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Management of Buccal bone Dehiscence with DFDBA and PRF with Amnion Chorion membrane

[1]Dr. Aena Jain Pundir, MDS, Professor, Department of Periodontology, Rungta College of Dental Sciences

[2]Dr. Ashida S Blesson, Post-Graduate Student, Department of Periodontology, Rungta College of Dental Sciences

[3]Dr. Siddharth Pundir, MDS, Professor & HOD, Department of Oral Pathology, Rungta College of Dental Sciences

[4]Dr. Harsha Tembhare, MDS, Department of Periodontology, Rungta College of Dental Sciences

Corresponding Author: Dr. Ashida S Blesson, Post-graduate Student, Department of Periodontology, Rungta College of Dental Sciences

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Introduction

Significant ridge resorption and alterations to the alveolar bone and soft tissues are brought on by tooth extraction, which can compromise aesthetics and make functional rehabilitation more difficult.1 The residual ridge diameters at healed extraction sites are frequently insufficient for the prosthetically-driven implantation of dental implants.2,3 In order to maintain the integrity of the marginal bone, implant placement in native bone frequently results in the exposing of the implant surface (i;e buccal bone dehiscence or fenestration). Jung RE in 2017, conducted a study observed that small bony buccal dehiscence defects developed greater-than-expected vertical bone loss 6 months after implant placement.4 Various protocols for the management of peri-implantitis have been proposed, many of them combining surface decontamination and traditional guided bone regeneration (GBR) principles.

The osteoinductive potential of demineralized freeze-dried bone allograft (DFDBA) is associated with the presence of bone morphogenetic proteins (BMPs); it contains BMP 2, 4, and 7, which help to stimulate osteoinduction.5 DFDBA tends to degrade more rapidly, enabling new bone formation.6 A novel preparation of platelet concentrate known as platelet-rich fibrin matrix (PRFM) has recently been studied in various intraoral and extra-oral procedures. The mechanical properties of PRFM translate it into a biological matrix that is easy to manipulate and implant in a variety of tissue repair and regenerative procedures7. It has been demonstrated that the vital platelets in PRFM generated six growth factors, including platelet-derived growth factor (PDGF), vascular endothelial growth factor (VEGF), fibroblast

growth factor (FGF), epidermal growth factor (EGF), transforming growth factor (TGF), and insulin-like growth factor (IGF) in about the sustained concentration for a period of 7 days 8.

Case Report

A 23 year old male patient reported to the Department of Periodontology, Rungta College of Dental Sciences and Research, Bhilai with chief complaint of missing teeth in upper front region of jaw #22. Patient reported no history of any underlying systemic diseases and dental history revealed that the trauma was responsible for loss of teeth which was further extracted as the prognosis of the was poor. Extra-oral examination revealed no abnormalities. Intraoral examination revealed partially edentulous area with missing #22 and 21 was endodontically treated (FIG 1). Implant placement with bone grafting using DFDBA & PRF along with with amnion chorion membrane was planned. Radiographic examination preferred was CBCT with #22 (FIG 2) which revealed that buccal bone loss.

Fig.1: Pre-operative Image

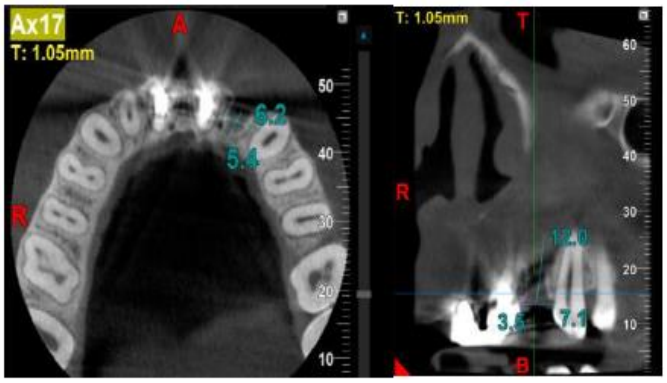

Fig. 2: CBCT Evaluation

Procedure started with crestal incision followed by flap reflection, buccal bone dehiscence was detected (FIG 3), hence the placement of graft with PRF and membrane was planned for regeneration of buccal bone after implant placement. Sequential drilling was done (FIG 4) and 3.3/11.5 implant placement was done.

Fig. 3: Buccal dehiscence detected

Fig.4: Image showing sequential drilling

9 ml of patient's autologous blood was collected which was centrifuged at 2700 rpm for 2 minutes (FIG 5).

Demineralized freeze dried bone allograft was used as a graft which was minced with PRF (FIG 6) and placed in the defect site followed by placement of amnion chorion membrane (FIG 7) which was cut in a trapezoidal shape and completely covered the defect.

Fig.5: PRF -chorion prepared

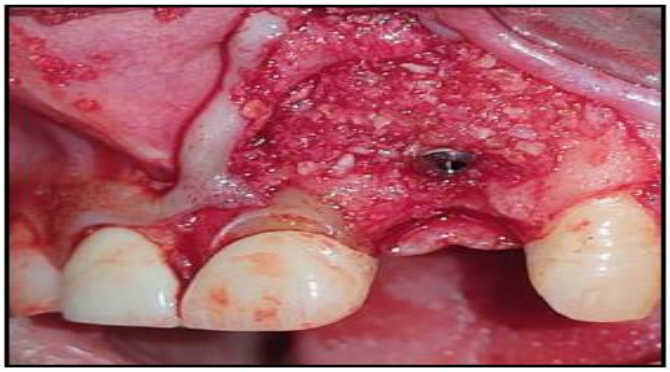

Fig. 6: Mixture of DFDBA & PRF placed on defect

Fig. 7: Amnion membrane placed

Approximation of flap was done using 3-0 silk sutures (FIG 8) and post-operative instructions and medications were given to the patient. After 14 days' suture was removed and clinical examination was done which revealed uneventful soft tissue healing. Implant was allowed to osseointegrate for 6 months and after which radiographic evaluation was done using RVG which showed the indication of osseointegrated implant. Following this second stage surgery was done involving placement of gingival former (FIG 9) and further successful placement of prosthesis was done (FIG 10).

Fig. 8: Sutures Placed

Fig. 9: Abutment planning using software

Fig. 10: Prosthesis placement

Clinical outcome

Clinical examination revealed uneventful soft and hard tissue healing with sufficient regeneration of the buccal

bone and successful osseointegration of the placed implant 6 months after placement of DFDBA with PRF and amnion chorion membrane as an attempt for GBR.

Discussion

In this case GBR has been attempted using DFDBA and PRF with amnion chorion membrane for the regeneration of lost buccal bone around an implant placed. The management of dehiscence on the labial aspect of the maxillary left lateral incisor during implant placement is presented. Klokkevold PR suggested Guided bone regeneration (GBR) along with the use of various barrier membranes to be a reliable method for the treatment of dehiscence type of defect.9 Matteo Chiapasco, Marco Zaniboni in their systematic review found that irrespective of the type of membrane use GBR has proven to give favourable outcome in correction of fenestration and dehiscence defects 10. GBR involves the placement of an occlusal barrier which prevents invasion of non-bone forming cells from the surrounding soft tissues into the defect. It allows time and space for the bone forming cells to repopulate the defect.11

Earlier the membranes used were expanded polytetrafluoroethylene (e-PTFE) membranes were proven effective but exposure, inflammation and compromising bone regeneration were frequently reported by Becker et al.11 and Nowzari and Slots12 even a second surgery is also required for removal of non-resorbable membrane which is considered as one of its major disadvantages. Hence resorbable membrane were introduced which has resulted in improved tissue healing, decreased morbidity and fast resorption and reducing the risk of bacterial contamination13. Placental barrier membranes have antibacterial and antifungal characteristics, minimize wound inflammation, and offer a protein-rich matrix that allows cells to migrate more easily.14 Its ability for delivery of biomodulator agents such as growth factors and genetic materials makes it a suitable scaffolding material in tissue engineering, as well as in cell adhesion and its self-adhering property reduces surgery time.15 Chen E et al. introduced amnion chorion membrane to achieve 1 mm bone around implant found amnion chorion membrane to be biocompatible to the implant.

Graft material in this case is an allograft (DFDBA) mixed with PRF matrix. DFDBA, the demineralization process removes the mineral phase of the graft which can expose the underlying bone collagen and possibly bone growth factors like BMPs.16 The BMPs are involved in a biologic cascade that includes chemotaxis and matrix attachment, cell proliferation, and differentiation into cartilage, bone, and marrow .17 It displays a rapid osteoinductive activity. In combination with the bone graft, growth factors from the fibrin matrix over the initial 7 days prolongs the chemotactic properties and promote proliferation of both fibroblast and osteoblast, including extracellular matrix deposition, differentiation of mesenchymal cell, vascular proliferation, and deposition of extracellular matrix. PRF traps circulating stem cells, leading to faster repair of large osseous lesions where stem cells are developing into osteoblasts.18 The use of PRF aids in the retention of bone graft material within the socket walls and the arrest of bleeding, as it is a fibrin clot 19. PRF fibrin fragments act as a biological link between bone fragments thus assisting in further healing of the defect.

Conclusion

Presence of dehiscence during implant procedure can be successfully treated by GBR procedures and is necessary to be treated because of it affects implant stability and long-term success. Simultaneous procedure of implant placement and GBR using bone grafts and membranes

yield good results. The procedure with the bone graft DFDBA along with PRF and amnion chorion membrane helps in bone formation and prevents failure of implants and improves the prognosis.

References

1. Schropp, L.; Kostopoulos, L.; Wenzel, A. Bone healing following immediate versus delayed placement of titanium implants into extraction sockets: A prospective clinical study. Int. J. Oral Maxillofac. Implants 2003, 18, 189–199.
2. Grunder U, Gracis S, Capelli M. Influence of the 3-D bone-to-implant relationship on esthetics.Int J Periodontics Restorative Dent. 2005;25(2):113-119.2.
3. Farina R, Pramstraller M, Franceschetti G, Pramstraller C, Trombelli L. Alveolar ridge dimensions in maxillary posterior sextants: a retrospec-tive comparative study of dentate and edentulous sites using comput-erized tomography data.Clin Oral Implants Res. 2011;22(10):1138-1144. doi:10.1111/j.1600-0501.2010.02087.x
4. Jung RE, Herzog M, Wolleb K, Ramel CF, Thoma DS, Hämmerle CH. A randomized controlled clinical trial comparing small buccal dehiscence defects around dental implants treated with guided bone regeneration or left for spontaneous healing. Clin Oral Implants Res. 2017;28:348-354. doi:10.1111/clr.12806
5. Commercially-prepared allograft material has biological activity in vitro. Shigeyama Y, D'Errico JA, Stone R, Somerman MJ. J Periodontol. 1995;66:478–487.
6. Protocol for maintaining alveolar ridge volume in molar immediate implant sites. Johnson TM, Berridge JP, Baron D. Clin Adv Periodontics. 2017;7:207–214.
7. Treatment of horizontal defect with and without platelet-rich fibrin matrix: a randomized comparative clinical study. Debnath K, Chatterjee A. J Indian Soc Periodontol. 2018; 22:406–413.
8. Comparative evaluation of growth factors from platelet concentrates: An in vitro study. Chatterjee A, Debnath K. J Indian Soc Periodontol. 2019; 23:322–328.
9. Lekovic V, Camargo PM, Klokkevold PR, Weinlaender M, Kenney EB, Dimitrijevic B, Nedic M. Preservation of alveolar bone in extraction sockets using bioabsorbable membranes. Journal of periodontology. 1998 Sep;69(9):1044-9.
10. Chiapasco, Matteo & Zaniboni, Marco. (2009). Clinical outcomes of GBR procedures to correct peri-implant dehiscences and fenestrations: A systematic review. Clinical oral implants research. 20 Suppl 4. 113-23. 10.1111/j.1600-0501.2009.01781.x.
11. Becker W, Lekholm U, Dahlin C, Becker BE, Donath K. The effect of clinical loading on bone regenerated by gtam barriers: a study in dogs. Journal of Oral and Maxillofacial Implants. 1994;9:305–313.
12. Nowzari H, Slots J. Microbiologic and clinical study of polytetrafluoroethylene membranes for guided bone regeneration around implants. IntJ Oral Maxillofac Implants. 1995;10:67–73.
13. Lorenzoni M, Pertl C, Keil C, Wegscheider WA (1998) Treatment of peri-implant defects with guided bone regeneration: a comparative clinical study with various membranes and bone grafts. Int J Oral Maxillofac Implants 13:639–646
14. Chen E, TofeA. A literature review of the safety and biocompatibility of amnion tissue. J ImplAdvClin Dent. 2010;2(3):67-75

15. Koob TJ, Lim JJ, Massee M, Zabek N,Denoziere G. Properties of dehydrated human amnion/chorion composite grafts: implications for wound repair and soft tissue regeneration. Journal of Biomedical Materials Research Part B: Applied Biomaterials. 2014 Aug;102(6):1353-62
16. Urist MR. Bone: formation by autoinduction. Science. 1965;150:893–9.
17. Schwartz Z, Mellonig JT, Carnes DL Jr, de la Fontaine J, Cochran DL, Dean DD, Boyan BD: Ability of commercial demineralized freeze-dried bone allograft to induce new bone formation. J Periodontol. 1996, 67:918-26. 10.1902/jop.1996.67.9.918.
18. Schwartz Z, Mellonig JT, Carnes DL Jr, de la Fontaine J, Cochran DL, Dean DD, Boyan BD: Ability of commercial demineralized freeze-dried bone allograft to induce new bone formation. J Periodontol. 1996, 67:918-26. 10.1902/jop.1996.67.9.918
19. Thakkar DJ, Deshpande NC, Dave DH, Narayankar SD: A comparative evaluation of extraction socket preservation with demineralized freeze-dried bone allograft alone and along with platelet-rich fibrin: a clinical and radiographic study. Contemp Clin Dent. 2016, 7:371-6. 10.4103/0976-237X.188567