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Case Report

Guided Bone Regeneration Using a Platelet-Rich Fibrin Membrane and Sticky Bone Graft along with Implant placement in Maxillary Anterior region: A Case Report

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ABSTRACT

The maxillary anterior region is considered to be the esthetic zone of human dentition. Missing teeth in this area leads to severely compromised aesthetics and function. Endosseous implants are a viable option for treatment of this problem. However, placement of implants depends on the quantity and quality of available bone. When bone deficiencies are present in the alveolar bone in either vertical or horizontal direction, it is necessary to augment the ridge. This can be achieved by various methods and materials. In this case report, we present a successful case of ridge augmentation in anterior maxilla using xenograft and resorbable collagen membrane along with platelet-rich fibrin. A fiber-reinforced bridge was given during the healing period. After six months of the healing period, permanent restoration was done.

Key words: Dental implant, Sticky bone, PRF, Maxillary defect ,Guided Bone Regeneration

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INTRODUCTION:

Dental implants are considered as the first line of treatment in restoring missing teeth in today's dentistry. However, a minimum amount of bone is required for successful osseointegration of dental implants. Resorption of alveolar bone due to physiological or pathological process is a common clinical problem. The deformities and defects may occur as a result of tooth loss due to extraction, advanced periodontal diseases or trauma, long-term use of removable appliances, dehiscence and fenestration defects, developmental defects/clefts, congenitally missing teeth and odontogenic cysts and tumors.[1]The extraction of teeth can result in up to 50% loss of alveolar ridge width within the first one to three years.[2] There are different methods to manage these defects including particulate bone and block grafts, guided bone regeneration, ridge splitting, expansion and distraction osteogenesis.[3] Guided bone regeneration helps in hard tissue reconstruction by preventing epithelial cell migration in the defect area. To accomplish this, the rate of osteogenesis extending inward from the adjacent bony margins must exceed the rate of fibrogenesis growing in from the surrounding soft tissue.[4] In this case report, ridge augmentation in anterior maxilla using xenograft and resorbable collagen membrane with simultaneous placement of endosseous implants is discussed. The particulate graft used was mixed with injectable PRF and a sticky bone was prepared. Sticky bone provides stabilization of bone graft in the defect, and therefore, accelerates tissue healing and minimizes bone loss during the healing period.[5]

CASE REPORT:

A 25-year male reported with a chief complaint of missing front teeth. On examination, it was observed that both maxillary central incisors and right lateral incisor were missing. The patient met with a road traffic accident one week back which led to the loss of these anterior teeth. Diagnostic impressions were taken. The radiological examination was done by Orthopantomograph and Dentascan. Clinical and radiographic examination revealed severe vertical ridge defect in the maxillary anterior region with the highest bone loss in right lateral incisor region.(fig1)

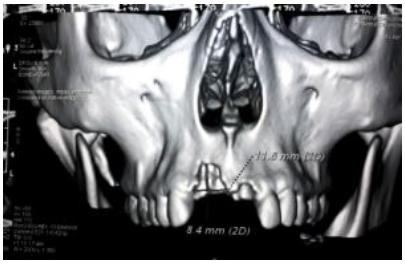

Fig 1: Dentascan showing ridge defect in maxillary anterior region

The amount of bone available was inadequate for an implant placement. Hence, guided bone regeneration with simultaneous placement of endo-osseous implants in left central incisor and right lateral incisor was planned. The surgical procedure was performed in sterile surgical field. Local anesthesia was done using 2% Lidocaine with 1:80000 adrenaline. Crestal incision along with two vertical releasing incisions were given and a full-thickness flap was reflected. Upon surgical exposure, a fractured labial plate was observed in lateral incisor region (fig2)

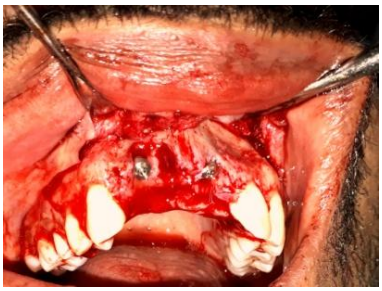

Fig 2: Dental implants placed with threads exposed in lateral incisor region.

Two endosseous implants (ADIN TOUREG, ISREAL) were placed and primary stability was achieved. 60 ml blood was drawn out of which 40 ml was used to prepare advanced PRF (1300 rpm for 8 min) and 20 ml was used to prepare injectable PRF(700rpm for 3min). Cerabone (Geistlich Pharmaceutical, Wolhusen, Switzerland) bone graft was mixed with iPRF which led to polymerization of the graft (fig4)

Fig 4 : PRF was prepared and was mixed with the particulate graft which lead to polymerization of the graft and formation of sticky bone.

This sticky bone graft was adapted on the defect site and was covered with PRF membranes.This was again covered with collagen membrane(Jason membrane biotiss biomaterial.It was stabilized using membrane tacs to prevent any micro-movement during the healing phase.(fig5)

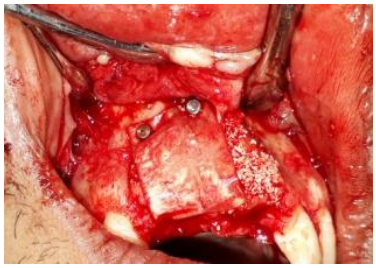

Fig 5: Sticky bone was adapted over the defect site and stabilized with collagen membrane and membrane tacs to prevent micromotion.

The surgical site was closed by interrupted sutures. Post operative OPG was done (fig 6)

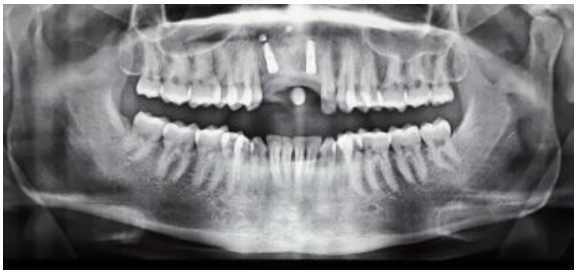

Fig 6: Post operative OPG

Oral hygiene instructions were given to the patient. A fiber-reinforced fixed partial denture was fabricated as a temporary restoration .The patient was examined once every month. After 6 months the site was re-entered and healing abutments were placed.A three unit all ceramic bridge was fabricated and cemented (fig7).

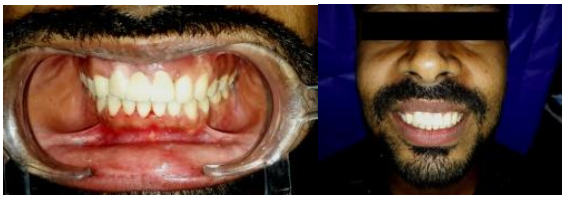

Fig 7: Final prosthesis was cemented.

Gingival coloured porcelain was used to cover the black triangles. Intraoral periapical radiograph of right lateral incisor region revealed bone regeneration.

DISCUSSION: During GBR procedures, it is important to create a space that is properly isolated from the surrounding soft tissues and can be maintained for an appropriate period of time to ensure osteogenesis. In addition to space maintenance, the membrane plays a role in clot stabilization while simultaneously preventing migration of non-osteogenic tissues into the area. PRF along with collagen membrane could be a better option for this. Earlier platelet-rich plasma (PRP) was utilized as a regenerative agent. Since PRP is known to contain a 6–8-fold increase in blood-derived growth factors that influence cellular growth, morphogenesis, and differentiation[6], it was reported that PRP facilitates bone and tissue healing during guided bone regeneration.[7]One

of the disadvantages of PRP was requirement of synthetic or biomaterials, such as bovine thrombin and calcium chloride, to make gel condition so there was risk of cross-contamination.[8] Platelet-rich fibrin (PRF) was therefore developed as a second generation autologous platelet concentrate without the use of anticoagulants, first termed by Choukroun et al.(2001).[9]It has been reported that PRF acts to release growth factors much more slowly as a result of both the use of a fibrin scaffold capable of entrapping growth factors and releasing them slowly over time, as well as additionally housing of leukocytes, a cell-type responsible for additional growth factor release .[10] It is seen that by decreasing centrifugation speeds, a higher proportion of leukocytes could be maintained in the upper layer where PRF is collected and thereby increasing total growth factor release. In 2014, a liquid injectable-platelet-rich fibrin (i-PRF) was developed by modifying spin centrifugation forces. At lower centrifugation speeds and by utilizing non-glass centrifugation tubes, the fibrin coagulation could be slowed down thus generating an injectable-PRF. Much like traditional PRF, i-PRF contains an increase in leukocyte number and is further able to stimulate growth factor release.[11]Injectable PRF also has the property of bonding with the graft materials and thus facilitating the proper adaptation of the defect sites.[12]

CONCLUSION: Guided bone regeneration is a viable option for the simultaneous implant placement bone deficient area. PRF has shown promising results in the past in bone generating due to the release of growth factors. Moreover, polymerization of bone graft substitute also helps in the stabilisation of grafts in the defect areas. Platelet-rich fibrin can be brought into routine use since they are autologous and can be easily prepared.

REFERENCES:

1. Wang HL, Al- Shammari K. HVC ridge deficiency classification: A therapeutically oriented classification. Int J Periodontics Restorative Dent. 2002;22: 335–43. [Pub-Med])
2. Schropp L, Wenzel A, Kostopoulos L, Karring T (2003) Bone healing and soft tissue contour changes following single-tooth extraction: a clinical and radiographic 12-month prospective study. *Inter J Perio Restor Dent* 23: 313-323.
3. Chiapasco M, Zaniboni M, Boisco M. Augmentation procedures for the rehabilitation of deficient edentulous ridges with oral implants. Clin Oral Implants Res 2006; 17(Suppl): 136–159. [PubMed]
4. Gher ME, Quintero G, Assad D , et al. Bone grafting and guided bone regeneration for immediate dental implants in humans. J Periodontol. 1994;65:881–91. [PubMed]
5. Dong-Seok Sohn, Bingzhen Huang, Jin Kim et al. Utilization of Autologous Concentrated Growth Factors (CGF) Enriched Bone Graft Matrix (Sticky Bone) and CGF-Enriched Fibrin Membrane in Implant Dentistry .The Journal of Implant & Advanced Clinical Dentistry Vol. 7, No. 10 December 2015
6. Jeong W.H, Roh TS, Kim YS, Kang EH, Jung BK, Lee WJ, Lew DH, Yun IS. Acceleration of osteogenesis by platelet-rich plasma with acellular dermal matrix in a calvarial defect model. Childs Nerv Syst 2016;32(9):1653–1659.
7. Plachokova AS, Nikolidakis D, Mulder J, Jansen JA, Creugers NH. Effect of platelet-rich plasma on bone regeneration in dentistry: a systematic review. Clin Oral Implants Res. 2008;19:539–545. [PubMed]
8. Dohan Ehrenfest DM, Rasmusson L, Albrektsson T.Classification of platelet concentrates: from pure platelet-rich plasma (P-PRP) to leucocyte- and platelet-rich fibrin (L-PRF).Trends Biotechnol. 2009;27(3):158-67
9. Choukroun J, Adda F, Schoeffler C, Vervelle A. Une opportunité en paro-implantologie: le PRF. Implantodontie 2001;42(55):e62.
10. Barrick B, Campbell EJ, Owen CA. Leukocyte proteinases in wound healing: roles in physiologic and pathologic processes. Wound Repair and Regeneration 1999;7:410-422.
11. Ghanaati S, Booms P, Orlowska A, Kubesch A, Lorenz J, Rutkowski J, Landes C, Sader R, Kirkpatrick C, Choukroun J. Advanced platelet-rich fibrin: a new concept for cell-based tissue engineering by means of inflammatory cells. J Oral Implantol 2014;40(6):679–689.
12. Mourao CF, Valiense H, Melo ER, Mourao NB, Maia MD. Obtention of injectable platelets rich-fibrin (i-PRF) and its polymerization with bone graft: technical note. Rev Col Bras Cir 2015;42 (6):421–423.

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