



## Research article

# Topical Application of Platelet-Rich Fibrin Liquid as a Novel and Minimally Invasive Treatment for Post-Gingival Depigmentation: A Case Report

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**Background:** Gingival depigmentation is a common perio–esthetic surgery which results in extensive open wounds, discomfort and increased risk of infection. Cellulose-based periodontal dressing (CBP) can protect the wound, has less toxicity than Coe-Pak but no curative effect. Platelet-rich fibrin (PRF) membrane has been shown to accelerate wound healing after gingival depigmentation, but it requires suturing which causes patient discomfort. A simple and minimally invasive technique is needed to optimize the use of PRF which is convenient for both the operator and the patient.

**Objective:** To investigate post-gingival depigmentation outcome – wound healing, pain and post-surgical complaint – after PRF liquid application compared to CBP.

**Case Report:** A 24-year-old male presented with a complaint of blackish gum that affected his self-confidence. The patient had a history of smoking for the last five years. Gingival depigmentation was carried out using a scalpel followed by the application of CBP (right) and PRF liquid (left). Evaluation was done using the Visual Analogue Scale (VAS) and the Healing Index (HI) on days 3, 7 and 14 after depigmentation, followed by evaluation using the Adobe Photoshop CS2.

**Results:** On day 3, the PRF HI was higher than that of the CBP. No postoperative complaint in the PRF group and the VAS score was similar.

**Conclusion:** The results suggest that PRF liquid provides better post-gingival depigmentation healing than CBP on the third day post treatment. Furthermore, utilization of PRF liquid is expected to be an alternative for minimally invasive open wounds management especially post-gingival depigmentation.

**Keywords:** gingival pigmentation, platelet-rich fibrin liquid, cellulose-based periodontal dressing, wound healing, case report

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Published: 25 April 2022

Publishing services provided by Knowledge E

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Selection and Peer-review under the responsibility of the NaSSIP 6 Conference Committee.



## 1. Background

Aesthetic factor becomes a vital consideration in dentistry especially in periodontics. Blackish colored gums, especially when smiling, is a common chief complaint. Although painless, these aesthetic complaints often reduce confidence in patients with high smile lines.

The treatment for gingival hyperpigmentation is called gingival depigmentation. This surgical procedure is performed in several ways, namely using a scalpel, abrasion techniques using bur and laser, gingivectomy accompanied by gingival grafts, electrosurgery and using chemicals[1]. Among the treatments above, surgical techniques using scalpel and abrasion techniques using bur are simpler and easier to apply in the clinic but cause relatively extensive open wounds[2].

Nowadays, wound care management has developed rapidly. Application of periodontal pack such as CBP showed better wound healing than Coe-Pak. It can protect the wound but has no curative effect[3].

The application of PRF membrane as a periodontal dressing showed successful approach to heals post-depigmentation wound[4]. Unfortunately, the application needs suturing to immobilize the membrane. Innovation in PRF application is needed to optimize the utility.

## 2. Objective

To investigate post-gingival depigmentation outcome - wound healing, pain, and post-surgical complaint – after PRF liquid application compared to CBP.

## 3. Methods and Treatment Result

A 24-year-old male patient visited Prof. Soedomo Universitas Gadjah Mada Dental Hospital with complaints of blackish gum that impair his appearance especially when smiling (Fig 1). The objective examination showed hyperpigmented gingiva in maxilla and mandibula especially in anterior region from canine to canine. The patient requested for esthetic treatment to remove the blackish pigmented in his gingiva especially in anterior region. He has a history of smoking in the last 5 years.

### 3.1. Pre-surgical procedure

Before surgery, a complete periodontal examination, medical history, and family history were carried out to rule out any contraindication for surgery. After that, we informed the patients about the entire surgical procedure including the risk and benefit then asked him to sign the consent.



**Figure 1:** Pre-operative feature of 24-year-old male complaining of blackish gums.

Oral Hygiene Index according to Green and Vermillion and the Plaque Index according to O'Leary were recorded. Initial treatments (dental health education and scaling root planning) were performed followed by PRF liquid preparation.

### 3.2. PRF liquid preparation

The patient's blood is drawn as much as 10 mL and put in a vacutainer without coagulant. Blood was centrifuged at 2700 rpm for 12 minutes[5]. Platelet rich fibrin was taken using tweezers then cut and stored in a sterile microtube until melted. Each microtube is prepared for daily use.

### 3.3. Surgical procedure

A scalpel surgery was performed to remove the gingival hyperpigmentation. Local anesthesia was infiltrated in the maxillary anterior region from right canines to left canines. A sterile blade (15c) was used to remove the pigmented layer (Figure 2). Pressure was applied with sterile gauze to control hemorrhage during the procedure. After removing the entire pigmented epithelium along with a thin layer of connective tissue with scalpel, care was taken to see that the pigmented layer was removed (Figure 3)



**Figure 2:** Removing the pigmented layer with scalpel.



**Figure 3:** Clinical feature after gingival depigmentation.

### 3.4. Post-surgical procedure

After surgery, the cellulose-based periodontal pack was applied in right side while PRF liquid was applied topically in the left side (Figure 4). Post-surgical instruction was informed to patient. The patient must apply PRF liquid (left side only) 3 times a day (at 6

am, 13 pm and 9 pm) and avoid eating and drinking for at least 1 hour after application. The analgesic was prescribed followed by the instruction.



**Figure 4:** The application of CBP (right) and PRF liquid (left).



**Figure 5:** Day 3 post – surgery.



**Figure 6:** Day 7 post – surgery.

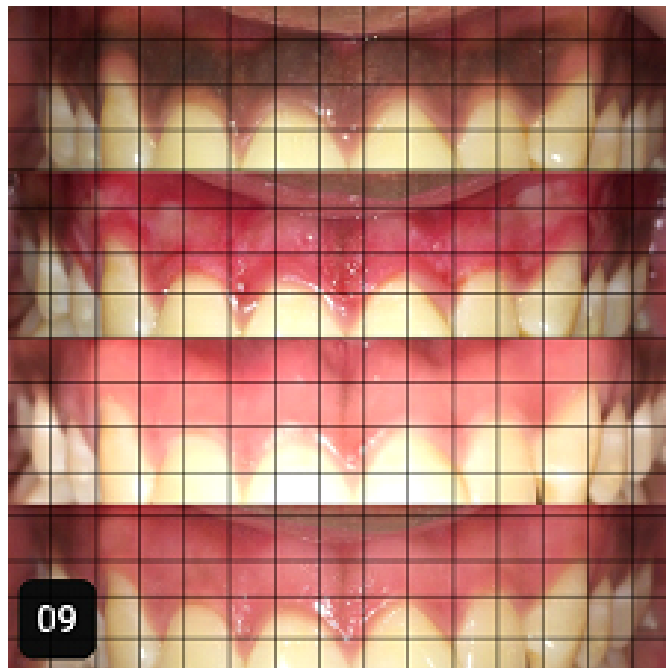


**Figure 7:** Day 14 post – surgery.

### 3.5. Post -- surgical evaluation

Patients were asked for control on day 3 (Figure 5), 7 (Figure 6) and 14 (Figure 7).

Evaluation of treatment outcome was performed by assessing the Healing Index (HI)[6], pain perception (VAS), and post-surgery complaint. The assessment of HI was



**Figure 8:** The modified measurement of HI using Adobe photoshop CS2 application.

modified by installing a 3x3 mm grid on the photo using the Adobe Photoshop CS2 application (Figure 8) to get more objective result. The results showed that the Healing Index in left side (PRF liquid) is higher than right side (CBP). The pain perception is similar (Table 1). No post – surgery complaint in PRF group. Otherwise, patient complained that the CBP site is loose and sticky. Patient declared that he only consumes the analgesic once after the surgery.

TABLE 1: The post – surgery outcome after application of CBP and PRF liquid

Day	Visual analogue score (VAS)		Healing Index (HI)		Post-surgery complaint	
	CBP	PRF liquid	CBP	PRF liquid	CBP	PRF liquid
3	1	1	2	3	Sticky, loose, uncomfortable	Nil
7	0	0	4	4	Nil	Nil
14	0	0	5	5	Nil	Nil

## 4. Discussion

In this case, patient complained a blackish pigmentation in his gum. He has a history of 5-year smoking and felt that the pigment become darker. The blackish pigmented is reported as result of excessive deposition of melanin in the basal layer and suprabasal epithelium[6]. Brown or black pigmentation of the gums can be caused by local and systemic factors. In this case, the history of smoking for 5 years is suspected to be

the dominant local factor. Besides smoking, vape, and direct exposure to the sun trigger gingival pigmentation as well as systemic conditions include endocrine disorders, Albright syndrome, melanoma, anti-malaria therapy, Peutz Jeghers syndrome, trauma, hemochromatosis, chronic lung disease and race or ethnicity. The prevalence of pigmentation and the amount of melanin is found more in African and East Asian descent[6].

The gingival depigmentation surgery was performed using scalpel because scalpel is simpler and easier to apply in the clinic. Unfortunately, it results in relatively extensive open wounds[2].

To protect the raw area of surgery, we applied two materials namely CBP (right) dan PRF liquid (left). The application of PRF liquid is very simple and easy. The patient applied the liquid 3 times a day with their sterile finger and not allowed to eat or drink for the next 60 minutes. At day 3 after surgery, we observed the wound using Healing Index[7] and asked for the pain perception using VAS. We also take a note about patients complain after both material applications. He reported that he has no complaint in PRF site, but he complains about the CBP site because it felt sticky, loose, and uncomfortable while speaking or eating in few hours after surgery.

At day 3, fibroblasts will fill the wound area, then the angiogenesis process begins in the form of fibroblast migration and formation of blood capillaries[7]. This case report showed that the Healing Index in PRF site is higher than CBP at day 3 (Table 1). PRF contains thick fibrin tissue enriched with leukocytes, cytokines, glycoproteins, and growth factors, such as transforming growth factor  $\beta$ -1, platelet-derived growth factor, vascular endothelial growth factor, and glycoprotein, for example thrombospondin-1. It was known to have a superior property of enhancing the wound healing[5]. The PRF concentrate can coat the exposed lamina propria and hold fibrin attached so that the wound healing process is more comfortable and faster than CBP.

This result is in accordance with previous case which proves that the application of PRF membranes can accelerate epithelialization post-gingival depigmentation[4]. However, the application in this case is different from the previous case. The previous case applied the PRF membrane with suturing whereas in this case we applied the liquid PRF directly to the wound area so that it was more comfortable and minimized the invasive action of membrane suturing on the wound area. This novel and non-invasive technique might be an alternative in open wound management especially post-periodontal surgery.

At day 7, the proliferation phase begins. Fibroblasts will stimulate collagen production and end with the epithelialization stage[3]. The granulation tissue will fill the wound



area and the wound edges are drowned. At day 14, the epithelization was formed, and keratinocytes migrate from the wound edge and close the wound[2].

However, the pain perception between both material is similar. Both materials -with different mechanisms- have positive impact to wound healing. Cellulose-based Pak (CBP) is shown to protect wounds and less irritation to fibroblast[3]. It protects the wound mechanically, so the patients do not experience excessive friction with food or lip mucosa. Dressing can keep the wound area clean while controlling bleeding during the physiological process of wound healing[1]. The previous study showed that the CBP will resorb directly after 30 hours[3] but in this case, patient claimed that this dressing resorbs after 8 hours.

## 5. Conclusion

The results suggest that PRF liquid provides better post-gingival depigmentation outcome than CBP on early stage of open wound healing. Furthermore, utilization of PRF liquid is expected to be an alternative for minimal invasive open wounds management especially post-gingival depigmentation.

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