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CONSERVATIVE APPROACH TO IMPLANT THREAD EXPOSURE: A CASE REPORT

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Abstract:

Dental implants have become an integral part of prosthetic dentistry, offering both functional and aesthetic solutions to edentulous patients. However, implant thread exposure can compromise implant stability and esthetics, potentially leading to peri-implant complications. Various management strategies, including surgical and non-surgical approaches, have been explored to address this issue. This case report presents the use of implantoplasty combined with free gingival grafting as a successful approach for managing implant thread exposure.

Keywords: thread exposure, implantoplasty, dental implants

Introduction

Dental implants have provided documented aesthetic and functional outcomes with long-term success rates.[1] Implant thread exposure represents a significant complication that can jeopardize the structural integrity and longevity of dental implants.[2] Etiology of implant thread exposure is multifactorial and complex with several contributing factors like mechanical overloading, peri-implant infections, surgical factors like improper implant positioning, anatomical limitations, soft tissue factors like insufficient keratinized tissue width and frenal tension, physiological bone remodelling that leads to marginal recession over time, certain implant designs and surface characteristics which could also contribute to increased thread exposure risk.[1-5] Management strategies for implant thread exposure varies significantly, encompassing both surgical and non-surgical approaches based on the severity of the condition and the underlying cause. Soft tissue augmentation techniques, like flap advancement and free gingival grafts (FGG), have been shown to effectively increase the keratinized tissue width while simultaneously reducing clinical parameters associated with inflammation.[5,6] In cases involving significant bone loss, guided bone regeneration (GBR)

with autogenous grafts, especially cortical block grafts from the mandibular symphysis, along with xenografts and allografts,can help restore the compromised osseous architecture.[2,6] Non-surgical approaches of regular professional cleaning with antimicrobial treatment, splinting of implants, and use of angled abutments to improve implant positioning can aid in controlling infection and slowing disease progression.[3,6]

Implantoplasty has been proposed as an adjunctive therapy for the management of implant thread exposure.[7-9] The procedure involves mechanical modification of exposed implant surfaces using diamond burs to remove irregularities and create a smooth and polished plaque-resistant surface with a goal of restoring the physiologic biological width.[7,8]

This case report addresses the successful management of implant thread exposure after stage-one implant placement through a conservative and effective treatment approach of implantoplasty and free gingival grafting.

Case Report

A 22-year-old male patient visited the department for the replacement of missing teeth and the restoration of fractured teeth (Fig. 1A). The patient had no relevant medical history but mentioned

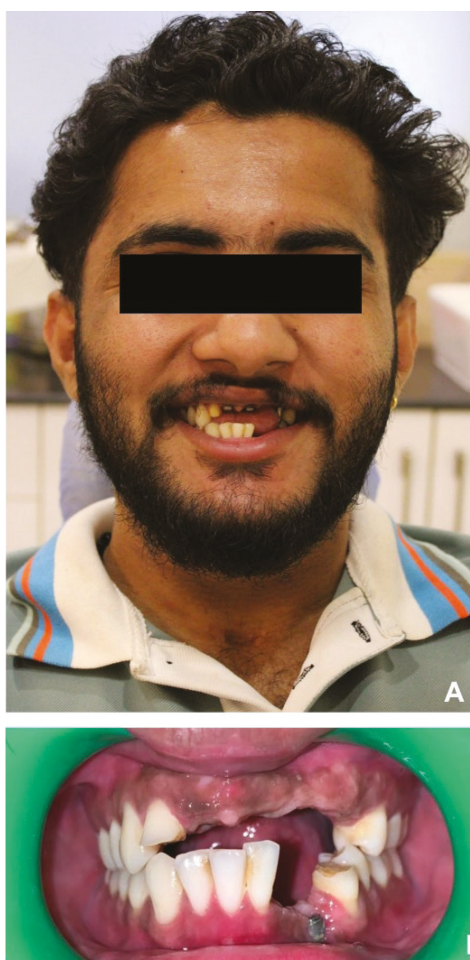

Figure 1. Pre-treatment views of the patient. A, Frontal view. B, Intraoral view.

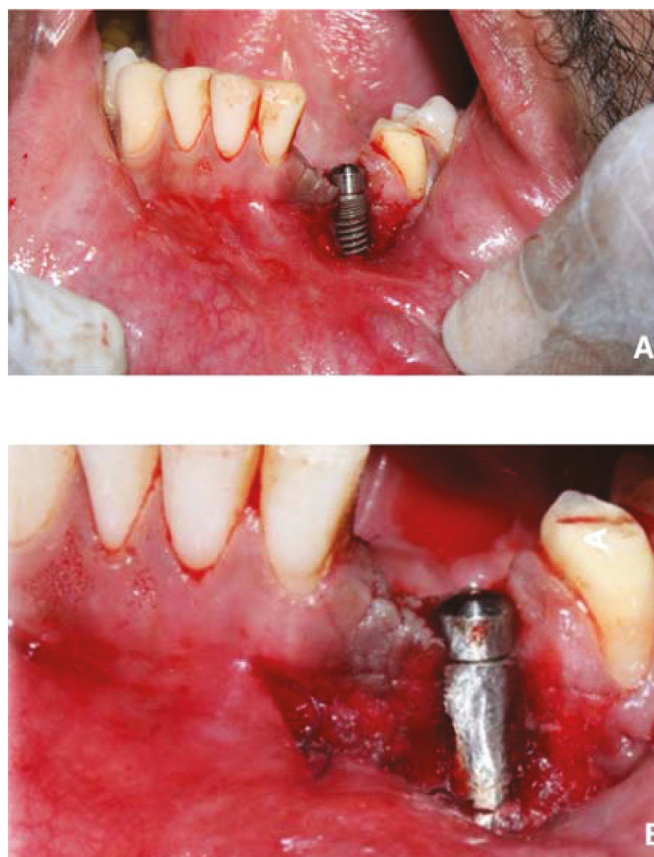

Figure 2. Surgical views of the implantoplasty procedure in the 33 region. A, Bone loss and thread exposure are seen on the buccal aspect after elevation of the mucoperiosteal flap. B, Post-implantoplasty view demonstrating the smoothed implant surface prior to soft tissue grafting

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about implant placement four months prior. Previous dental records revealed a history of facial trauma sustained a year ago with multiple dental injuries and no reported incident of facial bone fracture. His records also indicated Ellis Class III fracture of teeth #12 and #34, which were endodontically treated; an Ellis Class VIII fracture of tooth #23 that was extracted, followed by an immediate implant placement (GMI; 3.75×13 mm); and an Ellis Class V fractures of teeth #11, #21, #22, #32, and #33 with implants placed in region #11 (GMI; 3.30×13 mm), #21 (GMI; 3.75×13 mm), and #33 (GMI; 3.75×13 mm) (Fig. 1A, 1B).

Intraoral examination revealed all implants to be adequately covered with soft tissue except the one located in the 33 region that showed thread exposure (Fig. 1B) and a lack of attached gingiva. The limited width of the attached gingiva, along with the tractional pull of the lower lip, could potentially worsen thread exposure. However, the patient was not willing for any major surgical interventions for the management of thread exposure and expressed a preference for expedited prosthesis placement.[8]

At the second-stage surgery, exposure of all the other implants confirmed successful osseointegration without mobility. Healing abutments were placed on all the implants. Since the implant in 33 region with thread exposure did not show any mobility, implantoplasty combined with FGG was planned to increase the width of keratinized attached gingiva and minimize the severity of thread exposure.[8,9] Elevation of a full-thickness mucoperiosteal flap around the affected implant revealed an advanced buccal bone loss exposing around nine implant threads (Fig. 2A). After thorough debridement and removal of granulation tissues with hand instruments, implantoplasty was performed using a high-speed handpiece with flame-shaped diamond burs of different gritsizes (DIATECH multilayer diamond burs) under copious saline irrigation until a smooth surface was obtained (Fig. 2B).[5,8] A 13×8mm FGG was harvested (Fig. 3A) from the hard palate, and the donor site

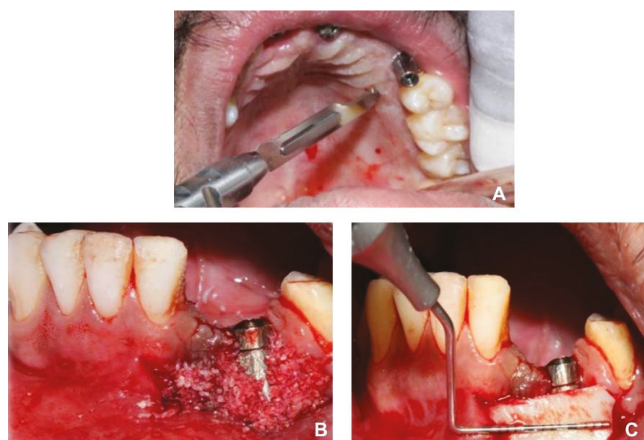

Figure 3. Soft and hard tissue grafting following implantoplasty in the 33 region. A, Harvesting of a free gingival graft from the palate. B, Application of bone graft material around the implant. C, Placement of the free gingival graft and clinical assessment of soft tissue thickness using a periodontal probe.

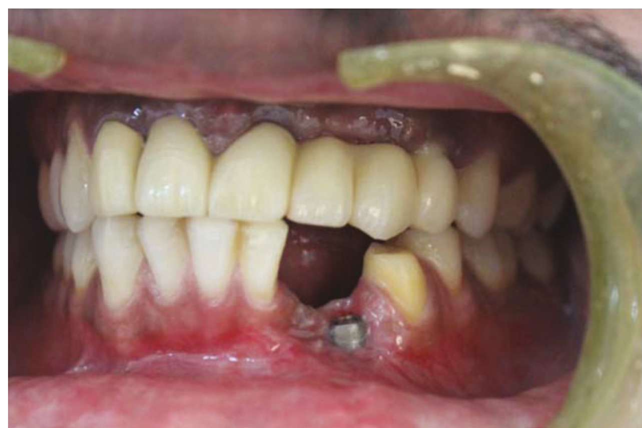

Figure 4. Healed implant site with healthy peri-implant soft tissue and adequate occlusal space for final prosthesis placement

was protected with a treatment denture.[10] Bone graft (Osseograft- DMBM) mixed with injectable platelet-rich fibrin (I-PRF) was placed in the area of bone defect adjacent to the exposed implant surface (Fig. 3B) and covered with the harvested FGG (Fig.3C), which was then stabilized using a 5-0 suture (Ethicon Absorbable surgical suture USP). Eugenol-free, surgical dressing (COE-PAK Regular set)was placed. After 2 weeks, the dressing was removed, and the site was examined for healing. When reviewed after 1 month, a 90% closure of the exposed threads was noted, without any uneventful complications (Fig. 4).

Figure 5. Post-treatment views of the patient. A, Frontal view. B, Intraoral view showing final prosthesis with harmonious soft tissue integration and functional occlusion.

In the prosthetic phase, a maxillary cement-retained fixed prosthesis and a mandibular screwmentable cantilever fixed prosthesis (Fig. 5A, 5B) were fabricated and cemented in place. The coronal portion of the treated implant surface, where complete soft tissue closure could not be achieved, was left undisturbed (Fig. 5B) to ensure access for hygiene and professional maintenance. Endodontically treated #12 and #34 were restored with porcelain-fused-to-metal crowns. At the follow-up visit, a favourable soft tissue response, reduced peri-implant probing depth and bleeding, adequate width of attached gingiva with sufficient vestibular depth, preventing further muscular traction, were noted.

Discussion

Despite the significant progress in periodontal and peri-implant surgical regeneration techniques, management of implant thread exposure presents a significant clinical challenge. In the present case, the primary cause of bone loss and thread exposure was likely the improper implant positioning coupled with inadequate attached gingiva and excessive muscle traction due to lip movements.[4,11-13] Previous studies by Lin et al. have identified the importance of adequate width of keratinized mucosa in maintaining peri-implant health.[11]

Considering the unfavourable bone defect morphology for regeneration, implantoplasty was chosen due to its proven efficacy in reducing bacterial recolonization and promoting the integration of peri-implant tissues after healing.[1,7,9,14] Bianchini et al. reported that implantoplasty significantly reduced marginal bone loss and improved implant survival rates.[15] Though effective, implantoplasty presents several challenges, like potential weakening of implant structure (particularly in narrow-diameter implants) and titanium particle release

that could trigger an inflammatory response.[16,17] Use of rotary diamond burs in descending grit sizes effectively reduces surface roughness as reported by Ramel Christian et al., while the final polishing step helps minimize implant surface roughness, thereby inhibiting biofilm formation and maturation.[15] Abundant saline irrigation ensured minimized titanium particle deposition and prevention of heat-induced damage to peri-implant tissues.[8,17]

Placement of xenograft - I-PRF covered with an autogenous FGG enhances regenerative outcomes. Studies by Kobayashi et al. showed that I-PRF releases growth factors that stimulate cellular proliferation and migration, potentially enhancing graft integration and soft tissue healing.[18] Autogenous tissue grafts are considered as a gold standard for increasing keratinized tissue width with a more predictable outcome, thereby addressing the underlying anatomical deficiencies.[6,8] Additionally, augmentation of keratinized tissue around implants significantly reduces bleeding on probing, improves plaque control, and decreases the incidence of recession.[6,8,19]

The limitation of this case report is the short follow-up period, preventing long-term outcome assessment. However, this case emphasizes the necessity of thorough pre-surgical planning to prevent thread exposure. A comprehensive evaluation of soft tissue biotype, vestibular depth, and muscle attachments prior to implant placement to identify and manage risk factors through preventive strategies like vestibuloplasty and soft tissue grafting during the initial time of implant placement could effectively lessen the subsequent complications.[4,7,8]

Conclusion

This clinical case highlights the effectiveness of combining implantoplasty with free gingival grafting in the management of implant thread exposure, thus suggesting its potential to serve as a minimally invasive alternative to more complex reconstructive procedures. However, further studies with large sample sizes and extended follow-up periods are needed to establish an evidence-based therapeutic protocol for implant thread exposure and soft tissue management.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

During the preparation of this work, the author(s) used ChatGPT and Claude to summarize a few portions of the original written draft of the case report. All content generated with the assistance of these tools was reviewed and edited by the authors to ensure accuracy with the scholarly standard of the work. The authors take full responsibility for the content of the manuscript.

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List of Abbreviations:

Abbreviation	Definition
FGG	Free Gingival Grafts
GBR	Guided Bone Regeneration
I-PRF	Injectable Platelet-Rich Fibrin