

CASE REPORT

Mandibular Anterior Lingual Recession: Keratinized Tissue Grafting and Minimally Invasive Harvesting

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Introduction: The mandibular anterior lingual (MAL) keratinized tissue (KT) band is often insufficient in dimension: <2 mm height of which <1 mm is attached gingiva (AG). Its gingival phenotype is commonly characterized as thin (<1 mm) gingival thickness (GT) and having inadequate (<1 mm) AG width. When surgical treatment is indicated, prevention of significant apical displacement of the gingival margin and improvement of long-term gingival stability are enhanced by KT increase and phenotype modification in order to establish thick GT and adequate AG. The aim of this case report is to describe a bilaminar surgical approach, the modified coronally advanced flap (mCAF) and connective tissue graft with retained KT band (mCAF + CTGkt). It is an outcomes-driven surgical approach for KT increase and phenotype modification in order to predictably establish thick GT and adequate AG. The mCAF + CTGkt procedure is minimally invasive, predictable, well-tolerated and addresses both the unique features of MAL anatomy and normal oral functioning movement during the postoperative healing phase.

Case Presentation: A 48-year-old female presented with chief complaint of MAL progressive gingival recession (GR). Attachment loss of 3–4 mm and lack of both KT and AG were documented. Primary treatment outcomes objectives were GR cessation, establish KT, increase GT and AG. A secondary outcome was decreasing GR.

Conclusion: The mCAF + CTGkt procedure resulted in KT increase, phenotype modification to establish thick GT and adequate AG, and decreased GR. It addressed unique features of MAL anatomy. Postoperative healing outcomes were not negatively impacted by normal oral functioning. *Clin Adv Periodontics* 2021;11:201–207.

Key Words: gingival recession; gingival thickness; mucogingival surgery; periodontal surgery; plastic periodontal surgery.

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Background

Over the last 50 years, mandibular anterior lingual (MAL) gingival recession (GR) treatment has been a matter of concern for both dentists and patients. Initially Lang and Loe in 1972 highlighted methodological limitations: “to the best of our knowledge, modern periodontal surgery offers no specific method for increasing the width of keratinized gingiva on the lingual surface of the lower incisors”.¹

Since 1976, MAL grafting approaches based on the use of free gingival grafts have been used to manage anterior lingual recessions.^{2,3} Later, with the advent of subepithelial connective tissue graft (SCTG),^{4,5} other approaches for the treatment of lingual recessions were reported. Wilcko et al.⁶ treated recipient sites with intra-marrow penetrations and Zucchelli et al.⁷ treated recipient sites with enamel matrix derivative (EMD), utilizing autogenous donor grafts without retained keratinized epithelium (KE) collars/bands. (Table 1)

TABLE 1 Evolution of technique used for lingual anterior grafting

Author	Year	Technique
Schokking ²	1976	<ul style="list-style-type: none"> • Full thickness or partial thickness flap • Apically positioning of the flap and suturing with catgut • Free gingival graft harvested from the palate • Graft secured with tissue adhesive coronal to the bone margin • Dressing applied to keep the floor of the mouth apically so that the graft will not get covered by mucosa
Langer and Calagna ³	1978	<ul style="list-style-type: none"> • Partial thickness flap • Epithelium and loose connective tissue removed to expose periosteum • U-shaped fenestration exposing bone was created • Free gingival graft harvested from the palate ½ mm to 1 mm thickness • Graft secured with silk sutures
Wilcko et al ⁶	2005	<ul style="list-style-type: none"> • Full thickness flap for the full width of the graft extending a tooth mesial/distal • Intramarrow penetrations • Subepithelial connective tissue graft harvested, without epithelium collar • The graft is secured with chromic gut single interrupted sutures • Coronally repositioning the full thickness flap to passively cover as much of the connective tissue as possible securing it with non-resorbable suture material
Zucchelli et al ⁷	2016	<ul style="list-style-type: none"> • Trapezoidal coronal advanced flap elevation (partial thickness flap) • De-epithelialization of the lingual aspect of the anatomic papillae and EMD application • Subepithelial connective tissue graft without epithelial collar harvested from the palate and adapted to the root exposure, interdental soft tissue and bone exposure • The lingual flap is advanced and stabilized with interrupted sutures along the vertical releasing incisions as well as sling coronal sutures

EMD = enamel matrix derivative.

It has also been demonstrated that patients who had increased keratinized tissue (KT) band width and phenotype modification postoperatively in both buccal^{8,9} and lingual sites,¹⁰ experienced GR reduction over time. Therefore, the aim of this case report is to describe a bilaminar surgical approach, the modified coronally advanced flap (m CAF) and connective tissue graft with retained KT band (mCAF + CTGkt), to treat lingual recession with KE insufficiency.

Clinical Presentation

A 48-year-old healthy female patient with a history of orthodontic treatment presented in January 2017 for evaluation at a University Periodontal Clinic with chief complaint of MAL progressive GR. Attachment loss on MAL incisors averaged 3–4 mm. Tooth #25 had no KT and teeth 23, 24, 26, had no AG (Fig. 1). Bone and roots appeared within normal limits. (Fig. 2). Primary treatment outcomes objectives were GR cessation, establish KT, increase GT and AG. A secondary outcome was decreasing GR.

Patient gave a written consent for treatment.

Case Management

Instruments and materials used are listed in Table 2.

Step 1: Recipient Site Incisions and Flap Reflection.



FIGURE 1 Initial presentation: Tooth #25 has no KT; teeth 23, 24, 26 have no attached gingiva (AG)

With scalpel blade perpendicular to surface tissue, a horizontal incision was placed 0.25 to 0.5 mm incisal to mucogingival junction (Fig. 3). This ensured preservation of viable KT borders for the incisal edge of the recipient site flap and the apical edge of the marginal tissue, thus facilitating keratinized epithelium (KE) migration from these tissue edges. Next, 9 to 11 mm length right and left vertical/oblique incisions were made with scalpel blade oriented perpendicular to surface tissue.

Flap reflection followed, ascending branches of sublingual arteries (SLA) were observed and transected without adverse bleeding (Figs. 4–6).

TABLE 2 Instruments and materials used in mCAF + CTGkt

Step	Instruments	Materials
1(a): Recipient Site Horizontal Incision	<ul style="list-style-type: none"> • #5 round scalpel handle • Kirkland knife K15-16 and/or Orban knife KO1-2 • Prichard periodontal surgical curette 1/2 	<ul style="list-style-type: none"> • Bard-Parker #15 stainless steel scalpel blade
1(b): Recipient Site Vertical/Oblique Incisions	<ul style="list-style-type: none"> • #5 round scalpel handle • Kirkland knife K15-16 and/or Orban knife KO1-2 	<ul style="list-style-type: none"> • Bard-Parker #15 stainless steel scalpel blade
1(c): Recipient Site Flap Reflection	<ul style="list-style-type: none"> • #5 round scalpel handle; Kirkland knife K15-16 and/or Orban knife KO1-2 • Pritchard periodontal surgical curette 1/2 	<ul style="list-style-type: none"> • Bard-Parker #15 stainless steel scalpel blade
2: Donor Site Harvest with Retained Keratinized Tissue Band	<ul style="list-style-type: none"> • #5 round scalpel handle; Kirkland knife K15-16 and/or Orban knife KO1-2 • Rhodes back-action periodontal chisel 36/37 • Pritchard periodontal surgical curette 1/2 	<ul style="list-style-type: none"> • Bard-Parker #15 stainless steel scalpel blade
3: Donor Graft Suturing to the Recipient Site	<ul style="list-style-type: none"> • Castro-Viejo curved tip (5.5-inch length) needle holder with carbide inserts • Adson Tissue Pliers-plain tip (4.75-inch length) with carbide inserts 	PGA-PLA (fast absorbing) <ul style="list-style-type: none"> • Suture size: 5-0 • Suture needle: 3/8 circle, 11 mm, reverse cutting
4: Recipient Site Flap Suturing Over the Graft	<ul style="list-style-type: none"> • Castro-Viejo curved tip (5.5-inch length) needle holder with carbide inserts • Adson Tissue Pliers-plain tip (4.75-inch length) with carbide inserts 	Flap closure with GORE-TEX CV-5 suture, Expanded polytetrafluoroethylene (e-PTFE) <ul style="list-style-type: none"> • Suture length: 24 inches (61 cm) • Suture needle: RT-18 (3/8 circle, 18 mm, reverse-cutting) • Cut back incision closure with PGA-PLA fast absorbing suture

Bard-Parker Stainless Steel Blade Size 15. Product# 371215. Aspen Surgical 6945 Southbelt Dr SE Caledonia, MI 49316.

PGA_PLA (fast absorbing). VICRYL RAPIDE (polyglactin 910) Suture. Ethicon Code VR490. Johnson & Johnson Health Care Systems Inc. 425 Hoes Lane Piscataway, NJ 08854 United States.

GORE-TEX Suture e-PTFE. Catalog # P5K23A; Thread size CV-5; Needle size RT-18. W. L. Gore & Associates, Inc. Flagstaff, AZ 86004.

mCAF = modified coronally advanced flap; CTGkt = connective tissue graft with retained KT band.

In conventional CAF preparation, the recipient site marginal tissue is de-epithelized in order to help maintain the coronal position of the flap. A distinctive feature of mCAF is intentionally avoiding this de-epithelialization in order to not interfere with the natural slight lingual retraction of the flap during the healing phase. Such retraction often results in a desirable exposure of the retained KT band of the graft.

Step 2: Donor Site Harvest with Retained KT Band. The graft was harvested according to Langer and Langer⁵ with modifications (Figs. 7–8).

Step 3: Donor Graft Suturing to the Recipient Site (Fig. 9)

Step 4: Recipient Site Flap Suturing Over the Graft. The flap was coronally advanced with the intent to completely cover the graft (Fig. 10).

Clinical Outcomes

The MAL graft surgery healing process was similar to that for facial/buccal aspect CAF and SCTG except for slight flap retraction that was associated with natural movements of the floor of the mouth and tongue during the healing phase. This was observed near the midline of the CAF (Fig. 11). Loose sutures were removed during the first post-operative appointment whereas all the remaining sutures were removed in the second week. Postoperative healing was uneventful and patient immediately after the procedure was prescribed anti-inflammatory medications for pain control along with an antimicrobial mouthrinse and was given modified oral hygiene instructions. Increased KT, GT, and AG and decreased GR were noted at the 3-year evaluation (Fig. 12).



FIGURE 2 Radiographic presentation: Slight to moderate bone loss



FIGURE 4 Flap reflection. Flap reflection is initiated with the curved leading edge of the Bard-Parker #15 scalpel blade. K15-16, KO1-2, and/or surgical curette $\frac{1}{2}$ are then used to reflect a full thickness flap in the graft placement zone and 1 to 2 mm further apically (\approx 5 to 6 mm in total height incisal-apical). During flap reflection, ascending branches of sublingual arteries are observed and transected which does not result in adverse bleeding. Lingual root surface dehiscence is not manipulated in order to retain soft tissue attachment which supports graft revascularization, however scaling and root planing was performed at all clinical exposed root surfaces preoperatively



FIGURE 3 Recipient site Incisions (Horizontal; Vertical/oblique). Horizontal incision depth: to underlying hard tissue. Midline submucosal tissue is thicker facial-lingually than adjacent lingual tissue and incision depth is better accessed by K15-15, KO1-2 knives and/or surgical curette $\frac{1}{2}$. Vertical/oblique incisions increase access/visibility; facilitate precise bed preparation; and increase flap mobility for tension-free or low-tension CAF closure. Incisal 60% of incision is to periosteum; 40% apical portion depth is reduced to 3 to 4 mm. Distinct flap “corners” are made: Slightly (<1 mm) extend the vertical/oblique incisions incisally beyond the horizontal incision in order to create distinct, thick flap corners. This decreases the risk of postoperative, marginal tissue slough and/or premature suture pull out. Care is taken to limit the incisal extension of the vertical/oblique incisions in order to avoid creating iatrogenic marginal tissue clefts



FIGURE 5 Partial thickness cutback incisions. Flap is checked for low-tension/tension-free mobility. Here, more release is necessary. Short (3 to 4 mm) R and L partial thickness cutback incisions are made extending horizontally and distally from the apical end of the vertical incisions

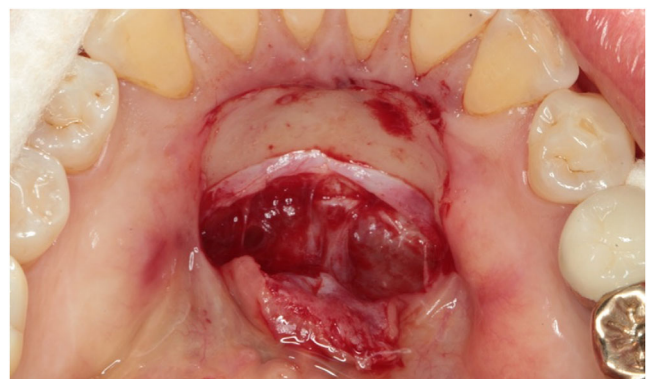


FIGURE 6 Final preparation of recipient bed. Additional flap release is needed. A shallow (2 to 3 mm depth) horizontal incision is made at the base of the flap, adjacent to and in close proximity to the alveolar bone, paralleling its profile

Discussion

For more than 50 years, there is almost an unanimous consensus that a minimum amount of KT band is necessary to maintain periodontal health.^{1,8,9,11-13} As reported by Agudio, et al (2017),⁹ it has been our clinical experience that CT grafts with retained KE can promote more favorable KT dimensions in addition to contributing to recession decrease over time.