Coronally advanced flap with and without connective tissue graft in root coverage procedure: A Case Series

Budi, Desy Situmorang, Irma Ervina,* Martina Amalia

Abstract

Objective: This paper aims to report the outcome of the coronally advanced flap with and without connective tissue graft in the root coverage procedure. We intend to explain the importance of connective tissue graft in coronally advanced flap surgery.

Methods: Two patients with gingival recession required surgical intervention to get root coverage and improve aesthetics. Both patients were treated with a coronally advanced flap. We combined the coronally advanced flap with a connective tissue graft for the first patient’s maxillary left second incisor and canine; meanwhile, we only did the coronally advanced flap for the second patient’s maxillary right canine and first premolar.

Results: Surgical intervention was done for both patients with good outcomes. For the first patient with a connective tissue graft, we noticed increased thickness on the keratinized gingiva and gained 1 mm of root coverage. Meanwhile, we got full root coverage for the second patient. In this article, a patient with a connective tissue graft was observed for six months, and a patient without a connective tissue graft was observed for two years. In both cases, we noticed stable and good results.

Conclusion: Coronally advanced flap procedure can be a reliable treatment for root coverage in the tooth with gingival recession. An additional connective tissue graft combined with a coronally advanced flap can increase keratinized tissue thickness.

Keywords: coronally advanced flap, connective tissue graft, mucogingival surgery, gingival recession, root coverage.

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Introduction

Gingival recession can be generally found in daily practice. Gingival recession is defined as an apical shift of the gingival margin caused by different conditions/pathologies associated with clinical attachment loss. Some consequences of gingival recession include dentine hypersensitivity, root caries, non-curious cervical lesions, and compromised aesthetics. In recession caused by plaque and calculus, connective tissue destruction occurs inside the gingival sulcus. Meanwhile, in toothbrush trauma lesions, destruction occurs from the outside.

Many classification systems are in use, and each system has an advantage. No single classification system is considered complete and everlasting. Miller’s classification of gingival recession defect is probably still the most widely used system to describe the gingival recession. Miller classified gingival recession into four classes: Class I: Gingival recession without interdental bone or soft tissue bone loss, which does not extend to the mucogingival junction, and the attached gingiva is present. Class II: Gingival recession without interdental bone or soft tissue bone loss extends to the mucogingival junction, and the attached gingiva is present. Class III: Gingival recession with interdental bone and/or soft tissue loss, which extends to mucogingival junction or extrusion of the teeth. Class IV: Gingival recession with interdental bone and/or soft tissue loss, extending to mucogingival junction and severe malpositioning of the teeth.

Pini-Prato stated that Miller’s gingiva recession classification has limitations, so a new classification system should be provided. It is proposed to adopt the Cairo classification of gingival recession, the newest classification scheme for periodontal and peri-implant diseases and conditions. In 2011, Cairo et al. identified this classification of gingival recession based on assessing clinical attachment loss at both buccal and interproximal sites: Recession Type 1 (RT1): Gingival recession without interproximal attachment loss. The interproximal cementoenamel junction was clinically not detectable in both the mesial and distal aspects of the tooth. Recession Type 2 (RT2): Gingival recession with interproximal attachment loss less than or equal to the buccal attachment loss. Recession Type 3 (RT3): Gingival recession with interproximal attachment loss. The amount of interproximal attachment loss was higher than the buccal attachment loss.

We can expect complete root coverage in Class I and II recession (RT1). In Class I recession, attached gingiva is present, so the most straightfor-
Gingival recession with interdental bone and/or soft tissue loss, and the attached gingiva is absent. Class III: Gingival recession without interdental bone involvement describe the gingival recession. Miller classified probably still the most widely used system to classify recession. Each system has an advantage. No single classification system is considered complete and everlasting. For lesions, destruction occurs from the outside. In recession caused by plaque and caries, non-carious cervical lesions, and compromised aesthetics. Gingival recession is defined as an apical vertical incisions at the left maxillary second incisor. Then a sulcular incision is made. We created two incisions and removed the connective tissue graft was around 2 mm (figure 1I). The root surface was smoothed with a fine diamond bur and root planning was performed with a connective tissue graft for root coverage. We planned a coronally advanced flap with a connective tissue graft to treat Class III recession. Meanwhile, in Case II, we performed a coronally advanced flap without a connective tissue graft in Class I recession.

### Case Report

#### Case I

A forty-four-year-old woman visits USU Dental Hospital complaining about gingival recession on anterior teeth. The patient also complained about sensitivity to the teeth when consuming cold food and beverages. The patient needed to learn to use a toothbrush with hard bristles and appropriate brushing techniques. We noticed Class III recession (RT2) with interdental bone loss. The gingival recession was 2 mm on the buccal side of the left maxillary second incisor and 3 mm on the buccal side of the left maxillary canine (figure 1A and figure 1B).

We planned a coronally advanced flap with a connective tissue graft for root coverage. We did initial therapy, such as scaling and root planning, control plaque instruction, and education about brushing techniques and toothbrushes with soft bristle selection.
original review

The coronally advanced flap begins with a clinical procedures. We performed external and povidone-iodine solution for 30 seconds before by using a hazmat suit and gargling a 1% irrigation to minimize overheating. The procedure involved root conditioning followed by rinsing with a 17% EDTA solution for 3 minutes, followed by rinsing with regular saline solution. The interdental papilla was de-epithelialized using a fine diamond bur with irrigation to minimize overheating.

After preparing the recipient site, we harvest connective tissue grafts from the palatal side. The de-epithelialized free gingival grafts method was used to extract connective tissue. This case was studied during the COVID-19 pandemic. We followed COVID-19 regulations by wearing a hazmat suit and gargling with 1% povidone-iodine solution for 30 seconds before beginning any clinical procedures. We performed exterior and internal aseptic operations using 10% povidone-iodine and 4% articaine as a local anesthetic. The coronally advanced flap was started with a horizontal incision 2 mm from the papilla tip, followed by a sulcular incision. To establish a tension-free flap, we made two vertical incisions at the left maxillary second incisor and canine, alternating between full-thickness and partial-thickness flap elevation. After measuring and labeling the donor site's dimension and position, we used a fine diamond bur with irrigation to remove the epithelium and expose the connective tissue figure 1F. We further created an incision and removed the connective tissue graft figure 1G. The bleeding in the donor site was controlled using a sterile gauge and an Ora-Aid wound dressing figure 1H. We trimmed the fat tissue on the connective tissue, and the thickness of the graft was around 2 mm figure 1I.

The connective tissue graft was placed at the recipient site and secured with an interrupted suture using a 6/0 polyglycolic acid absorbable suture at the mesial of tooth 12, interdental between tooth 12 and 13, and distal tooth 13. Then, the flap was repositioned coronally and secured with an interrupted suture using a 6/0 nylon suture. The suturing of the vertical incision site was also interrupted. Meanwhile, we used the sling suture technique to hold the flap coronally positioned figure 1J and figure 1K.

The patient was given post-surgery instructions and administered amoxicillin 500 mg thrice a day for 5 days as antibiotics and potassium diclofenac 50 mg as a painkiller. Sutures were

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The root surface was smoothed with a fine diamond bur and root planning was performed with Gracey curettes. Since the gingival recession was Class I recession without interdental bone loss, with those areas were longer and unaesthetic. We notice even give even better result time by time. Miller (RT1), the prognosis of this case is excellent. Since the gingival recession was Class I and II recession (RT1). Meanwhile, we found apical to root exposure is more than 2 mm and the stability of the patient was associated with a higher probability of achieving root coverage and thickening of keratinized tissue.

The patient was given post-surgery instructions and administered amoxicillin 500 mg thrice a day for 5 days as antibiotics and potassium diclofenac 50 mg as a painkiller. Sutures were removed two weeks post-surgery. We found good gingival healing without any pathology or infection after 2 years follow-up after surgery. Figure 4C. Complete root coverage was achieved stable and healthy gingival condition figure 4A – figure 4E. As for 2 years follow-up, we found a

Figure 3. A. Clinical and radiographic, B. View of 13 and 14, C. Root planning, D. EDTA application, E. Suturing, F. Horizontal and sulcular incision, G. Vertical incision, H. Flap elevation

Figure 4. A. 1 week, B. 2 weeks, C. 24 months follow-up result
Case I
A thirty-two-year-old woman visited USU Dental Hospital with dentine hypersensitivity at the right maxillary canine area. The patient felt the teeth in those areas were longer and unaesthetic. We notice Class I recession without interdental bone loss, with the gingival recession of 2 mm on the buccal side of the right maxillary canine and first premolar.

Since the gingival recession was Class I Miller (RT1), the prognosis of this case is excellent. We planned to do coronally advanced flap with anchorage with resin composite combination. We had initial therapy, like scaling and root planning, control plaque instruction, and education about brushing techniques and toothbrushes with soft bristle selection figure 3A and figure 3B.

Before initiating the surgery, we did extraoral and intraoral aseptic with povidone-iodine at 10% and local anesthesia with articaine at 4%. The coronally advanced flap starts with a horizontal incision 2 mm from the papilla tip, followed by a sulcular incision. We made two vertical incisions at mesial of right maxillary canine and distal of right maxillary first premolar with the combination of full-thickness and partial-thickness flap elevation to get free tension flap figure 3C – figure 3E.

We did root planning with Gracey curettes and root conditioning using EDTA 17% solution for 3 minutes and rinsed with normal saline solution. Papilla interdental was de-epithelialized using fine diamond bur with irrigation to prevent heating. The flap was repositioned coronally and secure with interrupted suture using a 6/0 nylon suture. The suturing of the vertical incision site was using an interrupted suture technique. Meanwhile, we used the sling suture technique to hold the flap coronally positioned. We added flap anchorage by securing the flap coronally with the help of resin composite figure 3F – figure 3H.

The patient was given post-surgery instructions and administered amoxicillin 500 mg thrice a day for 5 days as antibiotics and potassium diclofenac 50 mg as a painkiller. Sutures were removed two weeks post-surgery. We found good gingival healing without any pathology or infection conditions. In a six-month follow-up, we noticed a stable and healthy gingiva condition, with a good root coverage and thickening of keratinized tissue compared with before surgery figure 2A – figure 2C. The surgery result after 6 months shows good result of root coverage and creeping attachment phenomenon, which is soft tissue coronal migration, may even give even better result time by time.

Case II
A thirty-two-year-old woman visited USU Dental Hospital with dentine hypersensitivity at the right maxillary canine area. The patient felt the teeth in those areas were longer and unaesthetic. We notice Class I recession without interdental bone loss, with the gingival recession of 2 mm on the buccal side of the right maxillary canine and first premolar.

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Discussion
Gingival recession can cause discomfort to patients, such as impaired aesthetics and dentine hypersensitivity. Treatment of gingival recession may need surgical intervention, where various techniques are available.13 Non-surgical treatment of gingival recession, such as laser, yet it has not been proven as most effective in long lasting method.12 Coronally advanced flap procedure combined with connective tissue graft is the gold standard and the most predictable treatment option for single or multiple gingival recession defects.13

The rationale for treating Class I recession like in Case II is that the simplest root coverage procedure like coronally advanced flap procedure alone without soft tissue graft may be recommend ed.5 The efficacy of coronally advanced flap procedure alone relies on flap design that can maintain adequate vascularization.13 The indication to perform coronally advanced flap without connective tissue graft is given if the keratinized tissue height apical to root exposure is more than 2 mm and the soft tissue thickness is more than 0.84 mm.3

We can expect complete root coverage in Class I and II recession (RT1). Meanwhile, we found Class III recession (RT2) in Case I. Miller (2018) stated that only partial root coverage could be achieved in Class III recession.5 However, Arouca et al. found that complete root coverage can also be achieved in Class III recession in randomized clinical trials.14 Chambrore et al. stated that connective tissue graft-based procedures could give significant benefits in treating Class III recession defects.15 This is supported by Cairo, which stated that coronally advanced flap combined with connective tissue graft was associated with a higher probability of achieving complete root coverage than coronally advanced flap alone.3 Besides, the connective tissue graft procedure benefits final keratinized tissue thickness and width.13,16 Thick gingival biotype is considered to prevent future mucogingival surgery.12 Zucchelli et al. reported that coronally advanced flap procedures combined with connective tissue graft could significantly reduce pocket depth.17 Cairo et al also reported that coronally advanced flap with and without connective tissue graft can provide complete root graft, and the results of complete root coverage were compared with the results of the root coverage method.1, it is necessary to do extended follow-up to observe coronal migration of creeping attachment can be seen, but the results of the root coverage method.1, it is necessary to do extended follow-up to observe coronal migration of creeping attachment can be seen, but the results of the root coverage method
connective tissue graft for Class III recession to coverage, particularly in cases of Class I recession.

**Conclusion**

The results of the root coverage method.

It is supported by Cairo, which stated that coronally advanced flap procedures could give significant benefits compared to other treatment options for treating Class III recession defects. Therefore, coronally advanced flap procedures are recommended for the treatment of Class III multiple gingival recessions.

**Conflict of Interest**

The authors report no conflict of interest.

**References**

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