

Case Report Article

Association of subepithelial connective tissue graft and plasma rich-fibrin for treatment of gingival recession – clinical case report with 12 months post-surgical follow-up

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Received for publication: October 14, 2019. Accepted for publication: November 12, 2019.

Keywords:

subepithelial
connective tissue graft;
plasma rich fibrin;
periodontal surgery.

Abstract

Introduction: Gum is a portion of periodontal tissue that plays an important role in protecting the surface of the teeth. Its migration beyond the boundaries of the cementum enamel junction, exposing the root of the tooth, is called Gingival Recession (GR) which increases susceptibility to root caries, dentin sensitivity, and aesthetic discomfort. **Objective:** The main goal of this case report is to describe a surgical procedure that combined the technique of subepithelial connective tissue graft and Plasma-rich fibrin for treatment of gingival recession. **Case report:** A man, 45 years old, leucoderma, attended the Positive University dental clinic complaining that 'his gum was rising, and his teeth were sensitive'. Clinical buccal examination was performed according to international guidelines for periodontal data collection and was the man was diagnosed with GR in the region comprising the buccal faces of the first right upper molar to the first right premolar. Before surgical procedure, 60 ml of blood

was collected, and Plasma-rich fibrin was obtained. Subepithelial connective tissue from the donor area was inserted in the receiving area associated with PRF. After twelve months follow up the patient had a gain of keratinized gingiva, root coverage and no signs of inflammation or bleeding on probing. The patient reported no longer dentin sensitivity and was satisfied with the aesthetic result. **Conclusion:** The association of subepithelial connective tissue graft and PRF demonstrates potential to be used in gingival recession and exposed roots of human teeth treatment.

Introduction

Gum is a portion of periodontal tissue that plays an important role in protecting the surface of the teeth. Its migration beyond the boundaries of the cementum enamel junction, exposing the root of the tooth, is called Gingival Recession (GR) which causes functional and aesthetic disturbances to the affected individuals [20]. This condition substantially increases susceptibility to root caries, dentin sensitivity, and causes aesthetic discomfort [15].

Even though it is a multifactorial condition, its causes are still a matter of controversy and discussion. Intrinsic host factors such as low lip bridging or bridging, poor tooth position, trauma during tooth brushing, and psychological aspects are presumed to be among the leading causes of GR [6]. In addition, predisposing factors include areas with thin, minimal or no keratinized tissue [2]. Two surgical techniques for treatment of GR are widely used: the free gingival graft technique, in which a portion of tissue is removed from the donor area and transferred to the recession area [12] and the autogenous subepithelial connective tissue graft, which is considered the gold standard [16]. Even being efficient techniques, the extension of recession areas can restrict their effective success [3].

Plasma-rich fibrin (PRF) belongs to a new generation of platelet concentrates that can be obtained from the patient's own blood using management strategies. It consists of processing a blood sample taken from the patient himself and using this material as an adjunct to the surgical procedure. This platelet concentrate has several growth factors that can make a decisive contribution to bone and tissue regeneration [10]. Recent systematic review and meta-analysis founded few studies that use PRF for treatment of GR [11], so the main goal of this case report is to describe a surgical procedure in a man that combined the technique of subepithelial connective tissue graft

and PRF for the treatment of gingival recession with 12-month follow-up.

Case report

V.L.C, male, 45 years old, leucoderma, attended the Positive University dental clinic complaining that 'his gum was rising, and his teeth were sensitive'. Upon clinical examination it was found GR, Miller Class III, in the region comprising the buccal faces of the first right upper molar to the first right premolar, ranging from 11 mm to 16.9 mm but without signs of inflammation. Clinical buccal examination was performed according to international guidelines for periodontal data collection, imaging exams were requested to confirm the level of bone insertion of the teeth. In addition, complementary laboratory tests were requested to assess the patient's systemic condition. Prior to the surgery, 60 ml of blood was collected and distributed into dry Vacutube Biocon tubes without anticoagulant and centrifuged at a speed of 1,700 rpm. After centrifugation the fibrin gel (PRF) was carefully removed and placed in a fibrin box.

The surgical procedure started with asepsis was performed by the patient through a mouthwash with 0.12% chlorhexidine digluconate solution for one minute. The anesthetic technique used was subperiosteal with 3% mepivacaine. Two vertical incisions were made in the receiving area, and partial thickness flap folding. During the displacement, the integrity of the periosteum and flap was preserved to avoid compromising the blood supply to the operated area. Subsequently, infiltrative anesthesia was applied to the palate, in the premolars and molars region, right side to obtain connective tissue graft. The trapdoor technique was performed, which also recommends preservation of the local blood supply through a rectangular incision preserving one of the lips. In the receiving bed the graft was positioned and sutured with Vicryl 6-0

thread for better adaptation in the area and after segregation the PRF was inserted in the receiving area, accommodated with a Dietrich forceps, the flap that had been folded was sutured with suture silk (figure 1). Postoperative medication included antimicrobial, anti-inflammatory and analgesic. Instructions regarding postoperative care were passed on to the patient.

The sutures were removed two weeks after the surgical procedure and the patient was followed

periodically for 12 months (figure 2). Two months later it can be observed the covering of the entire receiving area including the furcation region of the first molar. Twelve months after the surgery, the patient had a gain of keratinized gingiva, root coverage ranging from 2 to 4 mm, probing depth of 2 mm in all teeth and no signs of inflammation or bleeding on probing. The patient reported no longer dentin sensitivity and was satisfied with the aesthetic result.



Figure 1 - Surgical procedure: Coronally advanced Flap. a) two vertical incisions connected to two horizontally beveled incisions, mesial and distal to the recession defect, located at papilla bases and partial thickness flap folding; b) flap raised and dissected beyond mucogingival junction and the tissue graft sutured with absorbable suture; c) PRF obtained after centrifugation; d) all obtained PRF samples positioned in the fibrin box for segregation; e) Insertion of the PRF membrane in the receiving bed; f) flap coronally advanced to cover the graft completely and sutured



Figure 2 - Chronological sequence of the clinical case report: a) initial aspect; b) two weeks; c) two months and d) twelve months after surgical procedure

Discussion

Gingival recessions are one of the most common aesthetic and functional problems that affect the periodontium [20]. Its prevalence increases with increasing age and currently affects a significant portion of the population [13]. In addition, aesthetic and functional root coverage procedures could be accompanied by high levels of discomfort and lengthy postoperative recovery [5]. Current techniques for RG treatment include minimally invasive techniques that combined blood derivatives from the patient to achieve root coverage [21]. In this sense, platelet-rich plasma (PRP) emerges like a promising biomaterial that can be used for tissue regeneration [11].

PRP is defined as a platelet concentrate produced from a patient's whole blood. This material is significant source of inflammatory cells, proteins, like fibrin, vitronectin, fibrin, adhesion molecules and epithelial growth factors [19] all these molecules are involved in modulation of the tissue reparation [1]. In the same direction, advances in basic research provided new compounds that are considerate the second generation of the platelet concentrates [15]. One of them is called Plasma-rich fibrin (PRF) [8]. PRF has shown in previous

studies the strong ability to amplify angiogenesis at the injury site [9, 7] and has the advantage to promote the releasing of the a significantly higher quantity of growth factors [14].

In this study we used the association of the subepithelial connective tissue graft with PRF for treatment of the gingival recession. This technique is not new and was initially described by Choukroun *et al.* [4] and consists in processing a blood sample taken from the patient himself and using this material as an adjunct to the surgical procedure. After twelve months of follow up the technique was clinically satisfactory once tissue reaction was favorable and there was root coverage of all teeth involved ranging from 2 to 4 mm, ingrowth of keratinized gingival tissue and reversed gingival tissue recession. Probing depth was 2 mm in all teeth and no signs of bleeding on probing. Although we do not have histological and immunological data, tissue reaction appears to be satisfactory since there are no clinical signs of inflammation. According to patient report, there is no more dentin sensitivity and aesthetic result was good. These findings corroborate data from previous studies that point to compounds with high concentration of platelets, especially PRF, as biomaterials with numerous therapeutic possibilities [10, 11].

Conclusion

In conclusion, the association of subepithelial connective tissue graft and PRF demonstrates potential to be used in gingival recession and exposed roots of human teeth treatment.

References

1. Andrade MGS, Dantas DB, Sadigursky M. Efeitos biológicos do plasma rico em plaquetas. *Rev Ciências Médicas Biol.* 2007;6(2):204-13.
2. Cairo F. Periodontal plastic surgery of gingival recessions at single and multiple teeth. *Periodontol* 2000. 2017 Oct;75(1):296-316.
3. Carvalho JC, Postiglioni FE, Kon S. Combination of a connective tissue pedicle flap with a free gingival graft to cover localized gingival recession. *Int J Periodontics Restorative Dent.* 1982;4:27-33.
4. Choukroun J, Diss A, Simonpieri A, Girard MO, Schoeffler C, Dohan SL. Platelet-rich fibrin (PRF): a second generation platelet concentrate. Part. V: histologic evaluations of PRF effects on bone allograft maturation in sinus lift. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2006;101: 56-60.
5. Clagett R, Ogdon D, Kim M, Geisinger ML. Treatment of recession defects with mucosal access and use of soft tissue allograft: a case report of a simplified protocol. *Clin Adv Periodontics.* 2020;10(1):30-7.
6. Culhaoglu R, Taner L, Guler B. Evaluation of the effect of dose dependent platelet-rich fibrin membrane on treatment of gingival recession: a randomized, controlled clinical trial. *J Appl Oral Sci.* 2018 Jun/Oct;26:e20170278.
7. Di Liddo R, Bertalot T, Borean A, Pirola I, Argentoni A, Schrenk S et al. Leucocyte and platelet-rich fibrin: a carrier of autologous multipotent cells for regenerative medicine. *J Cell Mol Med.* 2018;22(3):1840-54.
8. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhvi J et al. Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part II: platelet-related biologic features. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2006;101(3):e45-e50.
9. Dohan DM, Choukroun J, Diss A, Dohan SL, Dohan AJ, Mouhvi J et al. Platelet-rich fibrin (PRF): a second-generation platelet concentrate. Part III: leucocyte activation: a new feature for platelet concentrates? *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2006;101(3):e51-5.
10. Foster TE, Puskas BL, Mandelbaum BR, Gerhardt MB, Rodeo SA et al. Platelet-rich plasma: from basic science to clinical applications. *Am J Sports Med* 2009;37:2259-72.
11. Franchini M, Cruciani M, Mengoli C, Marano G, Pupella S, Veropalumbo E et al. Efficacy of platelet-rich plasma as conservative treatment in orthopaedics: a systematic review and meta-analysis. *Blood Transfus.* 2018;16:502-13.
12. Ghanaati S, Schlee M, Webber MJ, Willershausen I. Evaluation of the tissue reaction to a new bilayered collagen matrix in vivo and its translation to the clinic. *Biomed Mater.* 2011;6:1-12.
13. Heasman PA, Holliday R, Bryant A, Preshaw PM. Evidence for the occurrence of gingival recession and non-carious cervical lesions as a consequence of traumatic toothbrushing. *J Clin Periodontol.* 2015;42(Suppl. 16): S237-55.
14. Kobayashi E, Flückiger L, Fujioka-Kobayashi M, Sawada K, Sculean K, Schaller B et al. Comparative release of growth factors from PRP, PRF, and advanced-PRF. *Clin Oral Investig.* 2016;20(9):2353-60.
15. Kumar NS, Sowmya N, Singh VP. Dual role of subepithelial connective tissue rafting in regeneration of periodontal attachment apparatus. *Dent Update.* 2017 Oct;44:459-61.
16. Langer B, Langer L. Subepithelial connective tissue graft technique for root coverage. *J Periodontol.* 1985;56(12):715-20.

17. Maynard GJ. The value of periodontal plastic surgery – root coverage. *International J Periodontics Restorative Dent.* 2004;24(1).

18. Chrysanthakopoulos N. Gingival recession: prevalence and risk indicators among young greek adults. *J Clin Exp Dent.* 2014;6(3):e243-9.

19. Piccin A, Di Pierro AM, Canzian L, Primerano M, Corvetta D, Negri G et al. Platelet gel: a new therapeutic tool with great potential. *Blood Transfus.* 2017;15:333-40.

20. Shkreta M, Atanasovska-Stojanovska A, Dollaku B, Belazelkoska Z. Exploring the gingival recession surgical treatment modalities: a literature review. *Journal of Medical Sciences.* 2018 April 15;6(4):698-708.

21. Tuttle D, Kurtzman G, Bernotti AL. Gum drop technique: minimally invasive soft-tissue platelet-rich plasma grafting for marginal soft-tissue recession. *Compend Contin Educ Dent.* 2018 May;39(5):e9-12.