

Palatal Wound Healing Using Platelet Rich Fibrin: A Case Report

Priyadharshini V^{1,*}, Neelam Khalia², Triveni MG³, Mehta DS³

¹Department of Periodontology,
Indira Gandhi Institute of Dental
Sciences, Sri Balaji Vidyapeeth
(Deemed to be University),
Puducherry-607402.

²Ridgetop Dental International,
Bangalore.

³Department of Periodontics,
Bapuji Dental College and
Hospital, Medical College Road,
Kuvempu Nagar, Davangere,
Karnataka 577004.

For Correspondence

*Dr. Priyadharshini V

Email: privina05@gmail.com

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ABSTRACT

The task of managing non-healing wounds especially in instances with bone exposure is clinically challenging. Platelet-rich fibrin (PRF) represents a new step in the platelet gel therapeutic concept with simplified processing minus artificial biochemical modification. This article aims to describe a case of bone exposure following a soft tissue harvesting procedure and its management with platelet rich fibrin.

INTRODUCTION

Healing is a complex and a dynamic process which begins with clot formation and platelet degranulation releasing the growth factors necessary for wound repair.¹ Multiple factors can lead to impaired wound healing. In general terms, the factors that influence repair can be categorized into local and systemic. These factors are interrelated to each other as the presence of one influences the other in wound healing.² The presence of adequate blood supply is essential as it carries oxygen, growth factors and nutrients which are considered critical for wound healing.

If the synchrony of the healing process gets disrupted due to any reason, it can lead to complications even after performing a successful surgical procedure. Thus, the absence of blood supply deprives the tissue of the access to substances necessary for its metabolic sustenance which, in turn, may have resulted in necrosis of the overlying epithelium, delayed wound healing, and infection causing bone exposure.³ Platelet-derived growth factors are biologically active substances that enhance tissue repair mechanisms such as chemotaxis, cell proliferation, angiogenesis, extracellular matrix deposition and remodeling.⁴

Owing to its stimulatory effect on angiogenesis and epithelialization,

platelet rich fibrin (PRF), a second generation platelet concentrate, is an excellent material for enhancing wound healing. Preparation of PRF follows the protocol developed by Choukroun *et al.* in Nice, France.⁵ At the site of injury, platelets release an arsenal of potent inflammatory and mitogenic substances that are involved in all aspects of wound healing. PRF has proved its efficiency as a wound healing agent in skin wounds and recent evidence has suggested its usage in oral cavity for different treatment procedures. It has also been used topically for soft and hard tissue injuries. The following case report describes the expediency of PRF in managing a complication that occurred after harvesting the graft from the palate.

CASE REPORT

A 35 year old healthy female patient came with the chief complaint of pain in the palatal region. The patient was systemically healthy. Past dental history revealed that the patient had undergone a surgical procedure for the management of root exposure in her lower front teeth from a private practitioner. On clinical examination the patient presented with symptoms of severe pain in the palatal region with bad odor emanating from the oral cavity. The palatal mucosa in relation to tooth no# 14 and 15 revealed an exposed bone with yellowish slough

formation with surrounding erythema and edema (Figure 1a). Overlying epithelium showed necrosis. Based upon the history and the clinical features of the patient a diagnosis of complication following a soft tissue harvesting procedure was given and was decided to use PRF to initiate healing. Informed consent was taken from the patient. Ten ml of venous blood was collected from antecubital fossa of the patient and was immediately transferred to a sterile test tube. The blood was centrifuged at 3000 rpm for 10 minutes, following which the platelet-rich fibrin was obtained according to Choukron's protocol⁵ (Figure 1b). The palate was anesthetized and the wound was debrided with 5% iodine solution and bleeding was induced from the surrounding tissues. Pre-Suturing was done to prevent the dislodgement of PRF (Figure 1c). The PRF placed at the wound site and was secured with cross mattress suture (Figure 1d). A tin foil was also placed to stabilize the membrane (Figure 1e). Periodontal dressing was given to protect the treated area and post-operative instructions were reinforced to the patient (Figure 1f).

At 10 days postoperative, the size of the defect was reduced considerably but yet the healing was unsatisfactory, so again PRF was placed at the wound site (Figure 2a) and the patient was recalled after a week for reevaluation. Recall visits showed satisfactory healing and one month post-operative showed complete epithelialization of the wound (Figure 2b).

DISCUSSION

The wound-healing process mainly consists of four highly integrated and overlapping phases namely hemostasis, inflammation, proliferation, and tissue remodeling or resolution. These phases and their bio-physiological functions must occur in the proper sequence, at a specific time, and continue for a specific duration at an optimal intensity.² Hence various factors can interfere and disrupt the sequence of the healing process which can lead to impaired tissue repair.

Root coverage procedures with the use of soft tissue autografts have been long documented with excellent success rates but they require an additional site for harvesting the graft.⁶ In most cases the graft is harvested from the palate. In the present case, the patient might have undergone a free gingival grafting (FGG) procedure, the healing of which, could have been delayed due to reasons like excessive bleeding leading to slow healing and necrosis of the donor site.⁷ Literature quotes that pain and morbidity is more severe in case of a free gingival grafting procedure

Figure 1(a): Bone exposure in the palate



Figure 1(b): PRF prepared



Figure 1(c): Pre suturing done to prevent dislodgement of the PRF

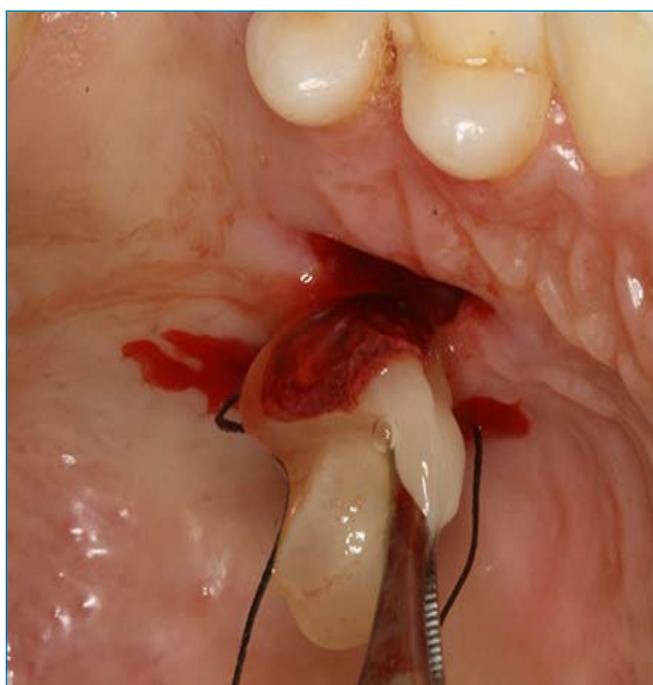


Figure 1(d): PRF within the wound site and cross mattress suturing done



Figure 2(a): Healing after 10 days



Figure 1(e): Tin foil placed and sutured



Figure 2(b): Healing after one month

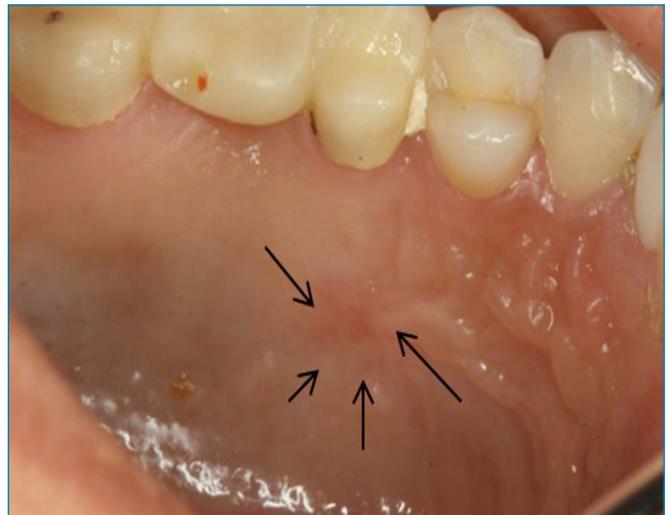


Figure 1(f): Periodontal dressing given



where the healing of the donor site takes place by means of secondary intention.⁸

PRF has been extensively used nowadays to treat various conditions like extraction socket preservation, intrabony defects, sinus augmentation procedures for implant placement, ridge augmentation, recession coverage procedures and healing of donor site with efficacious results.²

A study has reported that when patients were treated using PRF after harvesting FGG, it showed a faster healing of the donor site with almost a complete wound closure at 7 days and complete wound closure and epithelialization at 14 days postoperatively.⁹ PRF contains a pool of growth factors and is also economical for the patient.

In the present case the PRF obtained was placed in the wound without compressing so as to maintain the pool of growth factors within it.

PRF releases increased amounts of three main growth factors namely transforming growth factor b-1 (TGFbeta-1), platelet-derived growth factor AB (PDGF-AB), vascular endothelial growth factor (VEGF), and a significant amount of coagulation matricellular glycoprotein (thrombospondin-1, TSP-1) during 7 days. It is believed to contain platelets in a concentration seven times that of blood. Apart from these PRF also secrete Endothelial growth factor (EGF), Fibroblast growth factor (FGF), and various proinflammatory cytokines such as Interleukin (IL-1 β , IL-6) and Tumor necrosis factor- alpha (TNF- α).³ These secretory proteins direct the wound healing by creating a conducive environment for tissue regeneration.

PRF entraps circulating stem cells due to its unique fibrin structure. This property of PRF finds application in healing of large osseous defects where there is migration of stem cells differentiating into osteoblast phenotype.¹⁰ PRF also promotes the expression of phosphorylated extracellular signal-regulated protein kinase (p-ERK) and stimulates the production of osteoprotegerin (OPG) which in turn causes proliferation of osteoblasts.¹¹ In a one year prospective study on osteotome sinus floor elevation using Choukroun's platelet-rich fibrin grafting material, it was clearly demonstrated that fibrin matrix of PRF directly promotes angiogenesis.¹² Hence PRF by Choukroun's technique is a simple and inexpensive technique for the successful regeneration of periodontal tissues.⁵ The use of PRF in this present case can be justified because of its immense healing properties.

CONFLICTS OF INTEREST

None

References

1. Rozman P, Bolta Z. Use of platelet growth factors in treating wounds and soft tissue injuries. *Acta Dermatoven APA.* 2007;16: 156-65.
2. S. Guo and L.A. DiPietro. Factors affecting wound healing. *critical reviews in oral biology & medicine.* *J Dent Res* 2012;89: 219-29,
3. Jain V, Triveni MG, Tarun Kumar AB, Mehta DS. Role of platelet-rich-fibrin in enhancing palatal wound healing after free graft. *Contemp Clin Dent.* 2012;3:S240-43.
4. Margolis DJ, Kantor J, Santanna J, Strom BL, Berlin JA. Effectiveness of platelet releasate for the treatment of diabetic neuropathic foot ulcers. *Diabetes Care.* 2001;24:483-8.
5. Choukroun J, Diss A, Simonpieri A, Girard MO, Schoeffler C, Dohan SL, *et al.* Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part IV: Clinical effects on tissue healing. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2006; 101:E56-60.
6. Zucchelli G, De Sanctis M. Long-term outcome following treatment of multiple Miller class I and II recession defects in esthetic areas of the mouth. *J. Periodontol* 2005;76: 2286-92.
7. Hou LT, Yan JJ, Liu CM, Huang JF, Jehing SM, Wong MY *et al.* Treatment of the gingival recession - literature review of current progress. *Chin Dent J* 2005; 24 71-8.
8. Griffin TJ, Cheung WS, Zavras AI, Damoulis PD. Postoperative complications following gingival augmentation procedures. *J Periodontol.* 2006 77:2070-9.
9. Kulkarni MR, Thomas BS, Varghese JM, Bhat GS. Platelet rich fibrin as an adjunct to palatal wound healing after harvesting a free gingival graft: A case series. *J Indian Soc Periodontol.* 2014;18: 399-402.
10. Chang IC, Tsai CH, Chang YC. Platelet-rich fibrin modulates the expression of extracellular signal-regulated protein kinase and osteoprotegerin in human osteoblasts. *J Biomed Mater Res A.* 2010;95:327-32.
11. Diss A, Dohan DM, Mouhyi J, Mahler P. Osteotome sinus floor elevation using Choukroun's platelet-rich fibrin as grafting material: a 1-year prospective pilot study with microthreaded implants. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2008;105, 572e9.

Type 2 Poliovirus Detection after Global Withdrawal of Trivalent Oral Vaccine

Mass campaigns with oral poliovirus vaccine (OPV) have brought the world close to the eradication of wild poliovirus. However, to complete eradication, OPV must itself be withdrawn to prevent outbreaks of vaccine-derived poliovirus (VDPV). Synchronized global withdrawal of OPV began with serotype 2 OPV (OPV2) in April 2016, which presented the first test of the feasibility of eradicating all polioviruses.

High population immunity has facilitated the decline in the prevalence of Sabin-2 poliovirus after OPV2 withdrawal and restricted the circulation of vaccine derived polio virus2 to areas known to be at high risk for transmission. The prevention of VDPV2 outbreaks in these known areas before the accumulation of substantial cohorts of children susceptible to type 2 poliovirus remains a high priority. (Funded by the Bill and Melinda Gates Foundation and the World Health Organization.)

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