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Case Report

Horizontal Bone Grafting In Anterior Maxilla With Single Missing Teeth With Simultaneous Approach- A Case Report

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ABSTRACT:
Having an adequate bone volume is certainly an important prerequisite for a long-term implant success. Insufficient bone volume for dental implant placement in the maxillary anterior segment leads to functional and esthetic problems and can be difficult to solve. Among the various techniques developed to increase bone volume, GBR and the use of bone grafting materials or combination of these two methods are reported as providing the best and the most predictable results. Treatment planning and precise scheduling of tooth extraction and implant placement are important issues to reduce healing periods, morbidity of the patient, and to create the fewest number of surgical interventions. The purpose of the case report is to describe the simultaneous technique along with implant placement with the help of bone graft and resorbable membrane and its reliable esthetic outcomes for single missing teeth.
Key words: Horizontal, Grafting

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INTRODUCTION

Insufficient bone volume for dental implant placement in the maxillary anterior segment leads to functional and esthetic problems and can be difficult to solve[1].Several surgical techniques have been described in the last four decades regarding reconstruction of deficient alveolar bone for supporting dental implants, eg, particulate graft augmentation, block graft augmentation, ridge splitting or ridge expansion, and distraction osteogenesis. Materials used for the reconstruction of alveolar bone include autogenous bone, allogeneic bone, xenografts, alloplasts, bone promoting proteins, barrier membranes, titanium meshes and foils, fixation screws, pins and plates, and bone transportation devices[2].

Anterior maxilla commonly exhibit a thin labial bone plate, which mainly consists of bundle bone and thus results in more horizontal ridge deficiency than vertical that requires horizontal bone augmentation[5].Alveolar ridge rebuilding can be undertaken at different time points during treatment, and generally categorized as simultaneous or staged. In the staged approach, the alveolar bone is first reconstructed in an initial surgery, and implant placement is then carried out 2 to 6 months later[3].In contrast, in the simultaneous approach, implant placement and alveolar ridge reestablishment are undertaken in the same surgery[4].The simultaneous approach is obviously the preferred technique by the patient and clinician alike, since it reduces treatment time and cost. This case report describes the simultaneous technique along with implant placement with the help of bone graft and resorbable membrane.

CASE REPORT

A 24-year-old healthy man was referred for implant placement in the maxillary central incisor. The patient reported a history of trauma and inadequate endodontic treatments leading to the

loss of the anterior tooth (Figs. 1 and 2). The cone-beam reveals at the implant site horizontal bone resorption, the width of the alveolar ridge was less than 5 mm (class H-m according to Wang HVC classification [2002]) (Fig. 3,4 & 5). Therefore, we decided to perform horizontal bone augmentation with simultaneous approach along with implant implacement .A full thickness flap was raised and one implant 3.3mm*11mm (equinox, Myriad implant, Straumann India)was placed.During implant osteotomy preparation, significant resistance was noted, the implant was then inserted with a primary stability of 50 N/cm.In order to compensate for the less amount of regenerative bone, granules ofbovine derived xenograft (Bio-Oss ,Geistlich,Switzerland) were placed on buccal side of implant, covered by awith resorbable , non-friable barrier membrane (GTR Biodegradable membrane, Cologuide).The flaps were sutured and primary closure, with no tension, was obtained.The wound was closed using a buccal mucoperiosteal flap coronally repositioned (Figs. 6–9).The postoperative care includes use of antibiotic (amoxicillin 500 mg orally 3 times daily for 7 days) and an analgesic. Patient was instructed to rinse with chlorhexidine 0.12% twice daily for 2 weeks. Sutures were removed 10 days after surgery.At 6 months of healing, the augmented site was reopened using a crestal incision. Implant site preparation revealed a regenerated hard tissue clinically consistent with alveolar bone. Once it is fully exposed ,we undertake the second time surgery and an adequate healing abutment was screwed. Then, a definitive ceramometal crown was completed with periodical clinical maintenance.In this case, there were no clinical signs of inflammation or infection. This exposure did not affect the successful regenerative outcomes. He came in for weekly appointments for bacterialplaque control and to verify the status of the clinical healing.The postoperative follow-up revealed that the implant was stable with excellent osseointegration and the buccal depression of the surgical area was reconstructed (Figs. 10&11).

DISCUSSION

Having an adequate bone volume is certainly an important prerequisite for a long-term implant success. Long-term results are directly related to occlusal loads exerted by the final prosthesis. Overloading can lead to biological and/or mechanical complications. A force applied along the axis of an implant will be distributed around the implant, and the supporting bone will have a high load-bearing capacity. However, in the anterior maxillary area, the forces applied have a significant transverse direction resulting in a bending moment that can be detrimental to both implant and supporting tissues[14,15]. Among the various techniques developed to increase bone volume, GBR and the use of bone grafting materials or combination of these two methods are reported as providing the best and the most predictable results.

Figure 1 & 2: Preoperative photographs

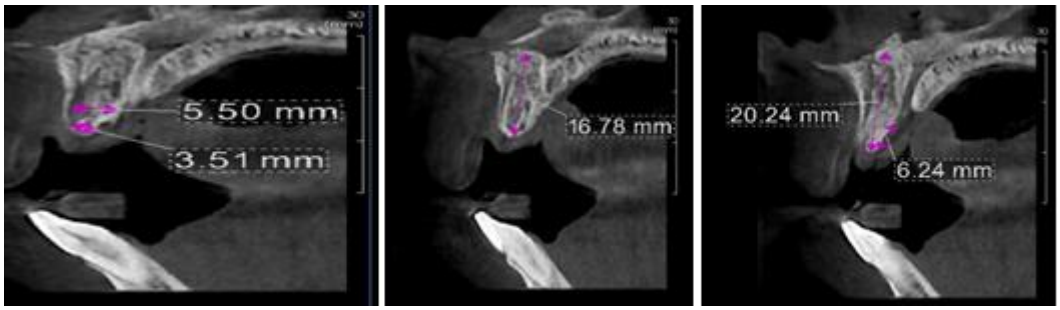

Figure 3, 4 & 5: Preoperative CBCT

Figure 6 & 7: Implant placement with IOPAR

Figure 8 & 9: Graft placed with resorbable membrane

Figure 10 & 11: Postoperative photographs

Many factors contribute to successful GBR outcomes. Barriers membranes must fulfill a certain design criteria as described by Scantlebury such as biocompatibility, space making, cell occlusiveness, tissue integration and clinical manageability. Barriers membranes are grouped as resorbable and non-resorbable membranes[6].Rigid non-resorbable membranes provide essential space maintenance and graft stability for neovascularation to take place. A titanium or titanium-reinforced mebrance can provide this vertically. The risk of perforation however is as high as 50 %. Titanium-reinforced dPTFE membranes may overcome this since the material does not support microbial colonization.Resorbable membranes are unreliable, have variable resorbability, and do not support the bone material long enough for graft incorporation to adequately take place. The addition of tenting screws is also inadequate to provide long-term support. Resorbable membranes should not be used for vertical augmentation or when augmenting both width and height[6].

The simultaneous approach is obviously the preferred technique by the patient and clinician alike, since it reduces treatment time and cost.However, if the residual bone volume precludes primary implant stability, or results in inadequate prosthodontic implant positioning, the staged approach is recommended. In the anterior maxilla (esthetic zone), a third component must be considered in the treatment decision process: the esthetic expectations of the patient and his/her esthetic profile (level of smile line, gingival biotype, soft tissue deficit, size of edentulous gap, and bone level at adjacent teeth).Treatment planning and precise scheduling of tooth extraction and implant placement are important issues to reduce healing periods, morbidity of the patient, and to create the fewest number of surgical interventions.

GBR with a barrier membrane equips the clinician with a variety of materials and techniques, yet vertical augmentation, space maintenance, graft stability, and so forth remain a challenge to these methods and are less favorable. But are favorable for horizontal augmentation.The less invasive principle of guided bone regeneration also resulted in a promising horizontal (4–5 mm) and vertical (2–7 mm) bone

gain,[7-9] however, it was frequently associated with wound dehiscence and premature membrane exposures, thus compromising the clinical results[10,11] .For most of techniques, autogenous bone is still considered to be the gold standard grafting material, mainly due to its osteogenic, osteoinductive, and osteoconductive properties[12].However, some potential drawbacks are related to its available quantity at specific intraoral donor sites, anincreased morbidity, and patient discomfort[10,13].In addition, a potential clinical drawback of autogenous bone is related to graft resorption, which was particularly pronounced for cancellous bone, ranging between 12 and 60% (1–5 years) postloading of implants[10].

CONCLUSION

The use of resorbable barrier membrane with bovine bone graft might be a reliable technique for horizontalalveolar ridge reconstruction with simultaneous approach,if proper implant stability and prosthodontics positioning is obtained. It decrease the treatment time and cost. This approach achieves goodfinal esthetic outcome of the implant-supported restoration.

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