Implant uncovery with the Picasso diode laser

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Introduction

Dental implants are placed either utilizing a 2-stage approach (levelling abutment placed at implant placement) or a 2-stage approach (implant covered by soft tissue at time of placement) and modification of the soft tissue to expose the implant fully may be required. When the prosthetic phase is initiated, soft tissue to either removed to uncover the implant or reshape the gingival margin for better esthetics which can be accomplished by several methods. A curette instrument (scalpel or tissue punch) has been the traditional approach to incise through the soft tissue to the underlying implant. The result is a bleeding edge that can interfere with impressions if they are to be taken at the same appointment. Additionally, post-operative sensitivity has been reported and can result from the fresh cut edge. Typically a delay of 2 weeks or longer is required before impressions can be taken so that bleeding doesn’t hamper the accuracy of how the soft tissue is captured.

An alternative to the blade, electro surgery has been offered as it can cauterize the cut edges and decrease post-operative bleeding. Yet, this presents with two negatives outcomes to use in and around dental implants. Electro surgery affects cell layers deep to the surface (deeper penetrating), combined with the temperature ranges covered this technology when used on more expensive CO2 and NdYAG lasers and the wide range of effective treatment afforded by these devices. Diode lasers, such as the Picasso (AMD Lasers, Indianapolis, IN, www.amdlasers.com) (Figure 1) provide adequate power to modify soft tissue in and around the dental implant for uncovery or alteration of the gingival margin to improve the esthetics. Additionally, these operate within the temperature range recommended so that the negative effects associated with electro surgery do not occur to the bone around the implant. Coagulation can also be controlled combined with the lack of thermal injury by following the use of the diode laser allowing impressions to be taken at the time of uncovery. As the diode laser affects fewer cell layers, tissue response does not involve an inflammatory response that can lead to tissue shrinkage during the healing period. (Figure 2)

Utilization of the diode laser

Diode lasers are primarily used in a healing period at the contact point with cut tissue to stabilize is required so that the gingival margin captured is stable when the prosthetics is returned for insertion. Increasing diode lasers being used in dental practices both due to lower costs to implement this technology then the more expensive CO2 and NdYAG lasers and the wide range of effective treatment afforded by these devices. Diode lasers, such as the Picasso (AMD Lasers, Indianapolis, IN, www.amdlasers.com) (Figure 1) provide adequate power to modify soft tissue in and around the dental implant for uncovery or alteration of the gingival margin to improve the esthetics. Additionally, these operate within the temperature range recommended so that the negative effects associated with electro surgery do not occur to the bone around the implant. Coagulation can also be controlled combined with the lack of thermal injury by following the use of the diode laser allowing impressions to be taken at the time of uncovery. As the diode laser affects fewer cell layers, tissue response does not involve an inflammatory response that can lead to tissue shrinkage during the healing period. (Figure 2)

In the beginning of the surgical unit with a grounding plate placed on the patient a distance from the oral cavity. When the current is activated it flows between the electro surgery tip through the soft tissue to the grounding plate, completing the circuit with the metallic implant conducting the current along the path. Temperature increases have been reported that when exceeding a threshold of 2 degrees C at the osseous interface with the implant may lead to bone loss and possible de-integration of the implant. A general recommendation is to avoid electro surgery units in and around dental implants.

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The diode laser tip is used in either an initiated state or an uninitiated state. Initiated refers to the tip of the diode laser which has been coated with a blocking material. This allows energy from the diode when activated, to heat the tip causing cell ablation (vaporization) at the contact point with cutting tissue. This secondary thermal effect of the heated tip allows cutting or incising of the soft tissue. An area of coagulation at the border of the vaporization results. Coagulation occurs in the tissue bordering this zone of coagulation as a result of contact with the overheated tip rather than by the laser energy itself. (Figure 3) Bacterial decontamination can be accomplished with an initiated diode tip which is useful in treatment of peri-implantitis on the implants surface or within the periodontal sulcus/pocket around implants and natural teeth.

Initiation of the tip is accomplished with the diode set at 0.5 watts and touched to a piece of blue articulating paper (Baush &Lomb SO5) and the laser is activated for 1 second. This is repeated 6-8 times contacting different areas of the tip so that when finished the entire tip and 3-4mm of the sides has been marked with the articulating paper. It is recommended to avoid articulating ribbon as it will irritate and be ineffective in initiating the tip. A green laser initiates which will glow orange when the foot pedal is depressed. The tip should be wiped with a piece of dry gauze to remove debris periodically as it is being utilized to maintain efficiency. When cutting fibrous tissue it may be necessary to reintinitate the tip during the procedure when the tip appears to not be cutting well.

Cauterization is efficiency related to wattage. The higher the wattage the faster the soft tissue is vaporized. But a greater zone of unwanted lateral thermal damage may result. It is advised to use the lowest wattage to accomplish the task to avoid the risk of thermal damage within the adjacent tissue. The assistant during usage of the diode laser uses the HV/EN near the site to remove any odors and periodically can spray water on the site to aid in cooling the tissue. This also minimizes thermal issues which improves initial healing. To minimize the soft tissue covering the implants cover screw or reshaping the tissue for esthetics a setting of 0.6-0.9 watts in a continuous mode is usually sufficient. A 400 micron diode tip (orange) is utilized for oral and periodontal surgical applications. The 3000 micron tip (purple) is designed for periodontal applications such as Laser Assisted Periodontal Treatment (LAPT).

Beyond the carbonization zone, an area of hemorrhosis (coagulation) occurs. Typically sites treated with the diode laser will demonstrate little to no bleeding depending on the condition of the tissue prior to treatment. Tissue that is hemorrhagic will require longer contact with the diode laser to achieve coagulation and may ooze due to the inflammation present prior to laser treatment. The coagulation affects and lack of post treatment tissue shrinkage allow immediate implant impressions should be desired.

The laser also creates an area of biostimulation adjacent to the coagulation area. Tissues and cells following irradiation with a diode laser, have a delayed response to minimize the risk of thermal injury within the adjacent tissue.

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biostimulatory effect that provides faster or more favorable wound healing with minimal pain and swelling as compared to a scalpel or electrosurgical unit. The laser irradiation stimulates the proliferation of mesenchymal stem cells without DNA alterations in the affected cells. Thus, wound healing is enhanced and soft tissue at the cut edges demonstrates faster healing when treated with a scalpel or other methods by stimulation of gingival fibroblasts inducing growth factors. It has been reported that healing/integration period.

Implant Uncovery technical considerations

The width of attached gingiva remaining will dictate the best method for implant uncovery (Figure 4A). When a wide band of attached gingiva is present and a sufficient amount of attached gingiva is present after uncovery on both the buccal and lingual then the diode laser is activated and inserted at the center of the site and worked in a spiral pattern outward until the entire cover screw is exposed (Figure 4C). A curette or other instrument may be necessary to loosen the tissue over the cover screw as the peristemium during implant healing becomes adherent to the titanium cover screw. Sites that present with a narrow width of attached gingiva of 3 mm at the crest will require some conservation of the remaining attached gingiva. In this clinical situation, the diode is utilized to remove an elliptical piece of soft tissue over the cover screw and then the tissue is pushed buccally and lingually to preserve the attached gingiva (Figure 4C). If less attached gingiva is present on either side of the center of the crest then the practitioner will need to preserve all of the attached gingiva present and a conventional flap is recommended to be able to position the tissue in a more apical direction. When this is necessary incisions can be made with the diode laser as an alternative to a scalpel (Figure 5).

Case report

A 40-year-old female patient presented with severely malposed maxillary central incisors tipped facially and a desire for esthetic improvement. A DICAT was taken and noted minimal bone present over the facial of the central incisor. Options for treatment were presented to the patient which included orthodontics to correct esthetics or extraction of the central incisors, placement of implants at these sites and restorations on the anterior teeth. The patient indicated that she did not wish to pursue orthodontic treatment option due to the time involved.

The patient presented for surgery and the central incisors were intruded automatically extracted under local anesthetic. The adjacent teeth were prepared for crowns, which would support a provisional bridge during the healing/integration period.

A 4mm wide 24 degree Co-Axis implant (Keystone Dental, Burlington, MA) was placed into the osteotomy at each central incisor orienting the prosthesis to a vertical position. The trajectory of the premaxilla. A provisional acrylic resin bridge was placed over the anterior area and allowed to set. Upon setting the prosthetic crown was maximally advanced into form an emergence profile in the soft tissue and preserve the papilla.

Six months post implant placement the provisional bridge was removed and preservation of the papilla was confirmed with a natural emergence profile within soft tissue (Figure 6). Local anesthetic was administered. The Picasso diode laser was set at 2.5 watts in continuous mode with an initiated tip and at the center of the depression in the soft tissue above the implants cover screw and moved in a circular motion moving outward until the entire cover screw was exposed. The process cuts the desired soft tissue and coagulates any bleeding from the cut edges. This was then repeated on the second implant. (Figure 9) Open tray implant impression abutments were placed into the implant and seating verified radiographically. An impression of the maxillary arch was taken utilizing Aquasil heavy body VPS (Caulk, Milford, DE) and a Mita Advanced Implant tray (Hager Worldwide, Hickory, NC) and Aquasil Ultra surmounted around the preparations and implant abutments. Head and abutments were placed into the implants. (Figure 10) The previously placed provisional bridge was tried in and modified at the pontics to allow the bridge to fully seat over the healing abutments and placed with a provisional cement (Saji Temp LT, CO America, Alsip, IL).

Two weeks later the prosthesis returned to the lab (DentLab, Lompoc, CA) and the provisional bridge was removed. Healing abutments were removed and the soft tissue was recontoured a lack of inflammation and a good periodontal health where it had been modified by the diode laser. Ceramic crowns were tried in on teeth 7, 10 and 13 and the screws returned zirconiabased implant crowns inserted. A radiograph was taken verifying fit of the implant prosthesis. A torque wrench was utilized to tighten the fixation screws on the implants to 30 Ncm and the ceramic crowns were luted with Panavia SA resin cement (Kuraray, NY, NY). Occlusion was checked and adjusted where needed.

Conclusion: Diode lasers are a useful adjunct to soft tissue modification to uncover dental implants or esthetically recontour the gingival margin. They provide better safety than external surgery maintaining a temperature profile within the safety zone of bone and do not cause tissue shrinkage that can affect the esthetic outcome. As the diodes tip provides simultaneous cutting and coagulation (hemostasis) a clear advantage to the use of a scalpel or tissue punch immediate impressions can be accomplished without site bleeding affecting the accuracy of the capture of the soft tissue contours and position.

References


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Study finds fundamental misconceptions about dental implants among patients

By DTI

HONG KONG, China: Investigating patients’ knowledge and perceptions regarding implant therapy, a Chinese study has found that an alarming number of participants had inaccurate and unrealistic expectations about dental implants. Moreover, the study determined that only 18 per cent felt confident about the information they had about the treatment.

In the study, the researchers investigated preoperative information levels, perceptions and expectations regarding implant therapy via a questionnaire. Responses from 277 patients were obtained during 2014 and 2015 in three different locations in China (Hong Kong, Sichuan and Jiangsu).

The analyses established that about one-third of the participants had mistaken assumptions about dental implants. According to the researchers, common misconceptions were that dental implants require less care than natural dentition, implant treatment is appropriate for all patients with missing teeth, dental implants last longer than natural dentition, and there are no risks or complications with implant treatment.

Overall, younger respondents (< 45) and those with higher education (bachelor’s and postgraduate degrees) tended to have more realistic perceptions and lower expectations of the treatment outcome.

When asked about their level of knowledge, 63 per cent of the participants said that they were generally informed about implants, but only 18 per cent felt confident about the information they had.

The study, titled “What do patients expect from treatment with dental implants? Perceptions, expectations and misconceptions: A multicenter study”, was published online ahead of print on 23 March in the Clinical Oral Implants Research journal.

Although dental implants are gaining increasing popularity, patients are often insufficiently informed and their perceptions unrealistic, a study has found. (Photograph: AnnaMoskvina/Fotolia)
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