Root Coverage with Platelet-Rich Fibrin in Miller’s Class I, III, and IV Gingival Retractions

Abstract
Coronally advanced flap (CAF) with connective tissue graft (CTG) is considered as the most predictable method to treat Miller’s Class I and II gingival recessions (GR). However, due to the patient’s postsurgical discomfort, the difficulty of finding a donor with an adequate tissue thickness, the high costs of acellular dermal substitute among others, the platelet concentrates have been found to scaffold alternative to replace CTG as a part of the CAF treatment for GR. Nevertheless, according to the recent literature, the evidence of success in Class III and IV has been limited for CAF and platelet-rich fibrin (PRF). The purpose of this report is to present a case of multiple Miller’s Class III and IV GR treated with CAF and PRF where the potential of PRF to increase gingival thickness and clinical attachment level, and improve soft-tissue healing and clinical appearance was corroborated.

Keywords: Connective tissue graft, gingival recessions, periodontal tissue regeneration, platelet-rich fibrin

Introduction
Coronally advanced flap (CAF) with connective tissue graft (CTG) is the technique with the most reproducible results in root coverage (RC) of gingival recessions (GR). Miller’s Class I and II are predictable by the presence of attachment loss.[] Due to the disadvantages presented with the obtaining of the CTG, the membrane platelet-rich fibrin (PRF) has been proposed as a replacement improving healing, slow protein release, circulating immune cells, and angiogenesis through the release of fibroblast growth factor, vascular endothelial growth factor, and platelet-derived growth factor.[] This report presents a case of GR I, III, and IV treated with CAF and PRF.

Case Report
A 44-year-old female patient attended to the Universidad Antonio Nariño with a main complaint: “My teeth seem to have a long appearance.” The patient presented bleeding on probing, tooth sensitivity, soft-tissue redness, and inflammation in her gingiva. Teeth 27 and 22 had GR Class I; 23 and 26 had GR III; and 24 had GR IV. Her O’Leary plaque control was 15%.

Teeth 1, 5, 12, 17, and 25 were extracted in her infancy. The space of 26 was closed with orthodontic. The intraoral periapical radiograph showed the moderate bone loss in her incisors and mild bone loss on 22 and 27.

After oral hygiene instructions and Phase I therapy baseline measurements were taken. Under local anesthesia and aseptic condition, releasing incisions were performed, and mucoperiosteal flap was reflected [Figure 1a]. Ten milliliters of blood sample were taken and centrifuged at 3000 RPM for 10 min.[] The fibrin clot was placed on the roots and bone. The flap was coronally sutured with 5-0 prolipropilen; the patient was medicated with winadene for 5 days and chlorhexidine gluconate twice a day.

On the next day [Figure 1a], the healing process was uneventful, the postoperative pain, swelling, and inflammation were minimal, and the flaps were in a suitable position [Figure 1b]. She was controlled at 48 h [Figure 1c] and 8 days when the sutures were removed [Figure 1d]. As expected, the patient showed satisfaction with the improved esthetic and the decrease of her sensitivity.

Measurements were taken the 1st [Figure 2a], 3rd [Figure 2b], 6th month

How to cite this article: Gutiérrez DA, Hinojosa JP, Pava JP, Dorado AI. Root coverage with platelet-rich fibrin in Miller’s class I, III, and IV gingival retractions. Contemp Clin Dent 2019;10:382-4.
[Figure 2c] an year [Figure 2d] after surgery by the same periodontist who found vertical gingival recession (VGR) on tooth # 22 was completely eliminated; he also found marked reduction in horizontal gingival recession (HGR) at general level. The probing depth was consistent with baseline, and a large growing in gingival thickness (GT) was found in all teeth [Table 1]. Control at a year shows vertical loss of bone (VLB) remained stable.

Discussion

As teeth with type I retractions were to be treated with CAF plus PRF, and bearing in mind, the patient collaboration and the absence systemic diseases, the technical committee decided to carry out this treatment in all teeth to evaluate the performance the type III and IV with PRF. This technique was proposed to the patient, who accepted it and signed the informed consent.

CAF together with CTG is a widely used procedure, but this method has limitations due to morbidity during harvesting tissue.[1] In our case report, we presented an alternative modality of using PRF to treat challenges Miller’s Class III and IV GR.

The effectiveness in Miller Class III for complete root coverage (CRC) with CAF is predictable in 57%–64%. Nevertheless, for Miller Class IV is unconfirmed in the actual literature.[1] To treat multiple GR with significant bone loss, the tunnel technique (TT) with CTG has been used being predictable for CRC of multiple Class III GR.[4] In a study, where TT with PRF was used to treat GR type I, II, and III of Miller, it was demonstrated that there was a reduction in GR Class III of 40%–50%, and a greater reduction of the GR by 50%–80% when used TT in combination with PRF membrane.[7]

In our case, only 22 had CRC due to the few vertical bone loss, and to that horizontally, the recession was smaller. On teeth 23 and 24, HGR and VGR remained stable; on tooth 26 decreased 1 mm; these results were predictable due to VLB that did not offer any support for the maintenance of the tissues at postsurgical level diminishing the prognosis of GR III and IV in CRC,[1,2]

As it was expected GT increased in all teeth, from 1 to 2 mm, clinical attachment level (CAL) was enhanced or maintained, and their clinical appearance and soft-tissue healing were improved. These results could be explained by the fact that PRF, when used as a membrane, creates a space that facilitates important cellular events in periodontal regeneration[4] such as the proliferation of osteoblasts, cells of the periodontal ligament, growth factors, and also acts as a barrier that inhibits the oral epithelial cell growth.[5]

This report corroborates the results of the other studies, in which it was compared the efficacy of PRF plus CTG in the coverage of bilateral and multiple Miller’s Class I and II GR after 12 months. It was found that there were no statistically significant differences in RC and attachment gain between the two techniques.[9] Other study performed at 6 months showed similar results regarding RC, but was more favorable for the group treated with the CTG.[10] Both studies coincided in a statistically significant gain in CAL and increased of GT.

Conclusion

Within the limitations of this case report, it could be concluded that the use of PRF is an effective procedure for covering GR and increasing periodontal biotype in Miller Class I GR. It was observed that although GR Class III and IV were not fully covered, they improved their clinical appearance, soft-tissue healing, CAL, and GT, what improved the prognosis and a great protection to the dentogingival attachment. The PRF technique can be used as an alternative to the CTG because it avoids a second surgical procedure and major discomfort to the patient.

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

This publication was supported by funds from Vice-rectory of Science Technology and Research (VCTI) of the Universidad Antonio Nariño and the Sistema Nacional de Regalías (SGR) de Colombia, project INNOVACCION Cauca.

Conflicts of interest

There are no conflicts of interest.

References

1. Chambrone L, Tatakis DN. Periodontal soft tissue root coverage procedures: A systematic review from the AAP regeneration workshop. J Periodontol 2015;86:S8-51.

2. Miller PD Jr. A classification of marginal tissue recession. Int J Periodontics Restorative Dent 1985;5:8-13.

3. Choukroun J, Adda F, Schoeffler C, Vervelle A. The opportunity in perio-implantology: The PRF. Implantodontie 2000;42:55-62.

4. 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.

5. 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:c37-44.

6. Aroca S, Keglevich T, Nikolidakis D, Gera I, Nagy K, Azzi R, et al. Treatment of class III multiple gingival recessions: A randomized-clinical trial. J Clin Periodontol 2010;37:88-97.

7. Garg S, Arora SA, Chhina S, Singh P. Multiple gingival recession coverage treated with vestibular incision subperiosteal tunnel access approach with or without platelet-rich fibrin – A case series. Contemp Clin Dent 2017;8:464-8.

8. Kijsmannith K, Surarit R, Vongsavan N. Effect of tropical fruit juices on dentine permeability and erosive ability in removing the smear layer: An in vitro study. J Dent Sci 2016;11:130-5.

9. Keceli HG, Kamak G, Erdemir EO, Evginer MS, Dolgun A. The adjunctive effect of platelet-rich fibrin to connective tissue graft in the treatment of buccal recession defects: Results of a randomized, parallel-group controlled trial. J Periodontol 2015;86:1221-30.

10. Öncü E. The use of platelet-rich fibrin versus subepithelial connective tissue graft in treatment of multiple gingival recessions: A randomized clinical trial. Int J Periodontics Restorative Dent 2017;37:265-71.

| Teeth | Measurements | Baseline | 1st month | 3 months | 6 months | 1 year |
|-------|--------------|----------|-----------|----------|----------|--------|
| 27    | VR           | −3       | −3        | −3       | −3       | −3     |
|       | HR           | 5        | 3         | 3        | 3        | 3      |
|       | CAL          | 3        | 5         | 4        | 4        | 4      |
|       | WKG          | 5        | 4         | 4        | 5        | 5      |
|       | TKG          | 1        | 1         | 1        | 2        | 2      |
| 26    | VR           | −3       | −3        | −2       | −2       | −2     |
|       | HR           | 3        | 3         | 2        | 2        | 2      |
|       | CAL          | 3        | 4         | 3        | 3        | 3      |
|       | WKG          | 4        | 5         | 4        | 4        | 4      |
|       | TKG          | 1        | 1         | 2        | 2        | 2      |
| 24    | VR           | −3       | −2        | −3       | −3       | −3     |
|       | HR           | 2        | 3         | 2        | 2        | 2      |
|       | CAL          | 4        | 3         | 4        | 5        | 4      |
|       | WKG          | 4        | 5         | 4        | 4        | 4      |
|       | TKG          | 1        | 2         | 2        | 2        | 2      |
| 23    | VR           | −3       | −3        | −3       | −3       | −3     |
|       | HR           | 3        | 2         | 2        | 2        | 2      |
|       | CAL          | 5        | 6         | 6        | 5        | 5      |
|       | WKG          | 4        | 4         | 4        | 4        | 4      |
|       | TKG          | 1        | 2         | 2        | 2        | 2      |
| 22    | VR           | −3       | −3        | −3       | 0        | 0      |
|       | HR           | 4        | 3         | 2        | 0        | 0      |
|       | CAL          | 4        | 6         | 4        | 2        | 2      |
|       | WKG          | 4        | 5         | 4        | 5        | 5      |
|       | TKG          | 1        | 1         | 2        | 3        | 2      |

VR: Vertical recession; HR: Horizontal recession; CAL: Clinical attachment level; WKG: Width keratinized gum; TKG: Thickness keratinized gum

Table 1: Measurements corresponding to 1st, 3rd, 6th month and 1 year