



## **Restoring implant bed alveolar defect with autologous bone graft taken from the patient's chin: a case report for the surgical procedure**

**Dr. Wael Sheet Shallawi. B.D.S, F.I.B.M.S (M.F.)**

**Dr. Rasha F. Albanna. B.D.S., M.Sc.**

### **Abstract**

Alveolar bony defects represent one of the most common problems that face oral surgeons who practice dental implant placement. This case report describes a modification of a recent technique that aims to restore a bony defect in the implant site using a cylindrical bone block autograft taken from the patient's own chin; then to make both clinical and radiographic evaluation of the prognosis periodically over six months postoperatively. The technique was found to be effective and successful as a treatment option to restore implant site bony defects.

**Keywords: Alveolar bone defects, implant bed, autograft, chin**

### **Introduction**

Loss of teeth and their supporting bone due to trauma or periodontal disease can possibly lead to defects in alveolar bone after healing. With the increase of population health requirements, methods to replace, restore or regenerate lost bone have become an essential clinical necessity in dental and maxillofacial surgeries. Although bone is regarded as a dynamic tissue with high capacity to heal; its defects; especially if large, can be really very challenging to the practitioner surgeons<sup>[1, 2, 3, 4]</sup>.

In dental Implant practice, it is crucial to have sufficient bone volume (height and width) in order to gain good primary stability and appropriate implant position for prosthetic replacement. The choice of defect management varies according to the size, location, biological and mechanical nature of the local

environment at the site of bone loss<sup>[3, 5]</sup>. Bone grafting is considered in relatively large defects in order to fill gaps and improve the biological repair of the defected area<sup>[3]</sup>. Bone graft is the second commonly transplanted tissue in the body. About 2.2 million bone grafting procedures are performed worldwide each year. In a statistical review, an estimated 96,000 of those grafts are related to the oro-facial region<sup>[6, 7]</sup>.

Bone graft types usually include autografts, allografts, xenografts, synthetic substitutes, and most recently the tissue engineered bone. Each of those types has its own advantages and disadvantages; however, autograft is still considered as the golden key for bone replacement. Donor sites for harvesting autograft in oro-facial reconstruction can be either extra oral as iliac crest, tibia and fibula, or can be

intra oral including symphysis, maxillary tuberosity and mandibular ramus<sup>[3, 8, 9]</sup>. This case report aims to demonstrate a modification of a recent technique that uses an autograft taken from symphysis with an implant installed within it to restore an anterior maxillary lost tooth with bony alveolar defect in one stage procedure.

### Case Report:

A 35 years old male patient attended to Dental Implant Unit at Dept. of Oral and Maxillofacial Surgery/ Mosul Dental College/ Iraq complaining of missing upper left central incisor seeking for implant placement. History of the case revealed that the patient had a traumatic accident during athletic activity five years ago; as a consequence, the patient lost his tooth along with a piece of supporting alveolar bone. The patient had two previous failed surgeries in an attempt to replace the missing bone by synthetic bone substitute; finally he restored the missing tooth by fixed bridge which had poor esthetics and faulty design. Now he intended to replace it by having dental implant.

The patient was medically fit, had a high educational background, good oral hygiene, showed good cooperation and motivation which made him a perfect candidate for implant placement.

After removing the fixed bridge, clinical intraoral examination for the site of injury showed bony depression defect buccal to the missing tooth. Preoperative panoramic radiograph showed enough vertical height in the defect area away from the nasal floor (Figure 1).

Before surgery, the patient was instructed to rinse his mouth with 0.2% chlorhexidin mouthwash. After local anesthesia was secured for the left maxillary anterior region and the

anterior part of chin bone, the surgical procedure started by raising a three sided flap to expose the maxillary defected area (Figure 2). A toilette for the implant bed was done by curettage and irrigation to remove the remnants of the previously applied alloplastic graft particles. Cylindrical trephine bur of 10.0 size diameter (Dentium trephine kit – Korea) was used to cut fresh bony edges and mark the graft recipient site at the upper left incisor region (Figure 3). In the mandible, a vestibular incision was made exposing the anterior chin, within which a dental implant of 3.3\*10 mm was placed (Leader Implant system-Italy)(Figure 4). After that, using the same 10.0 Dentium trephine bur, a cylindrical bony segment that contains the installed dental implant was removed from the body of the chin as one piece; and the whole block was carefully removed and adjusted to fit in the upper prepared implant bed, then the implant was tightened to be fixed to the underlining maxillary bone (Figures 5 and6). Absorbable collagen membrane was applied buccally to cover the whole implanted graft material, then the flap was readapted and secured by suturing. Immediate postoperative periapical radiograph showed nice adaptation of the grafted bone- implant segment in its place (Figure 7).

At the time of suture removal, there was good healing of the soft tissue and no signs or symptoms of infection. The old bridge was reused as a temporary prosthesis until definite prosthetic replacement is made. Periodic follow up visits were held over five months postoperatively. Clinically, good healing results were detected including absence of infection, good soft tissue healing and restoration of the buccal bony depression at the operation site. Radiographic evaluation reveal

obvious union between the implanted bony segment and the surrounding maxillary bone, minimal bone resorption at the surgery site and good implant osteointegration (Figure 8). On the other hand, the chin donor site showed good healing clinically and radiographically. Now the patient is ready to have the definite prosthetic replacement.

## Discussion

In this case report, the choice of autograft to restore the implant bed alveolar defect was adopted based on the advantages that this kind of graft can offer over the other grafting categories; as it provides osteoinductive growth factors, osteogenic cells, and act as an osteoconductive scaffold. On the other hand, it also has its own draw backs, as the patients have to suffer from two surgical sites; not to mention the donor site complications and morbidity like pain and loss of function.<sup>[3, 4, 6, 10]</sup>

Local bony defects in the anterior maxilla usually requires relatively small graft which can be taken from intra oral donor sites. Studies had showed that intraoral harvested membranous grafts (like from symphysis or mandibular ramus) showed less significant amount resorption than extra oral endochondral grafts (like iliac crest), besides being easier accessible, more economic, less complicated, can be done under local anesthesia and provides close proximity of donor and recipient sites<sup>[5, 9]</sup>.

One stage graft- implant placement was described by a number of studies<sup>[5, 9, 11]</sup>. It can have major advantages of reducing the number of surgical interventions and minimize the overall treatment period. However, the main disadvantage with this technique is in the fact that the fate of the implant is

related to the successful healing of the grafted block, so if the graft is lost, then the implant will be lost; that is why other studies would rather apply the graft then the implant in two stage surgeries<sup>[12, 13]</sup>. The procedure described in this case report was originally described by Tekin *et al*<sup>[11]</sup>. In this technique, using the graft as a block provides an opportunity to get adequate primary stability for the fixture, the thing that cannot be accomplished by using bone chips or synthetic bone substitutes. Besides, the trephine bur made the graft harvesting much easier and aided to take a bony cylinder with regular shape. Moreover, there is no need for extra measures for graft fixation as it will be held in place by the screwing the implant itself.

In our case report, we had two modifications on the original procedure. The first is that the implant was installed in the chin bone before removal of the graft block; this would be much easier in handling than trying to install the fixture in a free graft cylinder. The second modification is that we used a 10 mm length implant, and this did not compromise the graft stability or the clinical outcome of the case. This can possibly be less invasive and less traumatic to the bone and the adjacent vital structures.

## Conclusion

It can be concluded that one stage implant – graft surgery using symphyseal cylindrical graft blocks can be considered as an effective treatment option to restore alveolar defects in the anterior maxilla with considerable reduction of treatment period.

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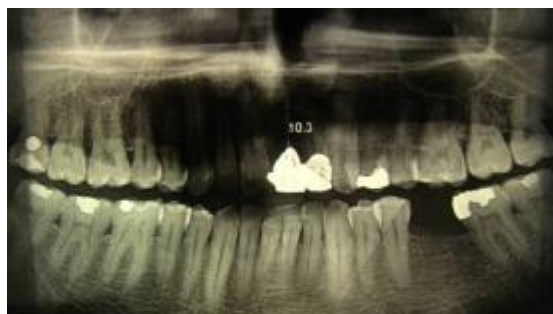


Figure 1: Preoperative panoramic view



Figure 2: After flap reflection, we can see the obvious absence of buccal bony plate



Figure 3: Toilette and preparation of the recipient site



Figure 4: Implant installation in the symphyseal donor site



Figure 5: Implant – graft segment



Figure 6: Implant – graft segment in final place



Figure 6: Periapical view immediately postoperatively



Figure 7: Periapical view 5 months postoperatively