

⁷ Bone grafting to support esthetics is key in this prominent area as the underlying ridge must support both the implant restoration and the soft tissue to achieve a long-lasting, esthetic result. Lateral¹ ridge augmentation is the challenge in bone construction. Relevant lateral defects of alveolar ridge may render the use of dental implants unfavorable. Severe alveolar bone resorption can occur after tooth removal.⁸ Treatment using the placement of dental implants requires bone height and width. When



A 24-year-old male patient reported to the dental office



Fig 1 Defect prior to intervention

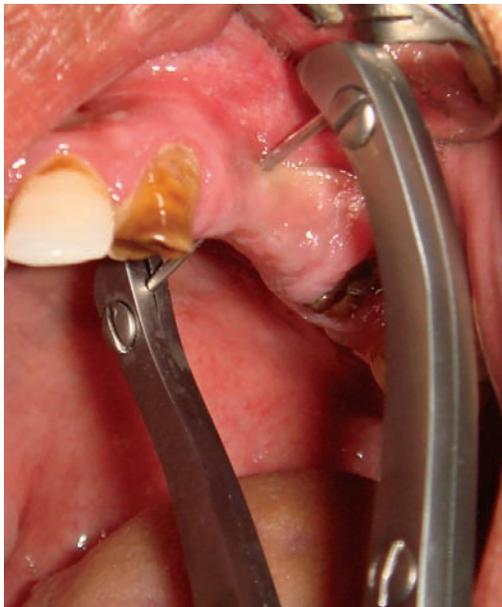


Fig 2 Use of bone gauge for measuring the bone defect

Implants were discussed in detail and the patient opted for the same. Medical history of the patient did not reveal any significant systemic conditions which would interfere with the operative procedure.



The patient received antibiotic prophylaxis (amoxicillin and clavulanic acid, 1 gm every 8 hours, starting 1 day preoperatively) in association with 0.2% chlorhexidine gluconate mouth rinse every 12 hours, starting 1 day preoperatively for 7 days).

Local anesthesia was combined with a sedative pre-medication (diazepam, 5 mg administered orally 30 minutes before surgery). A full thickness incision was made within

the keratinized gingiva from the distal aspect of #23. The incision was extended intrasulcularly and anteriorly to #27. Vertical releasing incisions were made at the mesiobuccal line angle of the second to last existing tooth and at the distal aspect of the crestal incision. The buccal and lingual flaps were reflected with a back action chisel, JO 1 (Hu Friedy, CH, USA), avoiding damage to the anatomic structures. Tooth number 23 and 26 were extracted and once exposed, the cortical bone was curetted with a back-action chisel to remove all residual connective tissue and the periosteum. Bone was obtained from chin area using Trepphine burs (Meisenger, Germany Fig. 3) and was mixed with , Frioss Algipore (Friadent GmbH) in a bone mill.

Decortications of the ridge was performed to activate the regional acceleratory phenomenon.

The bone was placed laterally over the defect and was stabilized by placing titanium membrane Osseoshield (Friadent, GmbH) by means of membrane tacks, Auto Tac (Biohorizons, AL, USA). Flaps were sutured with a combination of horizontal mattress and simple interrupted sutures using 3-0 cytoplast suture (Osteogenics Biomedical, TX, USA).

The patient was instructed to use chlorhexidine mouthwash 0.12% twice a day for a month. He was also instructed to avoid brushing and trauma to the surgical site. Analgesic Diclomol (Win Medicare India) three times a day for 5 days was prescribed to the patient. Sutures were removed after 2 weeks, and then postsurgery appointments were at 4, 6, 8 and 12 weeks for evaluation of healing.

The site was re-entered for implant placement 5 months after the ridge augmentation. A midcrestal incision was made



Fig 3 Trepphine harvest of chin graft

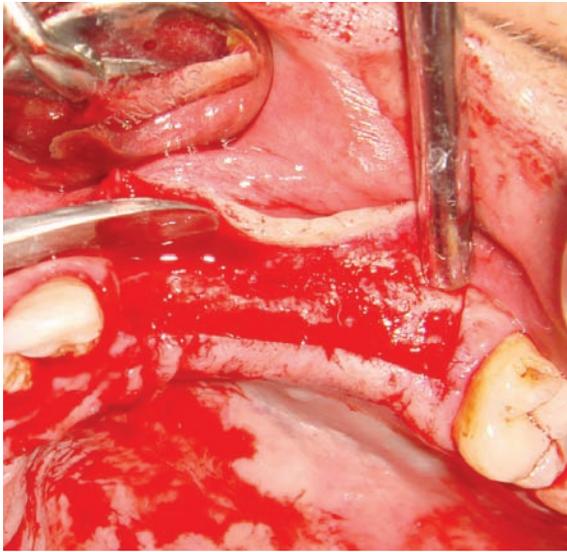


Fig 4 Re-entry surgery for placement at 5 months



Fig 5 Implant placement

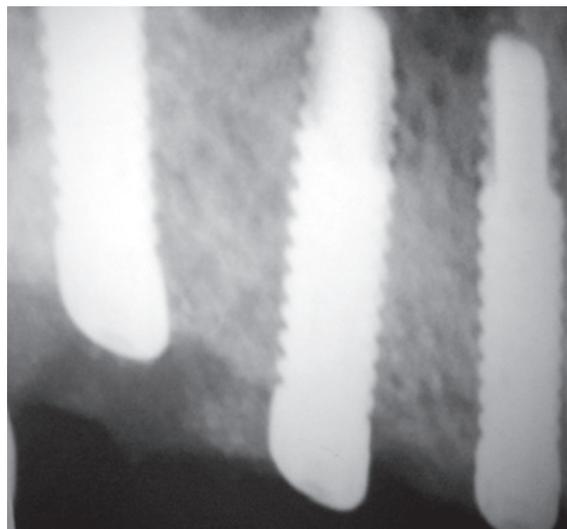


Fig 6 X-ray at implant placement

and 2 vertical releasing incision were given and a full-thickness flaps were elevated to allow measurement of bone augmentation site. The titanium membrane was removed at this stage (Fig. 4).

The autograft and alloplast showed minimal resorption and bone width of 6 mm was achieved. Using a surgical stent, 3 Biohorizons external implants (AL, USA) of diameters 3.5 mm and length 12 mm were placed as per conventional surgical protocol (Fig. 5). The X-ray image at implant placement shows correct equidistant placement of implants (Fig. 6).

The patient returned at 2, 4, 6, and 8 weeks of post-surgery healing.

Due to soft tissue recession and cover screw exposure (Fig. 7), a 4 mm tissue punch (Stoma, Germany) was used at the palate 4 mm away from the implants to remove tissue at each implant site (Fig. 8). A partial thickness flap was elevated and advanced buccally (Figs 9 and 10). The healing collars were placed (Fig. 11) and the site was sutured with a combination of 3-0 Cytoplast (Osteogenics Biomedical, TX, USA) and 3-0 chromic Gut (Ethicon, Johnson and Johnson, India) (Fig. 12).

After 3 weeks impressions were recorded in a closed tray technique using PVS material (Honigum, DMG), a cement retained PFM prosthesis was delivered (Fig. 13).

The final radiograph at 3 years postoperative shows minimal crestal bone loss (Fig. 14).

During the 5 months healing period after placement of the autograft and allograft, no membrane exposure or infection of the site was seen. On re-entry for implant placement, the Osseoshield was found to be intact and it completely covered the graft.

At re-entry for PME placement, the implants were integrated as they produced typical “ring”⁷ when tapped with a mirror handle. The implants were restored with a cement retained PFM bridge. As of this report, implants placed into this augmented site have been in function over 36 months, with no complications.

The present clinical case help us to evaluate whether this technique for horizontal bone regeneration using

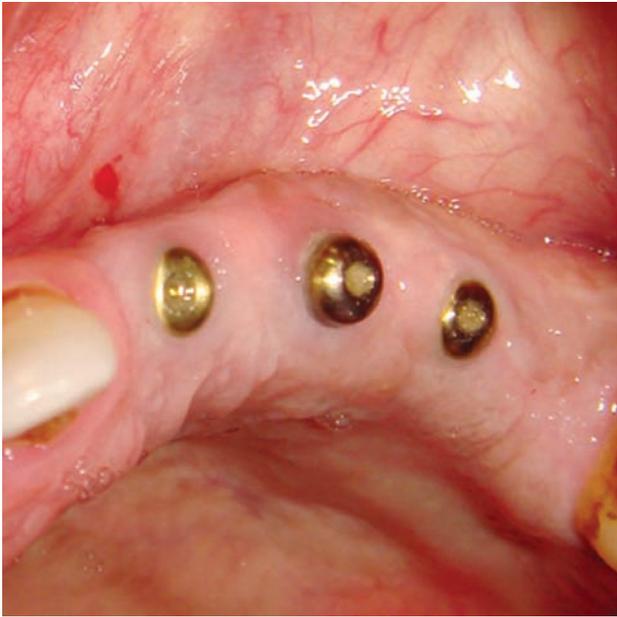


Fig 7 Five months postoperative healing

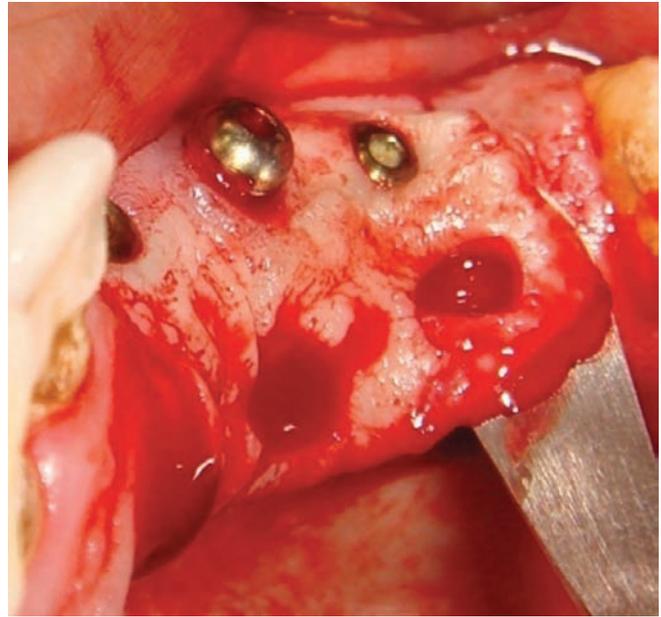


Fig 9 Elevation of palatal flap

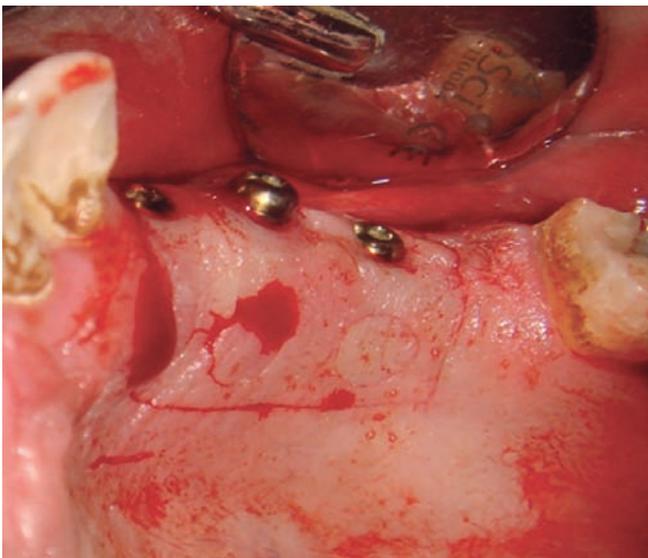


Fig 8 Use of tissue punch palatally

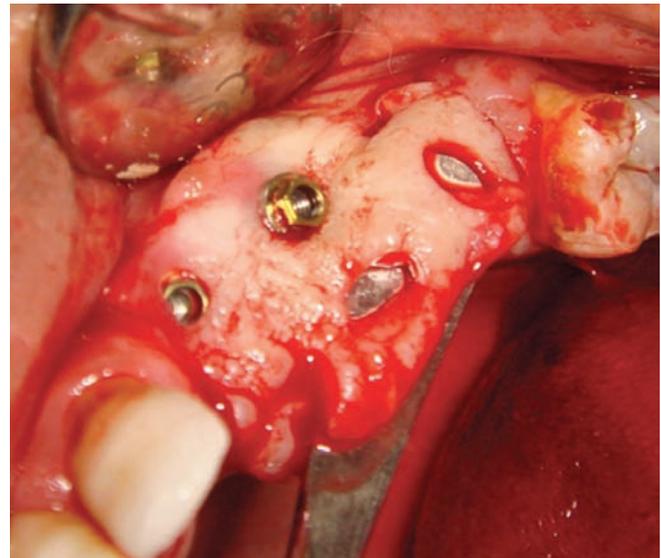


Fig 10 Completion of flap elevation

combinations of particulated autogenous bone graft (chin graft) and alloplast (Algipore-Friadent, Gmbh) graft which are covered by titanium reinforced membrane (Osseoshield-Friadent, Gmbh) could offer some advantage in lateral ridge augmentation.

Labial ridge deformity can be more severe if there is damage to the buccal plate during tooth removal. Bone

resorption activity continues throughout the life, as a result it is anticipated that many patients with tooth loss will have varying degrees of alveolar ridge resorption. This resorption can lead to compromise in the position of the implant fixture. In addition, the importance of having adequate labial bone thickness around implants cannot be underestimated. Particulate bone graft may be better alternative, because it

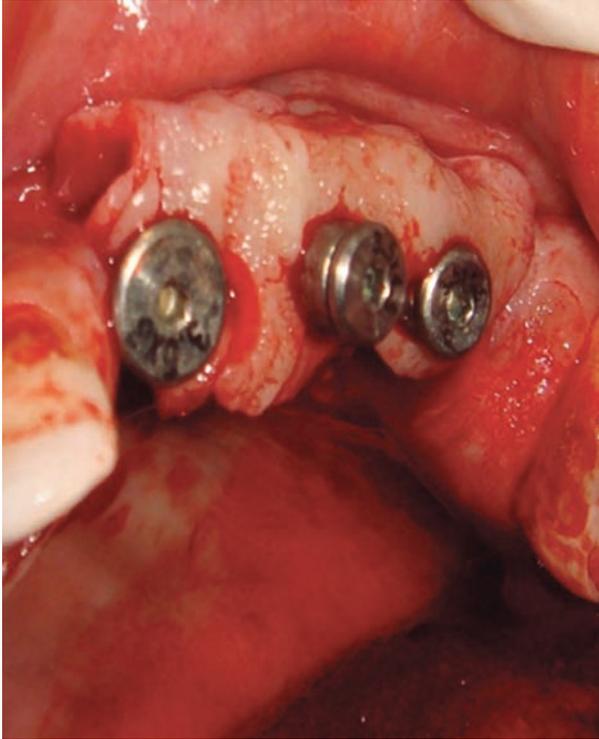


Fig 1 Flap rolled buccally and healing collars/pme's placed



Fig 3 Final clinical view

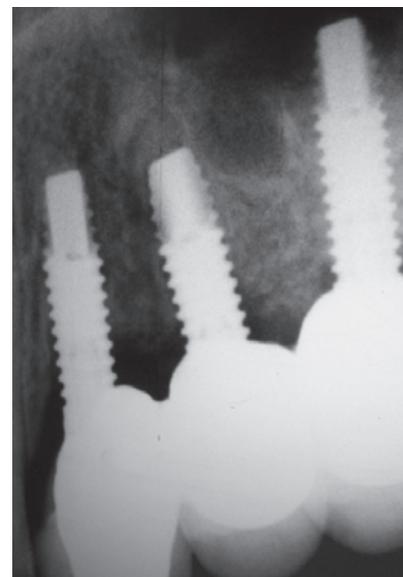


Fig 4 Radiograph at 3 years

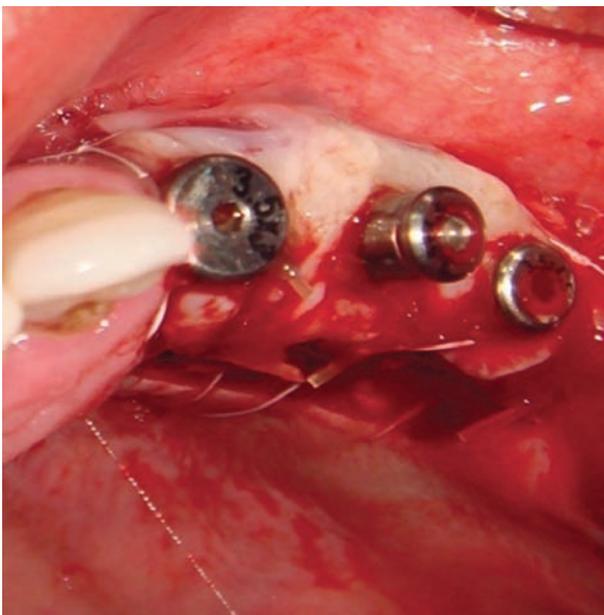


Fig 2 Sutured flap

treats the underlying bone defect to restore the natural support of the tissue architecture. The result in this case report suggest that particulated autograft can be combined with allograft under a regenerative membrane for significant

lateral ridge augmentation. Studies have reported bone resorption approximately 7 times greater without a membrane than with a barrier membrane over autograft and allograft.¹⁴ The presence of intact osseous shield (titanium membrane) suggests that this type of membrane can stay intact for a much longer period of time. This longevity aids in prevention of resorption of allograft and maximize the resulting volume of newly formed bone. There are significant differences in the healing process of autogenous cortical versus autogenous cancellous grafts.¹⁵ Cancellous bone revascularizes faster and is strengthened first by creeping substitution; whereas cortical grafts revascularizes slower and remain a mixture of necrotic and living bone for prolonged period of time. There are also important differences in mechanical strength from the repair process.

Cancellous grafts are strengthened during the repair process, whereas cortical grafts are weakened during repair.¹⁶

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This clinical report suggests that lateral ridge augmentation with autograft, allograft and titanium membrane is predictable and can lead to long-term success. Particulate onlay grafts can be used to convert unhealthy and unesthetic gingival contours into favorable sites. Cancellous grafts are strengthened during the repair process, whereas cortical grafts are weakened during repair.⁶ In reviewing the various techniques used to develop the implant site at the buccal aspect of the ridge, this technique made implant insertion possible and improved implant esthetics too. Correction of labial defects is just one of the many factors leading to excellent esthetic results. Just as important are treatment planning and case selection, correct implant placement, proper abutment selection and esthetic fabrication of the final crown. A longer follow-up is needed to evaluate the long-term stability of this grafting technique described.

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