healing.

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• Dr George Freedman

So why have lasers not been more widely embraced by the practising dentist?

There is a widely held perception in the profession that somehow the dental laser is not useful, too complicated, and too expensive. These concerns changed forever with the arrival of the diode laser on the dental market. There is now a conver-

gence of documented scientific evidence, ease of use and greater affordability that makes the diode laser essential for every dental practice.

Diode lasers: The science in brief

LASER is an acronym for light amplification by stimulated emission of radiation. Lasers are commonly named for the substance that is stimulated to produce the coherent light beam. In the diode laser, this substance is a semiconductor (a class of materials that is the foundation of modern electronics, including computers, telephones and radios). This innovative technology has produced a laser that is compact and far lower in cost than earlier versions.

Much of the research on lasers has focused on the 810 nm diode laser. This wavelength is ideally suited to soft-tissue procedures, since it is highly absorbed by haemoglobin and melanin. This gives the diode laser the ability to precisely cut, coagulate, ablate or vaporise the



• Fig. 1

target soft tissue with less trauma, improved post-operative healing and a faster recovery time. Given its incredible ease of use and versatility in treating soft tissue, the diode laser is the soft-tissue handpiece in the dentist's armamentarium.

The dentist can use the diode laser soft-tissue handpiece to remove, refine and adjust soft tissue in the same way in which the traditional dental handpiece is used on enamel and dentine. This extends the scope of practice of the general dentist to many soft-tissue procedures.

portability, high maintenance profile, confusion of operating tips, and complex procedural settings. Dentists are uncertain of which tip and settings to use for each procedure, and the need for a laser when their conventional techniques have served them well is not clear to them.

Enter the diode laser. It is compact and can easily be moved from one treatment room to another. Furthermore, it is self-contained, and does not have to be hooked up to water- or air-lines. It has one simple, replaceable fibre-optic operating tip.

“Laser therapy expands the clinical scope of practice”

Treatment with the Picasso 810 nm diode laser (AMD Lasers; Fig. 1) has been shown to have a significant long-term bactericidal effect in periodontal pockets. *Aggregatibacter actinomycetemcomitans*, an invasive pathogen associated with the development of periodontal disease and generally quite difficult to eliminate, responds well to laser treatment. Scaling and root planing outcomes are enhanced when diode laser therapy is added to the dental armamentarium. The patient is typically more comfortable during and after treatment, and gingival healing is faster and more stable.

Diode laser: Ease of use

Early adopter dentists thrive on new technologies. They enjoy the challenges that come with being the first to use a product. Most dentists, however, are not early adopters. Over the past two decades, lasers have intimidated mainstream dentists with their large footprint, lack of

The units come with several presets, although the operator quickly becomes so comfortable with the device that they are rarely needed. The power and pulse settings are easily adjusted to suit the particular patient and procedure.

Many dentists do not thrive on the challenges of brand new high-tech, high-stress technology. In fact, many lasers in the past promised to be user-friendly but were anything but. The 810 nm diode laser is a different experience; after a brief in-office demonstration, the dentist feels comfortable enough to use the laser handpiece to perform some simple clinical procedures. Further online training and lecture courses enhance both clinical comfort level and competency.

Diode laser: Affordability

Laser technology has always come with a high price tag. Manufacturing costs are high and cutting-



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Fig. 2



Fig. 3



Fig. 4



Fig. 5

edge technology commands steep prices, but diode lasers are less expensive to produce. Breakthrough pricing for this technology has now reached under US\$5,000. At this level, the diode laser becomes eminently affordable for the average practising dentist.

Gingivectomy, haemostasis and gingival troughing for impressions are easy entry points for the new laser user. The Picasso diode laser makes restorative dentistry a simple task. Any gingival tissue covering a tooth during preparation can easily be removed, as haemostasis is simultaneously achieved (Figs. 2–5).

The restoration is no longer compromised due to poor gingival conditions and there is no more battling with unruly soft tissue and blood. Gingival troughing prior to impression taking ensures an accurate impression, particularly at the margins, and an improved restorative

outcome. Packing cord is no longer necessary.

Operculectomy, excision and/or recontouring of gingival hyperplasia, and frenectomy are not commonly offered or performed by general dentists. However, they are examples of the expanded range of services readily added to the general practice with the diode laser. Dentists become more proactive in dealing with hyperplastic tissue that can increase risk of caries and periodontal disease. A frenectomy is now a simple and straightforward procedure.

Two types of diode lasers have been studied for their effects in laser-assisted periodontal therapy: (a) the diode laser (which emits high levels of light energy); and (b) the low-level diode laser (which emits low-intensity light energy). There is very compelling evidence in the dental literature that the addition of diode laser

treatment to scaling and root planing will produce significantly improved and longer-lasting results. Scaling and root planing is the gold standard in non-surgical periodontal treatment.

Low-level lasers for biostimulation have been used in medicine since the 1980s. The therapeutic effect is non-cutting and low intensity, and covers a much wider area than the traditional laser. Low-level laser therapy is treatment in which the light energy emitted by the laser elicits beneficial cellular and biological responses. At a cellular level, metabolism is increased, stimulating the production of adenosine triphosphate, the fuel that powers the cell. This increase in energy is available to normalise cell function and promote tissue healing.

The functions of the diode and low-level diode lasers have remained separate until recently. With

the Picasso biostimulation delivery tip, the diode laser is now able to provide both cutting and therapeutic effects.

When the low-level tip is used, the laser energy is delivered over a wider area, decreasing the energy level and producing a low-level therapeutic effect.

The soft-tissue diode laser has become an essential mainstream technology for every general practice. Its science, ease of use, and affordability make it simple to incorporate.

The laser is now the essential soft-tissue handpiece for the practice. In fact, there is a case for having a diode laser in each restorative and each hygiene treatment room. Diode lasers make restorative dentistry less stressful, more predictable and more enjoyable for the dental team and the patient.

Laser therapy expands the clinical scope of practice to new soft-tissue procedures that keep patients in the office. The patient's gingival health is improved in a minimally invasive, gentler manner. ◀◀

Dr Fay Goldstep has served on the teaching faculties of the postgraduate programmes in aesthetic dentistry at SUNY Buffalo, the University of Florida (Gainesville) and the University of Minnesota (Minneapolis), and has been an ADA Seminar Series speaker. She is a consultant to a number of dental companies, and maintains a private practice in Toronto, Canada.

Dr George Freedman is a founder and past president of the American Academy of Cosmetic Dentistry, a co-founder of the Canadian Academy for Esthetic Dentistry and a diplomate of the American Board of Aesthetic Dentistry. He was recently awarded the Irwin Smigel Prize in Aesthetic Dentistry by the New York University College of Dentistry.

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