

Regeneration Of A Facial Defect Following Tooth Extraction In the Aesthetic Zone: A Case Presentation

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INITIAL PATIENT PRESENTATION

A 62-year-old female patient presented with hopeless dentition in the maxillary anterior region secondary to advanced periodontal involvement (Figure 1). Radiographic examination revealed advanced localized horizontal and vertical involvement (Figure 2). The patient's chief complaint was progressive migration of the maxillary anterior dentition. Due to advanced and severe loss of supporting alveolus and high aesthetic requirements of treating the maxillary anterior region, the treatment plan included a staged approach to tooth extraction and regeneration to provide an optimal restorative result, followed by implant placement in five months.

DIAGNOSIS

- Hopeless dentition maxillary anterior region, teeth Nos. 7, 8, 9 and 10 due to advanced periodontitis
- Inadequate horizontal and vertical bone to support immediate implant placement in an optimal prosthetic position without guided bone regeneration
- Adequate interincisal clearance with the opposing dentition

TREATMENT PLAN

- Fabrication of diagnostic casts, wax patterns and a surgical guide
- Removal of splinted restorations (teeth Nos. 8 and 9) and extraction of maxillary central and lateral incisors (teeth Nos. 7, 8, 9 and 10) with simultaneous guided bone augmentation
- Immediate placement of a provisional partial denture (teeth Nos. 7-10)
- Placement of two NanoTite™ Certain® Implants (4mm diameter) in five months
- Osseointegration and soft tissue maturation period
- Implant level impression four months post implant placement and placement of a provisional fixed partial denture
- Placement of a definitive prosthesis

REGENERATIVE THERAPY

Following acceptance of the treatment plan by the patient, diagnostic casts, wax patterns and a surgical guide were fabricated. On the day of surgery, the patient received local anesthesia by infiltration. The splinted crowns supported by teeth Nos. 8 and 9 were removed, followed by extraction of teeth Nos. 7-10 using atraumatic techniques to maintain the residual supporting alveolus. The socket walls were debrided of all granulosomatous tissue using hand and rotary instruments and the integrity of the socket walls was evaluated. The residual sockets revealed large horizontal and vertical osseous defects with thin apical-facial plates in the area of tooth sites Nos. 7-10.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5

A full thickness mucoperiosteal flap was elevated facially from cuspid to cuspid to expose the defect (Figure 3). The large facial defect was carefully debrided and grafted with RegenerOss™ Allograft Putty in conjunction with Endobon® Xenograft Granules, a RegenerOss Product (Figure 4). This combination of materials was chosen to optimize the strengths of the individual graft materials. The RegenerOss Allograft Putty was selected for its verified osteoinductive properties as well as for its superior handling in heme filled sites. Endobon Xenograft Granules were selected due to well-documented osteoconductive properties and a long resorption profile.

An OsseoGuard™ Resorbable Collagen Membrane was trimmed and hydrated with sterile saline for 10 minutes, then intimately positioned over the graft and under the facial soft tissue flap. Membrane stability was verified. It adapted well to the surgical site and was easily draped over the grafted site, then tucked under the flaps without the need for tacking or suturing (Figure 5). An OsseoGuard Membrane was chosen in this case due to its superior handling characteristics and longer resorption profile (six months). Extensive periosteal releasing incisions were performed on the facial soft tissue flap to yield tension-free closure (Figure 6). An immediate provisional partial denture was tried-in and adjusted and the patient was dismissed with post-operative medications and instructions.

IMPLANT PLACEMENT

Five months post extraction and grafting, the patient returned for evaluation and implant placement. Healing was uneventful. Primary closure of the membrane was maintained throughout the healing duration. The provisional partial denture was removed revealing excellent soft tissue dimension and ridge width (Figure 7). Full thickness mucoperiosteal flaps were raised displaying remnants of the OsseoGuard Membrane and the regenerated osseous ridge to support future implant placement (Figures 8 and 9). A 9mm x 2mm hard tissue core was sampled with a 2mm trephine from the newly regenerated site.

Histology: The core was sent for histologic evaluation, which revealed vital bone cells in conjunction with evidence of the incorporation of the Endobon Xenograft Granules (Figure 10). No foreign body reaction was noted.

The surgical guide was placed onto the occlusal surfaces of the adjacent dentition delineating the ideal implant position, including the apical/coronal position to yield a proper emergence profile. Preparation of the osteotomies in tooth sites Nos. 7 and 10 began with a 2mm diameter Twist Drill placed through the predetermined locations in the surgical guide. Implant position was verified with Direction Indicators (Figure 11). At the time of surgery, the bone density was determined to be Type II to Type III (according to the Lekholm & Zarb Index) therefore the subsequent and final drill was a 2.75mm diameter Twist Drill used to the full predetermined depth. Two NanoTite™ Certain® Implants (4mm diameter x 13mm length) were placed into the prepared osteotomies. Cover screws were placed (Figure 12) and the soft tissue flaps were secured with mattress sutures to ensure tension free closure. The provisional restoration was relined and replaced and the patient was dismissed with post-operative medications and instructions.



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12



Fig. 13



Fig. 14



Fig. 15

Four months post implant placement into the regenerated site, the patient returned for second stage implant uncovering. A full thickness incision bisecting to the palatal was made to apically reposition the keratinized soft tissue at the time of implant exposure. EP® Healing Abutments were placed and the soft tissue flaps were secured with interrupted sutures. A verification radiograph was taken (Figure 13). The provisional restoration was relieved and relined over the healing abutments. The patient was dismissed with instructions for oral hygiene.

RESTORATIVE TREATMENT

Six weeks post implant uncovering, the healing abutments were removed and Certain® Pick-up Implant Impression Copings were placed into the internal interfaces of the implants with audible and tactile clicks to confirm seating. A periapical verification radiograph was taken. An impression was made of the impression copings with high-viscosity polyvinylsiloxane impression material. An alginate impression was made of the opposing arch and sent to the dental laboratory along with the implant impression, occlusal record and shade selection. PreFormance® Posts consistent with the size of the teeth being replaced were chosen for use as interim abutments due to the composition—PEEK (polyetheretherketone) to promote the development of excellent soft tissue contours during healing. A provisional fixed partial denture was fabricated to allow for final soft tissue maturation and for prosthetic confirmation of phonetics and aesthetics (Figures 14 and 15). The patient will be seen by the restorative dentist for seating of the definitive abutments and restoration.

CLINICAL OVERVIEW

This clinical case presentation demonstrates a staged approach to tooth extraction and GBR, followed by implant placement in four months, due to the severity of the osseous defect. Following tooth extraction, the osseous defect was grafted with RegenerOss™ Allograft Putty in conjunction with Endobon® Xenograft Granules. The graft was covered with an OsseoGuard™ Resorbable Collagen Membrane, which was chosen in this case due to its numerous advantages, specifically for its delayed resorptive profile, which is pivotal in the regeneration of lost alveolus. Excellent ridge width and soft tissue dimension was obtained, which provided for implant placement in the aesthetic zone with optimal results. Histologic evaluation of the regenerated bone revealed vital bone cells in conjunction with evidence of the incorporation of the Endobon Xenograft Granules. This clinical case presentation is an excellent representation of utilization of the individual strengths of regenerative materials and techniques to obtain a successful clinical and biological result.

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