

Treatment of Peri-Implantitis with the Picasso Diode Laser

A long-term follow-up after debridement and grafting

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The prevalence of peri-implant complications is rising significantly as implant treatment increases. Periodontal disease associated with implants can range from gingival inflammation in the absence of bone loss to significant bone loss and mobility

of the fixture. The latter can occur when the disease process is not identified early in the process or a “watch and wait” attitude is taken.

Treatment has traditionally involved flap elevation and mechanical debridement with surgical hand instruments to remove any granulation tissue present on the implant threads. As a result of the limitations of surgical tools, removal of additional bone might be required to reach areas that are not visible. Success diminishes as more surface area is left untreated.

Diode lasers have several benefits related to peri-implantitis treatment. The small diameter of the flexible glass fiber allows easier and more complete access without the need to remove as much bone as when only surgical instruments are utilized. Additionally, the

diode has the ability to sterilize the implant’s contaminated surface, eliminating any existing bacteria and keeping them from preventing healing after treatment.¹ The added benefit of using a diode in these procedures is biostimulation of the mesenchymal stem cells in the surrounding bone and soft tissue, an important tool for regenerative therapy and tissue engineering to provide better healing.^{2,3} Thus, the diode laser is a good adjunct in the treatment of peri-implantitis, improving the clinical results observed with more traditional methods.⁴

Case Presentation

A 64-year-old male patient presented in June 2010 with a fistula draining on the buccal of the upper right canine. The fistula was located



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FIG. 1

(1.) Fistula present at the distal of the maxillary right canine in close proximity to the gingival margin.

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distal to the canine midline in close proximity to the gingival margin (Figure 1). A gutta-percha cone was inserted into the fistula to trace the origination point of the draining infection and a radiograph was taken. It was determined that the fistula traced to the apical of the implant situated at site No. 6. Implants had been placed and restored for teeth Nos. 3 through 7 several years previously. The implant was identified as a Brånemark Mark III RP (Nobel Biocare, www.nobelbiocare.com) at site Nos. 4 through 6, and a NobelReplace (Nobel Biocare) at site No. 7. A radiograph was taken to evaluate the underlying osseous structure around the implant, which demonstrated radiolucency associated with the apical of implant No. 6 and crestal bone loss with thread exposure under the soft tissue on implant No. 7. Clinically, no recession was noted and no implant mobility was detected.

The patient was informed of the clinical issues and the available options, including removal of the ailing implant, grafting the site, and placing and restoring a new implant after an appropriate healing period. The other option would be elevating a flap, cleaning out any granulation tissue, and treating the site with a diode laser and graft to replace any lost bone. He was also informed that the latter option meant that the site would need to be evaluated

once entered and there was a possibility that the implant would need to be explanted should it exhibit mobility following debridement. The patient chose peri-implantitis repair.

Preoperative antibiotics (2.0 g amoxicillin) were given orally 1 hour prior to the initiation of treatment. A local anesthetic (Septocaine® 1:100,000 with epinephrine, Septodont, www.septodont.com) was administered for local infiltration on the buccal and palatal of the treatment area. A horizontal incision was made from the distal of the first premolar to the mesial of the lateral incisor several millimeters apical to the gingival margin to limit post-treatment recession potential. A vertical releasing incision was made at the mesial and distal extent of the horizontal incision and a full-thickness flap was elevated. Upon flap reflection, it was noted that a large dehiscence was present on tooth No. 6 from the crest to several millimeters beyond the apical of this implant. Additionally, some dehiscence was noted on the buccal of implant No. 5 with threads minimally covered with bone over the apical half of the implant. Site No. 7 presented with 30% to 50% of the threads circumferentially denuded of bone with complete soft tissue coverage.

A hand instrument was utilized to remove any gross granulation tissue adherent to the bone and exposed implant threads (Figure 3). An activated 300- μ m diode tip on the Picasso laser (AMD Lasers, www.amdlasers.com) set at 1.5 W in continuous mode was used to

remove any residual granulation tissue on the exposed threads at the defect and sterilize the defect area.^{5,6} The diode's fiber tip was placed into physical contact with the implant surface to remove any residual granulation tissue and sterilize the area of any bacteria that contributed to the peri-implantitis, leaving clean threads.

Following debridement and sterilization, bleeding points in the osseous walls were created. Geistlich Bio-Oss® (Geistlich Pharma North America Inc., www.geistlich-na.com), a bovine biocompatible porous bone mineral substitute, was packed into the defect around the implant and allowed to absorb blood from the surrounding tissue to form a coagulated mass. The bone graft was built out buccally to create a new buccal plate covering the entire implant below the crestal level (Figure 4). A piece of resorbable membrane (Ossix® Plus, OraPharma, Inc, www.orapharma.com) was trimmed to overlay the osseous graft and end on native bone and was placed over the graft under the flap. The flap was repositioned and secured with nine interrupted sutures using 5-0 silk to achieve primary closure. A radiograph was taken to document the bone fill of the osseous graft (Figure 5). Hemostasis was confirmed and the patient dismissed. A prescription for a Z-Pak (Zithromax®, Pfizer, www.pfizer.com) was given with the instructions to use as directed until finished. Additionally, a prescription was given for Dolobid® (Merck & Co., Inc., www.merck.com) 500 mg for pain

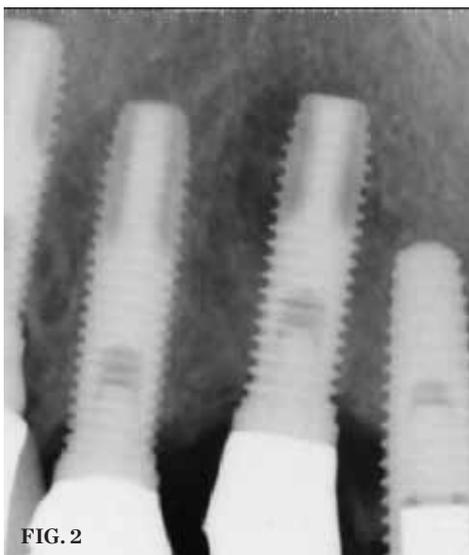


FIG. 2

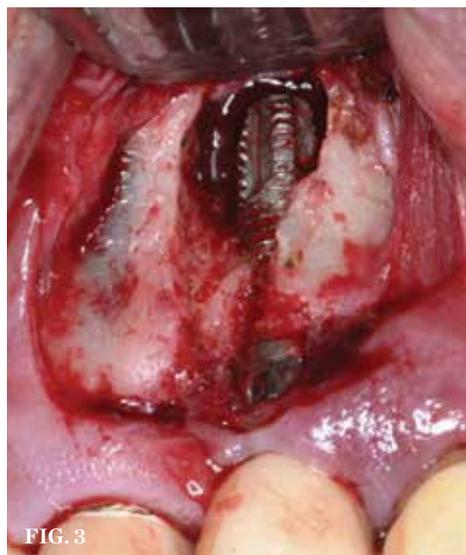


FIG. 3



FIG. 4

(2.) Initial radiographic presentation demonstrating a large radiolucency around the apical half of the implant at site No. 6. (3.) Following a full-thickness flap and removal of the granulation tissue with the Picasso diode laser, a lack of buccal bone is noted down the entire length to the apical. (4.) Osseous graft material was placed into the defect that had been cleaned with the Picasso diode laser and built out to the proper contour for the buccal plate.

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to be taken twice daily for the initial 3 days post-surgically. The patient returned after 1 week for suture removal and indicated no significant postoperative discomfort. The site appeared to be healing normally and he was appointed for a follow-up to check healing. At the next postoperative visit, the site appeared

healed with a lack of inflammation and the patient was placed on periodontal recall alternative with his general dentist office.

At 5 years post peri-implantitis treatment, cone-beam computed tomography (CBCT) was used to evaluate the long-term status of the repaired area. The cross section slice at the right maxillary canine demonstrated that the grafted buccal plate remained at the position completely covering the implant with no sign of further infection noted (Figures

6 and 7). A periapical radiograph confirmed osseointegration (Figure 8).

Discussion

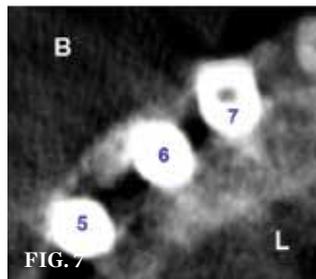
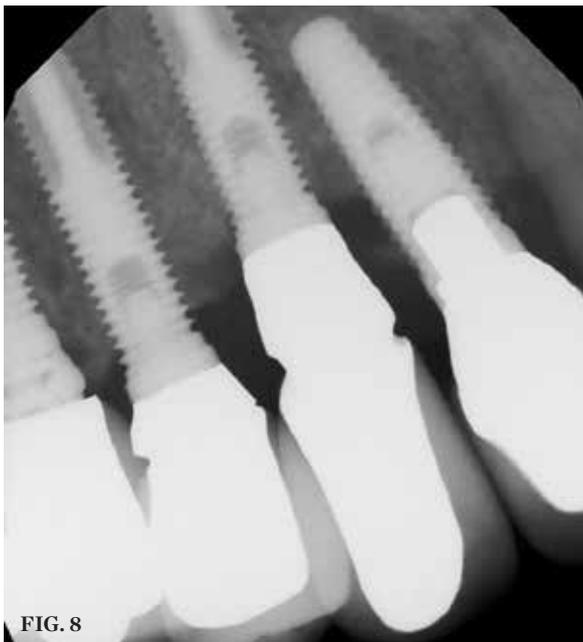
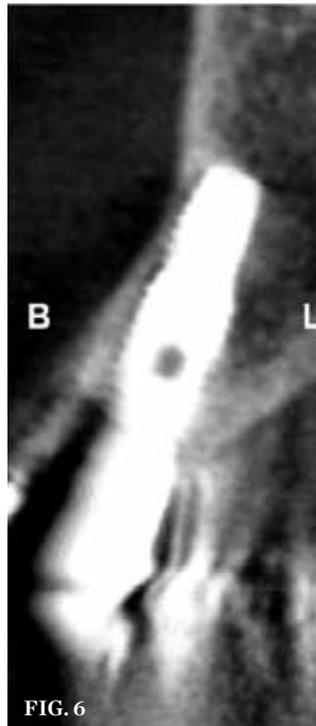
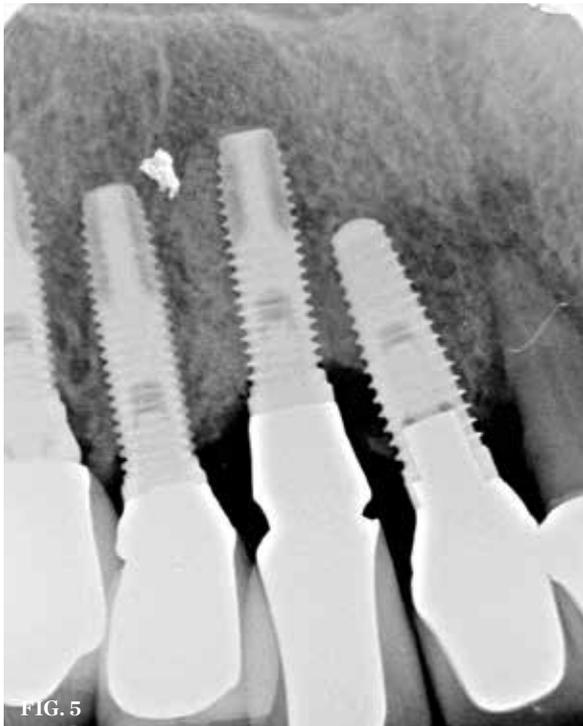
Managing peri-implantitis can be a challenge. As this case illustrates, bone loss may be progressing for an extended period of time before the clinician becomes aware of it. Treatment requires a surgical approach to remove any granulation tissue that has replaced bone overlaying the implant to achieve any success. The benefit of the Picasso diode laser is the fiber can be extended into hard-to-reach areas around the implant to achieve better sterilization and debridement without the need to remove additional bone for access, which would be necessary if only debridement with surgical hand instruments was utilized.

Traditional methods have reported mixed results in removing all of the granulation tissue from the exposed implant threads without altering or gouging the implant's surface or coating. A pulsed Er:YAG laser has also been reported to cause implant surface alterations.^{7,8} Scanning electron microscope analysis has demonstrated no damage or alteration of titanium surfaces from a diode laser, regardless of the power setting.⁸ No visible difference between lased and non-lased titanium surfaces after irradiation has been reported, ensuring that the result yields the best surface guided tissue regeneration compared to either mechanical debridement or a Er:YAG laser.

Success in peri-implantitis treatment is strongly linked to the ability to eliminate the bacteria in the site that could hamper regeneration. This becomes more critical with implants that have been surface treated. Treated implant surfaces exhibit micro roughness that are advantageous for initial integration, but also will harbor bacteria when peri-implantitis has occurred. Removal of bacteria in these micro irregularities is difficult by mechanical means. The diode laser has the ability to decontaminate the exposed surface and threads without any negative effects.⁹

Conclusion

The key to successful peri-implantitis treatment is early identification to limit bone loss from inflammation and infection. The diode laser is a powerful adjunct to treating peri-implantitis, allowing better access to eliminate more granulation tissue than when only mechanical means are utilized. This case demonstrates that the protocol can provide long-term predictable results showing 5-year



(5.) Periapical radiograph taken post-surgically demonstrating defect filled with the osseous graft material. (6. AND 7.) CBCT of a cross section (6.) and coronal slice (7.) of site No. 6 taken 5 years after peri-implantitis treatment demonstrating maintenance of the buccal plate and no return of the initial periodontal problem. (8.) Periapical radiograph at 5-year follow-up.

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maintenance of the grafted area and an absence of inflammation over that time.

Acknowledgement

Treatment for the case presented performed by Dr. Markus Weitz.

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1. Authors, the reviewer requested an additional reference for this statement. Can you please provide one? 

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