Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-95 (p) ISSN Print: 2348-6805

Case Report

Role of Platelet Rich Fibrin as barrier membrane in soft tissue healing around dental implants: A case report

[1]Joshi Salil, [2]Sharma Aditya, [3]Kaushik Mayur, [4]Agarwal Mrinalini

[1,2,3,4]Department of Periodontology, Subharti Dental College & Hospital, Swami Vivekanand Subharti University, Meerut, Uttar Pradesh, India

ABSTRACT:

Platelet Rich Fibrin (PRF) is an autologous source of growth factors with a great potential for soft tissue and bone regeneration, without causing inflammatory reactions that can be used alone or in combination with bone grafts to promote hemostasis, bone growth, and maturation. The purpose of the present case report was to evaluate the effect of Platelet Rich Fibrin on soft tissue healing response around dental implants. It was concluded that the use of PRF as barrier membrane appears to accelerate the healing at the surgical site thereby reducing postoperative complications associated with dental implants.

Keywords: Implants, Platelet Rich Fibrin, Soft Tissue Healing

Received: 10 May, 2021 Accepted: 17 June, 2021

Corresponding author: Joshi Salil, Department of Periodontology, Subharti Dental College & Hospital, Swami Vivekanand Subharti University, Meerut, Uttar Pradesh, India

This article may be cited as: Salil J, Aditya S, Mayur K, Mrinalini A. Title: Role of Platelet Rich Fibrin as barrier membrane in soft tissue healing around dental implants: A case report. J Adv Med Dent Scie Res 2021;9(8):1-5.

INTRODUCTION

Implant success is determined by its stability and longevity while in function. To achieve this objective various design modifications, surface alterations, growth factors and biomaterials have been employed in the field of dental implantology. [1]

Platelet Rich Fibrin (PRF) is a second generation platelet concentrate developed by Choukran *et al* in 2001. An autologous reservoir of concentrated growth factors which accumulates platelets and cytokines in a physiologic fibrin clot that doesn't lead to any immune response.[2] PRF promotes angiogenesis, graft stabilization, hemostasis, leads to more efficient cell migration and proliferation thereby accelerating healing process at the surgical site.[3]

The aim of this case report was to evaluate the response of PRF as a barrier membrane in soft tissue healing around dental implant.

CASE REPORT

A 47 year old male patient reported to the Department of Periodontology, Subharti Dental College & Hospital, Swami Vivekanand Subharti University, Meerut, India with chief complaint of missing tooth in lower right back region of the mouth. The patient was physically fit with no apparent medical condition. On intra oral examination mandibular 1st molar was missing with adjacent and opposing teeth intact. Sufficient buccal-lingual and mesial distal space was present at the operative site (Fig 1)

Fig 1: Pre-Operative View

A pre-operative diagnostic CBCT scan was done to determine the bone quality and dimensions of the implant. Patient was explained about the procedure and informed consent was obtained.
Patient was prescribed antibiotic (Amoxicillin with Clavulanic acid) along with a probiotic and an antacid one day prior to surgery

PREPARATION OF PRF

10 ml of patient's blood was collected in a test tube without any anticoagulant and centrifuged at2700 RPM for 12 mins using REMI® Medico Plus centrifuge thereby separating the blood into the three components (Fig 2a):

1. Acellular Plasma (Top Layer)
2. PRF Clot (Middle Layer)
3. RBC Base (Bottom Layer)

The acellular plasma was discarded and the PRF Clot was separated from the RBC base (Fig 2b). The PRF clot thus obtained was compressed between two glass plates to prepare the PRF membrane.

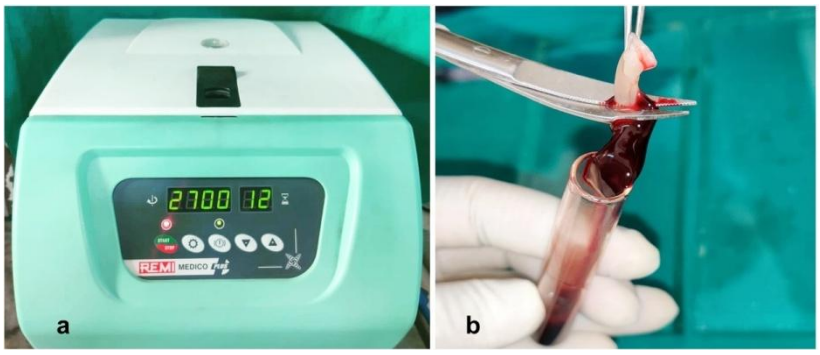

Fig 2a: Centrifugation cycle underway for preparation of Platelet Rich Fibrin (PRF)
Fig 2b: Separation of PRF clot from RBC base after discarding acellular plasma

SURGICAL PROCEDURE

After administration of local anesthesia, sub-crestal incision was given with a 12 no. blade and mucoperiosteal flap was reflected to expose the implant site. Lance drill was passed through surgical stent to the depth corresponding to implant length. Sequential drilling was done to prepare osteotomy site and paralleling pin was used to verify the desired angulation. Alpha bio® SPI implant was inserted at the osteotomy site followed by placement of cover screw into the implant with gentle pressure until resistance was met and seated into its final position (Fig 3, 4). The PRF membrane prepared was trimmed, shaped accordingly and placed over the implant site as a barrier membrane (Fig 5). Flap was approximated and sutured using 3-0 Polyglycolic acid (PGLA) sutures to achieve proper closure of the surgical site (Fig 6). Post operatively the patient was prescribed antibiotic, NSAID, probiotic and antacid for 5 days. Patient was instructed to rinse with 0.12% Chlorhexidine mouthwash and was instructed not to brush and chew from the operated side for 14 days. The patient was recalled at 14 days, 2 months and 3 months interval. Healing at the surgical site occurred uneventfully without any complications (Fig 7). Final prosthesis was delivered to the patient after 3 months post - implant insertion (Fig 8, 9)

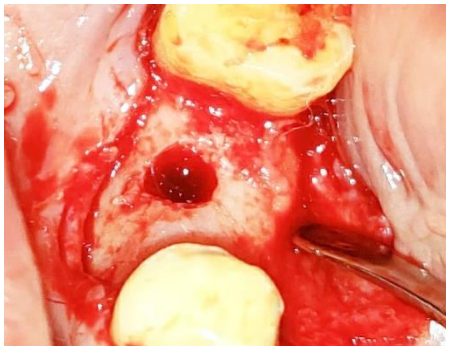

Fig 3: Osteotomy site prepared

Fig 4: Implant placement done

Fig 5: PRF membrane trimmed and placed over the implant as a barrier membrane

Fig 6: Flap approximated and sutured with 3-0 Polyglycolic acid (PGLA) sutures

Fig 7: Healing after 2 months post implant placement

Fig 8: Final prosthesis delivered

Fig 9: RVG after 3 months at crown delivery

DISCUSSION

Implants are a tested and proven treatment modality for the replacement of missing teeth. The success of an implant is measured by its ability to osseointegrate with the surrounding alveolar bone. [4]

Maintenance of good periodontal health around teeth depends upon the amount of keratinized attached gingiva. Similarly presence of healthy, keratinized soft tissue around implants affects their maintenance and stability in long run.

Linkevicius *et al* [5] demonstrated the importance of soft tissue biotype on implants and advocated placement of implants sub- crestally so as to reduce the amount of bone loss in first year. Bhat *et al* [6] evaluated the influence of soft tissue biotype on the marginal bone changes around implants. They concluded that the amount of marginal bone loss at the end of first year was more in patients with a thin tissue biotype as compared to thick tissue biotype.

PRF clot contains a large number of platelets within fibrin meshwork that are rich in various growth factors like vascular endothelial growth factor (VEGF), endothelial growth factor (EGF), platelet derived growth factor (PDGF), insulin like growth factors (IGF) and transforming growth factor beta (TGF-β) that play a crucial role in hard and soft tissue regeneration. [3]

Various studies have demonstrated the desirable effects of PRF in dentistry.

Khattar *et al* [7] evaluated the effect of DFDBA with autologous PRF in the treatment of periodontal intrabony defect and concluded that use of PRF with DFDBA in treatment of intrabony defects led to significant improvement in the clinical probing depth, relative attachment level and bone fill.

Öncü *et al* [8] in a study on the effect of PRF on implant stability concluded that PRF application along with implants resulted in improved stability during initial healing period.

Tomar *et al* [9] in a case report demonstrated that PRF membrane when used as palatal bandage reduced the post op pain and discomfort at the FGG donor site and accelerated the healing process thus reducing the donor site co-morbidity associated with the procedure.

Rationale for application of PRF membrane over the implant site, in the present case was to employ principles of guided tissue regeneration by placing PRF as a barrier between bone and connective tissue for creation of a secluded space to enhance proliferation of bone forming cells around the implant as well as utilizing the fibrin forming properties of PRF clot to accelerate the healing process. [10]

CONCLUSION

Use of PRF membrane releases a cascade of growth factors at the surgical site leading to reduction of post-operative pain, discomfort and complications associated with initial healing phase in implant surgery thereby accelerating the healing process.

A further follow up of one year is required to determine the effectiveness of the procedure regarding bone changes at the implant site.

REFERENCES

1. Misch CE, Perel ML, Wang HL, Sammartino G, Galindo-Moreno P, Trisi P, Steigmann M, Rebaudi A, Palti A, Pikos MA, Schwartz-Arad D, Choukroun J, Gutierrez-Perez JL, Marenzi G, Valavanis DK. Implant success, survival, and failure: the International Congress of Oral Implantologists (ICOI) Pisa Consensus Conference. Implant Dent. 2008;17:5-15.
2. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhyi J, Gogly B. Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part II: platelet-related biologic features. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2006;101:e45-50.
3. Agrawal AA. Evolution, current status and advances in application of platelet concentrate in periodontics and implantology. World J Clin Cases. 2017;5:159-171.
4. Jahan S, Kaushik M, Wadhawan A. Comparative Evaluation of Peri-implant Soft and Hard Tissue with and without Application of Bisphosphonate on Implant Surface and Osteotomy Site - A Clinico-radiographic, Cone-beam Computed Tomographic Study. Contemp Clin Dent. 2019;10:208-213.
5. Linkevicius T, Apse P, Grybauskas S, Puisys A. The influence of soft tissue thickness on crestal bone changes around implants: a 1-year prospective controlled clinical trial. Int J Oral Maxillofac Implants. 2009;24:712-719.

6. Bhat PR, Thakur SL, Kulkarni SS. The influence of soft tissue biotype on the marginal bone changes around dental implants: a 1-year prospective clinico-radiological study. Journal of Indian Society of Periodontology. 2015;19:640-644.
7. Khattar S, Kaushik M, Tomar N. The use of platelet rich fibrin and demineralized freeze dried bone allograft in the treatment of intrabony defect-A case report. Sch J Med Case Rep. 2014;2:563-567.
8. Öncü E, Alaaddinoglu EE. The effect of platelet-rich fibrin on implant stability. International Journal of Oral & Maxillofacial Implants. 2015;30:578-582.
9. Tomar N, Singh R, Jain G, Kaushik M, Dureja D. Enhancement of healing of donor hard palate site using platelet-rich fibrin. Journal of Current Research in Scientific Medicine. 2016;2:132-135.
10. Sharma A, Kaushik M, Saleem M. Guided Bone Regeneration. IJDSIR. 2020;3:537-542.