

Case Report

Treatment of Lingual Gingival Recession Using a Minimally Invasive Full-Thickness Tunneling Technique with Connective Tissue Graft and Coronal Advancement: A Case Report

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Abstract: Introduction: Lingual gingival recession is an uncommon condition that can lead to dentin hypersensitivity, impaired oral hygiene, and a risk of progression, including root surface exposure, clinical attachment loss, and reduction of keratinized mucosa width. Due to the anatomical complexity of the lingual area, its treatment poses a significant challenge. Currently, there are no standardized surgical protocols specifically designed for this condition, and the literature on the topic remains limited. **Objective:** To achieve root coverage of lingual gingival recessions using a minimally invasive full-thickness tunneling technique combined with a subepithelial connective tissue graft and coronal advancement of the flap. **Case Report:** A 35-year-old male patient, ASA I, presented with RT1-type lingual gingival recessions in teeth 33 to 43. The treatment involved a full thickness tunneling technique with a subepithelial connective tissue graft and coronal flap advancement. Complete root coverage was achieved, along with increased gingival thickness and resolution of dentin hypersensitivity. **Conclusion:** The full-thickness tunneling technique combined with a connective tissue graft represents a safe and effective treatment option for the management of lingual gingival recessions.

Keywords: Lingual Gingival Recession, Full-Thickness Tunneling Technique, Connective Tissue Graft, Root Coverage, Minimally Invasive Technique.

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INTERDACTION

Gingival recession is defined as the apical displacement of the gingival margin relative to the cemento-enamel junction, resulting in the exposure of the root surface to the oral environment (Wennström, 1996). This condition can occur on both buccal and lingual surfaces. Due to its aesthetic impact, most studies have focused on buccal recessions. However, lingual recessions also represent a relevant clinical issue, as they can cause dentin hypersensitivity, difficulties in biofilm control, and even functional interference (Aroca *et al.*, 2013).

The treatment of gingival recessions on the lingual surface presents significant technical challenges due to anatomical factors such as the limited mobility of the floor of the mouth, the presence of frenula, reduced width of keratinized mucosa, proximity to the lingual artery, and restricted access during surgical procedures (Cairo, Nieri, & Pagliaro, 2014). These anatomical limitations have hindered the development of

standardized treatment protocols, and the scientific literature on this topic is limited compared to that available for buccal recession management.

Recently, minimally invasive surgical techniques such as full-thickness tunneling procedures combined with subepithelial connective tissue grafts have shown promising clinical outcomes. These techniques maintain the vascular supply to both the flap and graft, promote primary wound healing, and enhance long-term stability. However, their application has been mainly limited to buccal recessions, and their use in the lingual area has not yet been validated or extensively documented (Carnio & Camargo, 2014; Chambrone & Tatakis, 2015; Zucchelli & De Sanctis, 2000).

Among the few published cases addressing lingual recessions, the clinical report by Agrawal stands out. The author describes the successful management of a lingual gingival recession in a mandibular lateral incisor using a minimally invasive full-thickness tunneling technique combined with a palatal connective

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tissue graft. This case highlights the feasibility of such an approach even in anatomically challenging areas (Agrawal, Chopra, & Sharma, 2021).

A 35-year-old male patient, ASA I, presented to the Periodontics Clinic at the Universidad Popular Autónoma del Estado de Puebla (UPAEP), referred by the Orthodontics Department. The chief complaint was: “I have sensitivity,” specifically referring to the lingual aspect of the lower incisors. The sensitivity caused discomfort during toothbrushing and when consuming cold beverages.

Periodontal clinical examination revealed multiple gingival recessions on the lingual surfaces of teeth 33 to 43 (Fig. 1), with approximately 3 mm of apicocoronally root surface exposure. The patient was undergoing fixed orthodontic treatment and presented with generalized biofilm-induced gingivitis. The bleeding on probing index was 15%, and the plaque score was below 20%. The gingival phenotype was thin, and the band of keratinized mucosa was limited in both width and thickness. No interproximal attachment loss or tooth mobility was observed. The gingival recessions were classified as RT1 according to Cairo’s classification system (Cairo *et al.*, 2011).



Fig. 1: Initial clinical photograph

Given the anatomical characteristics of the region, the thin periodontal phenotype, and the location being considered surgically challenging, a minimally invasive full-thickness tunneling technique was planned. This approach was combined with the placement of a subepithelial connective tissue graft (SCTG) and coronal advancement of the flap.

After obtaining informed consent and under local anesthesia (4% articaine with 1:100,000 epinephrine), a full-thickness tunnel was created (Fig. 2) using the Allen tunneling kit, including instruments TKN1, TKN2, and peri osteotome PH26M. The dissection was carefully extended toward adjacent teeth and apically, with attention to the surrounding anatomical structures, until adequate coronal mobilization of the flap was achieved without the need for vertical releasing incisions.



Fig. 2: Tunneling procedure

The connective tissue graft was harvested from the palate using the Zucchelli technique (Figs. 3 and 4). The graft was then prepared (Fig. 5), adapted into the tunnel, and stabilized with 5-0 nylon sutures. Subsequently, the mucogingival complex was coronally advanced to completely cover the exposed root surface (Fig. 6). Suspensory sutures were used to ensure stability of both the graft and the flap.

Spongostan was placed at the donor site, which was then sutured with 5-0 Vicryl (Fig. 7), and the palatal area was protected with a layer of flowable resin to reduce postoperative discomfort.



Fig. 3: Donor site



Fig. 4: Connective tissue graft



Fig. 5: Presentation of connective tissue graft



Fig. 6: Coronal advancement



Fig. 7: Suturing of the donor site

Written postoperative instructions were provided, including suspension of toothbrushing in the treated area for 14 days and analgesic management with 400 mg ibuprofen every 8 hours. The patient was

scheduled for follow-up visits on 8 days (Fig. 8) and 14 days post-surgery. The sutures were removed at the 14-day appointment.

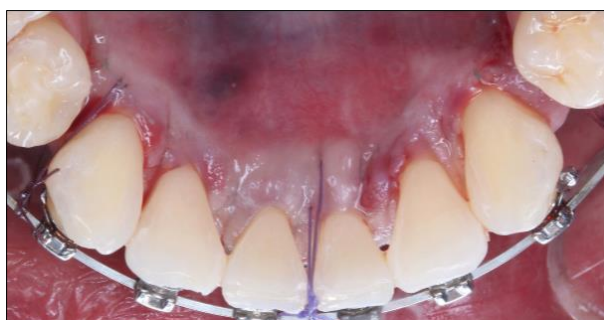


Fig. 8: Postoperative review at 8 days

At the two-month postoperative follow-up, the patient returned for evaluation. Clinical examination

revealed successful root coverage, adequate oral hygiene, and a thickened gingival phenotype (Fig. 9).



Fig. 9: Postoperative review at 2 months

DISCUSSION

Lingual gingival recession is an infrequent condition in the scientific literature, as most reports and clinical studies focus on buccal recessions due to their greater aesthetic impact. However, its clinical management is equally important since it can cause dentin hypersensitivity, plaque retention, and risk of progression if left untreated (Cairo *et al.*, 2011; Zucchelli & Mounssif, 2015; Chambrone & Tatakis, 2015). In the present case, the chief complaint was dentin hypersensitivity in the area affected by gingival recessions, where biofilm and calculus accumulation were also observed.

Given that the patient was young and referred from the orthodontic department, a multifactorial etiology is suggested, where orthodontic tooth movement could have contributed to the displacement of the gingiva beyond the lingual cortical plate (11). This is supported by Wennström, who states that orthodontic tooth movement may lead to gingival recession through the formation of dehiscence.

The diagnosis of the recessions allowed for a favorable prognosis for root coverage, as no interproximal attachment loss was detected. According to Cortellini and colleagues, in one of the publications supporting the Periodontal Disease Classification, “RT1 recession defects, which do not present interproximal attachment loss, are associated with a favorable prognosis for root coverage procedures, especially when coronally advanced flaps are used in patients with good plaque control and no systemic or local contraindications” (Cortellini & Bissada, 2018).

Based on this diagnosis, the full-thickness tunneling technique combined with a subepithelial connective tissue graft and coronal flap advancement was selected due to its demonstrated clinical efficacy in treating multiple or isolated gingival recessions. This technique preserves the vascularization of both the flap and the graft, promoting stable and predictable primary wound healing (Aroca *et al.*, 2013).

The choice of this technique was particularly suitable in this case because six recessions located on the lingual surface were treated as an area with more complex surgical access and challenging anatomy. In this context, minimally invasive techniques such as tunneling

offer significant advantages in increasing success rates and improving both esthetic and functional outcomes. This has been supported in the literature, as reported by Agrawal in 2022, who highlighted the effectiveness of this technique in managing lingual recessions.

Compared to traditional approaches such as the coronally advanced flap (CAF), this technique allows for a more conservative intervention by avoiding vertical incisions, which favors better vascular preservation and more predictable healing, in addition to providing superior esthetic results.

Furthermore, the decision to use a subepithelial connective tissue graft (SCTG) rather than a collagen matrix or other biomaterial substitutes was based on the need to increase both the thickness and quality of the gingival tissue key factors for achieving long-term surgical stability. Acellular dermal matrices are biomaterials derived from human or animal tissues, processed to remove cells while preserving the extracellular matrix, which acts as a scaffold for tissue regeneration. Although these represent a useful alternative in some contexts, the literature supports that SCTGs significantly improve success rates in RT1 recessions, especially in patients with a thin periodontal phenotype.

Techniques such as those described by Zucchelli have shown predictable results in multiple buccal recessions; however, their application on lingual surfaces is limited due to the anatomical conditions previously described. Therefore, the full-thickness tunneling technique is especially indicated in such cases, as demonstrated by Agrawal, who emphasized its efficacy and predictability in treating lingual recessions.

The diagnosis of RT1 recession according to Cairo’s classification allowed anticipation of a favorable prognosis for root coverage, given the absence of interproximal attachment loss. In line with the proposals of Cortellini and Bissada, type 1 defects have a high likelihood of success when appropriate techniques are employed in patients with effective plaque control and no systemic or local risk factors.

CONCLUSION

The treatment of lingual gingival recessions using a minimally invasive full-thickness tunneling

technique combined with a subepithelial connective tissue graft and coronal flap advancement represents an effective and predictable therapeutic option, even in anatomically challenging areas.

This clinical case demonstrates that the described technique constitutes a safe and efficient alternative for managing gingival recessions on the lingual surface. Its application is particularly valuable in compromised sites where other surgical approaches present greater limitations. Precise diagnosis, appropriate case selection, the use of an autogenous graft, suitable suture choice, and meticulous surgical execution were key factors in achieving satisfactory clinical outcomes, including complete root coverage, increased gingival thickness, and resolution of dentin hypersensitivity.

It is important to highlight that, in addition to the esthetic and functional benefits achieved, eliminating root surface exposure significantly reduces dental sensitivity, thereby improving the patient's quality of life and comfort during daily activities such as toothbrushing and the consumption of cold beverages. This symptomatic improvement represents a fundamental clinical objective in the comprehensive management of gingival recessions.

Furthermore, the management of the palatal donor site was performed safely and in a controlled manner without postoperative complications, reinforcing the viability of using autogenous grafts in mucogingival procedures. When executed with appropriate technique, palatal graft harvesting is well tolerated by patients and results in predictable healing.

Overall, this surgical approach not only minimizes operative trauma and promotes stable wound healing but also provides effective symptomatic relief, establishing itself as a highly recommendable option for the treatment of lingual recessions in patients with a thin periodontal phenotype and good oral hygiene.

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