

ARCH RECONSTRUCTION TECHNIQUES AROUND ATROPHIC RIDGE AND IMPLANT-A CASE REPORT

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Abstract

Bone volume deficiency is commonly seen that can hamper the placement of prosthesis in that area. So, it becomes great necessity to reconstruct the ridge. This can be corrected by various arch reconstruction procedures. Successful reconstruction depends on multiple biological factors as well as patient compliance. In this case report, ridge reconstruction has been done with particulate bone graft, PRF and collagen membrane. This was followed by the surgical placement of implants.

Keywords: atrophy, bone grafting, dental implants, collagen membrane, PRF, GBR.

Introduction

There are various conditions that result in bone loss like tooth loss, sinus pneumatization, periodontal disease, facial and dento-alveolar trauma, odontogenic and non-odontogenic cysts and tumors, oral pathologic lesions, and many other conditions. that result in bone loss. Alveolar bone grafting can be divided into ridge preservation and ridge augmentation. Ridge can be preserved by bone grafting in extraction socket. Atrophic ridge is the most common problem faced by periodontist¹. Atrophic ridge may hamper the aesthetic outcome and compromise functional and structural aspects of treatment. So, it became important to develop techniques that could help to regenerate bone.

Regeneration refers to thereconstitution of a lost or injured part by complete restoration of its architecture and function. Augmentation of bonevolume has been assisted throughdifferent methods, including use of growth and differentiation factors, particulate and blocks grafting materials, distraction osteogenesis, and guided bone regeneration (GBR).

Bone augmentation techniques may be used for the applications of –

- 1. Extraction socket preservation (ESP)-** It is seen that in 1 year of extraction, 50% of the alveolar ridge width is reduced. The average amount of loss is seen between 5-7 mm, and 2/3 of this reduction occurred within the first 3 months. Extraction socket preservation is done immediately after the extraction with bone grafting². Different bone materials that can be used for extraction socket preservation. Artzi et al reported 82.3% extraction socket filling with new bone at 9 months after ESP using porous bovine bone mineral (PBBM). Luczyszyn et al introduced a technique using an acellular dermal matrix to cover the socket graft with resorbable HA (hydroxyapatite). The HA affected the ESP outcome, and the matrix contributed to thickening of the soft tissue around the socket. FaciolaPessoa de Oliveira et al. reported successful ESP outcomes after covering with a polytetrafluoroethylene (dPTFE) membrane after minimally traumatic extraction.
- 2. Furcation involvement-** these cases can be healed with the use of different bone grafts or in conjunction with GTR membrane.

The management of class II furcation involvement presents a unique clinical problem due to the complexity in anatomy at the furcation area. However, the results observed in the present case showed that combined treatment modalities using allopastic bone graft and GTR membrane are beneficial for the treatment of mandibular grade II furcation defects.

- 3. Horizontal bone grafting-** can be done with the use of particulate bone grafts, bone plates, ridge split technique, or with the help of osteogenesis distraction³.
- 4. Vertical bone augmentation-** can be done by particulate bone grafting, bone blocks, bone grafts with GTR membrane, osteogenesis distraction⁴.
- 5. Immediate implants-** The quality of the regenerated bone around immediate or early implants might be critical in determining the long-term function and stability of dental implants and the peri-implant tissues. To achieve a good osseointegrated implant with a high degree of predictability, the immediate implant might be placed with bone graft and without immediate loading. For aesthetic needs, can be used provisional restoration and free from occlusion. The immediate dental implant placement with autogenous bone graft was significantly superior to synthetic bone graft. In addition, the immediate placement– delayed loaded dental implant remains the procedure of choice for predictably achieving osseointegration⁵. The combination of autogenous bone and synthetic grafts showed a slight superiority to autogenous bone graft alone, suggesting that it could be an optimum bone substitute for treatment of dehiscence around immediate dental implant⁶.

Case report

34 years old patient came to the Department of Periodontology and Oral Implantology, Bhojia Dental College and Hospital, Baddi with a chief complaint of mobile teeth in the upper and lower region of the mouth and bad breath from the past 2 years. He doesnot have any medical history. He had an history of chewing tobacco and smoking from the past 5 years and had quitted it year back. On examination, generalised mobility (grade III) and heavy deposition

of calculus was evaluated. There was generalised probing depth >6mm. On radiographic examination (OPG), generalised vertical bone defects were seen.

A definitive treatment plan was made to extract all the teeth and replace them with implant supported prosthesis. Treatment started with the SRP of full mouth and oral hygiene instructions were given to the patient. Patient was recalled for follow up on 7th, 14th day and after 21 days for the surgical procedure.

Surgical procedure

Proper aseptic conditions and proper sterilisation protocol was followed. Patient was advised to do oral rinse with chlorhexidine mouthwash 0.2%. Surgical site i.e. 4th quadrant was anesthetized with 2% lignocaine containing 1:80000 adrenaline. Once the site was anesthetized all the teeth were extracted i.e. 41, 42, 43, 44, 45, 46, 47. Once the extraction is done, horizontal incisions were given to connect all the extraction sockets. All the extraction sockets were then curetted with the curette no. #1, 2, #3, 4 to remove the granulation tissue. Flap was thinned using castroveizo scissor. Bone was smoothened with bone file to remove any sharp bony spicule. 10 ml of blood was drawn from the antecubital vein from the patient to prepare PRF. Two PIVOT implants were placed in the 44, 46 regions. Particulate xenograft bone grafting was done. Bone graft was secured with PRF, it was covered with collagen membrane which was cut into two halves so that whole quadrant can be covered after the anterior and posterior extent of reconstruction of 4th quadrant and contralateral segment was planned to rehabilitate the whole mandible for future prosthetically driven prosthesis and then secured at place with sutures (3-0 silk sutures)

Post-operative

Patient was asked to take soft liquid diet and not to spit forcefully. Patient was asked to drink juice without straw or to eat ice cream after 1 hour. Oral hygiene instructions were given, chlorhexidine mouthwash 0.12% was given BD for 14 days. Patient was given antibiotic coverage Amoxiclav 625mg TDS for 5 days, anti-inflammatory ketorol DT TDS for 3 days was given. Patient was recalled next day and on 7th day for follow up. Sutures were removed on 14th day. Patient was recalled after 1 month of surgery and OPG was taken



Figure No.1c



Figure No. 1d



Figure No.1e



Figure No.1a

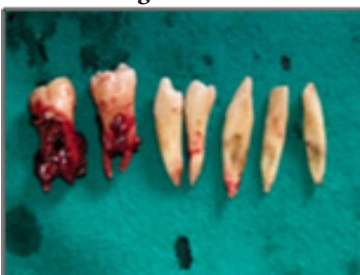


Figure No.1b



Figure No.1f

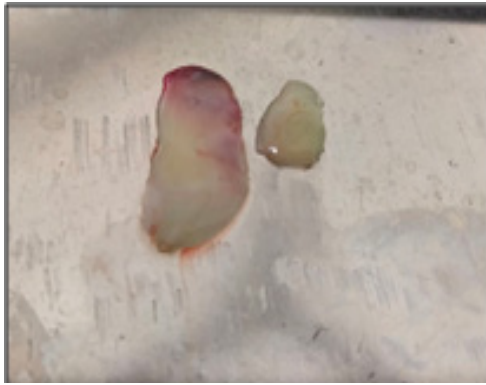


Figure No. 1g



Figure No.1h



Figure No.1i



Figure No.1j



Figure No. 1k

Fig-1a preoperative intraoral photograph, Fig-1b probing depth, Fig-1c extracted teeth from 4th quadrant, Fig-1d horizontal incision, Fig-1e particulate bone graft, Fig-1f particulate bone grafting in the extracted region, Fig-1g PRF, Fig-1h bone graft covered with PRF, Fig-1i collagen membrane secured over PRF, Fig-1j suturing, Fig-1k post-operative OPG.



Figure No.2: Post operative radiograph after 6 months

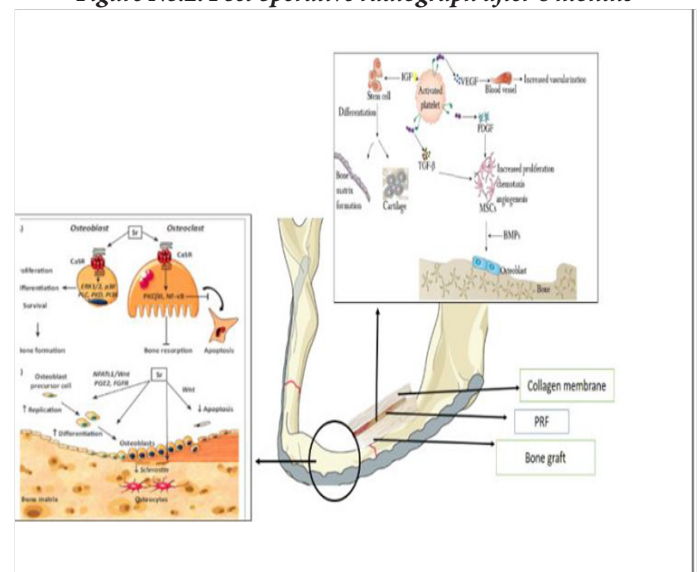


Figure No.3: Biologic dynamism of bone orchestratum



Figure No.4 Host bone, particulate bone graft, PRF and collagen membrane resulting in “ORCHESTRATED BONE”

PRF an autologous osteoinductive second-generation platelet concentrates in source rich in leukocytes & cytokines. With the gradual release of vascular endothelial growth factor and transforming growth factor (TGF) in the orchestration environment they polymerize and form three-dimensional structure with platelet cytokines which is entrapped in fibrin mesh which is crucial in provisional matrix formation and osteoblastic activity. It has direct effect on proliferation and differentiation of osteoblasts for osteoconduction. Thus development of cells and extracellular matrix may support new bone formation in the Orchestration differentiation and maturation

Conclusion

There are many techniques that exist for effective bone augmentation. These approaches largely dependent on the extent of the defect and specific procedures to be performed for the implant reconstruction. Various biomaterials can be used to augment bone for implant placement. No single biomaterial or clinical technique is ideal, and the clinicians need to decide the suitable approach which can provide suitable results with less complication. Each graft procedure has advantages and disadvantages and should use the material with a high success rate and less morbidity. It is most appropriate to use an evidenced-based approach when a treatment plan is being developed for bone augmentation cases.

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