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Case Report

Implant Placement in the Esthetic Zone with Porcine Collagen Xenograft and Scaffold Placement: A Case Report

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Abstract: The placement of dental implants in the anterior region is a complex procedure requiring precise planning to achieve optimal aesthetic and functional outcomes. This case study presents a 20-year-old male patient who sought rehabilitation of a missing maxillary central incisor (tooth 21) lost due to trauma. After diagnosing biofilm-induced gingivitis and confirming the absence of tooth 21 through clinical and radiographic examinations, a comprehensive treatment plan was developed. The initial periodontal phase involved biofilm control and mechanical debridement, followed by a re-evaluation after two weeks, confirming improved periodontal health. The surgical phase included guided implant placement using a Straumann Bone Level Tapered implant (3.3mm x 12mm), supported by a bovine xenograft and a porcine collagen scaffold to preserve alveolar volume and enhance tissue regeneration. A provisional restoration was placed to sculpt the emergence profile over four months. The technique resulted in excellent implant stability, preserved peri-implant tissues, and achieved functional and aesthetic rehabilitation, demonstrating the feasibility and effectiveness of this approach.

Keywords: Dental implant, anterior region, guided surgery, xenograft, collagen scaffold, emergence profile, peri-implant tissues, implant stability, bone regeneration, aesthetics.

INTRODUCTION

Implant placement in the anterior maxilla presents significant challenges due to high aesthetic and functional demands (Buser, Martin, & Belser, 2004). Successful outcomes rely on careful implant selection and meticulous management of hard and soft tissues (D'haese *et al*., 2012). Previous studies have emphasized the importance of primary stability, guided surgery, and biomaterials to optimize peri-implant healing and osseointegration (Buser, Martin, & Belser, 2004; D'haese *et al*., 2012). The present case highlights the use of a Straumann Bone Level Tapered implant, a xenograft, and a collagen scaffold to facilitate bone regeneration and soft tissue integration (Testori *et al*., 2018). This approach minimizes the need for autologous grafts while ensuring predictable aesthetic results (Gomez-Meda, Esquivel, & Blatz, 2021).

EXPERIMENTAL SECTION

A 20-year-old male patient attended the periodontal clinic at the Universidad Popular Autónoma del Estado de Puebla (UPAEP) seeking replacement of his missing front tooth. A clinical and radiographic evaluation confirmed the absence of tooth 21 due to trauma and biofilm-induced gingivitis (Fig. 1, 2 and 3). Initial treatment involved a periodontal phase including oral hygiene instructions and supragingival biofilm removal. Two weeks later, a re-evaluation showed reduced probing depth and bleeding on probing, allowing for surgical intervention. The patient signed an informed consent form prior to the procedure, ensuring respect for autonomy and well-being. Additionally, this case was approached with strict professional responsibility, guaranteeing that all interventions were carried out in compliance with the highest clinical and ethical standards in dentistry."

Guided implant placement was performed using a Straumann Bone Level Tapered implant (3.3mm x 12mm). After flap design and elevation (Fig. 4), a surgical guide was placed to ensure accurate drilling. The implant was inserted (Fig. 5), and the implant was position parallel to the adjacent teeth, which was confirmed radiographically (Fig. 6 and 11). The T-base attachment was placed for provisionalization (Fig. 7). To

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maintain bone volume, a bovine xenograft was applied, complemented by a porcine collagen scaffold to support soft tissue healing (Fig. 8). The surgical site was sutured with 4-0 Teflon sutures (Fig. 9). A provisional restoration was adapted and modified with fluid resin increments to sculpt the emergence profile (Fig. 12), which was adjusted at four months post-placement (Fig. 10).

Fig. 1 Fotografía oclusal inicial

Fig. 2. Fotografía frontal inicial

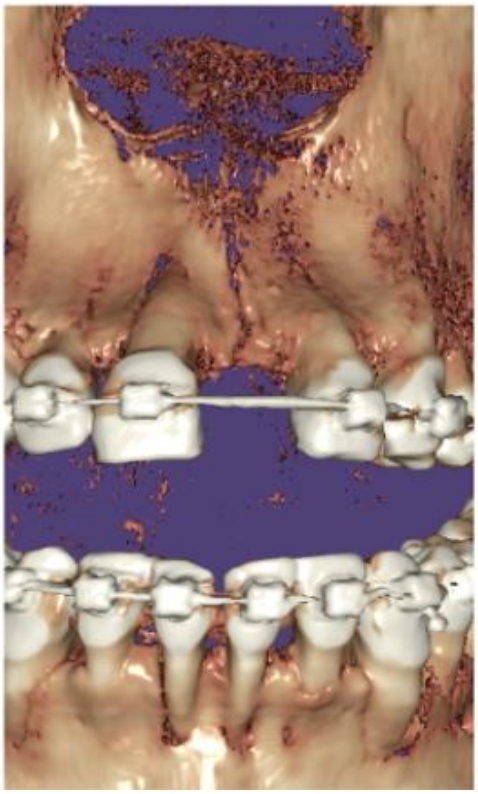

Fig. 3. Tomografía computarizada

Fig. 4 Flap design and elevation

Fig. 5 Placement of surgical guide and reducer

Fig. 6 Placement of BLT implant 12mm

Fig. 7 Placement of T-base abutment

Fig. 8 Placement of xenograft and porcine collagen scaffold

Fig. 9 Simple 4-0 Teflon sutures

Fig. 10 Replacement of the provisional restoration 4 months after implant placement

Fig. 11 Radiographic imaging.

Fig. 12 Acrylic provisional

RESULTS AND DISCUSSION

The Bone Level Tapered implant exhibited excellent primary stability and promoted favorable bone regeneration in the anterior maxilla (Degidi, Nardi, & Piattelli, 2011). Its conical design facilitated optimal force distribution in a limited space, essential for achieving both function and aesthetics (Degidi, Nardi, & Piattelli, 2011). The rough implant surface enhanced osseointegration, particularly in a post-traumatic site (Kan *et al*., 2011). The use of a xenograft supported bone regeneration, while the porcine collagen scaffold aided in soft tissue preservation, reducing the risk of flap retraction (Testori, *et al*., 2018). Non-absorbable Teflon sutures contributed to effective wound closure and primary healing (Buser, Martin, & Belser, 2004). Clinical follow-up at four months demonstrated stable peri-implant tissues and successful emergence profile formation, supporting the effectiveness of this treatment approach (Gomez-Meda, Esquivel, & Blatz, 2021).

CONCLUSION

The combination of a bone-level implant, xenograft, and collagen scaffold enabled successful rehabilitation of the anterior maxilla, ensuring bone volume preservation and soft tissue integration. This approach proved to be a viable alternative to more invasive procedures, such as autologous grafting, and facilitated a predictable aesthetic and functional outcome. The case supports the efficacy of guided implant placement with biomaterial augmentation for anterior implant rehabilitation, highlighting the importance of comprehensive treatment planning and follow-up care.

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