Laser Dentistry

By Dr. Glenn van As

The AMD Picasso Laser for Tissue Management in Cementing Implant Retained Crowns.

Introduction:

Each month I try to cover a unique dental application that uses the AMD Picasso Lite Diode Laser in a general dental practice setting. During the last two decades our profession has undergone dramatic changes to both our armamentarium and the procedural techniques we use daily. The rise of dental implants to replace missing teeth has gain tremendous acceptance, but the soft tissue management around implants during 2nd stage uncovery and around abutments when providing the final restorations can be challenging. The diode laser can be an integral part of the soft tissue manipulation that may be needed with dental implants, providing clinicians with a safe, effective, and simple method of removing soft tissue around both the implant and supra-structure emanating from the implant.

Diode lasers provide many advantages over electrosurgery including: the ability to be used with pacemakers, the lack of a grounding pad, less postoperative discomfort, decreased lateral thermal damage, bacterial reduction, and the ability to work with just topical anesthetic. (1) Perhaps though, it is the ability of the diode laser to safely be used around metallic objects such as braces, amalgam, partial denture frameworks, gold and maybe most importantly - implants - that gives diode lasers their greatest advantage over electrosurgical units. (2-3) Numerous studies have shown that monopolar electrosurge units can cause irreversible damage to teeth, bone, soft tissue and pulpal tissue when inadvertently touching metallic objects. In contrast, diode lasers, can be safely used in direct contact with all metallic objects including implants without fear of iatrogenic damage occurring. (4)

Diode lasers can come in handy for many aspects of implant dentistry. Lasers can be of great help in the initial surgical phase for creating a small soft tissue ablation crater by penetrating through the surgical stent into the soft tissue ridge in flapless surgical implant placement. The laser can be also be used to trim away small amounts of excess tissue, and help with hemostasis while providing a reduction of bacteria in the surgical site. During activation after the implant has successfully osseointegrated, soft tissue exposure of supra-crestal implants can be completed with the diode laser. Studies show this to be a safe and routine method of exposing the implant cover screw without fear of heat generation or sparking of the implant which could be encountered with a monopolar electrosurge unit. (5) If the amount of soft tissue to be removed is minimal, then at times the tissue can be removed with merely a strong topical anesthetic (e.g. Cetacaine). A major advantage of the diode laser is the ability to provide hemostasis thus improving visibility of the surgical site compared to scalpel surgery. In addition, if there is adequate attached gingiva such that the diode laser can be used, often sutures can be avoided during the activation phase. Often a little bit of soft tissue creeping in under the cover screw onto the implant can prevent complete seating of the impression abutment. A soft tissue laser can quickly, and often painlessly remove soft tissue on the implant hex even when in direct contact with the implant itself. The clinician should use conservative settings (for instance comfort mode on the Picasso Lite (1.8 watts pulsed or 0.6 -1.2 watts Continuous Wave) when in direct contact with the implant, but settings like these have been shown in the literature to provide safe soft tissue ablation without fear of damage to the implant itself. After every 15-20 seconds of laser ablation of tissue with the diode laser, the author suggests that the clinician blow water onto the surgical field to rinse and cool the surgical site.

When the final crown is returned from the laboratory, the laser provides incredible opportunities for quick and judicious soft tissue recontouring to allow full seating of the implant crown. (See case below). At times soft tissue can act as a barrier to cementation of the crown. This can be common both at the time of initial seating of the crown and should the crown come loose in the future. Although all patients are instructed to firmly replace any loose implant crown back onto the abutment immediately, many forget to do so. Even a short period of time with the crown loose can lead to major difficulty reseating the crown onto the prepared margins of the abutment itself due to soft tissue ingrowth. A laser can be a lifesaver in these cases to provide both hemostasis and soft tissue management during the recementation process.

Finally, there is a growing awareness of the bactericidal effects of all lasers which when they are combined with their Low Level Laser therapeutic effects can help promotes wound healing. There is growing and active research to show that all lasers can therefore be used in cases of peri-implantitis to help reduce bacterial in the area and in some instances to remove granulation tissue from the affected area. The bacterial reduction without interaction with the implant itself makes lasers an area of growing interest in the treatment of the failing implant itself.(6-7)

Technique for tissue management in cementing crowns:

When considering using the diode laser for implant soft tissue management, the clinician must consider several factors. Diode lasers are attracted to pigment, and the tissue around implants, and their abutments can be vascular, inflamed and not heavily innervated. This tissue is prone to bleed, but often requires less energy to ablate than thick, keratinized, fibrous, white tissue. The vascularity combined with the lack of a fibrous nature of this tissue requires that the diode laser tip be properly initiated in order to prevent bleeding. Slow steady hand movements combined with patience can at times accomplish the soft tissue management with only topical anesthetics, thus providing a positive experience for the patient as well.

As mentioned in the previous clinical techniques articles, careful evaluation of the laser-tissue interaction with enhanced visual acuity (magnification and illumination) can help reduce the settings and time needed to complete a soft tissue management around implants with the diode laser. Adherence to the principle of using the lowest energy necessary to complete the task at hand will also allow the clinician to ensure that heat buildup around the bone and implant does not create any long term iatrogenic events that could jeopardize the success and integration of the implant itself.

Table 1 - Clinical Procedure for Diode Soft tissue Management with implants.

Step	Procedure
1	Choose a 5 or 10mm disposable tip , and properly initiate the tip.
2	Place Cetacaine topical (small) or a few drops of anesthetic (large) to provide for patient comfort during activating laser
3	Use 0.6 - 1.2 watts Continuos wave (Less energy without anesthetic). Alternatively 1.2- 2.4 watts pulsed (comfort mode) can be used.
4	Use slow brush stroke movements with contact tip on the tissue needing to be removed. Every 15-20 seconds stop, rinse with water (saline or sterile water can be used if desired) and cool site with air to prevent accidental buildup of heat on the bone and implant.
5	Angle parallel to the abutment and between the gingival cuff and the abutment to create a “moat” of space around the abutment. Continue until fixture margin is visible or crown is able to be seated without springback. Do not do a gingivectomy or lower the tissue height.
6	Hydrogen Peroxide or wet cotton pellet to remove tissue tags and clean up site.

Clinical Case of Diode Laser with Implants

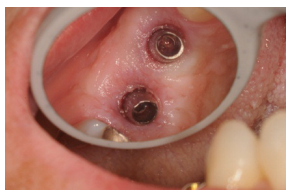

Fig. 1 Implant fixtures for 2 upper premolars.
Fig. 2 Note soft tissue on abutments preventing full seating of crowns.

Fig. 3 Soft-tissue troughing around abutments to allow for seating of crowns with Picasso Lite Laser.
Fig. 4 Note margin of abutment is now visable on facial. Tissue was not lowered apically, just distended away from abutment.

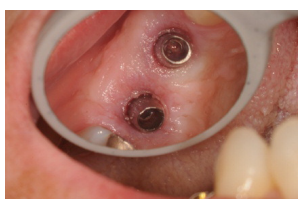

Fig. 5 Crowns fully seated, occlusal view.
Fig. 6 Crowns seated, buccal view.

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