DOI: 10.18044/MEDINFORM.202292.1577 ISSUE 2, 2022

Periodontal Surgery with Advanced Platelet-Rich Fibrin – a seven years follow-up case report

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Abstract

Different types of blood products have been introduced in dental medicine since 1990. Platelet-rich fibrin (PRF) is an autologous blood product that can improve tissue healing and finds wide clinical application. The application of PRF in dental medicine has gained popularity due to its effect on periodontal regeneration, wound healing, and anti-inflammatory effects. PRF can fulfill different purposes in periodontal treatment, including serving as an alternative to soft tissue graft. A common problem in periodontal treatment is the minimum amount of attached gingiva. In terms of attached and keratinized gingiva, the stable periodontal tissue provides long-term stability regarding clinical interventions such as creating a stable zone of attached gingiva.

Case presentation: A 62 years old female patient has a significant complaint of receding gum in the area of lower central incisors, accompanied by pain while brushing and inability to maintain proper self-performed oral hygiene.

Conclusion: After 7,5 years of follow-up, the results show satisfactory results in augmentation of the attached gingiva and deepening the oral vestibule. The application of an A-PRF membrane could be used as an alternative to free gingival graft in non-demanding periodontal cases.

Key words: attached gingiva,vestibuloplasty, advanced platelet-rich fibrin, gingival recession

Introduction

The medical opportunities of blood products are gaining awareness in the 1990s. In 2001 Choukroun et al. introduced the utilization of second-generation platelet concentrate – platelet-rich fibrin (PRF). Since then, the application of autologous blood products has become popular in dental medicine treatment protocols and is considered one of the modern biological therapies in periodontology, oral surgery, and implantology. PRF reduces the healing time, promotes angiogenesis, improves regeneration, improves the handling of grafting materials, and also can serve as a membrane [1,2,3]. PRF contains numerous growth factors and cytokines involved with mechanisms that promote angiogenesis, proliferation and differentiation of epithelial cells, fibroblast remodeling enhancement, etc. [4].

The mucogingival problem represents a significant challenge to clinicians since the treatment often requires surgical intervention. One of the most popular surgical techniques used for the augmentation of attached gingiva, keratinized tissue width, and oral vestibule correction is the free gingival graft (FGG) [5]. To perform the procedure, preparation of the recipient and donor site is necessary, which is associated with increased discomfort for the patient since the FGG is obtained from the palatal area, which in a clinical situation with large defects requires significant graft length. Alternative to the FGG is xenograft materials such as Mucoderm, Aloderm, etc., the application of which does not require the formation of a donor site [6-9].

The biological rationale for applying Advanced platelet-rich fibrin (A-PRF) relies on the product‘s basic mechanisms – wound healing stimulation, easy clinical application, and stable outcomes [4]. The possibilities that A-PRF offers in soft tissue augmentation and increasing the depth of the oral vestibule are related to the lack of a second operative site but also have satisfactory esthetic and functional results. Since no donor site graft was obtained, the procedure is characterized by reduced postoperative discomfort. Other advantages of this procedure are a high degree of predictability, simplicity, the ability to treat multiple teeth simultaneously, and the utilization of autologous material. The membrane preparation requires limited time, and the biological product is characterized by easy manipulation.

Aim

This article aims to improve the oral vestibule's depth and create a sufficient amount of attached gingiva by utilizing the A-PRF membrane.

Materials and Methods

A 62-year-old female patient visited the clinic complaining of receding gingiva in tooth # 31. Although the patient's main concern was tooth 31, we found minimal attached gingiva in tooth 41. When analyzing the periodontal status, a diagnosis of periodontitis was established. In the area of concern, Class IV Millers Classification (RT3 Cairo Classification) gingival recession was recognized – severe recession with no potential for root coverage and decreased depth of the oral vestibule. The latter makes it difficult for the patient to maintain satisfactory plaque control. These clinical findings led to the decision to execute the surgical procedure both for augmentation of the attached gingiva and deepening the oral vestibule for better plaque control.

After initial non-surgical periodontal treatment, the patient was introduced to the possible surgical treatment options. The patient rejected the FGG procedure and xenograft application and agreed with the procedure for treatment with an A-PRF membrane. Figure 1 is the initial stage of the case.

Figure 1. Clinical view in the initial diagnostics – inflammation of the gingival margin, lack of minimal amount of attached tissues, presence of gingival inflammation.

The surgical protocol included after local infiltration of anesthetic solution; the recipient site was created by a horizontal incision made by 15 blades along the mucogingival junction in the area of the incisors. A partial thickness flap was raised and repositioned apically, then sutured with single interrupted 4-0 sutures(figure 2).

Figure 2. Apical fixation of the mucosa with interrupted sutures.

Following venipuncture, 36 mL of blood was centrifuged according to the Choukroun protocol for A-PRF (Low relative centrifugal forces; centrifugation protocol is 1300 rpm for 8 minutes; Duo centrifuge/Process for PRF, Nica, France). Two fibrin membranes were prepared from the A-PRF blood concentrate.

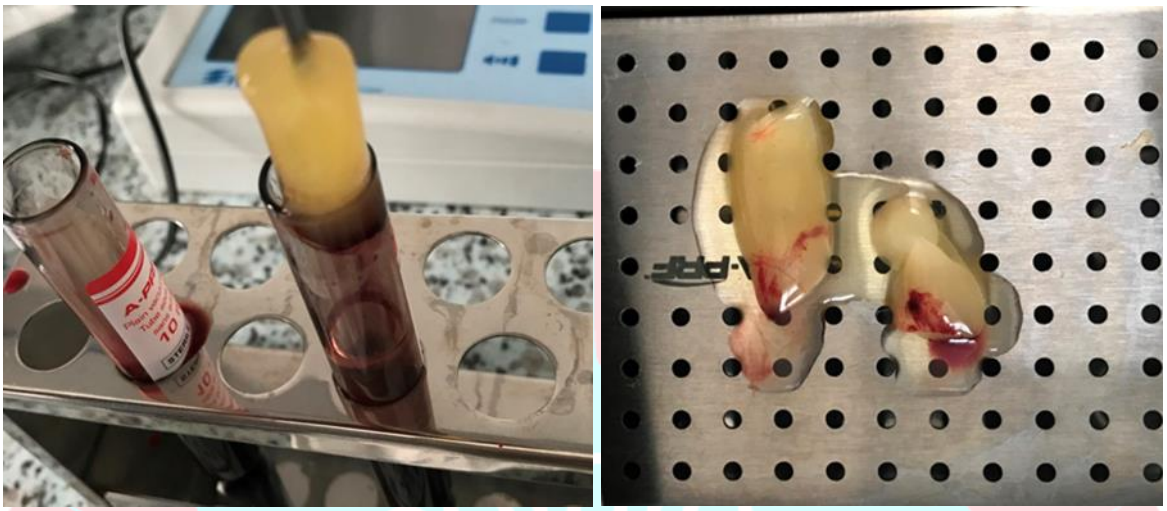

Figure 3. A-PRF material was obtained from the patient's blood.

The two-layered A-PRF membrane was placed on the periosteal surface and sutured with single interrupted sutures (Figures 3 and 4).

Figure 4. A-PRF membrane was positioned and sutured with interrupted sutures on the recipient site.

Results

The patient experienced less pain in the 1–6 h postoperatively, with minimal intraoral and no visible extraoral swelling. The patient was placed on individual maintenance intervals. Figure 5 shows the clinical view 10 and 14 days after surgery.

Figure 5. Clinical outcomes after 10 and 14 days postoperatively.

After two months of the procedure, we observed a widening of the attached gingiva (figure 6).

Figure 6. Clinical outcomes after two months postoperatively.

Long-term results are demonstrated in figure 7. The appearance of the treated area 3 years(figure 7B) and 7,5 years(figure 7C) after a surgical procedure shows a stable level of the attached gingiva, with minimal signs of gingival inflammation.

A

Figure 7. Comparison between the initial clinical status(A), three years (B), and 7,5 years after treatment(C).

Discussion

To provide safe and biologically sustained treatment, the clinician aims to introduce many possibilities for choosing a good technique for the patient. Different strategies for the augmentation of attached gingiva are commented on. The advantages of A-PRF membrane compared with free gingival graft are numerous. The surgical approach that we described has the benefits of utilizing autologous blood product serving as a grafted tissue to augment the amount of attached tissues and, in combination with oral vestibule deepening with effect from the patient's blood derivates, requires a more detailed clinical survey to establish a new minimal invasive protocol for both gingival augmentation an oral vestibule widening treatment options [10]. Our results are in agreement with those reported by Dixit et al.[11]. The described surgical procedure presents an alternative in terms of oral vestibule deepening and soft tissue gain compared with other techniques related to the need for a second operative site and was quickly accepted by the patient.

Conclusion

The A-PRF membrane, applied as an FGG alternative, provides good aesthetic and functional long-term results. The utilization of A-PRF is associated with a short clinical procedure and easy product handling. Further methods with a wide range of patients are needed to provide solid evidence that the A-PRF membrane can replace other surgical approaches like FGG and xenograft materials application and that it can represent a reasonable alternative to the abovementioned procedures.

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