

Building the Lost Bone and Esthetics via Autogenous Bone Graft - A Savior to Implant Dentistry

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ABSTRACT

Clinical challenges remain in augmentation of anterior maxillary alveolar bone deficiencies prior to endosseous implant implantation. Significant bone loss frequently occurs simultaneously with the traumatic loss of maxillary anterior teeth in the past. Reconstructing the original hard tissue form as closely as feasible is the goal of augmentation. This is necessary in order for the dental implants to be positioned optimally later on. Autogenous bone has long been considered the “gold standard” for bone grafting applications in implant treatment. Zygoma being the strongest bone was chosen as the donor site for autologous bone graft which was then mixed with xenograft and placed at the implant sites after placement of implant. In addition to aiding in the life of implants, autologous bone grafts taken from the zygomatic buttress are suitable for reconstructing bony alveolar crest abnormalities in the anterior maxillary region.

Keywords: Autogenous bone graft, Xenograft, Zygomatic Buttress, Implant.

INTRODUCTION

Road side accidents are the most common cause for loss to teeth. Trauma related dental injuries are frequently observed in the primary (23%) and permanent dentitions (15%). The maxillary anterior region is the most commonly affected region in case of trauma. The maxillary central incisors are

the most frequent teeth (70%) affected teeth in this region.¹ However, intrusions and avulsions have been reported to be at higher risk for ankylosis-related (replacement) and infection-related (inflammatory) resorption, 0.5–2% and 0.5–3%, respectively. When a traumatized tooth has deemed hopeless, several replacement alternatives exist – that

include orthodontic space closure, autotransplantation, resin-bonded bridge, and a tooth- or implant-supported fixed dental prosthesis (FDP).

In 1971, Brånemark was the first to report on the osseointegrated dental implant and a new alternative for fixed prosthetic tooth replacement was introduced. Today, implant therapy is considered a most reliable treatment option to replace missing teeth and grossly carious teeth, and with a long-term prognosis equal to tooth-supported FDPs. The advantages of dental implants include low morbidity, high biocompatibility and good treatment prognosis. In addition, sound adjacent teeth can be left untouched, thereby avoiding compromising their pulps while reconstructing a missing tooth. Disadvantages include potential technical, biological and aesthetic complications. These are more frequent in implant-supported single crowns than for tooth-supported FDPs.

Previous traumatic loss of upper anterior teeth is often concomitant with significant bone loss and placing endosseous implants becomes a challenge in such cases. Bone grafts are a saviour in cases where bone grafting is required, autogenous bone grafts being the gold standard are most commonly used in such cases. Autogenous bone graft is a better option for ridge augmentation and defect repair for dental implant placement, due to its advantages like autogenous block bone grafts have a shorter healing period than other approaches such as guided bone regeneration using bone substitutes. This graft usually requires only 4 months of healing before implants may be inserted. On incorporation, the quality of the graft often exceeds the density of the native maxillary bone. This enhanced quality improves implant stability and can shorten healing time.

CASE PRESENTATION

A 29 years male patient reported to the out patient department, department of prosthodontics with a history of accident 1

year back. The patient gave an history of tooth extraction with Ellis class 4 fracture i.r.t 21, and 22, and pain i.r.t 11. Clinically it was seen that patient had Ellis class 3 fracture with draining sinus seen buccally i.r.t 11 and partially edentulous i.r.t 21 and 22 with knife edge ridge. The patient was explained about all the treatment modalities, he was convinced with implant supported fixed prosthesis only. Therefore, the patient was asked to get a CBCT done for bone evaluation in the same region for implant placement. The diagnosis of the case after CBCT was partially edentulous with knife edge ridge i.r.t 21,22 after trauma and lost buccal plate i.r.t 11(Figure.1).

Autologous bone grafting has been used with increasing success for centuries and remains in common use today. The physiologic properties of autogenous bone graft has defined the “gold standard” for bone grafting, and the efficacy of bone graft alternatives are therefore compared to the known results of grafting bone defects with autogenous bone. Zygoma being the strongest bone and the only donor site in the maxillary arch was chosen as the donor site for autologous bone graft. A combination of autogenous and xenograft is considered as the most feasible option for graft placement in implant dentistry.

SURGICAL PROTOCOL

The patient was explained about the surgical protocol and was advised to take medication Tab. Dexona 0.5 mg bid and Tab. Amoxclav 625 mg bid 5 days before the surgery. Local anesthesia was given at the concentration of 1:80,0000 at the surgical site. Extraction was done 11. (Fig.2)

Mucoperiosteal flap reflection i.r.t 11,21 and 22. Osteotomy preparation followed by implant placement (NORIS) done i.r.t 11,21,22. Flap reflection done of zygomatic buttress (donor site) for collecting autogenous bone graft with scrapper (Fig.2) (Julludent Bone Scraper-European design). Autogenous bone graft collected from zygomatic buttress then mixed with Xenograft and normal saline. Bone graft (B-

OstIN Basic OSTeoINtegration) and GTR Membrane (ColoGuide GTR Membrane)

placement was done at the implant site. Suture placement done.

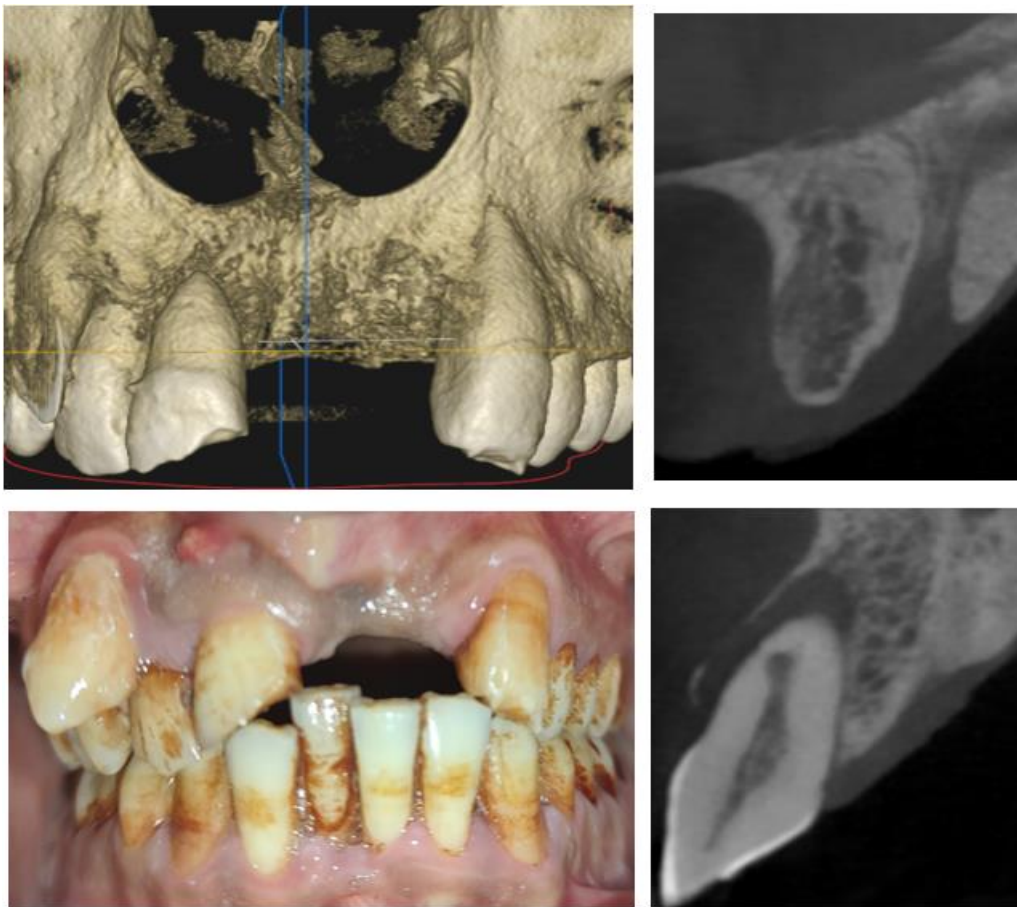


Figure 1- Pre-Operative CBCT and Intra-Oral photographs.

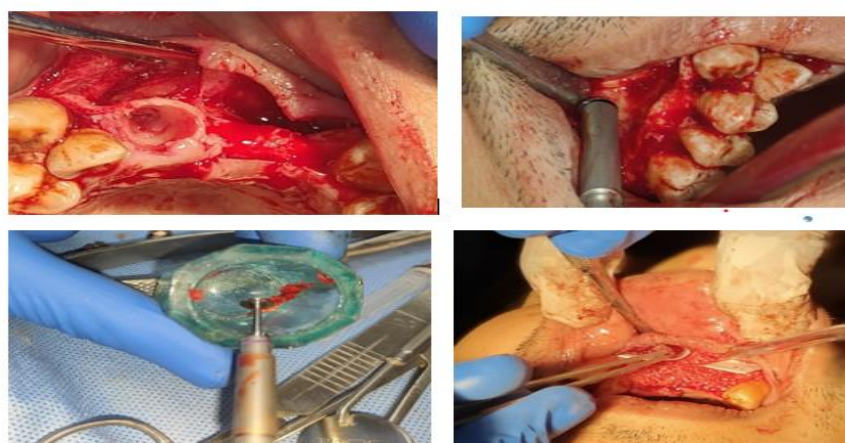
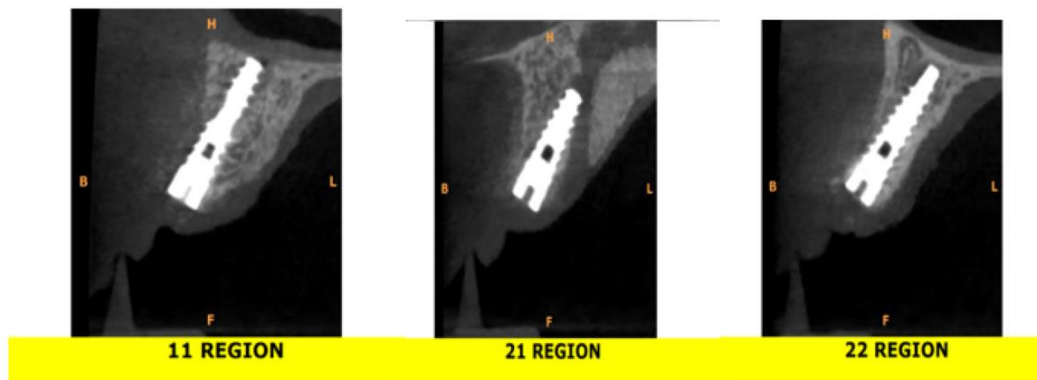


Figure.2- Intra oral photographs during the time of implant placement

An Post-operative OPG was done. The patient was asked to get a CBCT done after 4 months of implant placement for proper

evaluation of osseointegration of implants and bone formation (Fig.3).

Figure.3- POST IMPLANT PLACEMENT FOLLOW-UP – 4 MONTHS

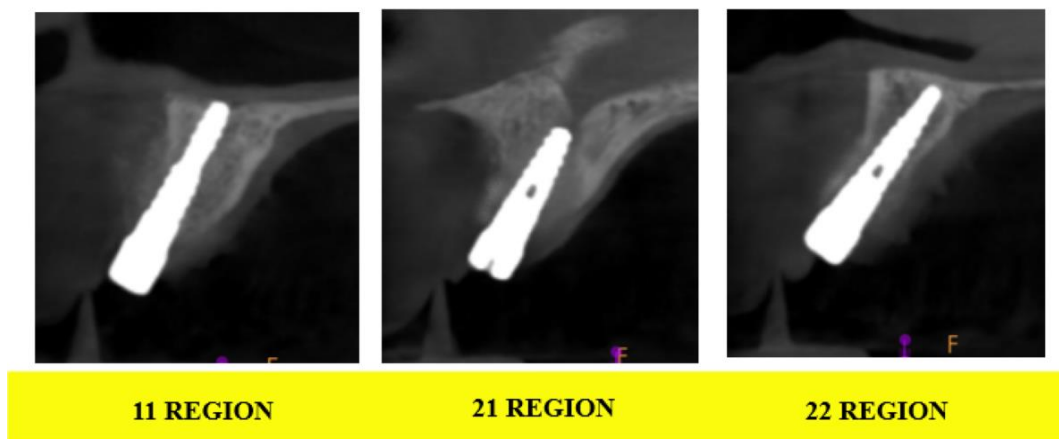


PROSTHETIC PHASE-

Patient was recalled after 5 months for further treatment. Soft tissue healing around the implant site was clinically satisfactory and osteointegration around the implant was seen radiographically that was satisfactory.

Therefore, Second stage surgery was done i.r.t 11,12 and 22. The patient was instructed to again get a CBCT report done for evaluation of bone loss if any bone loss is present. (Fig.4).

Figure.4- POST IMPLANT PLACEMENT FOLLOW UP- 6 MONTHS



Patient was recalled after 2 weeks for open tray implant impression using polyvinyl siloxane impression material (NeoEndo Neopure A-Silicone Impression Material) i.r.t to maxillary arch and diagnostic impression using irreversible hydrocolloid (Zhermack Tropicalgin Dental Alginate) i.r.t to mandibular arch. After this the impression was disinfected and the lab analog was secured on the impression

coping. Gingival mask was applied around the impression coping and the impression was poured using Type IV Gypsum (Kalabhai kalrock die stone). Jig- trail was made using pattern resin(fig.5) (GC Pattern Resin) and verified in the patient's mouth with IOPA and it was found that screw retained implant prosthesis can be made with good esthetics. After this, metal try in was made and verification was done using

IOPA and the access hole for the prosthesis was satisfactory. Therefore, final prosthesis i.e. PFM crown was fabricated.

For, final prosthesis the screws were given the required torque of 25Ncm and radiographically verified for the proper

seating of the crown. After this a piece of Teflon tape was put in the access hole and the access holes were sealed using composite (fig.5) (Prevest-Denpro Magma Nt Composite kit).



Figure.5- Intra-oral photographs of Prosthetic phase

DISCUSSION

Kim et al demonstrated that Autogenous bone graft has excellent bone repair abilities due to osteoinduction and osteoconduction through a series of experiments, including analysis of inorganic substances, electronmicroscopy, and histomorphometric analyses.³ Autogenous bone grafts have shown excellent outcomes for reconstructing areas of bone that were badly damaged or cases in which a large amount of bone augmentation was needed, such as ridge augmentation. Autogenous bone can be extracted from endochondral bones, such as the ilium, rib, and tibia, and intramembranous bones, such as cranial and facial bones including symphysis, ramus of mandible, zygomatic buttress, etc.⁴ Mostly, in cases were, we require autogenous bone grafts for ridge augmentation, managing any bone defects in cases of implants the surgical site chosen is intra-oral than extra-oral sites to avoid any futures secondary surgical sites than intra-oral. In cases where,

we are operating in the maxillary region, site chosen wisely would be zygomatic buttress and for mandibular region it would be either symphysis or ramus of the mandible.

Autogenous bone has long been considered the “gold standard” for bone grafting applications in implant treatment.² Harvesting autologous bone grafts from the zygomatic buttress is a relatively a new method and are suited for reconstruction of bony alveolar crest defects in the anterior maxillary region and also help in survival of implants. Although the harvesting of autogenous bone grafts is advantageous since it frequently occurs close to the surgical site, this can regrettably prolong the surgical operation. Compared to allografts, it is less expensive and carries a lower risk of rejection and disease transmission.

The optimal circumstances for this surgical site to harvest bone grafts are those in which only modest amounts of bone are required, particularly when implant implantation is to

be done in one or two dental regions of the maxillary arch. For the repair of alveolar projection loss in the anterior and posterior maxillary zones, the convex cross-section of the bone graft is perfect. In the facial skeleton, the zygomatic buttress is a robust bone pillar that facilitates pressure absorption and transduction. Approximately 0.5 to 1 cc of bone can be harvested with this method without harming the surrounding tissues.² There is mention of low morbidity at the donor and recipient sites. This donor site has the tremendous advantage of not requiring the detachment of muscles, and it generates good quality bone with perfect morphology. It also provides easy access and excellent vision. The bony structure in this area is particularly strong.

Excellent graft survival and success rate (95.6%) have been demonstrated in research using autologous bone;² these results are nearly identical to those of investigations on implants placed in rebuilt sites. After phased horizontal ridge augmentation, the early implant survival rate of 99.7% found in the current data is extremely high and equivalent to that found in earlier systematic evaluations.⁵ It is possible to achieve an implant survival rate even in cases where the bone graft gets completely resorbed.

CONCLUSION

Thus, placement of endosseous implants with cortico-cancellous bone grafts from intraoral sites is a predictable technique to facilitate dental rehabilitation of the jaw with defects where endosseous implant placement can be done, and it is associated with high bone survival rate and implant success. Autologous bone must be regarded as the most efficient material for two-stage pre-prosthetic augmentation in oral implantation, despite the fact that there are more bone substitutes available. For implant insertion, intraoral autologous grafts can be a dependable therapeutic choice for

reconstructing isolated lesions. There is very little morbidity, and the prosthetics, implants, and grafts all survive satisfactorily.

Declaration by Authors

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