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CASE REPORT

The use of platelet-rich fibrin in vestibuloplasty: A 36-month follow-up technique report

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Abstract

Introduction: Vestibuloplasty is a mucogingival procedure that aims to increase the vestibule and the amount of keratinized tissue (KT) around teeth and dental implants. Currently, the *gold standard* in this procedure is still represented by free gingival grafts (FGGs); however, they require a second surgical site, which means more morbidity for the patient and a higher risk of surgical complications, as well as surgical time and chromatic alteration of the recipient area.

Case Presentation: This is a description of the vestibuloplasty technique with platelet-rich fibrin (PRF) in a 35-year-old female patient with a thin gingival phenotype and no medical history of interest. The reason for consultation was tooth sensitivity during brushing and the presence of recessions in the fifth sextant.

Conclusions: The use of PRF as a graft biomaterial in vestibuloplasty is a valid and effective option as an alternative to secondary epithelialization of the surgical site, as well as to FGGs, with acceptable results in terms of KT gain and root coverage, and with minimal postoperative discomfort.

KEYWORDS
gingival recession, platelet-rich fibrin, vestibuloplasty

Key points

Why is this case new information?

- The use of PRF is an interesting option as an alternative to second-intention healing, as FGGs in vestibuloplasty.

What are the keys to successful management of this case?

- The most important part of the membranes is the part that was in close relation to the erythrocyte fraction in the blood collection tube, so this part must be oriented toward the recipient bed.
- A minimum of four membranes should be obtained, overlapping one on top of the other.

What are the primary limitations to success in this case?

- The stability of the PRF.

BACKGROUND

Vestibuloplasty is a procedure that aims to increase the depth of the vestibule and the amount of keratinized tissue (KT) around teeth and implants. It has been determined that the presence of at least 2 mm of KT is necessary to preserve the periodontal/peri-implant health.[1,2]

The gold standard in cases where there is inadequate width of KT is still the free gingival graft (FGG); however, it requires a second surgical site, which entails great morbidity and a higher risk of surgical complications.[3] For these reasons, the use of other biomaterials, such as extracellular matrix membrane (EMM), bilayer collagen membrane (BCM), living cellular construct (LCC), and acellular dermal matrix (ADM), were developed.[4] However, they also have drawbacks such as higher cost, as well as a significantly lower KT gain compared to the use of FGGs.[4,5]

Therefore, the use of platelet-rich fibrin (PRF) is interesting. PRF is obtained from the patient's blood to which no additive and/or anticoagulant is added. It allows, in single centrifugation, an optimized natural blood clot. This clot consists of a high-density fibrin mesh with a molecular structure, containing a large number of leukocytes and platelets (approximately 70% and 95% of the initial clot, respectively), as well as monocytes and circulating stem cells.[6]

The aim is to show the use of PRF in performing a vestibuloplasty with PRF as the sole grafting biomaterial.

CLINICAL PRESENTATION

A 35-year-old female patient with a thin gingival phenotype and no medical history of interest (ASA type I) is described. The reason for consultation was tooth sensitivity during brushing and the presence of recessions (Miller's type I and type II,[7] and Cairo´s RT1[8]) in the fifth sextant (Figure 1). A vestibuloplasty with FGG was the first option offered, but after explaining the details of the procedure, she decided in favor of PRF.

CASE MANAGEMENT

Preparation of the surgical site and orientation of the PRF membranes

The technique for performing vestibuloplasty with PRF does not differ from that performed when FGG or another type of biomaterial is to be used. However, a critical factor is that the horizontal incision should be made approximately 1 mm coronal to the mucogingival junction, thus allowing KT to form in between.[9] A partial-thickness flap, without any releasing incisions, was raised and sutured apically to the periosteum with simple absorbable stitches (Vicryl 5.0, Ethicone, Johnson & Johnson, New Brunswick, NJ, USA).

Once the blood tubes have been centrifuged (LC-04P Centrifuge, Zenith Lab, Inc., Jiangsu, China) without anticoagulants and/or additives, at 300–400 g for 10–12 min (depending on the protocol used), PRF clots are dehydrated in a specific surgical box (PRF Box, MCT, Gyeonggi, Korea) to obtain membranes.

Before placing the membranes, the surgical bed is de-epithelialized to achieve integration of the PRF into the substrate. Then, the area is cleaned with the exudate obtained from the dehydration of the membranes, which has a strong proliferative effect on stem cells[10] (Figure 2).

Number of PRF membranes

The number of PRF membranes influences clinical outcomes by modulating the surgical environment. A

FIGURE 1 Preoperative situation. Thin gingival phenotype, with Cairo's RT1 recessions in the fifth sextant and Miller's type I, except in 26, which had a type II recession

FIGURE 2 Horizontal incision, 1 mm coronal to the mucogingival junction apical repositioning of the flap and fixation to the new vestibule floor with absorbable suture. The keratinized gingiva is de-epithelialized by scraping with a 15C scalpel blade

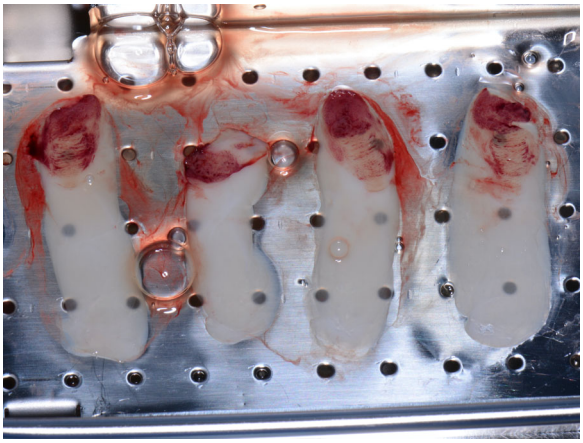

FIGURE 3 Ideally, four platelet-rich fibrin (PRF) membranes are obtained. The reddish portion should be placed toward the surgical site

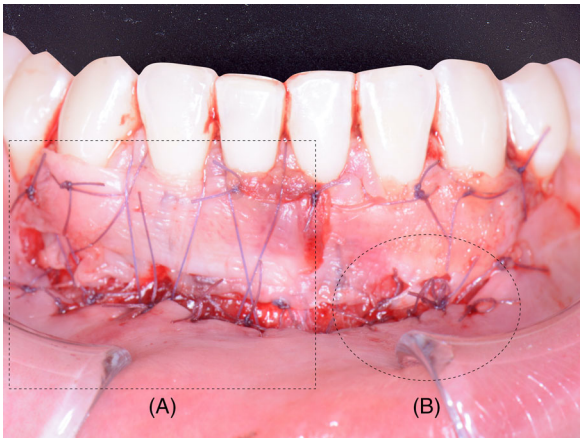

FIGURE 4 Stabilization of the overlapping PRF membranes in the recipient bed. It is recommended to fix them through tooth-anchored sutures (Holbrook and Ochsenbein technique)[11] instead of simple sutures to the periosteum (A), to prevent the PRF membranes from tearing (B)

minimum of four membranes should be obtained, overlapping one on top of the other (Figure 3). Temmerman et al.[3] sutured the membranes before placing them in the surgical site. This step can be omitted as, due to their adhesive properties, PRF membranes remain stable on top of each other, which facilitates their subsequent suturing to the recipient bed.

Suturing the PRF membranes to the recipient site

It is advisable to stabilize the PRF membranes to the periosteum using tooth-anchored sutures,[11] as suturing the edges of the membranes directly to the periosteum will tear the membranes (Figure 4).

Postoperative care

Ibuprofen 600 mg/8 h for 5 days, and chlorhexidine 0.12%, two times per day for 17 days were prescribed. It was suggested not to brush the area during this time.

CLINICAL OUTCOMES

After 15 days, the sutures were removed (Figure 5). At this time, one-third of patients undergoing this technique will have re-epithelialization of the area, while by the end of the third week, this will occur in 100% of cases[12] (Figures 6–8). At 3, 7, and 15 days, the patient reported slight discomfort (Visual Analog Scale score 3, 2, and 1, respectively), and healing was uneventful (Figures 6–8). At the 36-month follow-up (Figure 9), mucosal thickening was observed as

FIGURE 5 Healing after 15 days. Re-epithelialization of the recipient bed can be observed, with the formation of healthy granulation tissue. At the level of the original keratinized tissue (KT), tissue integration of the PRF is observed

FIGURE 6 Healing at 30 days

FIGURE 7 Healing at 3 months

FIGURE 8 Healing at 6 months

FIGURE 9 Evolution at 36 months. Adequate KT width, partial coverage of the gingival recessions, and, clinically, gingival thickening have been achieved

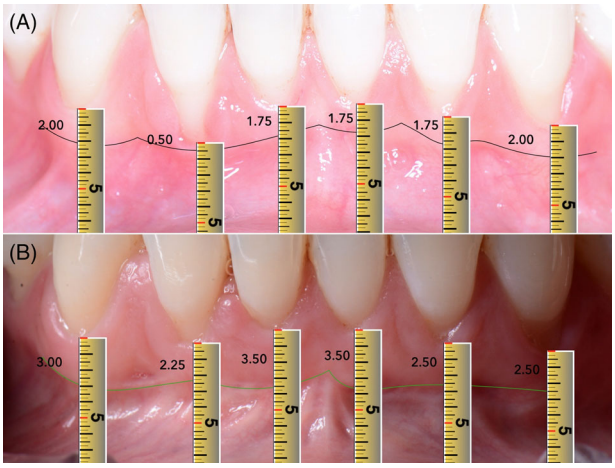

FIGURE 10 Comparison in KT width between baseline (A) and 36 months postoperative (B)

evaluated by the probe transparency (TRAN) method.[13] A mean increase in the width of KT of 1.25 mm (±0.52 mm; $p < 0.05$) (Table 1 and Figure 10) and a mean root coverage of −0.63 mm (±0.85 mm; $p > 0.05$) were registered (Table 2). The patient reported no further dentin hypersensitivity and is satisfied with the result.

DISCUSSION

The effect of PRF on the increase in width of the KT has only been investigated in a randomized clinical trial with a split-mouth design around implants,[3] showing a mean gain of 6.00 mm (±0.80) compared to 7.30 mm (±1.20) in FGGs, with a significantly greater increase in the FGG group of 1.30 mm (±0.90). In this regard, two systematic reviews and meta-analyses observed 1.39–2.00 higher KT gains with FGGs compared to other alternatives, such as EMM, BCM, LCC, and ADM.[4,5] These results are similar to those obtained with PRF,[3] so its use could be considered in secondary epithelialization, as well as an alternative to FGGs. Compared to the latter, the use of PRF decreased operative time (29.10 min [±4.80] vs. 48.10 min [±4.40]; $p < 0.01$), as well as pain and discomfort during the 6 postoperative days[3] as it does not require a second surgical area and acts as a local modulator of the immune system, controlling inflammation and reducing the rate of postoperative infections,[14] resulting in fewer doses of analgesics.[15] On the other hand, the tissue color and consistency are more natural as it does not produce a "patch effect."

CONCLUSION

With the limitations implied by the description of a clinical case, the use of PRF in vestibuloplasty is a valid and

TABLE 1 Comparison of the evolution of keratinized tissue (KT) width, in millimeters, between baseline and 36-month follow-up

	27	26	25	24	23	22	Mean
Baseline	2.00	0.50	1.75	1.75	1.75	2.00	1.63 ± 0.52
36-month follow-up	3.00	2.25	3.50	3.50	2.50	2.50	2.88 ± 0.49
Difference	+1.00	+1.75	+1.75	+1.75	+0.75	+0.50	1.25 ± 0.52 ($p < 0.05$)

TABLE 2 Comparison of recession evolution, in millimeters, between baseline and 36 months of follow-up, measured from the amelocemental junction to the gingival zenith of each tooth of the fifth sextant

	27	26	25	24	23	22	Mean
Baseline	0.75	3.00	0.75	0.50	1.75	1.50	1.38 ± 0.85
36-month follow-up	0.50	0.50	0.50	0.25	1.25	1.50	0.75 ± 0.46
Difference	−0.25	−2.50	−0.25	−0.25	−0.50	0.00	−0.63 ± 0.85 ($p > 0.05$)

effective option as an alternative to second-intention healing, as FGGs, with results that are acceptable in terms of KT gain and root coverage, appropriate tissue color and consistency, and minimal morbidity.

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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