

# The Effects of Platelet-Rich Fibrin Membrane on Secondary Healing After Pleomorphic Adenoma Excision in the Hard Palate: A Preliminary Study

Özer Erdem Gür, Nuray Ensari, Nevreste Didem Sonbay Yılmaz

Department of ENT, Antalya Education and Training Hospital, Antalya, Turkey

## Abstract

**Aim:** This study aims to evaluate the effects of platelet-rich fibrin (PRF) membrane on secondary healing after pleomorphic adenoma (PA) excision in the hard palate. **Materials and Methods:** PRF membranes were laid over mucosal defects which occurred following PA excision in the hard palate. The secondary healing process was monitored in the patients by follow-up examinations on postoperative days 5, 10, 15, 20, 25, 30, 35, and 40. **Results:** In this preliminary study, epithelialization was observed to have completed on the 30<sup>th</sup> day of follow-up in the first patient and on the 35<sup>th</sup> day in the second and third patients. No bleeding or infection was seen in any of the three patients. **Conclusions:** PRF membrane as a new method in the secondary healing after PA excision in the hard palate provided rapid healing and reduced complications such as bleeding and infection.

**Keywords:** Hard palate, platelet-rich fibrin, pleomorphic adenoma, secondary healing

## INTRODUCTION

Pleomorphic adenoma (PA) is the most common benign tumor of the major and minor salivary glands. The site mainly affected when it reaches the minor salivary glands is the palate. When this region is involved, clinical presentation is as a firm, slow-growing, painless swelling, covered with mucosa of normal appearance, rarely reaching large dimensions.<sup>[1-3]</sup> Treatment of extracapsular excision, including the mucosal lining and palatal periosteum, is generally sufficient. In large tumors where bone invasion is seen, removal of the palatal bone may be necessary.<sup>[3,4]</sup>

Mucosal defects which occur following PA excision in the hard palate will ideally heal through secondary healing. In the process of secondary healing, there may be complications such as secondary bleeding, delayed epithelialization, and infections.<sup>[5]</sup> Platelet-rich fibrin (PRF) is a second-generation thrombocyte product obtained from a concentration of thrombocytes and cytokines within the fibrin network. Thrombocytes play an important role in hemostasis and wound healing. Growth factors, such as transforming growth factor beta-1 (TGFβ-1), epidermal growth factor (EGF),

platelet-derived growth factor (PDGF), insulin-like growth factor (IGF-1), and vascular endothelial growth factor (VEGF), which function in the healing stages, are found in the alpha granules of thrombocytes. It also acts as an autogenous antibiotic because of the high number of leukocytes contained, thereby reducing the risk of infection.<sup>[6-8]</sup> PRF was first developed in France by Choukroun *et al.* for use in oral and maxillofacial surgery.<sup>[9]</sup> It is currently widely used by dental surgeons and in jaw surgery. Due to the positive effects on wound healing, it has started to have an increasingly wide area of use in many medical fields, such as orthopedics, plastic surgery, ophthalmology, and otology.<sup>[10-13]</sup> This preliminary study is the first study to have evaluated the effects of PRF following PA excision in the palate.

In this preliminary study of 3 patients operated on for PA in the hard palate, a PRF membrane was stretched over the exposed

**Address for correspondence:** Dr. Özer Erdem Gür,  
Meltem Mah. 2. Cadde B Blok 6/11, Antalya, Turkey.  
E-mail: erdemkaptan@yahoo.com

This is an open access article distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

**For reprints contact:** reprints@medknow.com

**How to cite this article:** Gür OE, Ensari N, Yılmaz ND. The effects of platelet-rich fibrin membrane on secondary healing after pleomorphic adenoma excision in the hard palate: a preliminary study. *Ann Maxillofac Surg* 2017;7:78-81.

### Access this article online

#### Quick Response Code:



**Website:**  
www.amsjournal.com

**DOI:**  
10.4103/ams.ams\_182\_16

bone surface for evaluation of the hemostatic effects and the positive effects on the healing process.

## MATERIALS AND METHODS

### Platelet-rich fibrin preparation

A 20-cc venous blood sample was taken by catheter from the patients into four dry, glass vacuum tubes. The tubes were immediately centrifuged (3000 rpm, 10 min). After completing the process, three layers were observed to have formed. The base layer was red blood cells (most dense), the top layer was noncellular plasma (least dense), and the middle layer was PRF coagulate (medium density). With sterile forceps, the PRF was removed from the tube and stripped from the adjacent red blood cell layer. With the absorption of the PRF serum into a gauze pad, a membrane, rich in fibrin from the matrix and with high resistance, was obtained [Figure 1].

### Operative technique

All patients had initially undergone an incisional biopsy under local anesthesia, for histopathological confirmation of the diagnosis of PA. The technique involved the surgical excision of the lesion together with the mucosal lining, plus a small safety margin of the adjacent mucosa 5 mm in length.

PRF membranes were laid over mucosal defects which occurred following PA excision in the hard palate. The PRF membrane was supported with a gauze pack for 3 days [Figure 2]. After removal of the gauze, the secondary healing process was monitored in the patients. Follow-up examinations were made on postoperative days 5, 10, 15, 20, 25, 30, 35, and 40.

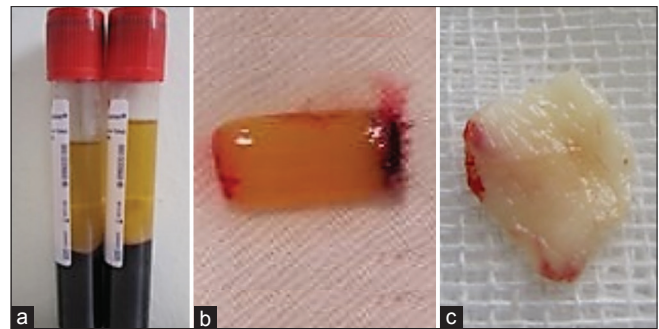
## RESULTS

Epithelialization was observed to have completed on the 30<sup>th</sup> day of follow-up in the first patient and on the 35<sup>th</sup> day in the second and third patients. No bleeding or infection was seen in any of the three patients [Figure 3].

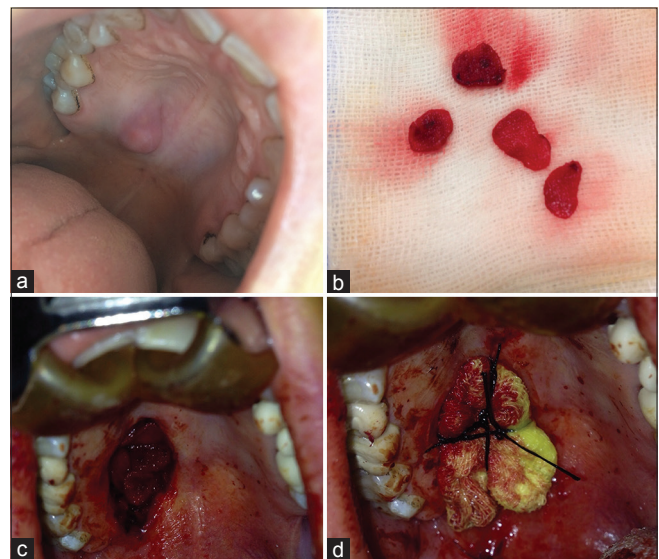
## DISCUSSION

Local excision of benign tumors of the palate without removal of palatal bone is adequate for an excellent prognosis. Reconstruction of palatal defects after excision of PPA can vary. The most common palatal closure techniques are secondary healing, intact mucosal flap, autogenic or allogenic grafts, transpalatal flap, buccinator myomucosal flap, and pedicled buccal fat pad flap.<sup>[3,14-16]</sup>

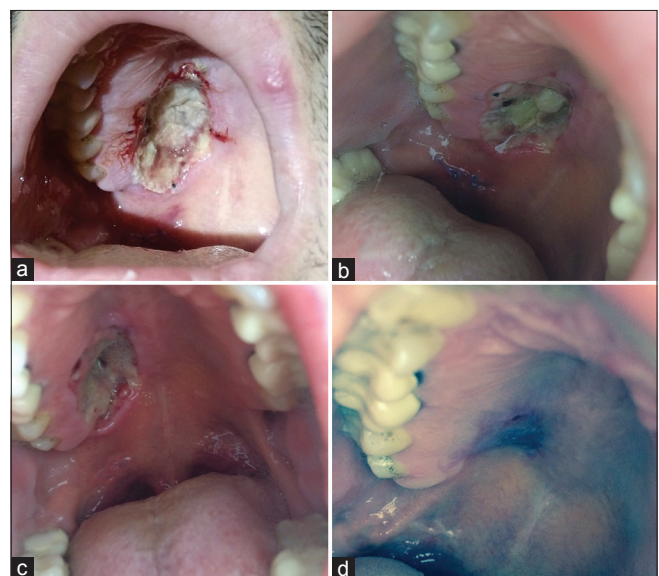
Although healthy intact mucosa over the tumor may be used for closure, there is an important disadvantage of this technique. PPAs have a loose capsule that adheres firmly to the overlying mucosa which can, therefore, result in residual tumor cells remaining under the mucosa creating a potential for recurrence. Denuding the palatal bone surface after the excision of a PPA to remove such residual cellular material has been shown to result in secondary healing by the formation of granulation



**Figure 1:** Platelet-rich fibrin preparation. (a) The centrifuged tubes (b) PRF coagulate (c) PRF membrane



**Figure 2:** Operative technique (a) Pleomorphic adenoma in the hard palate, (b) platelet-rich fibrin membranes, (c) platelet-rich fibrin membranes laid over mucosal defect, (d) the platelet-rich fibrin membranes were supported with a gauze pack



**Figure 3:** (a) After the gauze pack is removed. Postoperative day 10 (b), 15 (c) and 30 (d)

tissue. The duration of healing is approximately 2 months, and potential complications include secondary bleeding, delayed epithelialization, and infections.<sup>[5]</sup>

Dohan *et al.* reported that PRF consists of an intimate assembly of cytokines, glycanic chains, and structural glycoproteins enmeshed within a slowly polymerized fibrin network. These biochemical components have well-known synergistic effects on healing processes. For example, fibronectin, as a cell proliferation and migration guide, potentiates the stimulative effects of PDGF-BB. These preliminary data suggest that PRF could not only provide a new generation of platelet gel, but also a usable healing concentrate.<sup>[7]</sup> It also acts as an autogenous “antibiotic,” because of the high number of leukocytes contained, thereby reducing the risk of infection.<sup>[6-8]</sup>

Thrombocytes play an important role in hemostasis and wound healing. Growth factors, such as TGFβ-1, EGF, PDGF, IGF-1, and VEGF, which function in the healing stages, are found in the alpha granules of thrombocytes. Depending on the method by which they are acquired and the contents, thrombocyte concentrates can be separated into two groups: platelet-rich plasma (PRP) and PRF. PRF is a second-generation thrombocyte product obtained by concentration of thrombocytes and cytokines within the fibrin network. It differs from PRP in that no synthetic material or anticoagulant is added; it can also be obtained readily in a short time and at low cost. Highly resistant, flexible, elastic autologous fibrin membranes can be obtained.<sup>[6-8]</sup>

Alkan and Inal stated a secondary healing time-frame after PA excision as a mean of 2 months. Secondary bleeding, delayed epithelialization and infections are potential complications. To reduce these risks, hemostatic agent was applied to the exposed bone surface followed by an acrylic or gauze pack for 3 days.<sup>[5]</sup> In the current study, a PRF membrane was also used with a gauze pack for 3-day [Figure 2d]. After removal of the gauze pack, it was observed that the PRF membrane had integrated with the excision area. No bleeding or infection was observed in any of the 3 patients. Epithelialization was observed to have completed on the 30<sup>th</sup> day of follow-up in the first patient and on the 35<sup>th</sup> day in the second and third patients.

Soares *et al.* used an acrylic splint, which served to protect the surgical site after PA excision in the hard palate, during the postoperative period of 14 days. The use of a removable acrylic appliance in the initial healing period proved to be a reasonably good treatment option with regard to the removal of pathological tissue and postoperative complications.<sup>[4]</sup>

Kulkarni *et al.* used PRF over the donor site of free gingival graft. It was suggested that PRF, as a “bioactive dressing,” can significantly reduce patient morbidity and accelerate the donor site healing. It was also observed that placement of PRF in the free gingival donor site led to rapid hemostasis. In the current study, as the defects formed in the donor site after PA excision were considered to have similar characteristics, this supports the results of Kulkarni *et al.*<sup>[17]</sup>

In this preliminary study, no bleeding or infection was observed in any of the 3 patients and the healing period was seen to be significantly shorter. The use of PRF is a new method that provides rapid and effective healing using an autogenous material. The preparation of PRF membrane is easy and cost-effective.

## CONCLUSIONS

In this preliminary study, using PRF membrane as a new method in the secondary healing after PA excision in the hard palate, the results have shown that it can be considered to have significantly shortened the healing period and reduced complications such as bleeding and infection. In addition, it can be considered for use in all mucosal defects which could form in the palate. Despite the low number of patients, this study could be the basis for future research.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

## REFERENCES

- Speight PM, Barrett AW. Salivary gland tumours. *Oral Dis* 2002;8:229-40.
- da Cruz Perez DE, Pires FR, Alves FA, Almeida OP, Kowalski LP. Salivary gland tumors in children and adolescents: A clinicopathologic and immunohistochemical study of fifty-three cases. *Int J Pediatr Otorhinolaryngol* 2004;68:895-902.
- Pogrel MA. The management of salivary gland tumors of the palate. *J Oral Maxillofac Surg* 1994;52:454-9.
- Soares EC, Costa FW, Bezerra TP, Nogueira CBP, Medeiros JR, Neto IC. Surgical approach to pleomorphic adenomas arising in the palate: A 10 year retrospective study in a Brazilian population. *J Oral Diagn* 2012;1:36-40.
- Alkan A, Inal S. Closure of palatal defects following excision of palatal pleomorphic adenomas. *J Contemp Dent Pract* 2008;9:99-107.
- Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhyi J, *et al.* Platelet-rich fibrin (PRF): A second-generation platelet concentrate. Part I: Technological concepts and evolution. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2006;101:e37-44.
- 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 Radiol Endod* 2006;101:e45-50.
- 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;27:158-67.
- Choukroun J, Adda F, Schoeffler C, Vervelle A. Une opportunité en paro-implantologie: Le PRF. *Implantodontie* 2001;42:55-62.



10. Matsunaga D, Akizuki S, Takizawa T, Omae S, Kato H. Compact platelet-rich fibrin scaffold to improve healing of patellar tendon defects and for medial collateral ligament reconstruction. *Knee* 2013;20:545-50.
11. Sclafani AP, Saman M. Platelet-rich fibrin matrix for facial plastic surgery. *Facial Plast Surg Clin North Am* 2012;20:177-86, vi.
12. Alio JL, Rodriguez AE, Martinez LM, Rio AL. Autologous fibrin membrane combined with solid platelet-rich plasma in the management of perforated corneal ulcers: A pilot study. *JAMA Ophthalmol* 2013;131:745-51.
13. Gür ÖE, Ensari N, Öztürk MT, Boztepe OF, Gün T, Selçuk ÖT, *et al.* Use of a platelet-rich fibrin membrane to repair traumatic tympanic membrane perforations: A comparative study. *Acta Otolaryngol* 2016;136:1017-23.
14. Alkan A, Dolanmaz D, Uzun E, Erdem E. The reconstruction of oral defects with buccal fat pad. *Swiss Med Wkly* 2003;133:465-70.
15. Anastassov GE, Schwartz S, Rodriguez E. Buccinator myomucosal island flap for postablative maxillofacial reconstructions: A report of 4 cases. *J Oral Maxillofac Surg* 2002;60:816-21.
16. Bilkay U, Tokat C, Ozek C, Gundogan H, Gurler T, Tegsel Z, *et al.* Cancellous bone grafting in alveolar cleft repair: New experience. *J Craniofac Surg* 2002;13:658-63.
17. 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.