Root Coverage Associated with Acellular Dermal Matrix and L-Prf in Bilateral Unitary Gingival Recessions – Case Report

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Abstract: Gingival recession can be defined as the displacement of the marginal tissue apical to the cemento-enamel junction exposing the root surface of teeth. To restore the displaced tissue, grafts are used mainly to modify the periodontal biotype and reconstruct the gingival tissue and among graft types we mention autogenous, xenogenous and allogeneic. This paper aims to report a case of bilateral root coverage using acellular dermal matrix (ADM) graft and platelet-rich fibrin (L-PRF) membrane. Female patient, 27 years old, non-smoker and no previous medical conditions attended to a college dental clinic in northern Brazil with the main complaint of dental hypersensitivity. On intraoral exam it was observed gingival recessions stage II type 1 in teeth 13 and 23 due to orthodontic treatment. After preoperative exams and oral cavity adequacy, the recommended treatment was root coverage by Zucchelli & De Sanctis technique with autogenous graft. However due to the hard palate thin thickness and the patient's refusal to have a second postoperative area xenogenous and allogeneic were used. During the surgical procedure a coronally advanced flap without relaxing incisions were made and associated with L-PRF membrane in tooth 23 and ADM graft in tooth 13, then the coronal flap was fixed with sutures. We conclude that the use of L-PRF and ADM are viable techniques and with excellent predictability of success; both improved the range of keratinized mucosa and promoted clinical attachment level (CAL) increase.

Keywords: Platelet-rich fibrin, Gingival recession, Allografts.

INTRODUCTION

Mucogingival deformities are periodontal conditions which affects people worldwide. These abnormalities can be defined as the presence of pathological conditions such as gingival recessions or periodontal disease and are characterized by periodontal phenotype, dental positioning, width/ length of keratinized tissue, bone thickness, presence of dental plaque and systemic factors [1-3].

Gingival recession (GR) is among the most prevalent mucogingival deformities and can be defined as the displacement of the marginal tissue apical to the cemento-enamel junction exposing the root surface of teeth, this phenomenon might be associated with bone resorption and clinical attachment level (CAL) loss [3, 4]. Once exposed the dental root may develop root carious lesions or non-carious cervical lesions, such as abrasions or abfractions and it is commonly dentin hypersensitivity among patients with GR [5].

Although GR etiology is not yet fully understood, several predisposing factors such as: periodontal phenotype thickness, keratinized mucosa absence, dental crowding or diastema and orthodontic treatment can directly influence the incidence of GR as well as its length and width; which will directly affect the root coverage and its predictability. Orthodontic treatment might be one important risk factor for GR because depending on the orthodontic movements performed and periodontal conditions, GR can occur more frequently during orthodontic treatment [6-8].

GR treatment is directly related to the cause removal, in this sense, several root coverage techniques are used to treat tissue defects around teeth and implants [9]. However, in cases with multiple recessions, the initial dimensions of the periodontal defect will affect root coverage in its entirety; therefore, plastic surgical grafting techniques have been used to maximize the clinical gain of insertion and increase the thickness and width of the keratinized mucosa in the areas to be covered [8-10].

Among graft techniques, autogenous graft is considered the gold standard for keratinized mucosa increase and periodontal phenotype switch. However, some cases a autogenous graft removed from hard palate or maxillary tuber may be thin or unsatisfactory to increase keratinized mucosa length and width, other cases due to a morbidity of a donor area patient might

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refuse to use autogenous graft techniques. So, to prevent morbidity of xenogenous and allogeneic grafts such as acellular dermal matrix (ADM) and/ or platelet-rich fibrin (L-PRF) membrane are indicated [11-14]. This paper aims to report a case of bilateral root coverage using ADM graft and L-PRF membrane.

CASE REPORT

Female patient, 27 years old, non-smoker and no previous medical conditions attended to a college dental clinic in northern Brazil with the main complaint of dental hypersensitivity and esthetic impairment in the anterosuperior region. On intraoral exam it was observed bilateral gingival recessions stage II type 1 in teeth 13 and 23 due to orthodontic treatment. The GR classification used was established by Cairo *et al*. (2011) [6], tooth 13 GR presented 4mm of length and tooth 23 presented 3mm of length, thin periodontal phenotype, no interproximal bone loss, absence bleeding on probing and dental plaque (Figure **1A** / **1B**).

After preoperative exams and oral cavity adequacy, the recommended treatment was root coverage by Zucchelli & De Sanctis (2000) [12] technique with autogenous graft. However due to the hard palate thin thickness and the patient's refusal to have a second postoperative area xenogenous and allogeneic were used due to autogenous graft morbidities. Prior to the surgical procedure, L-PRF membranes were obtained, where a total of 40 ml of blood was collected by venipuncture, which were stored in four 10 ml tubes with EDTA. The samples were centrifuged at 2700 rpm for 12 minutes in a low speed centrifuge.

Soon, surgery was performed under local anesthesia of 2% lidocaine with epinephrine 1,100,000 (Nova DFL, Rio de Janeiro, Brazil) for bilateral infra-orbital nerve block. After analgesia, parapapillary incisions were made with 15c blades (Swann Morton, Sheffield, England) followed by the subperiosteal tissue divulsion using a micro blade (Welfare, Santa Catarina, Brazil) and tunelizers (Hu-Friedy, Rio de Janeiro, Brazil) to create flap mobility (Figure **2A** / **2B**).

Once flap was stress-free, the roots were flattened with 4138FF diamond tips (KG Sorensen, São Paulo, Brazil), the epithelial tissues of the anatomical papillae were removed using castroviejo scissors (Hu-Friedy-Rio de Janeiro- Brazil) then the roots were treated with EDTA 24%. After preparing the area both ADM and L-

Figure 1A/ 1B: Preoperative report presenting a stage II type 1 gingival recession in teeth 13 and 23.

Figure 2A/ 2B: Initial surgical incisions.

PRF membrane were positioned (Figure **3A**) (Figure **3B**) and sutured with vicryl 6.0 thread (Ethicon, Ohio, USA) next advanced flap was coronally fixed with sutures (Figure **4**).

Figure 3A: MDA set upon element 13.

Figure 3B: L-PRF set upon element 23.

Figure 4: Immediate postoperative.

It was prescribed antibiotic therapy (amoxicillin 500mg, 3 times a day for 7 days), corticosteroids (dexamethasone 4mg, 2 times a day for 3 days) and analgesic (toragesic 10mg 3 times a day for 5 days). days). During the postoperative follow-up, the root coverage was satisfactory, as well as the patient did not complaint of dentin hypersensitivity (Figure **5**). The patient attended to the dental college every 3 months (4 times control), the last one being performed 12 months after surgery.

Figure 5: 12 months of follow up.

DISCUSSION

The present case report, illustrated above, was developed to comparatively evaluate both functional and esthetic efficacy between ADM and L-PRF membranes in root coverage treatment of bilateral GR. The idea of comparing two different types of allografts in only one case is due to the fact that both teeth 13 and 23 GR's classification and clinical appearance are similar and based on this premise, the researchers used a single and constant operating methodology, leaving only allografts as variables [14-18].

It is well established in literature that the autogenous graft is considered the gold standard for increase length and width of keratinized mucosa and switch periodontal phenotype depending its indication in guided tissue regeneration (GTR). To perform GTR correctly it is necessary to choose the graft types which can vary between subepithelial or conjunctive; mixed and epithelial grafts alongside the surgeon must also consider that for each case there is a specific graft type and donor area, among intraoral donor areas the most used is the hard palate area. Consequently, autogenous graft removal promotes a postoperative morbidity augmentation, increases the surgical procedure time and can result in iatrogenesis such as pain, speaking or chewing impairments [7-9, 19, 20].

In addition, patient's anatomical and emotional factors must be considered prior to the surgical act, we cite as an example: hard palate tissue thickness, anatomical variations because, as well cited in the literature, the autogenous graft must have a minimum thickness to promote gingival biotype modification and improve the CAL. There are cases where the hard palate thickness is thin which may cause iatrogenesis such as hard palate hemorrhages and/or necrosis or

CAL decrease because of autogenous graft ineffectiveness regarding its thickness. In the present case report, during clinical and radiographic exams it was observed that the patient has a very thin palatal thickness and the patient also requested to use xenogenous and allogeneic grafts in her GTR [10-18].

Among the protocols adopted in this case report was the use of biomodifiers on root surface, which despite the divergent literature regarding the effectiveness of biomodifiers; the use of chemical agents, such as EDTA or tetracycline, on root surface could improve CAL increased results. According the literature the use of EDTA might can help in the collagen fibers displacement coronally to the dentin surface besides it removes the cytopathic material that inhibits the gingival fibroblasts proliferation. However, other studies demonstrate that the use of chemical agents should negatively affect root coverage results since the application of an acidic material can demineralize root surface, making it difficult for the collagen fibers adhesion [19, 22].

Regarding allogeneic grafts, the authors of this case report opted for the use of ADM. ADM is a tissue substitute obtained from a freeze-drying process of human dermal tissue in which the epidermis is removed while preserving the elements of acellular tissue matrix that allows high elasticity and resistance to traction besides cell migration and revascularization in the area. It is known that epithelialization from the graft results in keratinized epithelium through a mechanism of tissue induction [21]. So logically, MDA that is removed from the keratinized skin of different individuals, but of the same species, can result in the same induction capacity in guided tissue regeneration. In this case, the ability to successfully predict root coverage with an allograft, instead of an autogenous graft, can significantly assist patients with medical or anatomical limitations and emotional stressed [21, 22].

The L-PRF membrane role within GTR and GBR has been gradually increasing each year. Respecting L-PRF, it is known that it can accelerate the healing process and in GTR promote fibroblasts proliferation and increase tissue vascularization, consequently increasing collagen formation, mesenchymal and endothelial cells proliferation [23, 24]. However, current debate in GTR and GBR literature has been about use L-PRF to increase keratinized mucosa width and periodontal biotype modification. In this paper the region of tooth 23 it can be observed a width augmentation of keratinized mucosa, so by this result we authors might suggest that L-PRF can promote CAL increase and periodontal biotype modification, however, as mentioned before only one case it is not sufficiently to determine that L-PRF membrane modify periodontal biotype, so further studies are needed [23, 24].

Miller's classification was proposed based on diagnosis and prognosis principles and despite being widely used in periodontics for years, this classification must be carefully evaluated because based on this we can observe limitations, among these limitations we mention the difficult of differentiate between Classes I and II and the use of the term “loss of bones or soft tissues” as a reference to diagnose an interdental bone loss [2, 6-8]. In addition, we must consider that the Miller's classification was proposed in the advent of root coverage techniques and with technological and scientific development, the Miller's classification no longer includes the coverage predictability and results of the most advanced surgical techniques. Cairo's new classification is treatment-oriented and seeks to predict the potential for recovery through the gain of interdental CAL [2, 6-8].

CONCLUSION

We conclude that L-PRF membrane and ADM graft are potential substitutes for the autogenous graft. We also concluded L-PRF membrane and ADM graft are viable techniques and with excellent predictability; it both improved the width of keratinized mucosa, promoted clinical attachment level increase and stopped dental hypersensitivity.

REFERENCES

[1] Pini Prato GP. Mucogingival deformities. Ann Periodontol. 1999; 4: 1-6. https://doi.org/10.1902/annals.1999.4.1.98

[2] Cortellini P, Bissada NF. Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. J Periodontol. 2018; 89(1): S204-S213. https://doi.org/10.1002/JPER.16-0671

[3] Scheyer ET, Sanz M, Dibart S, Greenwell H, John V, Kim DM, *et al*. Periodontal soft tissue non-root coverage procedures: a consensus report from the AAP Regeneration Workshop. J Periodontol. 2015; 86(2 Suppl): S73-6. https://doi.org/10.1902/jop.2015.140377

[4] Kassab MM, Cohen RE. The etiology and prevalence of gingival recession. J Am Dent Assoc. 2003; 134(2): 220-5. https://doi.org/10.14219/jada.archive.2003.0137

[5] Serino G, Wennström JL, Lindhe J, Eneroth L. The prevalence and distribution of gingival recession in subjects with a high standard of oral hygiene. J Clin Periodontol. 1994; 21(1): 57-63. https://doi.org/10.1111/j.1600-051X.1994.tb00278.x

[6] Cairo F, Nieri M, Cincinelli S, Mervelt J, Pagliaro U. The interproximal clinical attachment level to classify gingival recessions and predict root coverage outcomes: an explorative and reliability study. J Clin Periodontol. 2011; 38(7): 661-6. https://doi.org/10.1111/j.1600-051X.2011.01732.x

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

[8] Pini-Prato G. The Miller classification of gingival recession: limits and drawbacks. J Clin Periodontol. 2011; 38(3): 243-5. https://doi.org/10.1111/j.1600-051X.2010.01655.x

[9] Kim DM, Neiva R. Periodontal soft tissue non-root coverage procedures: a systematic review from the AAP Regeneration Workshop. J Periodontol. 2015; 86(2 Suppl): S56-72. https://doi.org/10.1902/jop.2015.130684

[10] Renkema AM, Fudalej PS, Renkema AA, Abbas F, Bronkhorst E, Katsaros C. Gingival labial recessions in orthodontically treated and untreated individuals: a case - control study. J Clin Periodontol. 2013; 40(6): 631-7. https://doi.org/10.1111/jcpe.12105

[11] Renkema AM, Navratilova Z, Mazurova K, Katsaros C, Fudalej PS. Gingival labial recessions and the post-treatment proclination of mandibular incisors. Eur J Orthod. 2015; 37(5): 508-13. https://doi.org/10.1093/ejo/cju073

[12] Zucchelli G, De Sanctis M. Treatment of multiple recession-type defects in patients with esthetic demands. J Periodontol. 2000; 71(9): 1506-14. https://doi.org/10.1902/jop.2000.71.9.1506

[13] Zucchelli G, Testori T, De Sanctis M. Clinical and anatomical factors limiting treatment outcomes of gingival recession: a new method to predetermine the line of root coverage. J Periodontol 2006; 77(4): 714-21. https://doi.org/10.1902/jop.2006.050038

[14] Balderrama ÍF, Ferreira R, Rezende DRB, Nogueira ALRN, Greghi SLA, Zangrando MSR. Root coverage stability with acellular dermal matrix in multiple gingival recessions in esthetic zone: A clinical case report with 12-year follow-up. J Indian Soc Periodontol. 2019; 23(6): 584-588. https://doi.org/10.4103/jisp.jisp_582_18

[15] Kim DM, Bassir SH, Nguyen, TT. Effect of gingival phenotype on the maintenance of periodontal health: An American Academy of Periodontology Best Evidence Review. Journal of periodontology. (2019)

[16] Menceva Z, Dimitrovski O, Popovska M, Spasovski S, Spirov V, Petrushevska G. Free gingival graft versus mucograft: histological evaluation. Open access Macedonian journal of medical sciences, (2018); 6(4): 675. https://doi.org/10.3889/oamjms.2018.127

[17] Heasman P. A, Holliday R, Bryant A, Preshaw P. M. Evidence for the occurrence of gingival recession and non-carious cervical lesions as a consequence of traumatic toothbrushing. Journal of clinical periodontology (2015); 42: S237-S255. https://doi.org/10.1111/jcpe.12330

[18] Cunha MJ, Esper LA, Sbrana MC, Cirino CC, Oliveira PG, de Almeida AL. Evaluation of the effectiveness of diode laser on pain and edema in individuals with cleft lip and palate submitted to secondary bone graft. Cleft Palate Craniofac J. 2013; 50(5): e92-7. https://doi.org/10.1597/11-281

[19] İzol BS, Üner DD. A New Approach for Root Surface Biomodification Using Injectable Platelet-Rich Fibrin (I-PRF). Med Sci Monit. 2019; 26(25): 4744-4750. https://doi.org/10.12659/MSM.915142

[20] Fathima KH, Harish VS. A comparison of efficiency of biopolymer and allograft matrix with autogenous gingival graft used in root coverage procedure. J Pharm Bioallied Sci. 2015; 7(Suppl 2): S695-9. https://doi.org/10.4103/0975-7406.163481

[21] Costa PP, Alves LB, Souza SL, Grisi MF, Palioto DB, Taba M Jr, *et al*. Root Coverage in Smokers with Acellular Dermal Matrix Graft and Enamel Matrix Derivative: A 12-Month Randomized Clinical Trial. Int J Periodontics Restorative Dent. 2016; 36(4): 525-31. https://doi.org/10.11607/prd.2560

[22] Joly JC, Carvalho AM, da Silva RC, Ciotti DL, Cury PR. Root coverage in isolated gingival recessions using autograft versus allograft: a pilot study. J Periodontol. 2007; 78(6): 1017-22. https://doi.org/10.1902/jop.2007.060428

[23] Rodas MAR, Paula BL, Pazmiño VFC, Lot Vieira FFDS, Junior JFS, Silveira EMV. Platelet-Rich Fibrin in Coverage of Gingival Recession: A Systematic Review and Meta-Analysis. Eur J Dent. 2020; 27. https://doi.org/10.1055/s-0040-1701907

[24] Moraschini V, Barboza Edos S. Use of Platelet-Rich Fibrin Membrane in the Treatment of Gingival Recession: A Systematic Review and Meta-Analysis. J Periodontol. 2016; 87(3): 281-90. https://doi.org/10.1902/jop.2015.150420

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