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Restoring the Smile: Two-Implant rehabilitation of maxillary central and lateral incisors

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Abstract
Rehabilitation of two adjacent missing teeth in the anterior maxilla presents esthetic and surgical challenges. This case report describes the management of a 36-year-old male with missing teeth 11 and 12 due to trauma. Two endosseous implants were placed in a healed ridge using a delayed placement approach. Healing was uneventful, and provisional crowns guided soft tissue shaping before definitive restorations. At 12-month follow-up, both implants exhibited clinical stability, preserved bone levels, and satisfactory esthetic integration. This case highlights the importance of proper implant positioning, soft tissue management, and provisionalization in achieving predictable esthetic outcomes in adjacent anterior implants.

Keywords: Dental implants, tooth loss, esthetics, soft tissue management, cone-beam computed tomography

Introduction

Dental implants have become a predictable and widely accepted treatment option for replacing missing teeth, with success rates exceeding 95% in most clinical situations [1]. However, implant placement in the anterior maxilla poses unique challenges due to high esthetic demands, limited bone volume, and the complex anatomy of soft and hard tissues in this region [2]. Achieving optimal outcomes requires meticulous planning and execution to ensure functional stability and harmonious integration with the surrounding dentition and facial features.

Replacing adjacent missing teeth in the esthetic zone—such as maxillary central and lateral incisors (teeth 11 and 12)—is particularly demanding. When two implants are placed side-by-side in the anterior region, maintaining inter-implant papillae and soft tissue contours becomes difficult, especially when the bone or soft tissue volume is compromised [3]. Inadequate spacing, improper angulation, or poor soft tissue management may result in black triangles, recession, or asymmetry, which can severely affect the esthetic outcome [4].

The success of such procedures depends on various factors, including proper three-dimensional implant positioning, sufficient inter-implant and implant-tooth distances (minimum of 3 mm between adjacent implants), and the presence of adequate labial bone thickness (≥2 mm) to prevent buccal recession [5, 6]. In cases where the labial plate is thin or deficient, guided bone regeneration (GBR) or other grafting techniques may be required to ensure long-term stability of the peri-implant tissues [7]. Another important consideration is the timing of implant placement. While immediate and early implant placement may reduce treatment time and preserve bone, a delayed approach is often favored in anterior cases with long-standing edentulism, especially when the ridge is well-healed and esthetic demands are high [8].

This case report describes the successful rehabilitation of a patient with missing maxillary central and lateral incisors using two implants placed in a healed ridge. It highlights the surgical and prosthetic approach adopted to preserve hard and soft tissue architecture, achieve optimal implant positioning, and restore esthetics and function in the anterior maxilla.

Case Report: A 36-year-old male patient presented with missing maxillary central and lateral incisors (teeth 11 and 12), extracted seven years earlier due to trauma. The patient was systemically healthy, non-smoker, with no relevant medical history or contraindications to implant therapy. Clinical examination showed a well-healed edentulous ridge with adequate keratinized tissue. Cone-beam CT revealed sufficient bone volume (approx. 14 mm height, 7 mm width) and an intact labial plate, allowing for conventional implant placement.

Under strict aseptic conditions and after administration of local anesthesia (2% lidocaine with 1:100,000 epinephrine), a mid-crestal incision was made in the edentulous area of the maxillary anterior ridge. A full-thickness mucoperiosteal flap was reflected to expose the alveolar bone and allow for visualization of the ridge contour. Sequential osteotomies were prepared, and two implants (4mm × 10 mm) and (3.75mm× 10 mm) were placed in sites 11 and 12 with good primary stability. Cover screws were placed, and the flap was sutured with 3-0 silk sutures. Postoperative instructions were given, and the patient was prescribed antibiotics (amoxicillin 500 mg TID for 5 days), analgesics (ibuprofen 400 mg TID as needed), and chlorhexidine mouthwash 0.12% for one week. Postoperative healing was uneventful.

After 4 months of submerged healing, second-stage surgery was performed, and healing abutments were placed. Soft tissue maturation was allowed for two weeks. Final PFM crowns were delivered after soft tissue stabilization. At 12-

month follow-up, both implants remained clinically and radiographically stable, with healthy peri-implant soft tissues and satisfactory esthetic outcome. The patient reported high satisfaction with function and appearance.

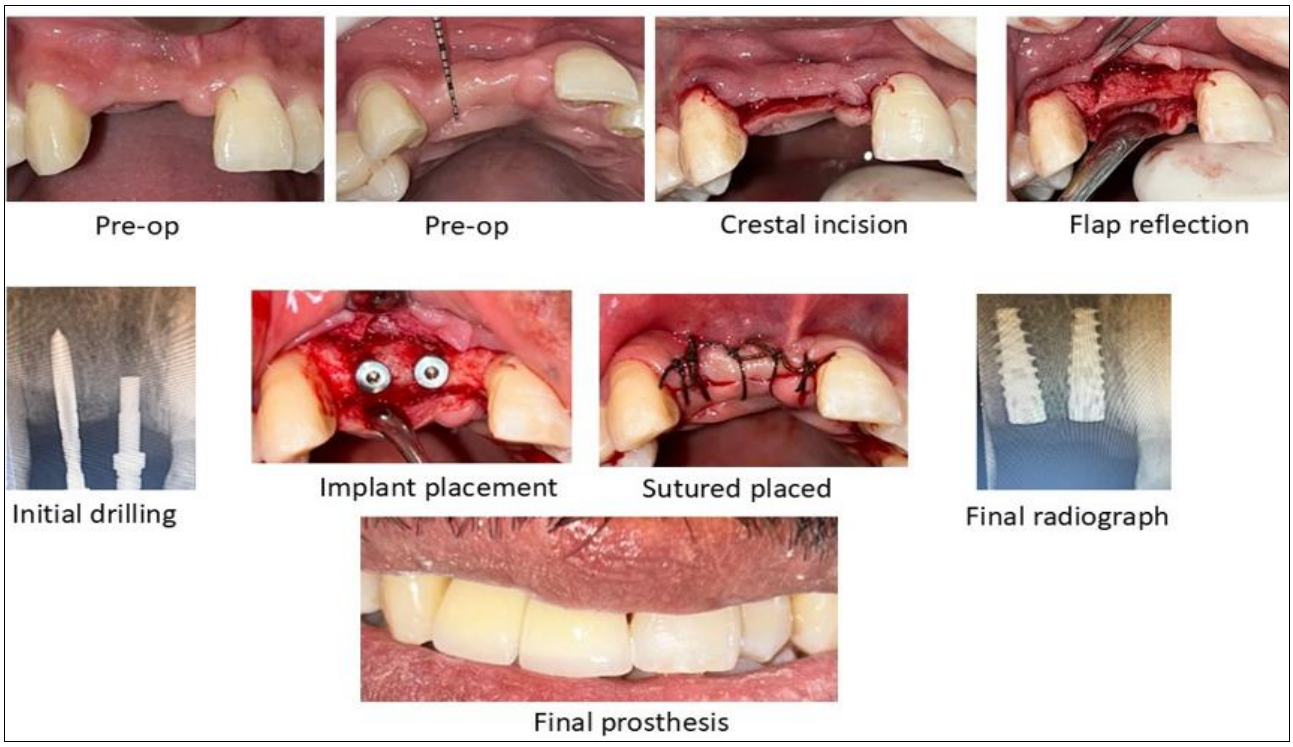

Fig1: Clinical pictures depicting rehabilitation by implant

Discussion: The present case illustrates a successful functional and esthetic rehabilitation of two adjacent missing maxillary anterior teeth (11 and 12) using dental implants in a healed ridge. While this approach is well-established, it remains clinically demanding due to the interplay between soft tissue architecture, bone support, implant positioning, and prosthetic planning. In such cases, even minor surgical or prosthetic errors can compromise esthetic outcomes, leading to unsatisfactory patient experiences.

A critical factor in this case was the timing of implant placement. A delayed protocol was chosen, given the seven-year post-extraction edentulous ridge, which allowed for sufficient soft tissue maturation and bone remodeling. Although immediate implant placement can reduce treatment time and help preserve alveolar dimensions, it has been associated with higher risk of midfacial mucosal recession, particularly in cases with a thin labial bone plate [9]. Studies have shown that midfacial soft tissue recession occurs in 9–41% of immediate implant cases in the anterior maxilla [10], whereas delayed placement offers more predictable soft tissue outcomes.

In addition, the selection of implant diameter and positioning was tailored to the narrow alveolar ridge and the esthetic zone requirements. Narrow-diameter implants (4mm and 3.75mm) were used to accommodate the available bone without risking labial plate fenestration or excessive inter-implant spacing reduction. Proper 3D placement—especially a palatal and apical orientation—was essential to ensure an adequate emergence profile, biologic width preservation, and space for papilla formation. De Rouck et al. emphasized the importance of placing the implant platform 3–4 mm apical to the future gingival margin for optimal esthetic results [11].

Papilla preservation between two adjacent implants is another challenge. Studies have consistently reported that the presence and height of the inter-implant papilla are influenced by the distance between implants and the underlying bone crest [12]. Tarnow et al. demonstrated that a minimum inter-implant distance of 3 mm is necessary to maintain an adequate papillary height [13]. In this case, careful implant spacing and soft tissue management contributed to favorable papilla formation and a natural-looking esthetic outcome.

Another noteworthy point is the long-term stability of the labial bone. Although guided bone regeneration (GBR) was not required in this case due to adequate ridge width, the use of narrow implants and atraumatic surgical technique helped preserve labial plate integrity. Preservation of facial bone is strongly associated with long-term esthetic success, particularly in thin biotype patients [14].

Finally, patient satisfaction is a key outcome measure in anterior implant cases. The patient in this case expressed high satisfaction in terms of esthetics, phonetics, and function, aligning with current evidence that shows patient-reported outcomes are significantly improved when implants are carefully placed and prosthetically guided [15].

Conclusion: This case demonstrates that successful rehabilitation of two adjacent missing teeth in the maxillary anterior region using dental implants is achievable with careful planning, proper implant positioning, and attention to soft tissue management. A delayed placement approach allowed for predictable healing and optimal esthetic outcomes. Maintenance of inter-implant distance and patient-specific prosthetic planning were key to the favorable results. Long-term follow-up remains essential to assess stability and esthetic durability.

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Conflict of Interest
The authors declare no conflicts of interest related to this study.

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