

A case report: Coronally advanced flap using connective tissue graft for root coverage in gingival recession

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Abstract

Background: Aesthetics is becoming more of a concern for patients in the current era of dentistry. Gingival recession is a clinical condition related to patient aesthetics and frequently encountered complaints. Gingival recession is a condition where the root surface is exposed due to apical migration from the gingival tissue margin to the cemento-enamel junction. There are various types of treatments to treat patient's complaints of gingival recession, both non-surgical and surgical. One of the treatments that can be chosen is the coronally advanced flap technique using a graft originating from the patient himself, which will be discussed further in this case report.

Purpose: The purpose of writing this article is to describe a coronally advanced flap technique using a connective tissue graft for root coverage in gingival recession

Case: A 21-year-old male patient came to the periodontics specialist clinic of RSGM Universitas Airlangga Surabaya complaining of wanting to treat the upper right gum that looked raised and sometimes felt sore. The patient had used braces and had them removed about 1 year ago. The patient brushes his teeth in the morning when taking a shower and at night before going to bed. The patient does not smoke, has no history of systemic diseases, and has no allergies.

Case Management: The treatment plan involved dental health education, scaling root planning, and evaluation, followed by coronally advanced flap + CTG. After surgical therapy, the maintenance phase was continued with periodic checks.

Keywords: Gingival Recession; Connective Tissue Graft; Flap; Case report

1. Introduction

The goal of periodontal treatment is to preserve the natural tooth and maintain functional periodontal attachment to improve comfort, function, and aesthetics. Conditions such as marginal tissue recession (gingival recession), inadequate width or thickness of attached gingiva, aberrant frenulum, and shallow vestibule are called "mucogingival problems". This mucogingival problem is known to affect the stability of the periodontium. Therefore, surgery is needed to repair anatomical or pathological defects to restore periodontal tissue health¹.

Aesthetics is becoming more of a concern for patients in the current era of dentistry. Root coverage in cases of gingival recession has become an important requirement in the field of aesthetics and periodontal. Gingival recession is characterized as the apical migration of gingival tissue away from the cemento-enamel junction (CEJ) which causes exposure of the root surface². Many factors cause a gingival recession³. Non-surgical treatment options for gingival recession defects include establishment of optimal plaque control, removal of overhanging subgingival restorations, behaviour change interventions, and use of desensitizing agents. In cases where a surgical approach is indicated,

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coronally advanced flap and tunnelling procedures combined with a connective tissue graft are considered the most predictable treatment options for single and multiple recession defects⁴.

Over the years, various surgical techniques (pedicle and free soft-tissue grafting) have been proposed as the treatment of mucogingival defects on exposed root surfaces in the aesthetic zone of the dentition, where patient expectations are very high⁵. Various surgical techniques are used today in the treatment of gingival recession, but the most preferred and well-documented method is the closure of gingival recession with the help of an autogenous connective tissue graft taken from the palate along with coronally advanced flap (CAF) technique³. This case report aims to present the therapeutic results of the coronally advanced flap technique with connective tissue graft originating from the palatal area for root coverage in the aesthetic zone of the maxilla.

2. Case Report

A 21-year-old male patient came to the periodontics specialist clinic at RSGM Universitas Airlangga Surabaya with complaints of wanting to treat his upper right gum which appeared to be rising and sometimes felt painful. The patient had used braces and had them removed about 1 year ago. Patients brush their teeth in the morning when showering and at night before going to bed. The patient does not smoke, has no history of systemic disease, and has no allergies. On extra oral examination, no abnormalities were found. On intra-oral examination, plaque was found on all teeth, there was no bleeding on probing. In tooth 14, a recession of 3 mm was found, with a keratinized tissue width of 2 mm and a thin phenotypic thickness. The diagnosis for tooth 14 was mucogingival deformities (Miller class I recession). The treatment plan carried out is to carry out dental health education, scaling root planning, and evaluation phase, followed by phase 2, namely Coronally advanced flap + CTG at 14. After surgical therapy, the maintenance phase is continued by carrying out periodic controls.



Figure 1 Preoperative. Gingival recession of tooth 14 is visible

3. Case Management

Before the surgical procedure is carried out, informed consent is carried out and vital signs are measured. After that, extraoral and intraoral asepsis was carried out using 10% povidone iodine. Local infiltration anesthesia in the working area using Scadinibsa® (3% Mepivacaine Hcl). An incision was made using a 15 c scalpel on tooth 14. Then continued with making a partial thickness flap on the mesial and distal 14, followed by full thickness on the buccal 14, and continued with partial thickness towards the vestibule mucosa until there was no tension on the flap. Connective Tissue Graft preparation on the right upper palate by making an incision at a 90-degree angle at 2mm below the gingival margin on the right palate in regions 15 and 16 with a rectangular shape measuring 10x7 mm. A graft of this size is taken and deepitalization is carried out. Periodontal pack application in the palatal donor region, namely the upper right palate.



Figure 2 (a) Extraoral asepsis (b) Intraoral asepsis (c) Anesthesia with local infiltration technique in the mucobuccal fold



Figure 3 Coronally Advanced Flap Procedure: (a) Sulcular incision (b) Perform a partial thickness flap on the mesial and distal 14 (c) followed by full thickness on the buccal 14 (d) followed by partial thickness towards the vestibule mucosa. Until there is no tension on the flap.



Figure 4 Coronally Advanced Flap Procedure: (a) Partial thickness flap towards the vestibule mucosa (b) Application of 24% EDTA



Figure 5 CTG preparation on the right upper palate: (a) Asepsis (b) Anesthesia with local infiltration technique (c) Measuring the dimensions of the tissue to be removed (d) Making an incision at a 90-degree angle at 2mm below the gingival margin on the right palate regions 15 and 16 with a rectangular shape measuring 10x7 mm (e) the graft that has been taken is soaked with PPP (f) Applying a periodontal pack to the palatal donor region

After taking the graft, the CTG graft is immersed in the PPP. The CTG is placed in the operating area and then sutured until the CTG is stable. The flap was placed 2mm more coronal than the CEJ of tooth 14 and sutured using the sling suture technique. Then the periodontal pack application continues.



Figure 6 Coronally Advanced Flap Procedure: (a) Place the CTG in the surgical area (b) perform suturing until the CTG is stable (c) Place the flap more coronal 2mm from the CEJ of tooth 14 and suture with a sling suture technique (d) PPP irrigation (e) periodontal pack application

The patient was prescribed amoxicillin tabs 500 mg and mefenamic acid 500 mg. Patients are instructed to avoid eating and drinking hot, sour, spicy, and hard foods, consume prescribed medication regularly, maintain oral hygiene by not brushing their teeth in the surgical area, avoid chewing food on the side of the surgical area, and avoid sucking on the surgical wound. And don't rinse your mouth too hard, contact the operator if there is discomfort that cannot be resolved, or if there is bleeding after 24 hours, if the periodontal pack comes off before 3 days, then please contact the operator, and have it checked 7 days later. During the day 8 control, the patient felt that the gums had no pain. Patients take medication according to the prescription given. The periodontal pack was removed in the 14,15 region. The patient was given dental health education to maintain oral hygiene and prescribed chlorhexidine gargle mouthwash. During the control at day 30, the patient had no complaints. Patients take medication according to the prescription given. Patients are given dental health education to maintain oral hygiene, stitches are removed and hyaluronic acid is given.



Figure 7 (a) Preoperative (b) Control day 8 after surgery (c) Control day 30 after surgery

4. Discussion

Gingival recessions can be an unpleasant condition for patients who experience plaque retention, dentin hypersensitivity, crown lengthening, and gingival irritation. When treating such GRs, mucogingival surgery aims to completely cover the roots and satisfy the patient's cosmetic preferences; the soft tissues should be identical to the surrounding soft tissues in terms of color, thickness, and surface texture after healing⁶. Mucogingival surgery involves various invasive procedures with the aim to correct defects in the morphology, position, and/or amount/quality of soft tissues surrounding teeth or implants. "Mucogingival surgery" was originally introduced by Friedman in 1957 and includes surgical interventions designed to preserve gingival tissues, correct abnormal frenulums or muscle attachments, and increase the keratinized gingiva and vestibule depth⁷.

Gingival recession is a gum disorder that negatively impacts dental aesthetics and causes tooth hypersensitivity, root caries, and poor dental plaque control. Several factors have been associated with the etiology of gingival recession, including periodontitis, excessive occlusal forces, lack of gingival attachment, muscle position, and a thin periodontal phenotype. Gingival recession is treated with mucogingival surgery by covering the exposed root surface with soft tissue, thus improving the aesthetic appearance, increasing the width of the attached gingiva, and reducing tooth sensitivity⁸.

The key factors that determine the successful management of gingival recession are the identification of the etiological agent and its elimination, assessment of the degree of tissue involvement, and selection of surgical procedures to achieve optimal root coverage. The choice of surgical technique and material is based on different factors such as degree of recession, location, width of keratinized tissue, biotype of gingival tissue, level of interdental papillae and alveolar bone, vestibular depth and position of labial frenulum, aesthetic demands, and patient preferences⁹.

Among the different types of flap designs used in periodontal plastic surgery, the most frequent approach was the Coronally Advanced Flap. This technique became very popular in the 1990s and several combinations by adding grafts, barriers or biomaterials over the root were suggested¹⁰. Coronally advanced flap is a technique that is suitable for covering the roots in cases of gingival recession in one tooth or several teeth. This technique shows good results in the treatment of Miller class I gingival recession with adequate thickness and height of apical keratinized tissue with exposed root surfaces. There are two alternative coronal flap designs: trapezoidal flap and triangular flap. Initially, Zuchelli and De Sanctis introduced the trapezoidal CAF, and later Zuchelli et al. introduced a modified CAF with a triangular design that was comparable in effectiveness to a trapezoidal CAF. In the case of a trapezoid flap, the trapezoidal surgical papilla is placed over the triangular anatomical recipient papilla, and as a result, there is excess soft tissue covering the avascular tooth surface⁵.

Connective tissue graft is a bilaminar procedure designed to maximize the supraperiosteal and gingival blood supply to the tissue graft. The graft is placed over the recession area while nutrition and revascularization are obtained from the recipient area, the interdental papilla and the flap covering the graft¹¹.

The introduction of connective tissue graft (CTG) and the increasing switch from FGG to CTG represents a transition from traditional mucogingival surgery to periodontal plastic surgery. Although traditional mucogingival approaches are aimed primarily at improving KTW, the primary goal of modern periodontics should include the final aesthetic result. There is a lot of evidence that CTG is the technique of choice in treating gingival/mucosal recession at teeth and implant sites, to increase soft tissue thickness, cover visible discoloration of roots or implant components, and reconstruct interdental papillae¹².

The combination of CTG + CAF provides a greater vascularization of the graft, achieving a double blood supply, through the supraperiosteal vessels as well as the flap which covers it. Among the benefits obtained, it found higher success rates in terms of complete root coverage, as well as better aesthetic results, as it presents the same color as the pre-existing mucosa compared to the FGG¹³. The histological observations indicated that one major difference between gingival connective tissue and alveolar mucosal connective tissue is the amount of elastic fiber consisting of an elastin core. A modern in vitro study has also shown the lack of a role that elastin in gingival connective tissue has played on the keratinization of overlying epithelium. Consequently, a CTG helps to gain more KTW when combined with a CAF for root coverage¹⁴.

Platelet-poor plasma (PPP), as a by-product of anticoagulant blood centrifugation, has a lower platelet concentration than normal blood. The main components of PPP are fibrinogen, fibronectin, and thrombin. The biological effect of PPP is to participate in hemostasis and coagulation, act as a cell attachment vector, and also promote mitosis of fibroblasts and epithelial cells. Although PPP does not concentrate on platelets like PRP, it has been shown to maintain cell growth and survival. PPP promotes cell functions related to wound healing and accelerates cell migration and fibroblast proliferation¹⁵. In this case, there was a Miller class 1 recession of 3 mm with a KTW of 2 mm on tooth 14 with a thin thickness. Treatment was carried out to close the recession by performing a coronally advanced flap using a connective tissue graft.

5. Conclusion

There are various types of treatments to treat patient's complaints of gingival recession, both non-surgical and surgical. The choice of treatment technique is closely related to the clinical condition in the recession area and the patient's condition in general and has advantages and disadvantages. One of the treatments that can be chosen is the coronally advanced flap technique using a graft originating from the patient himself

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

References

- [1] Peeran, S.W. and Ramalingam, K. 2021 *PERIODONTICS & ORAL IMPLANTOLOGY*. 1st edn. Saranraj JPS Publication.
- [2] Mostafa, D. and Fatima, N. (2022) 'gingival recession and root coverage up to date, a literature review', *Dentistry Review*, 2(1), p. 100008. doi:10.1016/j.dentre.2021.100008.
- [3] Bednarz, W. *et al.* (2021) 'Coronally advanced flap in the treatment of multiple adjacent gingival recessions along with a connective tissue graft harvested from augmented or nonaugmented palatal mucous membrane: A two-year comparative clinical evaluation', *Applied Sciences*, 11(3), p. 1081. doi:10.3390/app11031081.
- [4] Imber, J.-C. and Kasaj, A. (2020) 'Treatment of Gingival Recession: When and How?', *International Dental Journal*, 71(3). doi:https://doi.org/10.1111/idj.12617.
- [5] Georgieva, I. (2020) 'Coronally advanced flap technique for root coverage in the aesthetic zone of Upper Jaw', *Journal of IMAB - Annual Proceeding (Scientific Papers)*, 26(3), pp. 3267–3270. doi:10.5272/jimab.2020263.3267.
- [6] Georgieva Zlatina Tsoneva, I. (2023) 'Vertically coronally advanced flap with connective tissue graft for treatment of single miller's class II recession defect in the anterior zone of Mandibula: A case report', *International Journal of Science and Research (IJSR)*, 12(6), pp. 1615–1619. doi:10.21275/sr23614012106.
- [7] Georgieva Deliverska-Aleksandrova, E. and Kosyov Emilov, D. (2024) 'Effectiveness of mucogingival surgery for the treatment of gingival recessions and root hypersensitivity', *Dentistry [Preprint]*. doi:10.5772/intechopen.115147.
- [8] Bautista, Claudia Amaya, *et al.* Treatment of a Single Gingival Recession With a Subepithelial Connective Tissue Graft With a Double Papilla Flap: A Case Report. *SAGE Open Medical Case Reports*, vol. 10, SAGE Publications, Jan. 2022, p. 2050313X2210787. Crossref, <https://doi.org/10.1177/2050313x221078706>.
- [9] Shkreta M, Atanasovska-Stojanovska A, Dollaku B, Belazelkoska Z. 2018. Exploring the gingival recession surgical treatment modalities: A literature review. *J Med Sci*. 6(4): 698-708.
- [10] Cairo, F., Nieri, M. and Pagliaro, U. (2014) 'Efficacy of periodontal plastic surgery procedures in the treatment of localized facial gingival recessions. A systematic review', *Journal of Clinical Periodontology*, 41(s15). doi:10.1111/jcpe.12182.
- [11] Tavelli L, Ravidà A, Lin GH, Del Amo FS, Tattan M, Wang HL. Comparison between Subepithelial Connective Tissue Graft and De-epithelialized Gingival Graft: A systematic review and a meta-analysis. *J Int Acad Periodontol*. 2019; 1;21(2): 82-96.
- [12] Zucchelli, Giovanni, *et al.* Autogenous Soft Tissue Grafting for Periodontal and Peri-implant Plastic Surgical Reconstruction. *Journal of Periodontology*, vol. 91, no. 1, Wiley, Oct. 2019, pp. 9–16. Crossref, <https://doi.org/10.1002/jper.19-0350>.
- [13] Ripoll, S. *et al.* (2021) 'Complications in the use of deepithelialized free gingival graft vs. Connective Tissue Graft: A one-year randomized clinical trial', *International Journal of Environmental Research and Public Health*, 18(9), p. 4504. doi:10.3390/ijerph18094504.
- [14] Cheng, G. -L. *et al.* (2014) 'Root coverage by coronally advanced flap with connective tissue graft and/or enamel matrix derivative: A meta-analysis', *Journal of Periodontal Research*, 50(2), pp. 220–230. doi:10.1111/jre.12199
- [15] Zhang, Jiahui, *et al.* The Effects of Platelet-Rich and Platelet-Poor Plasma on Biological Characteristics of BM-MSCs in Vitro. *Analytical Cellular Pathology*, vol. 2020, Hindawi Limited, Aug. 2020, pp. 1–11. Crossref, <https://doi.org/10.1155/2020/8546231>.