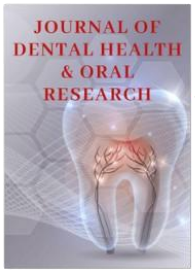

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Case Report

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Management of a Failed Anterior Implant Due to Buccal Malposition: Immediate Reimplantation with Sticky Bone, PRF and Pediculated Roll Flap for Hard and Soft Tissue Reconstruction: A Case Report

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Abstract

Background: Implant placement in the anterior maxilla requires strict adherence to tridimensional positioning principles. Buccal malposition is a critical factor leading to aesthetic and biological failure, often resulting in buccal bone resorption and soft tissue recession.

Case Description: This report describes the management of a failed implant in the maxillary central incisor region caused by buccal positioning and vestibular bone loss. The treatment involved implant removal, immediate reimplantation in a palatal position, buccal bone reconstruction using biphasic calcium phosphate combined with Platelet-Rich Fibrin (PRF) in a Sticky Bone protocol and soft tissue augmentation using a pediculated roll flap. A provisional restoration was used to guide peri-implant soft tissue conditioning, followed by a definitive zirconia crown.

Results: Significant hard and soft tissue reconstruction was achieved, restoring the buccal contour, gingival thickness and emergence profile, with high aesthetic integration and symmetry with the contralateral tooth.

Conclusion: The combination of correct implant positioning, biologically driven bone regeneration, vascularized soft tissue augmentation and prosthetic conditioning can successfully reverse severe aesthetic implant failures.

Keywords: Dental Implant Failure; Guided Bone Regeneration; Sticky Bone; Platelet-Rich Fibrin; Pediculated Roll Flap; Aesthetic Zone

Introduction

Implant therapy in the anterior maxilla remains one of the most demanding procedures in implant dentistry due to the high aesthetic expectations and the delicate balance between hard and soft tissue stability. Achieving an optimal aesthetic outcome requires precise surgical execution and careful management of the peri-implant tissues.

Improper tridimensional positioning, particularly buccal placement, has been consistently identified as a primary cause of aesthetic failure [1,2]. Such malpositioning often leads to a cascade of complications, including buccal bone resorption, soft tissue thinning, implant show-through and a compromised emergence profile. The buccal bone plate in the anterior maxilla is typically thin (often less than 1 mm), making it highly susceptible to resorption following implant placement or tooth extraction [3]. When an implant is placed too far buccally, the overlying bone and soft tissue are placed under excessive tension, frequently resulting in recession and exposure of the implant restorative margin.

This case report illustrates a comprehensive surgical and prosthetic approach to correcting a severe aesthetic failure caused by buccal implant malpositioning. The treatment strategy combines immediate implant replacement in a correct position,

biologically enhanced bone regeneration using a Sticky Bone and PRF protocol, vascularized soft tissue augmentation via a pediculated roll flap and prosthetically guided tissue conditioning.

Case Presentation

Initial Situation

A patient presented with a chief complaint regarding the aesthetics of an implant-supported crown in the position of the maxillary left central incisor (tooth #21). The patient reported dissatisfaction with the crown's appearance, noting an apparent misalignment and perceived mobility.

Clinical and radiographic evaluation revealed a buccally positioned implant with significant loss of the buccal bone plate. The peri-implant soft tissue exhibited a thin gingival phenotype with a greyish discoloration, indicative of implant show-through. Furthermore, there was a notable gingival margin discrepancy compared to the adjacent natural teeth. Importantly, the perceived mobility was associated with the implant body itself, rather than the prosthesis, indicating a failure of osseointegration (Fig. 1-4).

Figure 1: Pre-operative assessment showing clinical aesthetic failure and radiographic evidence of buccal malposition.

Figure 2: Pre-operative assessment showing clinical aesthetic failure and radiographic evidence of buccal malposition.

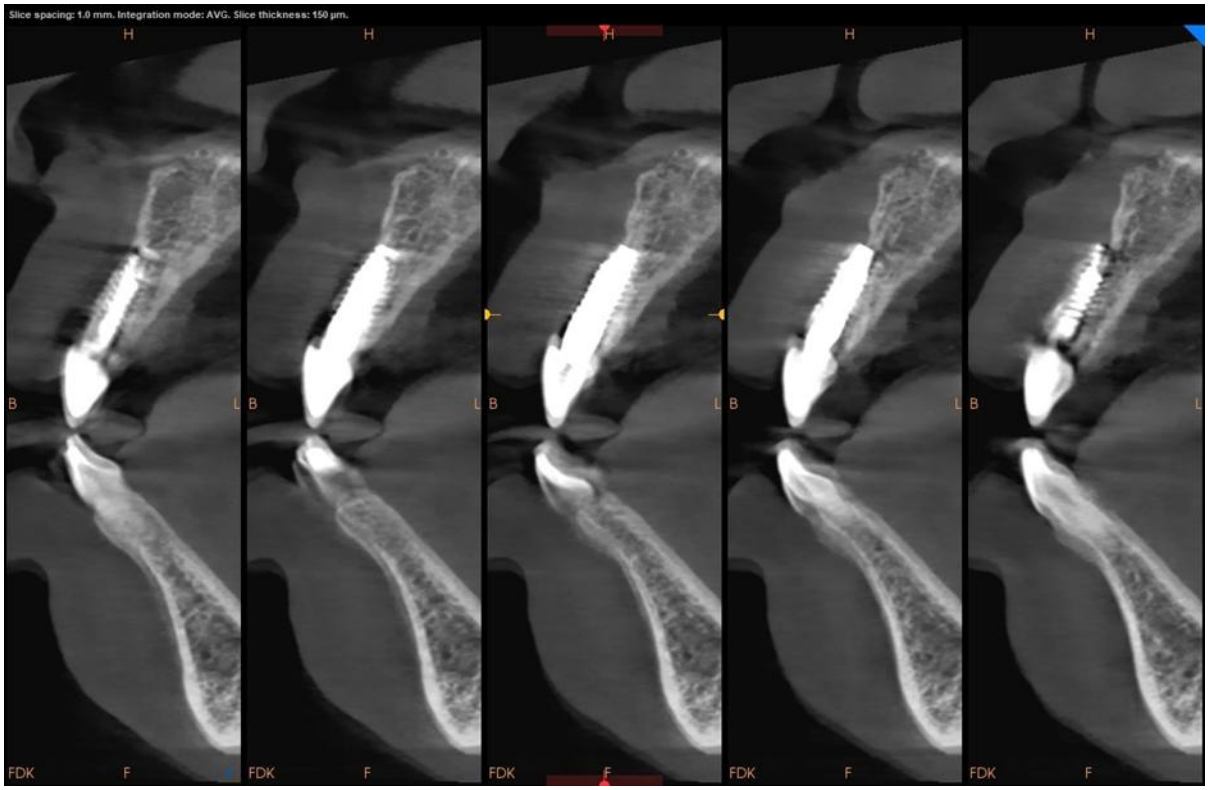

Figure 3: Pre-operative assessment showing clinical aesthetic failure and radiographic evidence of buccal malposition.

Figure 4: Pre-operative assessment showing clinical aesthetic failure and radiographic evidence of buccal malposition.

Diagnosis

The case was diagnosed as a biological and aesthetic failure due to incorrect tridimensional implant positioning combined with severe buccal bone deficiency.

Treatment Plan

To address the biological and aesthetic complications, a comprehensive, multi-stage treatment plan was formulated:

1. Atraumatic implant removal
2. Immediate implant placement in the correct tridimensional (palatal) position
3. Buccal bone reconstruction using Guided Bone Regeneration (GBR)
4. Soft tissue augmentation
5. Provisionalization for soft tissue conditioning
6. Final prosthetic rehabilitation

Surgical Procedure

Implant Removal and Immediate Placement

The failed implant was atraumatically removed to preserve the remaining bone architecture. Following thorough debridement of the socket, a new implant (3.0 × 12 mm, ROOTT system) was placed. Crucially, the new implant was positioned more palatally, respecting the principles of prosthetically driven implant placement.

Scientific Rationale: Palatal positioning of the implant in the anterior maxilla is essential to ensure adequate buccal bone thickness, which is critical for long-term stability and aesthetics. This positioning improves the emergence profile and significantly reduces the risk of future mucosal recession (Fig. 5) [1,4].

Figure 5: Immediate implant placement.

Buccal Bone Reconstruction-Sticky Bone with PRF

To reconstruct the deficient buccal bone plate, a Guided Bone Regeneration (GBR) procedure was performed using a Biphasic Calcium Phosphate (BCP) graft combined with Platelet-Rich Fibrin (PRF) in a "Sticky Bone" protocol.

Sticky Bone Protocol: Blood was drawn from the patient and centrifuged (1800 rpm for 10 minutes) to obtain PRF. The fibrin clot was fragmented and mixed with the BCP particulate graft. Liquid plasma was added to initiate polymerization, creating a cohesive, stable graft mass known as Sticky Bone. PRF membranes were then placed over the graft to serve as a biological barrier.

Scientific Rationale: PRF is an autologous matrix that promotes angiogenesis, cellular migration and the sustained release of key growth factors (such as PDGF, TGF-β and VEGF), significantly enhancing tissue healing and regeneration [5,6]. The Sticky Bone concept provides exceptional graft stability, reduces micromovement of the particulate graft and facilitates handling and adaptation to the defect, ultimately leading to improved graft integration (Fig. 6-8) [7,8].

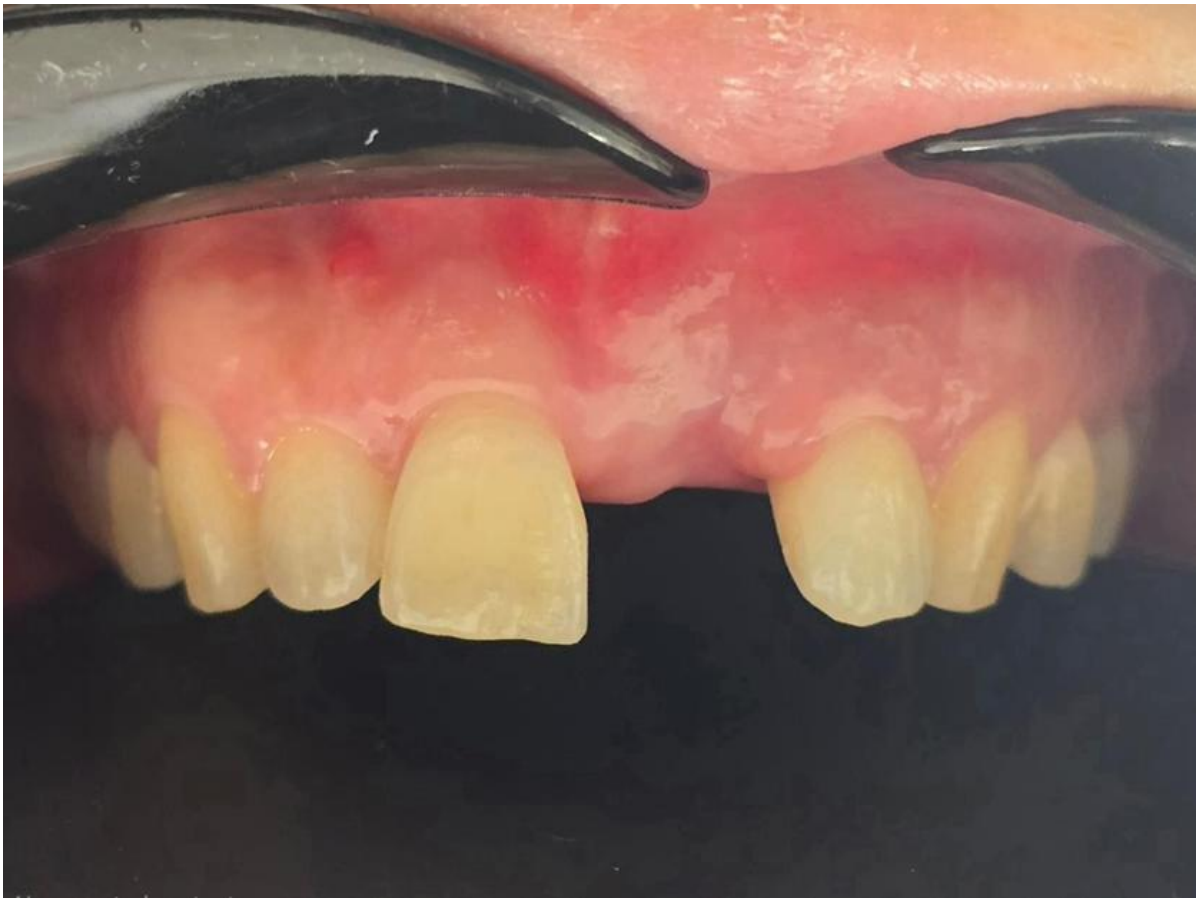

Figure 6: Post-operative clinical healing and radiographic confirmation of corrected implant position.

Figure 7: Post-operative clinical healing and radiographic confirmation of corrected implant position

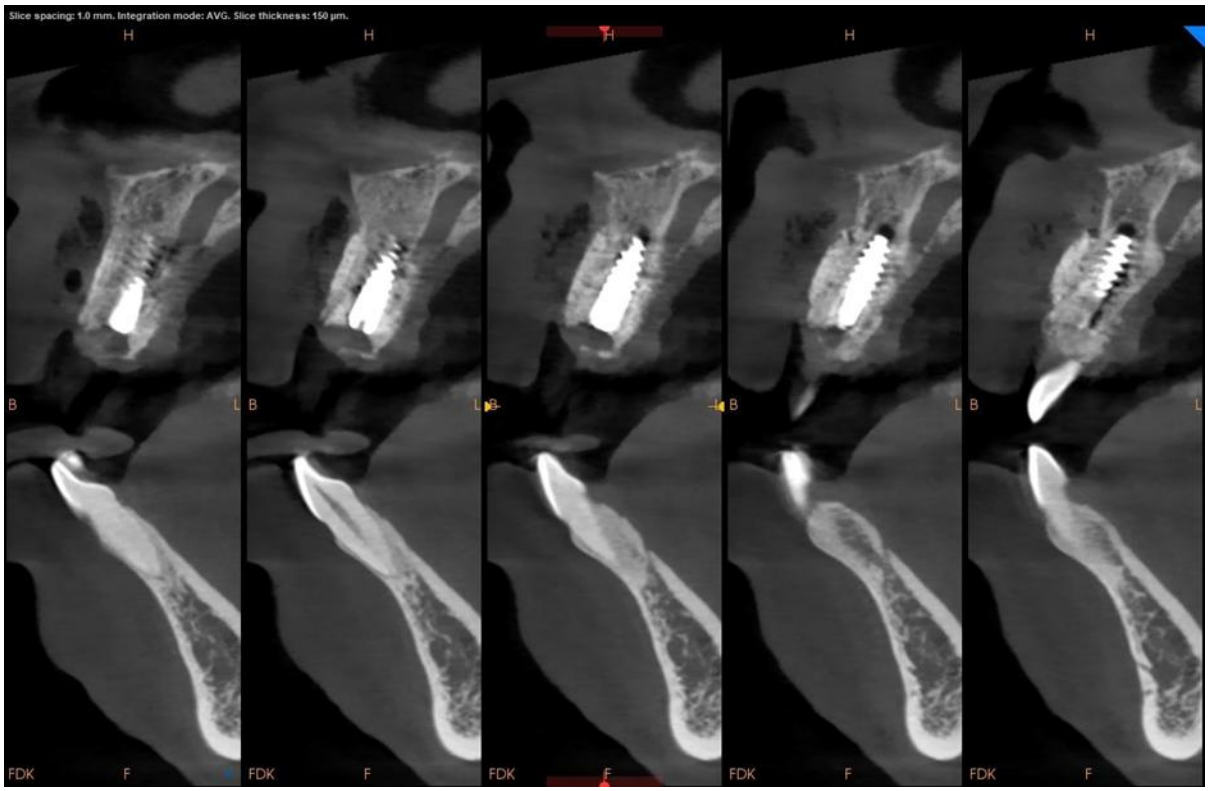

Figure 8: Post-operative clinical healing and radiographic confirmation of corrected implant position.

Soft Tissue Management-Pediculated Roll Flap

To address the thin gingival phenotype and augment the buccal soft tissue volume, a partial- thickness pediculated roll flap was performed during the second stage of treatment. Approximately 80% of the palatal tissue was de-epithelialized, elevated as a pedicle and rotated internally to the buccal aspect of the implant site.

Scientific Rationale: The pediculated roll flap technique is highly effective for increasing peri-implant soft tissue thickness. Compared to free connective tissue grafts, the roll flap maintains its original vascular supply, thereby reducing the risk of graft necrosis and improving long-term volumetric stability (Fig. 9,10) [9,10].

Figure 9: Pediculated roll flap procedure for soft tissue augmentation and provisionalization.

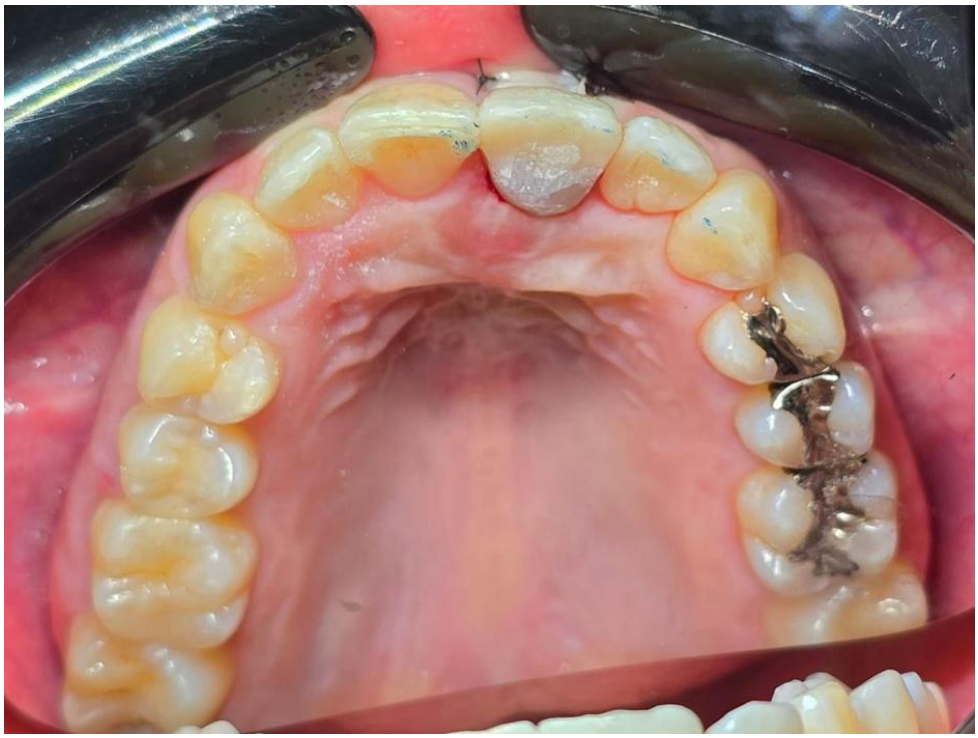

Figure 10: Pediculated roll flap procedure for soft tissue augmentation.

Provisional Phase and Tissue Conditioning

A provisional restoration was utilized extensively to shape and condition the peri-implant soft tissue profile. The provisional crown supported the healing tissues and guided the formation of a natural emergence profile.

Scientific Rationale: Provisional restorations play a crucial role in the aesthetic zone. They guide soft tissue healing, define the emergence profile and stabilize the gingival architecture prior to final impression making (Fig. 11) [11,12].

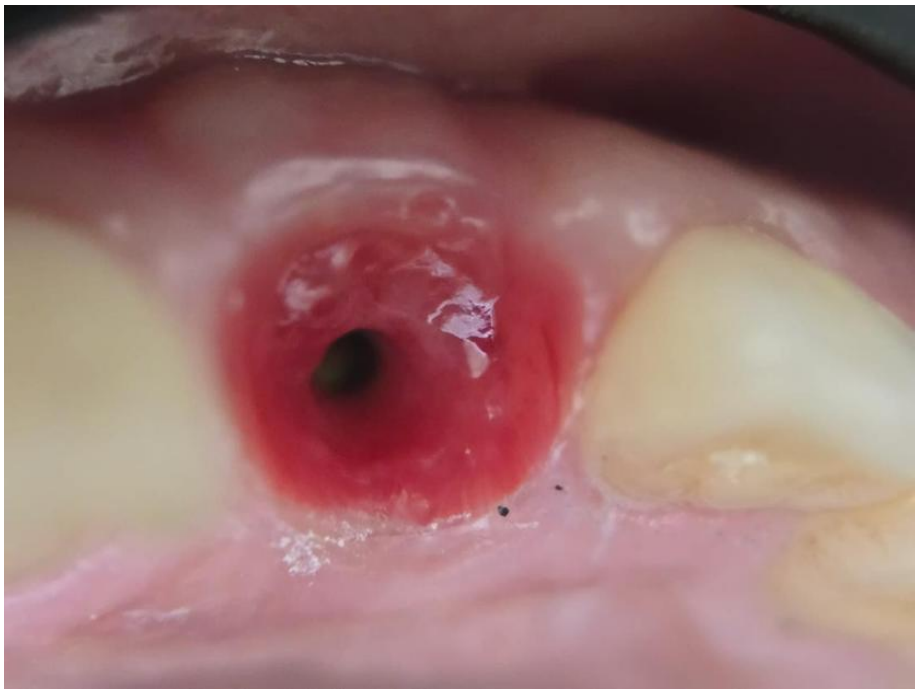

Figure 11: Matured peri-implant soft tissue exhibiting a healthy emergence profile.

Definitive Restoration

After a tissue conditioning period of two months, the final prosthetic phase was initiated. The established emergence profile was captured using a digital intraoral scanner. A definitive zirconia crown was then designed and fabricated based on the digital scan of the conditioned soft tissues and the provisional restoration.

Scientific Rationale: Digital workflows in implant dentistry, particularly the scanning of provisional restorations or customized impression copings, allow for the precise replication of the developed tissue contours. This approach reduces the need for chairside adjustments and ensures highly predictable aesthetic outcomes (Fig. 12,13) [13,14].

Figure 12: Final zirconia crown in place, showing successful aesthetic and functional rehabilitation.

Figure 13: Final zirconia crown in place, showing successful aesthetic and functional rehabilitation.

Results

The comprehensive treatment approach yielded excellent clinical outcomes. The buccal volume was successfully restored and the gingival thickness was significantly increased. The final zirconia crown exhibited a natural emergence profile and harmonious symmetry with the contralateral central incisor, completely resolving the patient's initial aesthetic and functional complaints.

Discussion

This clinical case strongly reinforces a fundamental principle of modern implant dentistry: implant success in the aesthetic zone is determined primarily by precise tridimensional positioning, rather than osseointegration alone. The original failure in this case was a direct consequence of buccal and coronal implant placement, exacerbated by a lack of buccal bone support.

Reversing such severe aesthetic failures requires a meticulous, multidisciplinary approach. The successful outcome was dependent on four critical steps:

- Repositioning: Correcting the tridimensional error by placing the new implant in a palatal position
- Bone Reconstruction: Utilizing biologically active materials (Sticky Bone and PRF) to regenerate the lost buccal plate
- Soft Tissue Thickening: Employing a vascularized roll flap to ensure robust and stable soft tissue coverage
- Prosthetic Conditioning: Using a provisional restoration to sculpt the emergence profile prior to final restoration

Conclusion

The management of a failed implant due to malpositioning is a complex clinical challenge. A multidisciplinary approach that integrates surgical precision, biologically driven hard and soft tissue regeneration and meticulous prosthetic control can successfully reverse severe aesthetic implant failures and restore both function and natural aesthetics.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Statement

The project did not meet the definition of human subject research under the purview of the IRB according to federal regulations and therefore was exempt.

Informed Consent Statement

Informed consent was obtained from all participants included in the study.

Authors' Contributions

All authors contributed equally to this paper.

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