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A novel combined implantoplasty and regenerative surgical approach to salvage implants: A report on two 20-year-old implants

KEYWORDS
Peri-implantitis;
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Peri-implantitis, an inflammatory disease caused by pathogenic bacteria, can potentially compromise implant longevity.[1] When clinical signs are accompanied by progressive peri-implant bone loss, the condition is defined as peri-implantitis. Without treatment, bone loss progresses, eventually resulting in the loss of osseointegration and, ultimately, implant failure. However, there is no consensus on the most effective treatment approach.[1–3] Nonsurgical therapy is often insufficient to fully resolve inflammation. Surgical interventions have shown more favorable outcomes, with evidence supporting resective, reconstructive, or combined approaches to control progressive bone loss and promote soft tissue health.

Data from a systematic review and meta-analysis by Lin et al. suggested that both regenerative and non-regenerative approaches, combined with implantoplasty for surface decontamination, led to high implant survival rates and peri-implantitis resolution. Additionally, the regenerative approach resulted in greater radiographic bone fill compared to the non-regenerative treatment.[2] Most clinical studies have shown promising results for the surgical treatment of peri-implantitis with adjunctive enamel matrix derivative (EMD).[3] This case report aimed to demonstrate the use of a novel combined implantoplasty and regenerative surgical approach, incorporating EMD, alloplasts, and a barrier membrane, to treat peri-implantitis and extend implant survival to 20 years.

A 51-year-old female patient presented with Stage III periodontitis, a thin tissue phenotype, missing teeth, and a bruxing habit. Dental implants at sites 36 and 46 were placed in 2004 and restored in 2005 (Fig. 1A). In 2013, abutment screw loosening was noted, and the patient was referred to a prosthodontist for screw retightening. Recurrent abscesses and cellulitis developed at both implant sites in 2017, coinciding with the patient's diagnosis of diabetes. By 2019, approximately 4.5 mm of marginal bone loss was observed around both implants. Nonsurgical therapy for peri-implantitis was performed between 2009 and 2019; however, progressive bone loss of 2–3 mm occurred during this period (Fig. 1B).

A surgical approach was recommended and performed to treat peri-implantitis (Fig. 1C). A full-thickness flap was raised to ensure adequate access, followed by thorough debridement of granulation tissue using hand instruments, ultrasonic devices, and rotary instruments. Circumferential intrabony defects were observed around implants 36 and 46. Surface detoxification was carried out through implantoplasty using a sequence of carbide and diamond burs under copious irrigation (Hager & Meisinger GmbH, Hansemannstr. 1041468, Neuss, Germany) followed by air abrasion device with glycine powder (Prophy-Jet, Dentsply

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Figure 1 Clinical photographs and radiographs of the patient.
(A) Dental implants at sites 36 and 46 were placed in 2004 and restored in 2005. (B) In 2013, abutment screw loosening was noted, and the patient was referred to a prosthodontist for retightening. By 2019, approximately 4.5 mm of marginal bone loss was observed around both implants. (C) A full-thickness flap was raised to ensure sufficient access to implant 46. Granulation tissue was debrided using hand instruments, ultrasonic devices, and rotary instruments. Circumferential intrabony defects were observed around implants 36 and 46. Surface detoxification was performed through implantoplasty using a sequence of carbide and diamond burs under copious irrigation (Hager & Meisinger GmbH, Hansemannstr. 1041468, Neuss, Germany), followed by air abrasion device with glycine powder (Prophy-Jet, Dentsply Sirona, Charlotte, NC, USA) on the diseased implant surface. After implantoplasty, the intraosseous compartment of the implantoplastic surface was treated with enamel matrix derivative, grafted with alloplastic material, and covered with a collagen membrane. Polytetrafluoroethylene sutures were used to ensure primary wound closure. (D) Clinical and radiographic evaluations of implants 36 and 46 at the 4-year follow-up showed no bleeding on probing or purulent exudate, probing depths within 3 mm, 2 mm of marginal tissue recession, and 2 mm of bone gain.

Sirona, Charlotte, NC, USA) on the diseased implant surface. After implantoplasty, the intraosseous compartment of the implant surface was treated with EMD, grafted with alloplastic material, and covered with a collagen membrane. Polytetrafluoroethylene sutures were used to ensure primary wound closure. Clinical and radiographic evaluations at the 4-year follow-up showed no bleeding on probing or purulent exudate, probing depths within 3 mm, 2 mm of marginal tissue recession, and 2 mm of bone gain (Fig. 1D).

This is the first long-term case report demonstrating the successful preservation of implants using a combined implantoplasty and regenerative surgical approach for peri-implantitis with adjunctive EMD, alloplasts, and a collagen membrane. The key risk factors for progressive peri-implantitis in this case included a history of chronic periodontitis, diabetes, lack of peri-implant keratinized mucosa, and occlusal overloading. Risk factors for peri-implantitis may be associated with plaque accumulation, surgical complications, or prosthetic factors. Schwarz et al. reported an increased risk of peri-implantitis in patients with a history of chronic periodontitis, poor plaque control, lack of regular maintenance care after implant therapy, and insufficient peri-implant keratinized mucosa.[1] Similarly, Canullo et al. identified malpositioning (OR = 48.2) and overloading (OR = 18.70) as major predictors of prosthetically induced peri-implantitis.[4]

In a comprehensive review, Fan Chiang et al. highlighted the limitations of non-surgical treatments in achieving complete resolution of moderate to severe peri-implantitis and confirmed the effectiveness of surgical interventions in significantly reducing progressive bone loss.[3] In this case, non-surgical therapy for peri-implantitis, performed between 2009 and 2019, failed to control progressive bone loss due to both biological and technical complications. A novel combined implantoplasty and regenerative surgical approach, incorporating adjunctive EMD, alloplasts, and barrier membranes, was performed to preserve the implants. Implantoplasty and air polishing of the intraosseous compartment of the implant surface were conducted for thorough decontamination, which was crucial for successful re-osseointegration. Consistent with the findings of Froum et al., good oral hygiene, more frequent maintenance, screw-retained restoration, and preoperative bone loss of less than 50 % of the implant length were factors favoring a successful treatment outcome in this case.[5] Further

prospective, controlled studies with larger sample sizes are necessary to validate this novel approach.

Declaration of competing interest

All the authors declared no conflict of interest.

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