

Esthetic rehabilitation in patient with guided bone regeneration around dental implants: A case report.

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Abstract

Introduction: The concept of demineralized bone which is used to fill the bony voids around the implants supporting proper osseointegration plays an important role. The areas accommodating demineralized bone showed active bone remodeling.

Case description: A male patient reported to rehabilitate the upper and the lower anterior segment following a road traffic accident. The patient opted for a fixed restorative treatment. CBCT was advised and blood reports were checked. Immediate extractions of root pieces were planned in the upper and lower arches with subsequent placement of implant of proper diameter.

Discussion: Edentulous maxilla with its spongy bone becomes a tail-and-made situation for implants along with bone grafts. Using a guide for bone regeneration to build up bone deficiencies in predictable ways to regenerate enough bone volume for a dental implant to be placed correctly. These may be done simultaneously with an implant placement or in stages.

Keywords: Demineralized bone graft, esthetic reconstruction, guided bone regeneration, immediate implants, surgical guides.

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Introduction

Before placing dental implants, atrophic maxillary bone is frequently restored using bone grafting procedures. Trauma, oncological conditions, oral infections, congenital missing teeth, or the tridimensional alveolar ridge resorption process after dental extractions are the causes of maxillary bone atrophy. Large bone defects can be repaired using a variety of grafting materials, which can be either natural or synthetic. The highest rate of success is shown when using autologous grafts, and autogenous block grafts are regarded as the gold standard since they have the best osteogenic, osteoinductive, and osteoconductive qualities.^[1,2] Even though

autogenous bone grafts are still the favored reconstructive technique, demineralized bone allografts are now more frequently used in oral and maxillofacial surgery. Bone resorption is one of the main risks associated with bone transplantation. Bone augmentation treatments including a non-degradable membrane can be employed to reduce the absorption to prevent this problem.^[3] Platelet-rich fibrin can be used along with collagen membrane can be used as an agonist for proper bone healing. Growth factors including transforming growth factor 1, platelet-derived growth factor, and vascular endothelial growth factor are slowly released from the platelet-rich fibrin (PRF) membrane, improving tissue regeneration and wound healing.^[4]

Case Report:

A male patient (35 years) reported the department of prosthodontics with a chief complain of missing teeth in upper and lower anterior region (Figure 1). His primary concern was esthetics and function. Patient had a history of road traffic accident leading to fracture of the maxillary segment along with tooth fracture. Immobilization and fixation of the maxillary segment was done along with extraction of the fractured root segment. Post rehabilitation a CBCT was planned and the patient was made aware of the nitty gritty of the whole procedures including implants and bone grafts. The anatomy of bone and the vital structures were taken into consideration and implants of proper diameter and length were planned. Bone grafting using sterile bioresorbable demineralized bone matrix (OSSEOGRAFT®) (Figure 2a) along with collagen membrane (HEALIGUIDE®) (Figure 2b) and platelet-rich fibrin (PRF) was planned alongside the implants. Implant selected for the purpose of rehab was ADIN TOURAEG OS of size: three implants of dimensions (3.5x11.5, 3.5x11.5, 5x10) for maxillary segment and four implants of dimensions (3.75x13, 3.75x13, 5x10, 5x11.5) for the mandibular segment.

Alginate impressions of the maxillary and mandibular arch was made and poured with type III dental stone (Neelkanth). The casts were articulated in their maximum intercuspation position and tooth arrangement was done. Surgical guides were made of vacuum formed thermoplastic sheets. These guides would help in guiding the implants in proper orientation.

Surgical intervention:

The patient's blood was drawn from the median basilica vein using two 100 mL tubes, and the PRF was removed using a 15-minute, 2700 rpm centrifugation procedure. This was used along with the bone graft and collagen membrane to enhance the bone remodeling.

Infiltrative local anesthetic was performed with 1: 100,000 articaine tubes (Septanest) in the incisive papilla region and infraorbital region. Similarly, inferior alveolar and mental blocks were performed in the mandibular arch. Maxillary surgical guide was placed and Lindemann guiding drills were used to determine the axis of the implant placement. This guiding osteotomy helped with the further osteotomy steps. A central crestal incision was placed along with crevicular incision in the adjacent tooth. Simultaneously, a full- thickness mucoperiosteal flap was raised. The guided osteotomy points in the residual alveolar bone were increased with the successive drills until the target diameter that matched the required implant diameter. The root pieces were extracted and in the deficient socket region, xenograft was placed. With the aid of bone plugger, the material was shifted apically. The prepared sites were filled with implants and the surrounding area was covered with GBR Collagen Membrane. Cover screws were placed and the flap was approximated with 3-0 Vicryl sutures. Patient was asked to come after 10 days for suture removal and placement of lower implants. Similar steps were followed in the placement of lower implants. Bone graft was placed with surrounding collagen membrane alongside the implants. Cover screws were placed and the flap was closed. Patient was asked to come after 10 days for suture removal. Anti-inflammatories and antibiotics were prescribed for 5 days.

The patient was called back after 4 months leading to complete osseointegration of the implants. Full thickness mucoperiosteal flap as elevated and healing abutments were placed and flaps were sutured back in upper and lower arch. (Figure 3 and 4).

Prosthetic phase:

Special trays for upper and lower arch were constructed. Patient was recalled after 10 days and open tray impressions were made and

casts were poured. Jig verification was done (Figure 5). Metal trial was performed at a recorded vertical dimension of occlusion (Figure 6). Implant abutments were placed (Figure 7). Final prosthesis was tried and placed in patients mouth (Figure 8).

Discussion:

Rehabilitation with dental implants with immediate extraction and placement of implants requires a good viable bone graft which shows proper bone remodeling and structured growth around the implants. It was feasible to see in this case report that xenogeneic bone grafting combined with PRF membranes allowed the patient to be rehabilitated with osseointegrated implants since height and volume were gained. When grafting vast areas, xenogeneic bone was quite successful and produced very positive results.^[5-7] Xenogenous bones, often referred to as DBBM, are the biological material most frequently employed for bone grafting in the craniomaxillofacial region, claim Sanz et al.^[8] Its architecture and geometric structure, which are similar to those of human bone, as well as its gradual absorption capacity—an important therapeutic attribute that enables the development in bone volume—are this biomaterial's key advantages.^[9] The results of the current investigation indicate that xenogeneic bone is a good substitute for bone restoration. Because autogenous bone has the qualities of osteogenesis, osteoinduction, and osteoconduction, it is the best option for grafting treatments.^[10] This biomaterial does, however, have several drawbacks, consisting of a limited supply of bone, a high rate of resorption, bone being collected from the donor location, and greater surgical morbidity.^[11] As PRF membrane acts on soft tissue by quickening the construction process, it was employed to reduce the possibility of damage of the graft material.^[3] The present case goes by the successful use of xenograft along with collagen membrane.

Conclusion:

The present case shows the placement of implants along with xenografts and collagen membrane which undergoes guided bone regeneration for bone morphology. This leads to appreciable function and esthetics recreating the smile and enhancing the confidence of the patient. As a result of the patient's oral and mental health being enhanced by the use of osseointegrated implants, the outcome was both visually pleasing and functionally satisfying. Further research is required to determine if osseointegration in this form can be sustained over the long run.

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FIGURES



Figure 1

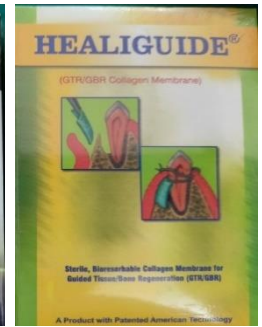


Figure 2a and b

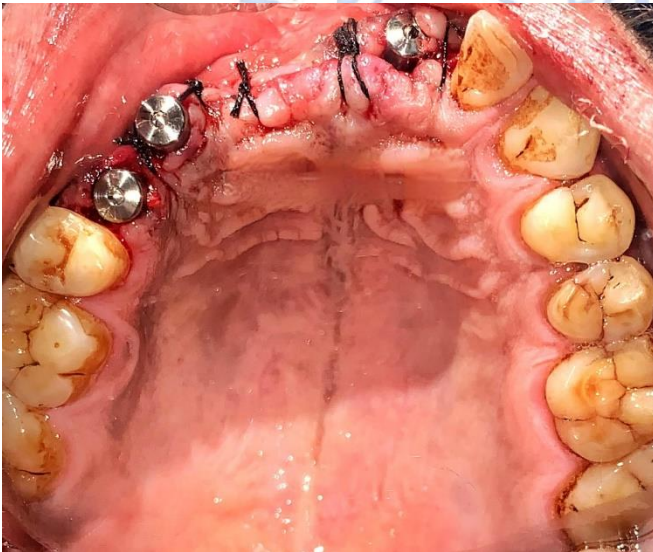


Figure 3

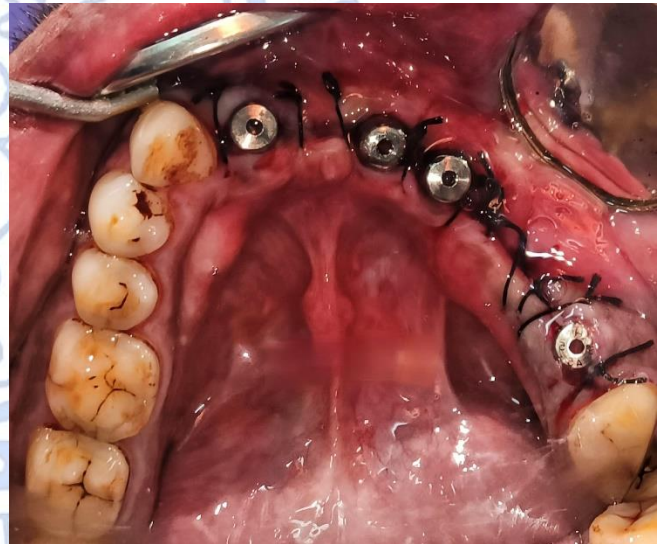


Figure 4

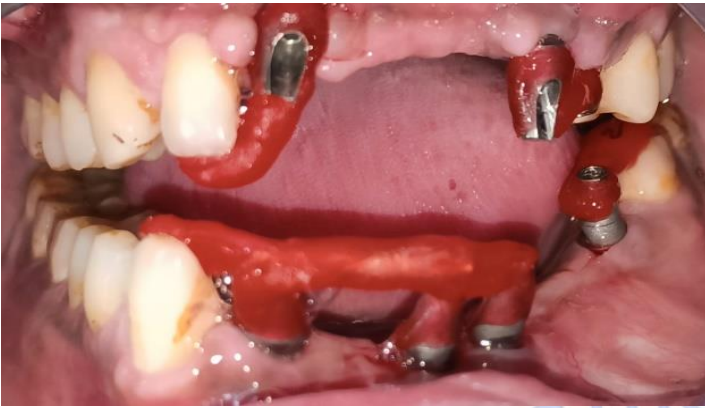


Figure 5



Figure 6



Figure 7



Figure 8