The Use of Platelet Rich Fibrin Membrane for Accelerating Healing in Gingival Depigmentation

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Abstract

Gingival pigmentation frequently poses an aesthetic problem, especially in patients with gummy smile. The present study was performed to test the efficacy of Platelet Rich Fibrin (PRF) membrane on depigmented gingival wound. Uneventful healing with less post-operative discomfort and less inflammation as confirmed by histopathology was seen on the PRF treated sites. Hence, PRF membrane can be used to protect open wounds and accelerate healing.

Keywords: Aesthetic, Gingival pigmentation, Healing, Inflammation, Platelet rich fibrin membrane.

Introduction

Gingival health and appearance are essential components for an attractive smile and correction of unsightly pigmented gingiva is the need for a pleasant and confident smile.[1] The color of the gingiva varies among different individuals and is thought to be dependent on cutaneous pigmentation.[2] The color variation in the gingiva mainly depends on the thickness of the gingival epithelium, blood supply, amount of the keratinization, and number of the pigmented cells present.[3]

Melanin is produced by melanoblasts in the gingival epithelium which adds the brown color to the gingiva. Gingiva is the highly pigmented part of the oral mucosa.[4] The variation in the degree of gingival hyperpigmentation among different populations is considered a racial trait and is not related to gender or age of the individual.[5,6] Hyperpigmentation is related to the melanoblastic activity of the epithelial cells in the gingiva and its degree differs from person to person.[7]

Numerous techniques have been reported to treat depigmentation and enhance aesthetics. Gingival depigmentation can be performed by various techniques including scalpel, bur, laser, and chemicals whereby the gingival hyperpigmentation is removed or reduced. The procedure leads to the removal of gingival epithelium along with a layer of the underlying connective tissue and allows the exposed connective tissue to heal by secondary intention.[8]

Platelet Rich Fibrin (PRF) can be considered as a natural fibrin-based biomaterial favorable to the development of a micro-vascularisation and able to guide epithelial cell migration to its surface. Hence PRF membrane can be used to protect open wounds and accelerate healing.[9]

Thus, the present research is aimed at clinical and histologic comparison of wound healing between PRF membrane and COE-Pak in gingival depigmented wound.

Case Report

A 49-year-old male patient reported to the Department of Periodontology, Government Dental College and Hospital, Jamnagar with the chief complaint of black gums since 10 years as shown in Figure 1 and Figure 2. No relevant systemic history or habits were reported.

The patient was informed about the surgical procedure along with the application of PRF membrane and the benefit that can be derived from it. A written informed consent was obtained from the patient.

The depigmentation procedure was carried out by bur abrasion technique as observed in Figure 3.

Following the depigmentation procedure, PRF membrane was applied on the maxillary arch, and COE-Pak (non-eugenol dressing) was applied on the mandibular arch.

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Received: 04 Jan, 2022; **Accepted:** 25 Jan, 2022; **Published:** 20 Feb, 2022

How to cite this article: Thakkar R, Patel N, Changela R, Verlianey N. The Use of PRF Membrane for Accelerating Healing in Gingival Depigmentation. J Res Adv Dent 2022;13(2):94-101.

Access this article online

Website: www.jrad.co.in

DOI: https://doi.org/10.53064/jrad.2022.13.2.14

The individual was refrained from brushing for 3 days following the procedure and was instructed to rinse mouth with 0.2% chlorhexidine mouthwash. On the 3rd day, the patient was recalled, and the periodontal pack was removed.

The clinical, as well as histological parameters, were evaluated after the surgical procedure. The healing was evaluated on the 3rd and 5th day and epithelialization test was done on the 5th day.[10] The histological analysis was carried out on the 5th day by punch biopsy from the depigmented gingival epithelium.

Preparation of PRF membrane

About 10 ml of blood present in glass vacutainer was centrifuged in SHK-Hexad centrifugation machine for 2700 rpm for 12 min. The gel obtained following the centrifugation had three layers. The top layer consisted of platelet-poor plasma and the bottom layer had concentrated red blood cells. The middle layer harbored fibrin network gel as observed in Figure 4.

The middle layer was then compressed in PRF Box, and the supernatant was discarded to obtain the PRF membrane.

Surgical procedure

The depigmentation procedure was carried out by abrasion technique with the help of a medium gritted football-shaped diamond bur with light pressure. The patient underwent depigmentation procedure with abrasion technique in the maxillary and mandibular anterior teeth region.

On the maxillary arch, the PRF membrane was placed as contemplated in Figure 5. PRF membrane was stabilized with 4- 0 absorbable vicryl suture.

The mandibular anterior sextant directly received periodontal pack following the depigmentation procedure as seen in Figure 6.

The postoperative view at 3rd and 5th day is contemplated in Figures 7 and 8.

Observation

Uneventful healing was noted on the maxillary arch while scattered erythematous areas were noticed on the mandibular arch on the 3rd and 5th post-operative day. Epithelisation test was performed using toluidine blue on the 5th post-operative day. The amount of staining was substantially less on PRF sites than on non PRF sites (Figure 9).

The histological analysis was carried out on the 5th day by punch biopsy from the depigmented gingival epithelium. Histologic examination of the PRF sites revealed Para-keratinised stratified squamous epithelium with fibrous connective tissue stroma and no inflammatory cell infiltrate (Figure 10) whereas Coe-pak sites revealed inflamed juxta-epithelial connective tissue and some scattered hemorrhagic areas (Figure 11).

Discussion

The hyperpigmentation of the gingiva is an aesthetic concern for individuals and it requires the removal of the hyperpigmented gingival epithelium. The depigmentation leaves behind a denuded connective tissue on the gingival surface which heals by secondary intention.[11]

The postsurgical dressings do not have any curative properties. They protect the wound from mechanical trauma and provide patient comfort during tissue healing after surgery.[12] Coe-Pak being dimensionally unstable results in delayed healing due to contraction during few minutes after completion of its setting.[13]

PRF first described by Choukron *et al*., is a second generation platelet concentrate. PRF can be used to promote wound healing, bone regeneration, graft stabilization, wound sealing, and hemostasis. Because the fibrin matrix is better organized,

Figure 1: Pre-operative view-maxillary arch

Figure 2: Pre-operative view-mandibular arch

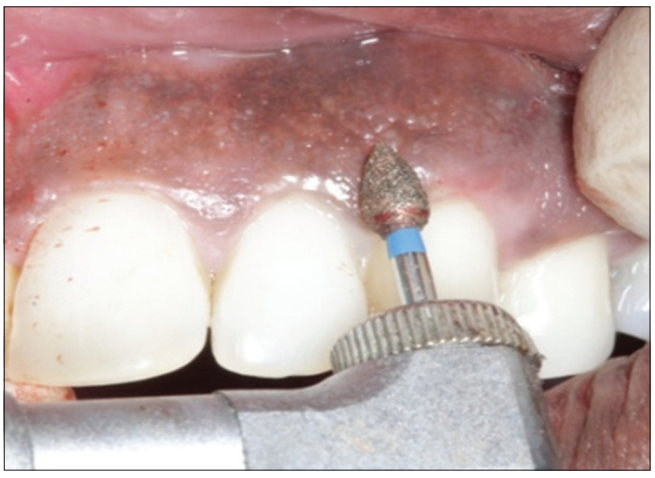

Figure 3: Depigmentation with bur abrasion

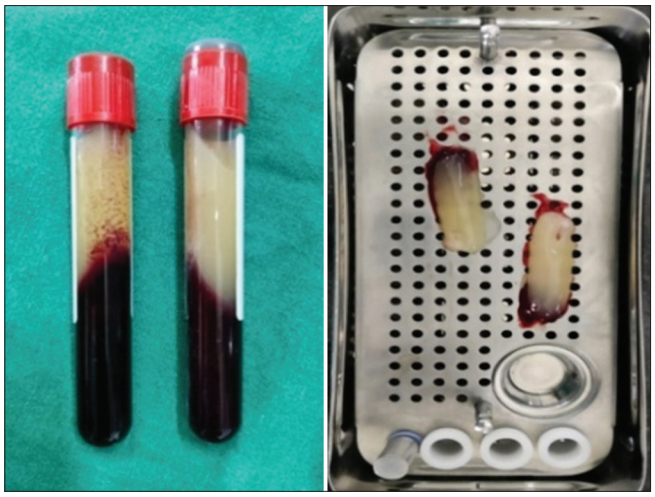

Figure 4: Preparation of Platelet Rich Fibrin membrane

Figure 5: Platelet Rich Fibrin membrane on Maxillary arch

Figure 6: COE-Pak on Mandibular arch

Figure 7: Post-operative view on the 3rd day

Figure 8: Post-operative view on the 5th day

Figure 9: Toluidine blue staining on the 5th postoperative day

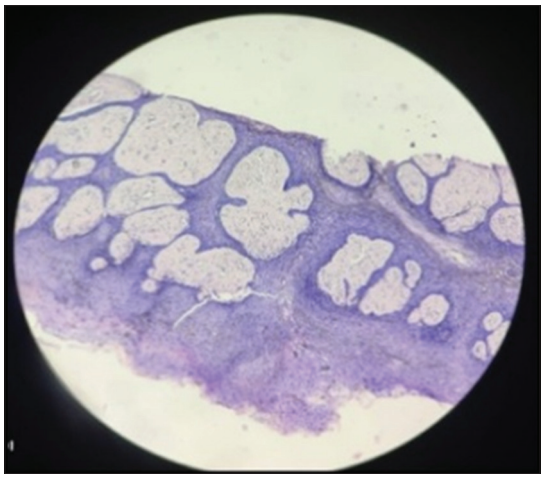

Figure 10: Histologic evaluation of Platelet Rich Fibrin treated sites

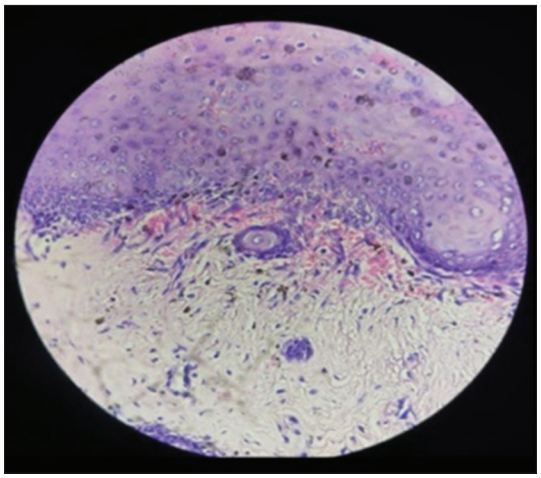

Figure 11: Histologic evaluation of COE-Pak treated sites

it is able to more efficiently direct stem cell migration and the healing program. Release of growth factors from PRF led to optimization of the clinical applications of PRF.[14]

Conclusion

The use of platelet concentrates known for its immense reparative potential could be a boon for rapid epithelization on the depigmented gingival surface.[11] Thus, PRF membrane can be used to cover the depigmented gingival wound as it promotes healing and provides better post-operative comfort.

Conflict of interest

No potential conflict of interest relevant to this article was reported.

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