

CASE REPORT

# Management of Failed Implant Site with Symphyseal Graft in Combination with Xenograft and 4-year Follow-up Post-reimplantation

<sup>1</sup>Lanka Mahesh, <sup>2</sup>Manesh Lahori, <sup>3</sup>TV Narayan, <sup>1</sup>Sagrika Shukla

<sup>1</sup>Private Practice, New Delhi, India

<sup>2</sup>Professor, Department of Prosthodontics, KD Dental College, Mathura, Uttar Pradesh, India

<sup>3</sup>Professor and Head, Department of Oral Pathology, The Oxford Dental College, Hospital and Research Center, Bengaluru Karnataka, India

**Correspondence:** Lanka Mahesh, Private Practice, The Dental Centre, S-382, Panshila Park, New Delhi-17, India  
e-mail: [drlanka.mahesh@gmail.com](mailto:drlanka.mahesh@gmail.com)

## Abstract

Implant failure results in a considerable bony defect, often requiring multistaged treatment for achieving optimal hard and soft tissue volumes prior to reimplantation. Fresh autogenous cancellous bone is ideal for secondary alveolar cleft bone grafting, for such defects, because it supplies living, immunocompatible bony cells that integrate fully with the maxilla and are essential for osteogenesis. When combined with a slowly resorbing particulate graft like a xenograft, a stable platform for implant placement can be expected.

**Keywords:** Implant failure, Symphyseal graft, Xenograft.

## INTRODUCTION

Currently implants in dentistry have become a successful treatment option for replacement of missing teeth or tooth, however, sufficient width and height of maxillary or mandibular alveolar ridge is must for implant placement. Implants should have primary stability in a position appropriate for prosthodontic rehabilitation.<sup>1</sup> If primary stability or appropriate positioning cannot be achieved, ridge augmentation is recommended before implantation.<sup>1,2</sup>

Alveolar defects can arise due to a variety of reasons, such as, extraction, infection, trauma, or aplasia or failure of implant as with this case. Reconstruction of osseous defects can be done with a variety of grafting materials. Fresh autogenous cancellous bone is ideal because it supplies living, immunocompatible bony cells that integrate fully with the maxilla and are essential for osteogenesis because of its osteoinductive and osteoconductive properties.<sup>3</sup> Though it has some disadvantages like second surgical site, unpredictable resorption of the graft and donor site morbidity, it is still considered the gold standard for grafting of oral and maxillofacial region.<sup>3-5</sup>

There are various donor sites available for correction of osseous defects, the most commonly used include ilium,

rib, calvarium, tibia, maxilla, and the mandible.<sup>3</sup> There is experimental evidence suggesting intramembranous bone grafts undergo less resorption than endochondral grafts when used in an Onlay technique.<sup>3</sup> Koole<sup>3</sup> proposed that the volume maintenance of mandibular symphyseal bone grafts is related to a more rapid revascularization, which enhances early healing. This phenomenon may be explained due to similar embryonic origin (ectomesenchyme) of the donor and recipient sites. Multiple hypotheses have been offered to clarify this healing procedure, but further studies are needed for better understanding, if any, in the physiology of endochondral and intramembranous bone grafting.<sup>3</sup> Gerry M Raghoobar,<sup>1</sup> in his study showed negligible resorption of mandibular grafts (mean, 5%; range, 0 to 10%), when used for maxillary ridge augmentation, and also the grafted mandibular bone showed a greater density than the surrounding bone.

Advantages of mandibular symphysis graft include restriction to one intraoral site of operation, a shorter stay in hospital, minimal pain or discomfort, and an invisible scar in the lower labial sulcus.<sup>6</sup> The major disadvantage with symphyseal bone is the limited volume available because of permanent dentition, thus it is not suitable for larger defects.<sup>6</sup>

## CASE REPORT

A 26-year-old male patient reported to dental office with a history of previous implant surgery and acute pain. Intraoral examination showed an unesthetic partial denture and pus discharge in the region of 11 (Fig. 1). Radiographic examination revealed a large osseous defect around a failing implant in the 11 regions (Fig. 2).

The patient did not have any systemic or local contraindications to bone grafting surgery.

Under local anesthesia, a trapezoidal mucoperiosteal flap was raised to expose the failed implant and the implant removed to reveal a large 3-dimensional bony defect (Fig. 3). After thorough debridement of the defect, the soft tissue was assessed to ascertain if tension free primary closure could be achieved after grafting procedure. Having found soft tissue to be adequate in quality and quantity, the grafting procedure was undertaken.

The defect was filled with a particulate bovine xenograft Bio-Oss (Geistlich) mixed with blood.

A second mucoperiosteal flap was raised in the mandibular symphysis region and a corticocancellous autograft was harvested (Figs 4 and 5). The bone was trimmed to fit the defect and fixated using titanium microscrews (Bone fixation kit, Biohorizons, AL, USA). All dead spaces were further filled with Bio-Oss (Fig. 6), the grafted area was covered with a Memlok membrane (Biohorizons, AL, USA). Soft tissue closure was achieved with 3-0 cytoplast sutures (Osteogenics Biomedical, TX, USA).

The immediate (Fig. 7) and late postoperative periods were uneventful and devoid of complications 4 months after grafting (Fig. 8), volume rendering CT scan (Fig. 9) of the surgical site showed excellent consolidation of graft material by the host body. Upon re-entry (Fig. 10) a rich vascular supply and sufficient volume for implant insertion was noted. Only one of the fixation screws was removed, the other left *in situ* since it was away from the path of insertion of the implant.

A 4.8/12 mm Biohorizons tapered Laser Lok Internal Implant was placed (Figs 11 to 13) and restored after 4 months with a PFM crown with a midline diastema as per patient's desire (Fig. 14). 36 months after insertion, implant is in function with no reported complications.

## DISCUSSION

Implant failure etiology is multifactorial. Proper case analysis is very important before implant placement. But failure does not indicate that an implant cannot be placed



Fig. 1: Preoperative view



Fig. 2: IOPA of failing implant with large osseous defect

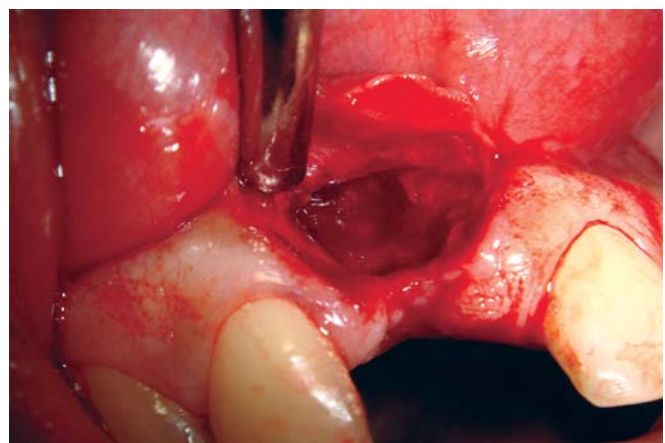
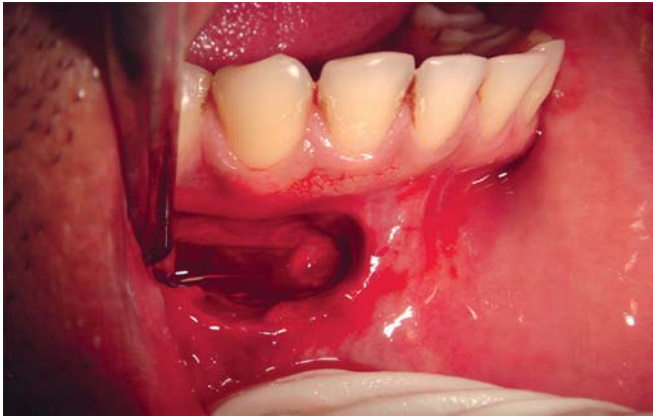


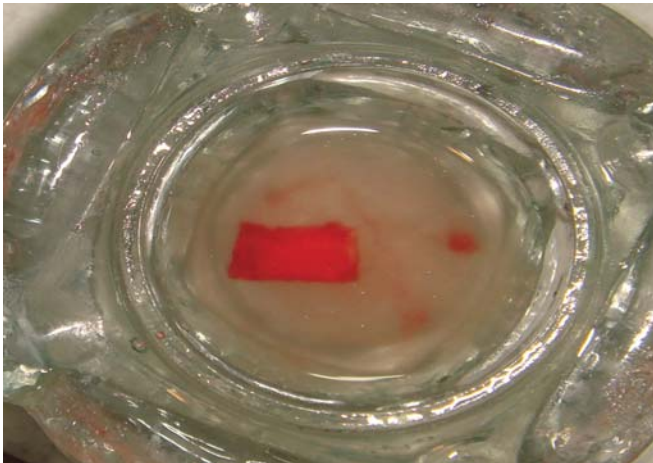
Fig. 3: Three-dimensional osseous defect



**Fig. 4:** Chin graft harvested



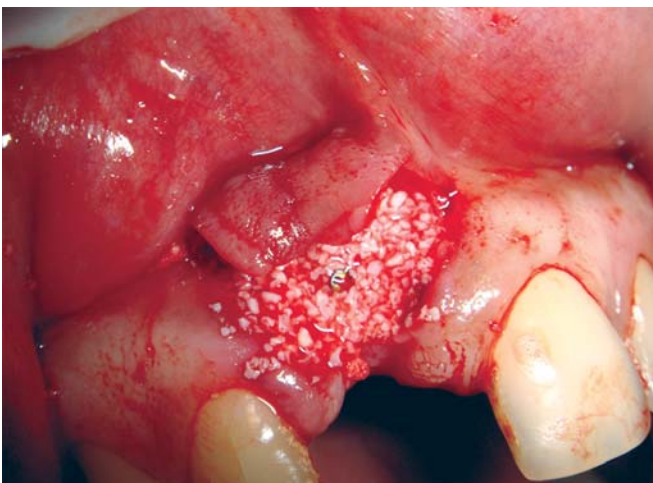
**Fig. 7:** IOPA, immediate postoperative



**Fig. 5:** Harvested graft



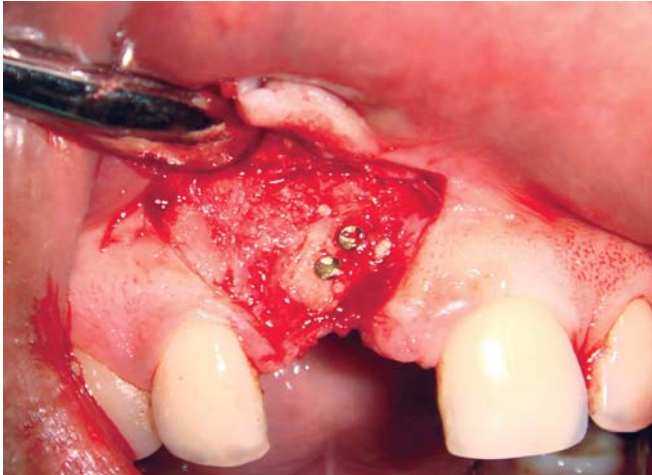
**Fig. 8:** Intraoral view four months postgrafting



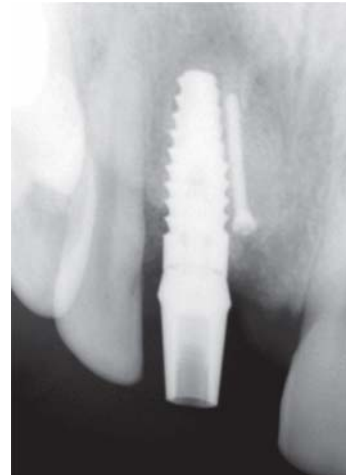
**Fig. 6:** Bio-Oss and autogenous graft bone placed, retained with titanium microscrews



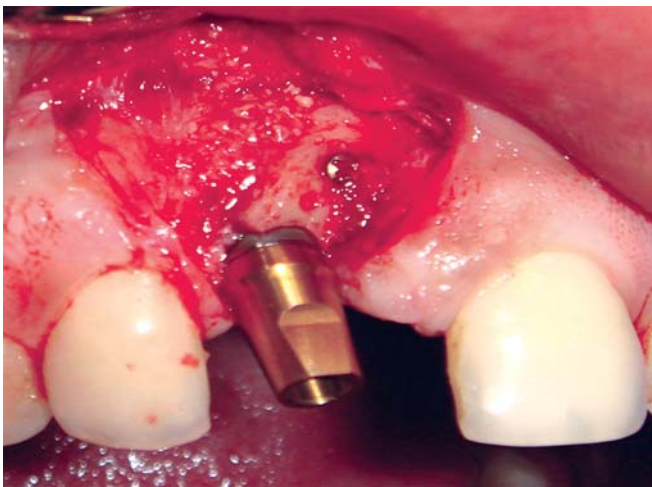
**Fig. 9:** Volume rendering 4 months postoperative



**Fig. 10:** Graft site shows rich vascularization, indicating excellent graft uptake



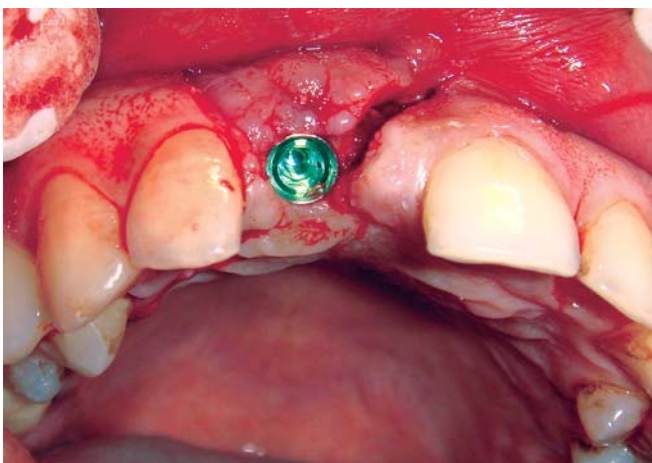
**Fig. 13:** Postoperative IOPA X-ray



**Fig. 11:** Implant placement



**Fig. 14:** Retracted view of single crown



**Fig. 12:** Incisal view of implant position

at the same intraoral site again. Human bone has a life saving tendency to regenerate itself, but huge defects like that of this case require help in the form of bone grafting. Autogenous bone grafting has its own limitations, and large pieces cannot be harvested due to permanent important structures around it, but if the harvested piece can fill the osseous defect, it is the best method and option available for ridge augmentation.

The patient had a large 3-dimensional osseous defect, with only the palatal wall intact. For such cases, it is important to fill the defect, which was done with Xenograft and over that harvested autogenous chin graft was placed.

Bio-Oss is a stable, slow resorbing matrix structure, resembling human bone.

Criteria for graft selection include:<sup>7</sup>

1. The ability to produce bone by cellular proliferation from viable transplanted osteoblasts or by osteoconduction of cells along the graft's surface.
2. The ability to produce bone by osteoinduction of recruited mesenchymal cells.
3. Remodeling of the initially formed bone into mature lamellar bone.
4. Maintenance of the mature bone overtime without loss through function.
5. The ability to stabilize implants when placed simultaneously with the graft.
6. Low-risk of infection.
7. Ease of availability.

A Symphyseal chin graft fulfills this criteria and is suitable for grafting small to moderate osseous defects with good results. The stages involved with bone graft healing include the natural processes of inflammation and cell proliferation, both of which are stimulated by the surgical procedure and the nature of the graft, and also provide the growth factors necessary for inducement of cells to develop into osteoblasts, and it also accelerates the bone production sequence.<sup>7</sup>

## CONCLUSION

Large localized osseous defects can be successfully grafted with a combination of xenografts and autogenous chin bone grafting as an onlay graft, in the maxillary anterior zone followed by implant placement with predictable results.

## REFERENCES

1. Gerry M Raghoobar, Rutger HK, Batenburg, et al. Augmentation of Localized Defects of the Anterior Maxillary Ridge With autogenous bone before insertion of implants. *J Oral Maxillofac Surg* 1996;54:1180-85.
2. Buser D, BrLgger U, Lang NP, et al. Regeneration and enlargement of jaw bone using guided tissue regeneration. *Clin Oral Implant Res* 1990;1:22.
3. Andre Montazem, David V Valauri, Hugo St-Hilaire, et al. J Oral Maxillofac Surg the Mandibular Symphysis as a Donor Site in Maxillofacial Bone Grafting: A Quantitative Anatomic Study 2000;58:1368-71.
4. Rolf Ewers. Maxilla sinus grafting with marina algae derived bone forming material: A clinical report of long-term result. *J Oral Maxillofac Surg* 2005;63:1712-23.
5. Tiwana PS, Kushner GM, Haug RH. Maxillary sinus augmentation. *Dent Clin N Am* 2006;50:409-24.
6. Secondary Alveolar Bone Grafting: The Dilemma of Donor Site Selection and Morbidity. *British Journal of Oral and Maxillofacial Surgery* 2008;46:665-70.
7. Michael S Block, John N Kent. Sinus Augmentation for Dental Implants: The use of autogenous bone. *J Oral Maxillofac Surg* 1997;55:1281-86.