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Case Report

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Treatment of a single gingival recession with a subepithelial connective tissue graft with a double papilla flap: A case report

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Abstract

Gingival recessions are widely prevalent deformities that affect the normal position of the gingiva and cause exposure of the tooth root, and are often associated with unsatisfactory aesthetics and dentin hypersensitivity. The double papilla technique for root covering is a periodontal plastic surgery technique recommended for the treatment of gingival recessions. In this case report, we show the clinical results after a 12-month follow-up of a root-covering procedure in an upper canine affected by a gingival recession. A 56-year-old patient presenting a Cairo type I gingival recession on the vestibular surface of tooth 23 was treated with a one-stage surgical procedure, carried out using the double papilla technique in combination with a partially epithelialized connective tissue graft, reaching 100% root coverage. After a 12-month follow-up, this technique showed highly successful results both in 100% coverage of the defect and in long-term stability and aesthetics.

Keywords

Gingival recession, root covering, double papilla, connective tissue graft, periodontal plastic surgery

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Introduction

Gingival recessions are gum deformities that negatively affect dental aesthetics and lead to tooth hypersensitivity, root caries, and poor control of dental plaque.[1] Several factors have been associated with the etiology of gingival recessions, including periodontitis, excessive occlusal forces, absence of attached gingiva, muscle position, and having a thin periodontal phenotype.[2,3] Gingival recessions are treated with mucogingival surgery by covering the exposed root surface with soft tissue, which improves the aesthetic appearance, increases the width of the attached gingiva, and reduces tooth sensitivity.[4] In this context, there are several techniques to treat gingival recessions, such as pedicle flap (double papilla), laterally or coronally advanced flap (CAF), envelope, or tunneling procedures, including the use of simple single-layer, double-layer, or bilaminar techniques.[5]

In the bilaminar technique, a connective tissue graft (CTG), an autologous subepithelial tissue extracted from the palate, is placed between the flap and the root surface, thus receiving a double blood supply from the underlying periosteum and the pedicle that covers it.[6] Consequently, the use of the bilaminar technique favors the nutrition of the CTG on the avascular tooth root, provides stability to the wound, and improves healing, thus being frequently used to treat both single and multiple recessions.[7] In this context, the use of a CTG during the bilaminar technique has become a key point to increase the predictability of root coverage.[8,9] Therefore, its use is recommended during periodontal plastic surgery for recession coverage, as well as soft tissue management around implants and the improvement of the periodontal phenotype.[6]

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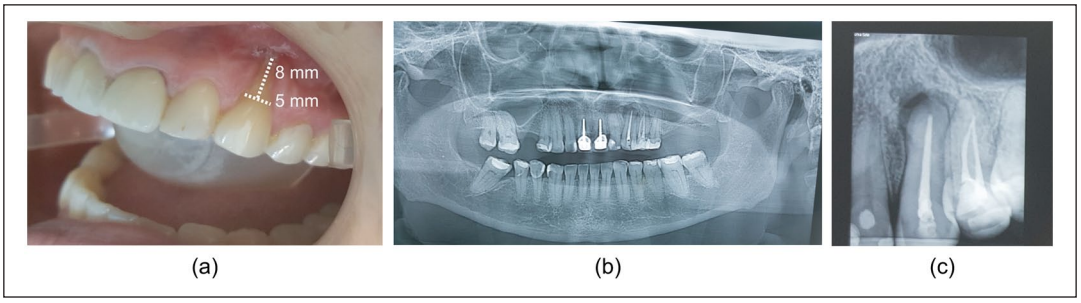


Figure 1. Preoperative clinical and radiographic images. (a) Intraoral photography showing the dimensions of the gingival recession before the mucogingival surgery. (b) Panoramic radiography. (c) Periapical radiography.

In 1968, Cohen and Ross[10] proposed a periodontal surgical technique designed for the covering of gingival recessions in teeth that do not present interproximal papilla height loss. This surgical technique involves a double papilla repositioned flap and consists in joining the two papillae adjacent to the recession to form a flap that covers the exposed or previously grafted root.[10,11] The advantages of this technique are minimal exposure of the underlying periodontium to the denuded area, less risk of interproximal bone loss, rapid healing, reduction of the tension produced in CAFs, greater vascularization and less risk of necrosis, and finally, the gain of attached gingiva due to the union of the two papillae.[10] This case report aims to analyze the clinical results and 12-month follow-up of a root-covering procedure in an upper canine affected with a Cairo type I gingival recession. A one-stage root-covering procedure was used by applying the double papilla technique combined with a partially epithelialized CTG.

Case report

This is a case study of a 56-year-old female patient affected with a Cairo type I gingival recession in tooth 23,[12] with minimal loss of interdental height. The patient agreed to participate in the study by signing an informed consent registered under code 01-2019. The study was conducted in compliance with the Declaration of Helsinki and national regulations.

Medical history and clinical examination

The patient was affected by hypothyroidism and treated pharmacologically with levothyroxine sodium 100 mg/day. Apart from that, the patient did not present any other systemic disease, nor did she smoke. Intraorally, she presented loss of clinical attachment level, probing depth ⩽3 mm, and less than 30% of the periodontal sites with bleeding on probing, thus being diagnosed with generalized gingivitis induced by dental plaque in a reduced periodontium, with no antecedent of periodontitis, according to the 2017 classification.[13] Tooth 23 showed signs of being under excessive occlusal force and a gingival recession with a length of 8 mm and width of 5 mm at its most coronal portion (Figure 1(a)). In addition, this tooth showed a probing depth of 5 mm in the middle of the facial surface, and the width of the centrally keratinized gingiva was 0 mm. There was no mobility or pain on percussion, and there was evidence of fremitus, wear facets, and widening periodontal ligament space, confirming the presence of excessive occlusal forces.

Radiographic evaluation

Panoramic and periapical X-ray examinations were performed. In tooth 23, a slightly under-filled endodontic treatment and apical lesion were observed. In addition, a horizontal radiolucent line was evidenced, indicative of possible root cracking and endo-periodontal lesion (Figure 1(b) and (c)). The endo-periodontal lesion was defined as a grade 1 lesion, which corresponds to the presence of a narrow periodontal pocket on a single surface in a patient without periodontitis.[14] The integrity of the mesial bone crest was determined; however, the distal bone crest was not clearly observed due to overlapping of images.

Treatment

The main objective of treatment was the occlusal adjustment and complete root coverage by mucogingival surgery. Occlusal contacts were evaluated in centric relation to identifying occlusal discrepancies in the teeth, leading to the elimination of premature contacts. The patient did not report any parafunctional habits. Previous to the mucogingival surgery, oral hygiene instructions, prophylaxis, coronal debridement, scaling and root planing, and endodontic retreatment in tooth 23 were performed. The mucogingival surgery was carried out when the patient presented less than 10% of the periodontal sites with bleeding on probing and a plaque index <20%, according to the O'Leary index.[15] During the surgical procedure, the apical third of the tooth was clinically explored in order to evaluate the presence of the root cracking observed during the radiographic evaluation. This clinical exploration included the use of transillumination,

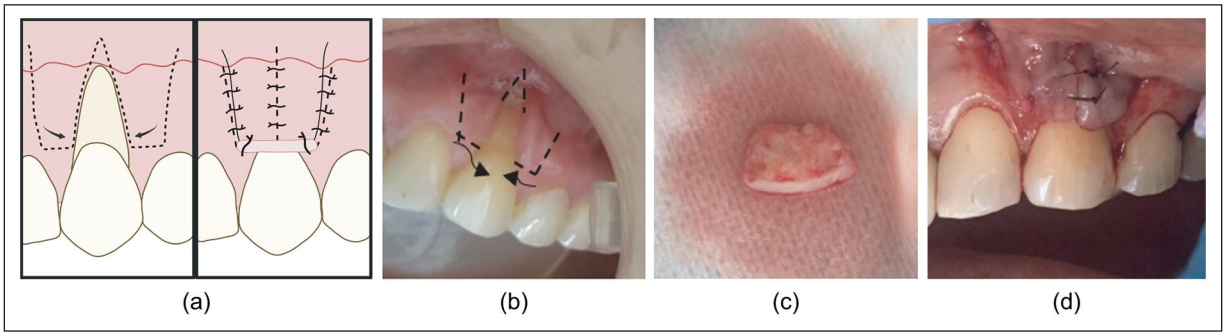


Figure 2. Double papilla flap surgical procedure with a partially epithelialized connective tissue graft. (a) Flap design. (b) Flap design during surgery. (c) Partially epithelialized connective tissue graft. (d) Joining of the two pedicles with simple sutures in the midline of the recession using 5-0 nylon and positioning of the graft.
Figure 2(a) was created with BioRender.com.

magnification loupes, and staining with methylene blue. After this clinical evaluation, the radicular integrity was demonstrated, discarding the presence of root cracks apparently present during the radiographic evaluation.

Surgical procedure

Before the surgery, the patient was instructed to rinse her mouth with 0.12% chlorhexidine, and the perioral area was disinfected with 10% povidone-iodine solution. Lidocaine anesthesia was applied intraorally for infraorbital nerve's block and locally in the palatal area of tooth 23. Scaling and root planing were performed to remove plaque deposits and infected cementum, thus providing a smooth and decontaminated root surface. The root surface was conditioned with tetracycline for 5 min to expose collagen fibers, further decontaminate the root, and eliminate the smear layer.[16]

At the recipient site, horizontal incisions were made with a 15C scalpel blade at the level of the mesial and distal cemento-enamel junction of tooth 23 and up to 0.5 mm from the adjacent tooth (Figure 2(a)).[9] Then, vertical incisions were made which extended beyond the mucogingival line, and an intrasulcular incision was made to join the horizontal incisions, in order to achieve the elevation of the partial thickness flap (Figure 2(b)). The mesial and distal papillae were de-epithelialized to favor the flap coping and healing.

At the donor site, the design for the removal of the CTG included an epithelial band to provide keratinized tissue in the wider area of the gingival defect (Figure 2(c)). Thus, the formation of a tissue bridge was ensured to favor the occurring of creeping attachment and gingival healing.[17] Once placed at the recipient site, the CTG was fixed with a 5-0 polyglycolic acid absorbable suture and covered with the double papilla flap (DPF), which had been sutured at the midline level with a single 5-0 nylon suture (Figure 2(d)), a suspensory suture in the coronal area, and simple suture at the vertical incisions. A complete root coverage was obtained with an adequate amount of keratinized gingiva.

Postoperative regimen and evaluation

The patient was instructed with the following postoperative recommendations: to use a soft toothbrush for at least 3 months, avoid brushing the surgical area for 2 weeks, rinse with 0.12% chlorhexidine twice a day for 1 min, and take 600 mg ibuprofen at the end of the procedure and 6 h later conditioned to pain. In addition, the patient attended the postoperative checkup appointments at 5, 8, 14, 30, and 90 days after the procedure (Figure 3(a)–(g)). After 14 days, the sutures were removed, and the area of the necrotic border was debrided with a gauze impregnated with chlorhexidine, leaving an erythematous gingival tissue in the healing process (Figure 3(e)). Oral hygiene instructions and care of the operative area were reinforced. At 12-month follow-up (Figure 3(h)), a 100% root coverage was observed, corroborated by comparative images between the preoperative state and 12-month postoperative control after mucogingival surgery (Figure 3(i) and (j)). The percentage of root coverage was calculated by measuring the midline of the gingival recession from the gingival margin to the cemento-enamel junction using the ImageJ software (National Institutes of Health, USA). In the preoperative image, the linear distance was 8 mm, and in the 12-month postoperative image, it was 0 mm, meaning a 100% root coverage.

Discussion

In the herein presented case, a double papilla periodontal plastic surgery technique was performed with a CTG with an epithelial band to achieve root coverage of a single tooth with Cairo type I gingival recession produced by excessive occlusal force. This surgical technique was proposed as an alternative to achieve better long-term efficacy in terms of functional and esthetic results, which could not be guaranteed and maintained using the non-bilaminar techniques or a free gingival graft.[18,19] Among others, this surgical proposal was recommended, based on the vestibule depth, position of

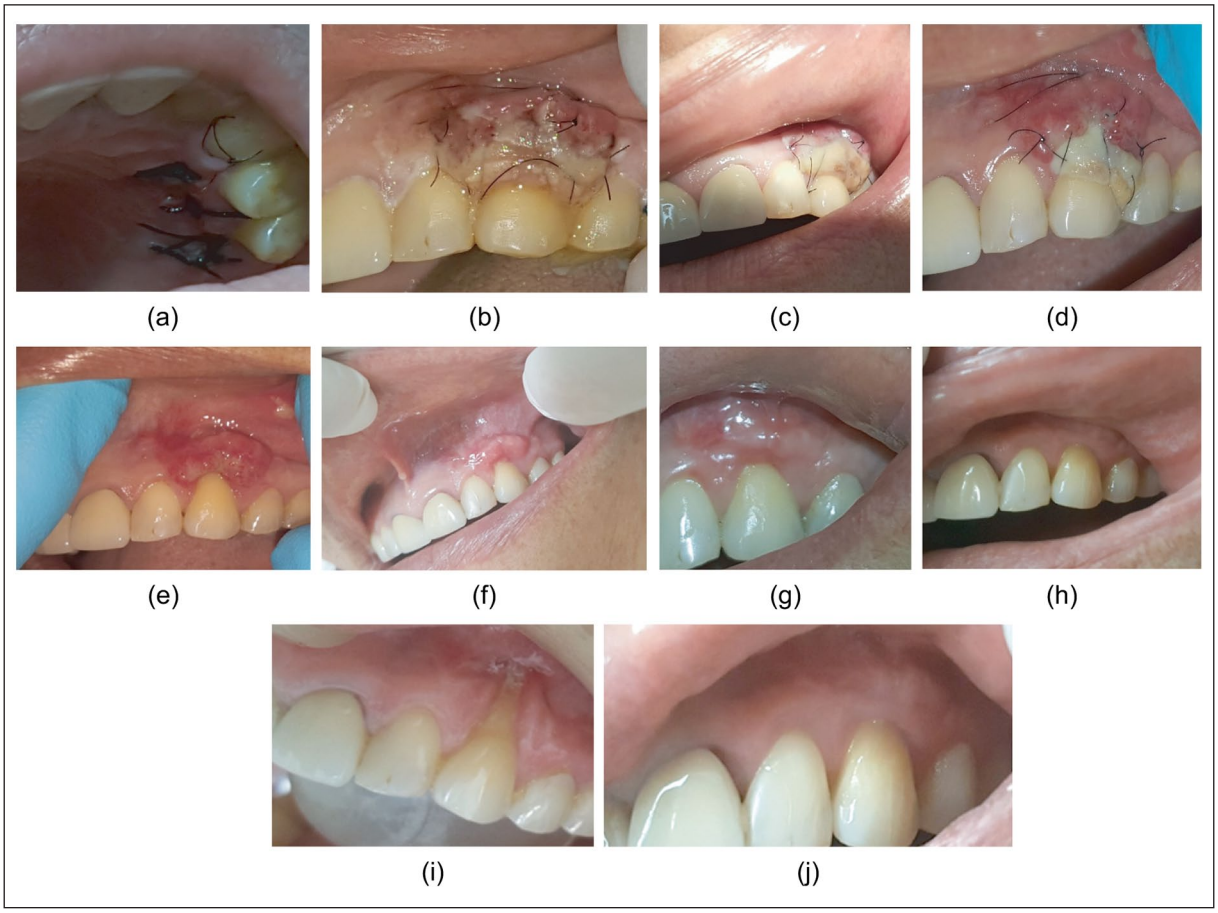


Figure 3. Results and follow-up of the reported case. (a) Five-day postoperative control of the donor area. (b) Five-day postoperative control of the recipient area. (c) and (d) Eight-day postoperative control. (e) Fourteen-day postoperative control with suture removal. (f) Thirty-day postoperative control. (g) Three-month postoperative control. (h) One-year postoperative control. (i) and (j) Comparative images between the preoperative state and 12-month postoperative control after mucogingival surgery.

the tooth, and the conditions of the tissues adjacent to the defect, including the width of the keratinized tissue and height and width of the interdental papilla. A complete root coverage was obtained with an adequate amount of keratinized gingiva firmly adhered to the tooth. Besides, an excellent long-term result was achieved, with an improvement of pink aesthetics.[18]

In addition to the root coverage and the increase in the width of the keratinized gingiva herein achieved, the vestibular gingival architecture of this wide and deep gingival defect was restored. In fact, in this case, it was demonstrated that single, wide, and very deep gingival recessions can be treated with the described technique and that its results are similar to those obtained with the advanced coronal flap and the envelope flap accompanied by CTG.[4] It is important to highlight that this case provides evidence for the treatment of gingival recessions $\geqslant$5 mm, which are scarcely reported in the literature since cases of management of gingival recessions of 2–4 mm depth are regularly reported.[1] In this context, the combined use of CTG with an epithelial collar could benefit the stability of the gingiva at the marginal level, granting greater longevity and stability to the root coverage by favoring the occurrence of creeping attachment.[17] Indeed, the advantages observed with this technique include its high predictability, reconstruction of a large amount of keratinized gingiva, improved aesthetics, long-term tissue stability, and rapid healing of both the donor site and the intervened area. Conversely, the disadvantages include discomfort mainly in the donor area, limited use to single gingival recessions, and the ability of the surgeon, who must join two small flaps in such a way that they work as one.

Although the CAF and tunneling procedures combined with a CTG are considered the most predictable treatment options for patients affected with single or multiple recessions, the defect morphology and conditions of the adjacent tissues could justify using other surgical techniques, such as the DPF.[20] In this context, Nelson and Harris, pioneers of the DPF technique, reported a complete root coverage of 91% and 97.7%, respectively,[8,21] where the DPF procedure showed high over time stability in terms of the gingival margin position and keratinized gingiva width.[20] It is also important to highlight that, in addition to the selection of the

appropriate technique and the skill of the operator, the absence of occlusal alterations is key to maintaining long-term results. In this sense, excessive occlusal forces may negatively influence the success of treatment or promote the development of new mucogingival defects. Although excessive occlusal forces are not an etiological factor of gingival recession, it is suggested that the presence of these forces can promote the appearance of mucogingival alterations or conditions around the teeth.[3] Furthermore, these excessive forces are associated with clinical and radiographic indicators of occlusal trauma, such as fremitus, wear facets, and widening of the periodontal ligament space, which were present in the herein reported case. In fact, fremitus is one of the indicators of occlusal trauma, and in turn, occlusal trauma could be caused by the development of excessive occlusal forces.[3]

A high percentage of root coverage is achieved with the combination of CTG with DPF or CAF, reaching values from 88% to 97.6% and from 84% to 96.1% of the root surface, respectively.[21,22] However, the DPF combined with CTG shows a greater increase in the amount of keratinized tissue (3.0 versus 1.8 mm) as compared with the CAF combined with CTG, and these better results are also observed in gingival recessions $\geqslant$5.0 mm.[21] In the herein presented case, a necrotic border was observed in the most coronal portion of the graft, which can be attributed to an inadequate blood supply from the adjacent tissues due to difficulties with the graft immobilization or flap management. Despite this, the goal of this surgical approach was successfully achieved. Indeed, with this technique, the exposure of the periodontium underlying the denuded area was reduced, the risk of interproximal bone loss was minimized, and the tension produced in the CAFs was decreased.

Conclusion

In this case report, we show that the wide and deep gingival recessions affecting aesthetic areas can be handled with a one-stage surgical procedure, by using the double papilla technique combined with a partially epithelialized CTG. Indeed, to successfully treat this case, it was not necessary to carry out a two-stage procedure, consisting of a first stage aimed at increasing the width of the keratinized gingiva and then a second stage in which the root coverage is carried out. In this case, a root coverage of 100% with long-term stability and aesthetics was achieved.

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Declaration of conflicting interests

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Ethical approval

Our institution does not require ethical approval to report individual cases; however, this was internally approved in the private dental office and registered under the code 01-2019.

Informed consent

Written informed consent was obtained from the patient who accepted and authorized the anonymous use of the data to be published in this article.

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