

Case Series

Modified Semilunar Coronally Advanced Flap

Kamran Haghighat*

Background: Correction of mucogingival recession deformities with a variety of periodontal plastic surgery procedures has been described, each demonstrating a variable degree of success. A modified semilunar coronally advanced flap is described for the treatment of recession defects on multiple adjacent teeth.

Methods: Semilunar incisions were made apical to the recession defects, starting within mucosa and extended mesio-distally, arching more coronally to terminate apical to the papillae mesial and distal to the teeth exhibiting the defects. The papilla between the teeth with recession was coronally advanced after a split-thickness dissection and sutured more coronally, over the deepithelialized portion of the original papilla. The flap design gave better mobility and stability to the repositioned pedicle than previously described semilunar coronally advanced flap procedures.

Results: Seven cases treated with this approach healed without complication and remained stable throughout the 8 to 22 months of post-surgical observation.

Conclusions: This technique will be particularly valuable when previous attempts for root coverage with soft tissue autografts have resulted in residual recession defects on adjacent teeth and in a thicker-tissue biotype that would be amenable to partial-thickness dissection. An adequate thickness of tissue that will allow a partial-thickness flap dissection is required to avoid tooth or alveolar bone fenestrations. This technique provides better control over flap repositioning than previously described semilunar coronally advanced flaps. *J Periodontol* 2006;77:1274-1279.

KEY WORDS

Deformities; flap; gingival recession; plastic surgery.

A variety of periodontal plastic surgery procedures have been described for the correction and management of mucogingival deformities and defects, each demonstrating a variable degree of success. Mucogingival surgery is defined as a procedure designed to correct defects in morphology and position or to enhance the dental gingival junction.¹ Gingival recession is the migration of the gingival margin apical to the cemento-enamel junction, either associated with inflammatory periodontal disease² and mechanical trauma³ or with the presence of a host of predisposing factors that include tooth malposition and root prominence, aberrant frenulum attachment,⁴ orthodontic tooth movement,^{5,6} underlying alveolar dehiscence,^{5,7} gingival phenotype,⁸ and iatrogenic restorative and periodontal treatment-related factors (surgical recession).⁹ Although most research evaluating the relevance of attached gingiva in the maintenance of gingival health has demonstrated that health can be achieved with proper oral hygiene practices in areas where minimal or no attached gingiva exist, clinicians are still faced with correcting recession defects for reasons of adverse esthetics, reduction of root sensitivity, prevention of further recession, and management of shallow root caries or abrasion grooves to address both functional and biologic needs.¹⁰

Variability in the gingival-width dimensions is influenced by the positioning of teeth in the arch, teeth inclination, degree of eruption, and age. Despite a tendency for an increase in gingival dimensions with age, a large proportion of the adult population with good oral hygiene exhibits one or more sites with gingival recession, commonly localized to the buccal aspect of teeth.^{3,11}

Root coverage techniques can be broadly divided into pedicle soft tissue grafts¹²⁻¹⁸ and soft tissue autografts,¹⁹⁻²² although combination procedures,^{23,24} with or without adjunctive regenerative²⁵⁻³⁰ and root biomodification procedures, using citric acid, tetracycline, and EDTA,³¹⁻³³ have been extensively discussed in the literature.

* Department of Periodontology, School of Dentistry, Oregon Health Sciences University, Portland, OR.

The advantage of pedicle over free soft tissue grafts is the retention of flap vascularity. Pedicle flaps, whether coronally advanced or laterally rotated, can be performed by either a partial-thickness, full-thickness, or combination dissection. Partial- or split-thickness flaps with periosteal and connective tissue retention have been shown to cause less resorption of the underlying alveolar bone.³⁴⁻³⁶ Despite a high success rate in achieving root coverage, the coronally advanced flap requires periosteal and vertical releasing incisions for tension-free flap mobilization. However, this may result in shallowing of the vestibule and, depending on the gingival phenotype, scarring of the vertical incisions that could detract from the esthetics.

The semilunar coronally advanced flap was described in 1986.³⁷ A prerequisite for using this technique is the presence of a thick-tissue biotype, with adequate tissue thickness apical to the recession defect, to prevent tooth root or alveolar bone fenestrations. Despite the lack of tension in the mobilized pedicle, its stability in the more desired coronal position is questionable, as no suturing of the advanced flap portion is indicated. This is of particular concern when the procedure is considered for teeth with highly scalloped gingival margins, where coronally manipulating the tissue could be more demanding. The semilunar flap is a modification of a technique described in the late 1960s for incisally repositioning the gingival tissues to address recession defects on labial surfaces of maxillary cuspids.³⁸ The pedicle flap was mobilized using a full-thickness dissection, which resulted in fenestration deformities over bone or roots that were often corrected with a free tissue graft. In contrast to the semilunar flap described by Tarnow,³⁷ the incisally repositioned flap proposed by Sumner³⁸ used full-thickness reflection of the papillae.

TECHNIQUE

The modified semilunar coronally advanced flap is described here for the correction of gingival recession present on adjacent teeth (Fig. 1). Following careful debridement of exposed root surfaces, a semilunar incision is made apically, following the curvature of the gingival margins of the teeth exhibiting gingival recession (Fig. 2, A). The most apical extent of the arc of this incision is typically located in mucosa. The lateral extensions of the incisions curve coronally within the keratinized tissue to terminate apical to the papillae, mesial and distal to the teeth exhibiting recession, and maintaining an adequate distance from the papilla tip in the vertical axis such that the vascularity to the mobilized pedicle is not compromised. A partial-thickness intrasulcular incision, similar to that described for the semilunar coronally advanced flap,³⁷ is made along the gingival margins of the two adjacent

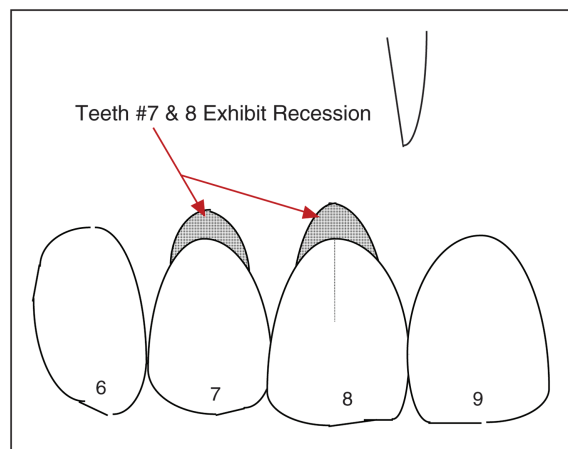


Figure 1.

Illustration depicting recession defects on teeth #7 and #8.

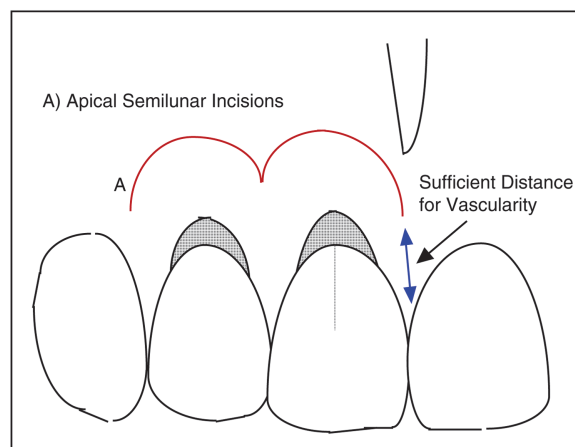
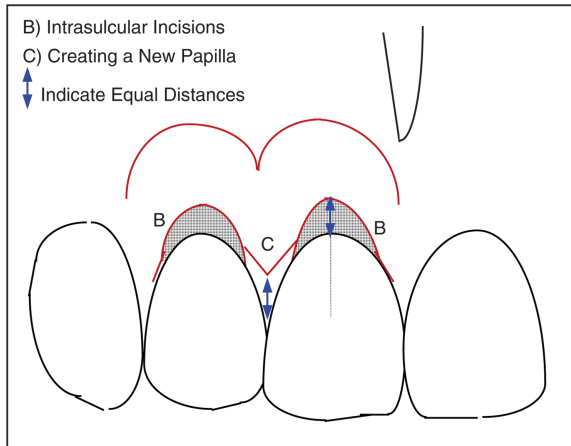


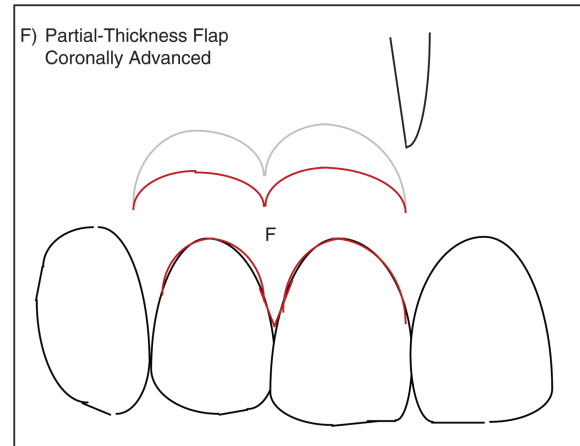
Figure 2.

Semilunar incision is made (A) that terminates apical to the papillae, ensuring adequate distance from the papilla tip such that vascularity is not compromised.

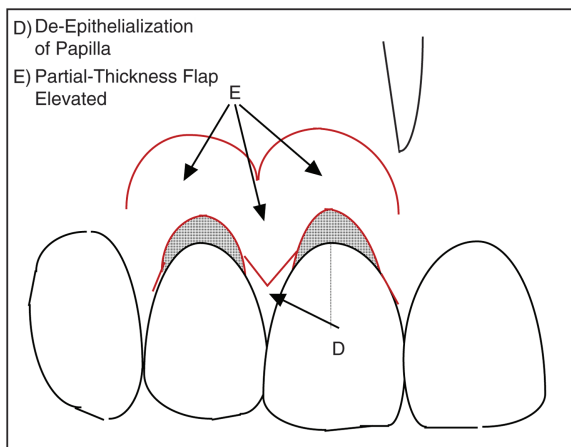
teeth (Fig. 3, B). A partial-thickness flap, extending from the marginal tissue coronally to the double semilunar incision apically, is mobilized. The mesial and distal papillae are left intact; over the middle papilla, between the two teeth with recession defects, the incision along the gingival margin is extended to create a new middle papilla tip located apical to that of the original, at a distance equal to that of the recession defect (Fig. 3, C). Following a partial-thickness flap reflection over the midline papilla, the remaining original papilla is subsequently deepithelialized (Fig. 4). The partial-thickness flap is coronally advanced, with the newly created papilla positioned over the deepithelialized segment (Fig. 5). The flap is sutured through the midline papilla to stabilize it coronally.

**Figure 3.**

Intrasulcular incisions are made (B), and a new papilla is created (C) that will be coronally advanced.

**Figure 5.**

The partial-thickness pedicle flap is coronally advanced (F) and sutured through the midline papilla.

**Figure 4.**

A partial-thickness pedicle flap is elevated (E), and the midline papilla is deepithelialized (D).

CASE DESCRIPTION

A 42-year-old white female patient presented for treatment of anterior recession defects for esthetic and tooth-sensitivity reasons. The patient was enrolled in this study, conducted in accordance with the Helsinki Declaration of 1975, as revised in 2000, and provided consent to be profiled. There was no history of tobacco use, and her medical history was unremarkable. The recession defects had been present for ~10 years and had not increased significantly over the last 3 years. Examination revealed multiple mucogingival deformities, particularly pronounced on tooth #8 (Fig. 6). She exhibited good plaque control, and the tissues did not show clinical signs of inflammation. Due to a thin biotype and a reduced width of keratinized tissue associated with the central

**Figure 6.**

At presentation: recession defects present on tooth #8, as well as teeth #7 and #11.

incisor, this site was initially treated with a connective tissue graft. This case demonstrates the use of the modified semilunar coronally advanced flap procedure for the simultaneous correction of 2-mm residual recession defects, 10 months postgrafting, on teeth #7 and #8 (Figs. 7 and 8). Following the elevation and coronal advancement of the pedicle graft to the desired position to achieve complete coverage of the recession, the flap was sutured using 7/0 polypropylene blue sutures (Figs. 9 through 11). Healing was uneventful, and at 22 months, complete coverage of the defect has been maintained (Fig. 12).

DISCUSSION

Seven cases have been treated using the modified semilunar coronally advanced flap. All cases have demonstrated minimal postoperative discomfort, particularly because a donor site for a tissue autograft is eliminated. A follow-up period of 8 to 22 months has



Figure 7.

Ten months after treatment of teeth #8 and #11 with a soft tissue autograft. Note that tooth #7 was not treated. Full coverage of tooth #11 was achieved.



Figure 10.

The pedicle flap is coronally advanced. The newly created papilla is positioned coronally over the deepithelialized portion.



Figure 8.

Close-up view, showing 2-mm residual recession defects on teeth #7 and #8.



Figure 11.

The coronally advanced flap is sutured through the middle papilla.

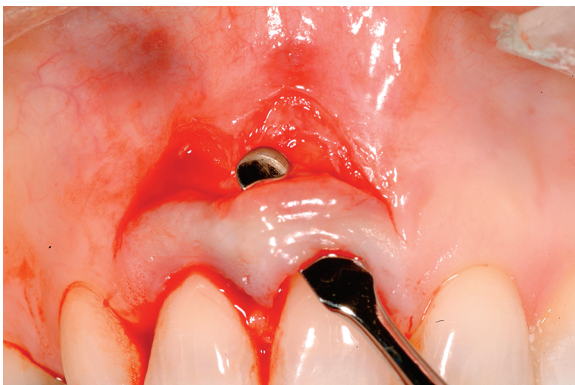


Figure 9.

Partial-thickness flap mobilized with semilunar incision. The papillae mesial and distal to the recession defects are left intact to ensure sufficient vascularity. The middle papilla is deepithelialized.



Figure 12.

Healing at 22 months.

shown complete clinical root coverage. Suturing the semilunar coronally advanced flap through the mid-line papilla offers stabilization of the mobilized pedicle and, hence, of the marginal tissues in the desired location. This technique provides better control over flap repositioning than previously described semilunar coronally advanced flaps and reduces the likelihood of apical tissue retraction when attempting root coverage on two adjacent teeth. This is particularly of value for highly scalloped gingival margins where coronal manipulation and stability are difficult. As described with the original semilunar flap procedure, adequate thickness and width of keratinized tissue apical to the recession defect are required. In cases exhibiting a thin-tissue biotype, tissue augmentation either before or at the time of the corrective surgery is advocated, as illustrated in the case described here. Therefore, the technique is of value in the correction of residual recession defects on two adjacent teeth where previous attempts at coverage using soft tissue autografts have been made.

The incisally repositioned flap described by Sumner³⁸ used full-thickness reflection of the papillae, mesial and distal to the recession defect, which could compromise healing. The use of a partial-thickness dissection in the middle papilla ensures adequate vascularity and better repositioning capability. Additionally, due to the incision design outlined above, potential scarring from vertical incisions is eliminated.

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- Correspondence: Dr. Kamran Haghighat, Department of Periodontology, School of Dentistry, Oregon Health Sciences University, 611 S.W. Campus Dr., Rm. 12B, Portland, OR 97239-3097. Fax: 503/418-0230; e-mail: haghigha@ohsu.edu.

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