



EFFECT OF PLATELET-RICH FIBRIN (PRF) IN PREVENTING THE OCCURRENCE OF ALVEOLAR OSTEITIS AFTER TRANSALVEOLAR EXTRACTION

Sanjeev N., Madhumati Singh., Sendhil Kumar., B S Bhavana Koushik., Amith Woody Ashok Nived R and Charulakshmi S Nair

Raja Rajeswari Dental College and Hospital, Bangalore

ARTICLE INFO

Article History:

Received 14th September, 2021

Received in revised form 29th

October, 2021

Accepted 05th November, 2021

Published online 28th December, 2021

Key words:

Platelet rich fibrin, Alveolar osteitis, Granulation tissue, Halitosis and Trans alveolar extractions.

ABSTRACT

Aim: To evaluate the effectiveness of platelet-rich fibrin (PRF) in preventing alveolar osteitis (AO) development following trans alveolar extractions.

Materials and Methods: The present study was done on 60 patients on an outpatient basis in the Department of Oral and Maxillofacial surgery in Rajarajeswari dental college and hospital, Bangalore. Patients indicated for trans alveolar extraction were selected for the study. Following extraction, platelet rich fibrin prepared from patients own blood was placed in the extraction socket of the study group. The patients were assessed for postoperatively pain, halitosis and presence of healthy granulation tissue. On the 3rd and 7th postoperative day.

Results: All the local signs and symptoms were mild to moderate and subsided in normal course of time. Pain was less in study group compared to control group. Soft tissue healing was better in the study group. Socket healing after trans alveolar extraction was better and faster in the study group.

Conclusion: The study showed that autologous PRF is biocompatible and has significantly improved soft tissue healing and thus preventing the incidence of alveolar osteitis. However, a more elaborate study with a larger number of clinical cases is very much essential to be more conclusive regarding its efficacy.

Copyright©2021 *Sanjeev N et al.* This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

INTRODUCTION

Any disruption in the structural integrity of the skin, mucosal surfaces or an organ is known as a wound. The cause for this is multifactorial ranging from disease to accidents or even iatrogenic. The complexity of the process of healing and restoration of integrity of the disrupted tissue is extensively studied, the multiple cellular and extracellular pathways which upon activation restores the tissue. (1) (2)

The four stages of wound healing, haemostasis, inflammation, proliferation and tissue remodelling. The platelets at the site of injury accumulate and release growth factors responsible for bone and tissue regeneration. Based on this many studies have been carried out to increase the platelet concentration in the area by introducing platelet preparations. (1) (2)

Platelet rich plasma, an autologous concentrate which contains relatively small volume of plasma helps in aiding the injured site with growth factors, although their effectiveness is only confined to the initial stage of healing and does not render any function in the later stages of healing. (8).

Choukroun introduced a new family of platelet concentrate in France to overcome the disadvantages of PRP. PRF (Platelet Rich Fibrin) is considered as second-generation platelet

concentrate, because the natural concentrate is produced without any anticoagulants or gelifyingagents. (3)

PRF consists of a matrix of fibrin that contains platelet cytokines, growth factors and cells trapped in the matrix released over a period of time, it acts as a resorbable membrane that aids healing of bone too.

In Oral and Maxillofacial Surgery PRF is used in sinus lift procedures, implant procedures, alveolar osteitis, extracted sockets and cyst enucleation procedures (11)

MATERIALS AND METHODS

The present study was done in the Department of Oral and Maxillofacial surgery in Rajarajeswari dental college and hospital, Bangalore. Patients indicated for trans alveolar extraction were selected for the study. Written informed consent will be taken from the subjects prior to treatment.

Patients were divided into two groups of 30 each.

Group 1: patients receiving PRF (study group)

Group 2: patients not receiving PRF (control group)

*Corresponding author: **Sanjeev N**

Raja Rajeswari Dental College and Hospital, Bangalore

PRF Preparation

Under aseptic conditions, blood samples are collected about half an hour before the procedure for the preparation of PRF using Choukrouns technique wherein 10ml of whole blood without anticoagulant centrifuged at 3000 rpm at room temperature for 10mins. This prepared PRF has to be used within a span of one hour of preparation.

On centrifugation 3 layers are formed namely – Red blood cells, acellularplasma, buffy coat layer.

To obtain the PRF preparation the buffy coat layer is separated and is placed in surgical gauze and pressure is applied to obtain PRF membranes.

Surgical Procedure

Trans alveolar extraction is carried out under aseptic conditions by a single operator.

- Patient is advised to rinse the mouth with chlorhexidine.
- Standard scrubbing and painting is done with betadine.
- Anaesthesia is administered using 2% lignocaine with epinephrine 1:200000.
- Trans alveolar extraction is carried out atraumatically
- After irrigation of the socket the PRF is placed only in the study group and sutured.
- Analgesics prescribed for 3-5 days

Socket healing is assessed using the following parameters:

1. Pain assessed using visual analogue scale. 0-10 rating given for nociceptive experience
2. Presence/Absence of halitosis
3. Patient will be reviewed post operatively on day 3 and day 7.

RESULTS

In our study out of 60 patients,1 patient (3.3%) had halitosis in group A and 5 patients (16.7%) in group B. there was absence of healthy granulation tissue in only 1 patient (3.3%) from group A whereas 4 patients (13.3) from group B showed absence of healthy granulation tissue.

Based on the VAS scale, the minimum and maximum pain scores in groupA on the 3rd post operative day were found to be 2 and 5 respectively with a mean of 3.63 and a standard deviation of 1.03. The minimum and maximum pain scores in group A on the 7th post operative day were found to be 0 and 5 respectively with a mean of 0.37 and a standard deviation of 0.99.

Based on the VAS scale, the minimum and maximum pain scores in group B on the 3rd post operative day were found to be 4 and 8 respectively with a mean of 6.73 and a standard deviation of 1.04. The minimum and maximum pain scores in group B on the 7th post operative day were found to be 1 and 6 respectively with a mean of 2.83 and a standard deviation of 1.36.

Among the 60 trans alveolar extractions performed, 5 cases were diagnosed with AO where 1 patient was from the PRF group and 4 were from the non-PRFgroup.Based on the independent sample t test, there was a highly significant association with the use of PRF and the reduction in pain levels, presence of healthy granulation tissue and halitosis which were used as indicators to diagnose AO.

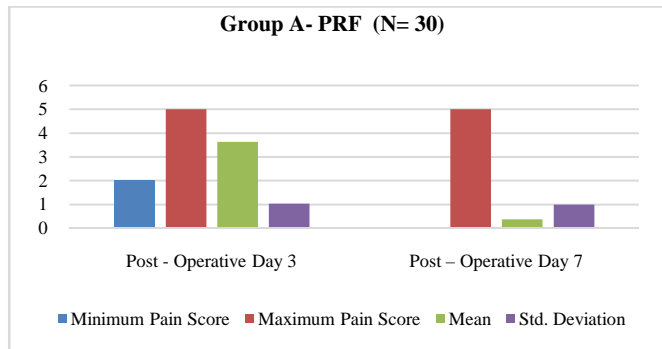


Table 1 Post-operative Pain scores in patients of Group A (PRF) at intervals of Day 3 and Day 7

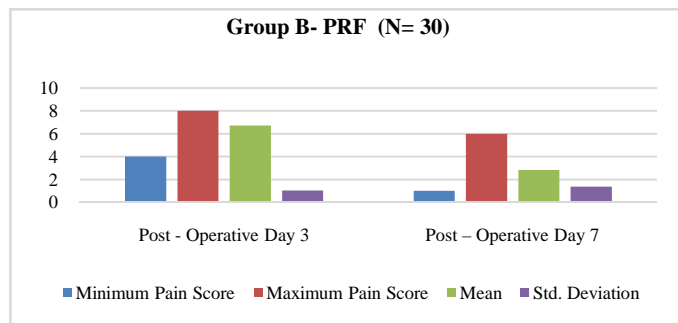


Table 2 Post-operative Pain scores in patients of Group B (Non-PRF) at intervals of Day 3 and Day 7

Table 3 Comparison of mean Pain Scores in Group A (PRF) and Group B (Non-PRF) study participants at Post –Operative Day 3 & Day 7 intervals

Interval	Groups	N	Mean ± Std. deviation	Std.Error	t	df	P value
Post - Operative Day 3	PRF (Group –A)	30	3.63 ± 1.03	0.26	-11.6	58.0	0.001**
	Non – PRF (Group-B)	30	6.73 ± 1.04				
Post - Operative Day 7	PRF (Group –A)	30	0.37 ± 0.99	0.30	-8.01	58.0	0.001**
	Non – PRF (Group-B)	30	2.83 ± 1.36				

Independent sample t test p value ** highly significant

Table 4 Comparison of Post-Operative Halitosis in patients of Group A(PRF) and Group B (Non-PRF) at intervals of Day 3 and Day 7

Variables	Categories	PRF Group A (N=30)		Non PRF Group B (N=30)	
		n	%	n	%
Post - Operative Day 3	Halitosis on	28	93.3%	26	86.7%
	Halitosis absent	2	6.7%	4	13.3%
Post – Operative Day 7	Halitosis on	29	96.7%	25	83.3%
	Halitosis absent	1	3.3%	5	16.7%

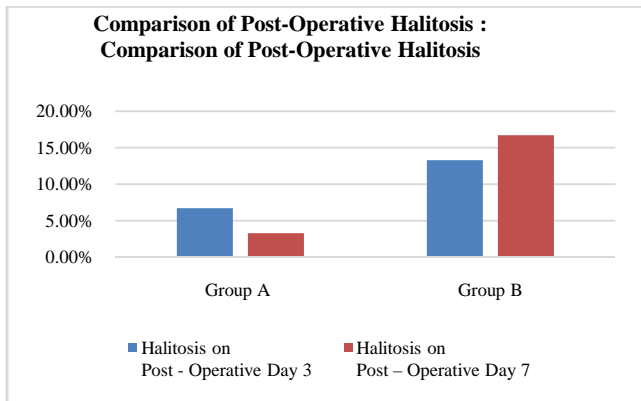
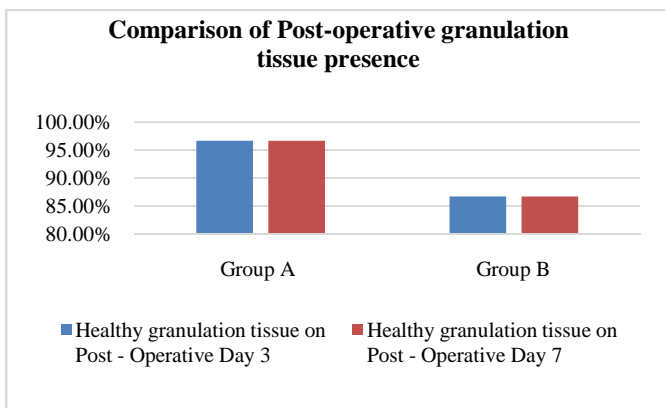


Table 5 Comparison of Post-operative granulation tissue health in patients of Group A (PRF) and Group B (Non-PRF) at intervals of Day 3 and Day 7

Variables	Categories	PRF Group A (N=30)		Non PRF Group B (N=30)	
		n	%	n	%
Healthy granulation tissue on Post - Operative Day 3	Absent	1	3.3%	4	13.3%
	Present	29	96.7%	26	86.7%
Healthy Granulation tissue on Post - Operative Day 7	Absent	1	3.3%	4	13.3%
	Present	29	96.7%	26	86.7%



DISCUSSION

Healing as we know occurs by two processes repair and regeneration. The healing of an extraction socket also involves these two mechanisms. To name a few cellular events that’s involved in healing are the specific signalling molecules, growth factors, cytokines, TGF-β1 and PDGF-A. These molecules are detected on the surface of cells upon tissue injury. (1) (2)

Alveolar Osteitis or dry socket is a painful condition occurring due to compromised healing and is debilitating in nature.it has shown an incidence of 1-30% after permanent teeth extraction and is self-limiting. The span of this condition ranges from 5-10days. 1-3 days after surgery there is foul taste and lymphadenitis, halitosis. The extent of AO depends on the difficulty index of surgery, amount of trauma intraoperatively, the surgeons experience, patients age, habits such as smoking, infection present pre operatively, excessive irrigation of the socket, use of oral contraceptives and menstrual cycle in women. (11)

PRF is a second-generation platelet concentrate after PRP. This matrix is obtained when the platelets collide and against the wall of the test tube in the centrifuge leading to release of

granules. Gradual polymerisation of fibrins gives rise to PRF which is flexible, elastic and has a large pool of leucocytes and cytokines. The gradual release of fibrin from fibrinogen from the thrombin that’s available physiologically hence helping the healing process.

PRF can be used widely in bone augmentation, angiogenesis, wound healing and has shown good results. (16)

In a Double-Blind Randomized Clinical Trial conducted by Eshghpour *et al*, the Effect of Platelet-rich Fibrin (PRF) on Frequency of Alveolar Osteitis following Mandibular Third Molar Surgery was evaluated. Among 156 surgeries performed in this study among the extraction sockets that received PRF, the risk of AO development was 0.44 of the control sockets. (11)

In a study conducted by Quadri *et.al* for the potential osseous regeneration of PRF he found that there was increased bone density, bone regeneration and better soft tissue healing in extraction sockets. (12)

Our study found similar results and we found better healing of soft tissues, decreased incidence of AO even in traumatic extractions which helped the patient with post operative pain as it was minimal to nil. Use of PRF has been observed to yield better healing by initiating cellular events that retain throughout the process of healing and help in better outcomes.

CONCLUSION

Our observations with the study are that using PRF can decrease the incidence of alveolar osteitis especially following traumatic extractions, patients in the extremes of age. PRF enhances the growth factors locally, revascularisation and thereby increased potential for regeneration at the site. Usage of PRF has to be encouraged to yield better outcomes after procedures of exodontia.

References

1. Singh S, Young A, McNaught CE. The physiology of wound healing. Surgery-Oxford InternationalEdition. 2017 Sep; 1;35(9):473-7.
2. Smith SE, Roukis TS. Bone and wound healing augmentation with platelet-rich plasma. Clinics in podiatric medicine and surgery. 2009 Oct; 31; 26(4):559-88.
3. Raja VS and Naidu ME. Platelet-rich fibrin: Evolution of a second-generation platelet concentrate. Indian J Dent Res 2008;19(1):42-46.
4. Naik B, Karunakar P, Jayadev M, Marshal VR. Role of Platelet rich fibrin in wound healing: A critical review. *Journal of conservative dentistry: JCD*. 2013 Jul; 16(4):284.
5. Sánchez AR, Sheridan PJ, Kupp LI. Is platelet-rich plasma the perfect enhancement factor? A current review. *International Journal of Oral & Maxillofacial Implants*. 2003 Jan; 1;18(1).
6. Kaul RP, Godhi SS, Singh A. Autologous platelet rich plasma after third molar surgery: a comparative study. *Journal of maxillofacial and oral surgery*. 2012 Jun; 1;11(2):200-5.
7. Moraschini V, Barboza ES. Effect of autologous platelet concentrates for alveolar socket preservation: a systematic review. *International journal of oral and maxillofacial surgery*. 2015 May; 31;44(5):632-41.

8. Das JR, Parambath PS, Arthur AS. Efficacy of platelet rich plasma in third molar impaction surgery, PRP in third molar surgery. *Universal Research Journal of Dentistry*. 2014 Jan; 1;4(1):36.
9. Rao SG, Bhat P, Nagesh KS, Rao GH, Mirle B, Kharbhari L, Gangaprasad B. Bone regeneration in extraction sockets with autologous platelet rich fibrin gel. *Journal of maxillofacial and oral surgery*. 2013 Mar; 1;12(1):11-6.
10. Eshghpour M, Majidi MR, Nejat AH. Platelet-rich fibrin: An autologous fibrin matrix in surgical procedures: A case report and review of literature. *Iranian journal of otorhinolaryngology*. 2012; 24(69):197.
11. Eshghpour M, Dastmalchi P, Nekuyi AH, Nejat A, Effect of Platelet-rich Fibrin (PRF) on Frequency of Alveolar Osteitis following Mandibular Third Molar Surgery: A Double- Blind Randomized Clinical Trial, *Journal of Oral and Maxillofacial Surgery* (2014).
12. Quadri A, Quadri S, Khan TA. Potential for Osseous Regeneration of Platelet Rich Fibrin: A Comparitive Study in Mandibular Third Molar Socket. *IJSS Journal of Surgery* 2016;2(6):75-78.
13. Chang YC, Zhao JH. Effects of platelet-rich fibrin on human periodontal ligament fibroblasts and application for periodontal infrabony defects. *Australian dental journal*. 2011 Dec; 1;56(4):365-71.
14. Kalburgi VC, Warad S, Jenefer HD, Ashok N, Kokatnur V. Application of Platelet Rich Fibrin and Osseomold Bone Graft in Different Intrabony Defects–2 Case Reports. *International Journal of Clinical Dental Science*. 2012 Jan; 7;3(1).
15. Knighton DR, Hunt TK, Thakral KK, Goodson 3rd WH. Role of platelets and fibrin in the healing sequence: an in vivo study of angiogenesis and collagen synthesis. *Annals of surgery*. 1982 Oct; 196(4):379.
16. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhyi J, *et al*: Platelet-rich fibrin (PRF): a second-generation platelet concentrate—part II: platelet-related biologic features. *Oral Surg Oral Med Oral Pathol Oral RadiolEndod* 101(3): e45-50, 2006.

How to cite this article:

Sanjeev N *et al* (2021) 'Effect Of Platelet-Rich Fibrin (Prf) In Preventing The Occurrence Of Alveolar Osteitis After Transalveolar Extraction', *International Journal of Current Advanced Research*, 10(12), pp. 25623-25626.
DOI: <http://dx.doi.org/10.24327/ijcar.2021.25626.5116>
