

TUNNELING TECHNIQUE COMBINED WITH THE MODIFIED VISTA APPROACH: CASE REPORT

TÉCNICA DE TUNELIZAÇÃO COMBINADA COM A ABORDAGEM VISTA MODIFICADA: RELATO DE CASO

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ABSTRACT

Gingival recession is a clinical condition characterized by the apical migration of the gingival margin relative to the cemento-enamel junction, resulting in root exposure, dentin hypersensitivity, and aesthetic impairment. This case report describes root coverage of mandibular incisors using the tunneling technique combined with a modified VISTA (Vestibular Incision Subperiosteal Tunnel Access) approach. A 31-year-old female patient with RT2 gingival recessions on teeth 32, 31, and 41 underwent initial periodontal therapy followed by surgical treatment. The procedure involved the creation of a subperiosteal tunnel through a remote vestibular incision, placement of a subepithelial connective tissue graft, and stabilization with suspensory sutures. Clinical follow-up showed favorable healing, with reduced root exposure, increased gingival thickness, and improved soft tissue contour. At the 18-month follow-up, the outcomes remained stable, with maintenance of root coverage and clinical attachment gain. The tunneling technique combined with the modified VISTA approach may represent a minimally invasive alternative for the treatment of gingival recessions in mandibular incisors, with favorable and stable clinical outcomes.

KEYWORDS: Gingival recession; Connective tissue transplantation; Wound healing.

RESUMO

A recessão gengival é uma condição clínica caracterizada pela migração apical da margem gengival em relação à junção ameloementária, resultando em exposição radicular, hipersensibilidade dentinária e comprometimento estético. Este estudo tem como objetivo relatar um caso clínico de recobrimento radicular em incisivos inferiores utilizando a técnica de tunelização associada a uma abordagem VISTA (*Vestibular Incision Subperiosteal Tunnel Access*) modificada. Uma paciente de 31 anos, apresentando recessões gengivais classe RT2 nos dentes 32, 31 e 41, foi submetida à

terapia periodontal inicial seguida de tratamento cirúrgico. O procedimento envolveu a criação de um túnel subperiosteal por meio de uma incisão vestibular distante, combinada com a colocação de um enxerto de tecido conjuntivo subepitelial e estabilização com suturas suspensórias. O acompanhamento clínico demonstrou cicatrização favorável, com redução da exposição radicular, aumento da espessura gengival e melhora do contorno dos tecidos moles. No acompanhamento de 18 meses, observaram-se resultados estáveis, com manutenção do recobrimento radicular e ganho de inserção clínica. Conclui-se que a técnica de tunelização associada à abordagem VISTA modificada representa uma alternativa eficaz e minimamente invasiva para o tratamento de recessões gengivais em incisivos inferiores, proporcionando resultados estáveis a longo prazo.

PALAVRAS-CHAVE: Recessão gengival; Enxerto de tecido conjuntivo; Cicatrização de feridas.

1. INTRODUCTION

Gingival recession is defined as the apical displacement of the gingival margin relative to the cemento-enamel junction, resulting in exposure of the root surface to the oral environment. This clinical condition is highly prevalent in the adult population and can be observed in individuals with good biofilm control as well as in those with a history of periodontal disease. In addition to aesthetic impairment, particularly in anterior regions, it is frequently associated with dentin hypersensitivity, increased biofilm retention, risk of non-carious cervical lesions, and functional discomfort^{1,2}.

The etiology of gingival recession is multifactorial and involves interactions among anatomical, inflammatory, traumatic, and iatrogenic factors. The main predisposing factors include a thin periodontal phenotype, reduced thickness of the buccal bone plate, insufficient keratinized mucosa, unfavorable tooth positioning, and traumatic toothbrushing habits.

Additionally, orthodontic tooth movement outside the bony envelope, persistent gingival inflammation, and subgingival restorations may contribute to the development and progression of this condition³.

Accurate classification of gingival recessions is essential for diagnosis and treatment planning. In this context, the classification proposed by Cairo *et al.* (2011)⁴ has been widely adopted because it considers interproximal attachment loss a key criterion for predicting root coverage. RT1 recessions have greater treatment predictability, whereas defects with interproximal involvement require a more cautious assessment of expected outcomes⁴.

Several surgical approaches have been described for the treatment of gingival recessions to promote root coverage, restore tissue harmony, and increase gingival thickness, thereby favoring long-term stability. The subepithelial connective tissue graft remains the gold standard, particularly when combined with a coronally advanced flap, because of its high clinical predictability and satisfactory aesthetic outcomes. However, minimally invasive techniques have gained prominence because they may reduce surgical morbidity and better preserve tissue vascularization⁵.

The tunneling technique, especially when combined with the Vestibular Incision Subperiosteal Tunnel Access (VISTA) approach, represents a promising alternative for treating gingival recessions in aesthetically critical areas. Described by Zadeh (2011)⁶, this approach provides access through a remote vestibular incision, allowing subperiosteal tunnel preparation while preserving the interdental papillae and reducing surgical trauma. These features favor coronal tissue mobilization and proper adaptation of the connective tissue graft⁶.

Despite technical advances, the treatment of gingival recessions in mandibular incisors remains clinically challenging because of local anatomical limitations, such as reduced tissue thickness and a narrow zone of keratinized mucosa. In this context, minimally invasive approaches combined with periodontal phenotype enhancement may improve treatment predictability and tissue stability over time⁷.

Therefore, this report aims to describe a clinical case of root coverage in mandibular incisors using the tunneling technique combined with a modified VISTA approach, highlighting the diagnostic, surgical, and clinical aspects, postoperative outcomes, and the relevance of this approach to the management of gingival recessions in the mandibular anterior region.

2. CASE REPORT

This case was reported in accordance with the CARE guidelines. A 31-year-old female patient presented to the dental clinic of the Centro Universitário das Faculdades Integradas de Ourinhos (UNIFIO) with a complaint regarding root exposure on the mandibular incisors, associated with dentin hypersensitivity triggered by thermal and/or mechanical stimuli.

Following periodontal stabilization and surgical planning, the decision was made to perform root coverage using the tunneling technique combined with a modified VISTA approach⁶.

During the anamnesis, oral hygiene habits, medical and dental history, potential toothbrushing trauma, previous orthodontic treatment, presence of parafunctional habits, and predisposing factors related to the development of gingival recession were investigated.

Upon intraoral clinical examination, RT2 gingival recessions were observed in the mandibular incisor region (teeth 32, 31, and 41). The need for surgical periodontal treatment was identified to achieve root coverage, increase the thickness of the gingival phenotype, and improve tissue stability in the affected area. Written informed consent was obtained from the patient, and the study was approved by the Research Ethics Committee via Plataforma Brasil: 8.443.974.



Figure 1. Initial clinical appearance showing gingival recessions in the mandibular incisors, with root exposure and a reduced zone of keratinized tissue.

Results

Initially, the patient underwent initial periodontal therapy, including oral hygiene instructions, optimization of brushing technique, biofilm control, and removal of local irritants, to provide a more favorable tissue environment for the surgical intervention.

Following periodontal stabilization and surgical planning, root coverage was performed using the tunneling technique combined with a modified Vestibular Incision Subperiosteal Tunnel Access (VISTA) approach⁶. The surgical procedure was performed under local infiltrative anesthesia using 4% articaine with 1:200,000 epinephrine.

Initially, a modified VISTA incisions were made in the vestibular mucosa between the central incisors and distal to the mandibular canines. These incisions were strategically positioned to provide subperiosteal access to the recipient site without directly compromising the gingival margins of the involved teeth. From these incisions, a tunnel was carefully prepared beneath the vestibular mucosa and interdental papillae of the mandibular anterior region.

After preparation of the recipient bed, the exposed root surfaces were mechanically treated by scaling and root planing and smoothed to remove irregularities, biofilm, and potential contaminants that could interfere

with tissue adaptation and healing. Subsequently, a subepithelial connective tissue graft was harvested from the palatal donor site. The graft was obtained using the free gingival graft technique followed by extraoral de-epithelialization on a sterile surface (according to Bosco), then prepared and trimmed to fit the dimensions of the tunnel before being inserted beneath the soft tissues of the mandibular anterior region. The donor site was sutured with horizontal mattress sutures and protected with flowable resin.

Following graft positioning, the recipient site was stabilized with suspensory sutures and contact point-anchored sutures. Cornick and Shanelec sutures were used to close the modified VISTA incisions with 6-0 nylon suture (Techsuture, Bauru, Brazil).



Figure 2. Recipient site after modified VISTA incisions.



Figure 3. Tunnel preparation.

At the end of the procedure, detailed postoperative instructions were provided, including local care, avoidance of mechanical trauma to the surgical site, temporary discontinuation of direct toothbrushing in the surgical area, rinsing with 0.12% chlorhexidine digluconate twice daily for 14 days, and prescriptions of nimesulide 100 mg twice daily for 5 days and dipyrone 1 g every 6 hours for 3 days in case of pain.



Figure 4. Harvested subepithelial connective tissue graft positioned outside the recipient bed.

During postoperative follow-up visits, favorable healing was observed, with progressive tissue reorganization, adequate graft integration, and improved

gingival contour. At the 14-, 90-, and 120-day follow-up evaluations, marked clinical improvement was observed, characterized by reduced root exposure, increased soft tissue thickness, and improved marginal adaptation. At the 18-month follow-up, the case showed a satisfactory clinical outcome and long-term stability, with maintenance of the initial results and clinical attachment gain in the treated region.



Figure 5. Immediate postoperative view of the recipient site.



Figure 6. Immediate postoperative view of the donor site with palatal protection.



Figure 7. Recipient site at 14 days postoperatively.



Figure 8. Recipient site at 90 days postoperatively.



Figure 9. Recipient site at 120 days postoperatively.



Figure 10. Recipient site at the 18-month postoperative follow-up.

3. DISCUSSION

The treatment of gingival recessions in mandibular incisors remains challenging in periodontal plastic surgery, primarily because of anatomical characteristics frequently observed in this region, such as a thin periodontal phenotype, a narrow zone of keratinized mucosa, reduced vestibular depth, and muscle attachments located close to the gingival margin. These features not only favor the onset and progression of recession but also limit coronal flap mobilization and may compromise the stability of surgical outcomes over time. Consequently, management of these recessions requires careful anatomical assessment and the selection of a surgical approach suited to the local anatomical complexity^{3,8,9}.

The predictability of root coverage is directly related not only to the surgical technique, but also to the recession type and the condition of the interproximal tissues. The classification proposed by Cairo *et al.* represents an important advance in this context because it incorporates the interproximal attachment level as a prognostic parameter. Although RT1 defects generally have a greater likelihood of complete root coverage, RT2 recessions, such as those observed in the present case, require a more cautious interpretation because interproximal attachment loss may limit the maximum achievable root coverage. Nevertheless, favorable outcomes may be achieved through careful case selection, meticulous tissue preparation, and control of etiological factors^{4,10}.

Regarding treatment selection, the subepithelial connective tissue graft remains the primary reference for root coverage procedures, especially when the goal is not only root coverage, but also increased tissue thickness and greater long-term stability. Systematic reviews have shown that connective tissue graft-based procedures provide superior or highly consistent outcomes in terms of recession reduction, clinical attachment gain, increased keratinized tissue, and long-term stability; therefore, they remain the gold standard in various clinical situations. In the present case, use of a connective tissue graft was particularly relevant because of the need to modify the periodontal phenotype in an anatomically unfavorable area^{5,11-13}.

Concurrently, minimally invasive techniques have gained prominence because they aim to preserve vascularization, reduce surgical trauma, and improve the aesthetic tissue integration. Among these approaches,

tunneling is notable for preserving the interdental papillae and creating a continuous bed for graft placement, thereby favoring a broad vascular supply and improved adaptation of the mucogingival complex. A systematic review of the tunnel technique concluded that this approach is effective for both localized and multiple recessions, although outcomes depend heavily on operator experience, defect characteristics, and the associated biomaterial. Thus, the use of tunneling in the present case was biologically consistent with the aim of minimizing marginal incisions and optimizing healing^{14,15}.

In this context, the VISTA approach, originally described by Zadeh, provides an additional advantage by allowing access through a remote vestibular incision and subperiosteal preparation, thereby reducing direct manipulation of the gingival margin and papillae. This concept favors a broader coronal tissue mobilization, with a lower risk of visible scarring in aesthetic areas and a potential benefits in regions with restrictive anatomy. Although the original technique was primarily described for the maxillary anterior region, its clinical adaptation to other anatomical sites may be appropriate when the biological principles of the technique are respected. In the present case, the modified VISTA incisions combined with tunneling provide adequate surgical access, facilitated insertion of the connective tissue graft, and enabled effective stabilization of the soft tissues^{6,16,17}.

The outcomes observed during clinical follow-up, including reduced root exposure, increased tissue thickness, improved gingival contour, and stability for up to 18 months, reinforce the importance of appropriate case selection, connective tissue grafting, and stable fixation of the mucogingival complex. In root coverage procedures, tension-free positioning and initial tissue immobility are critical factors for graft integration and maturation of the clinical outcome. Furthermore, the literature suggests that periodontal phenotype modification should not be viewed merely as an immediate aesthetic benefit but also as a strategy to improve resistance to relapse and maintain the gingival margin over the long term^{13,18,19}.

Finally, maintenance of the outcomes depends on continuous control of etiological factors associated with gingival recession. Even after a technically successful procedure, persistent toothbrushing trauma, biofilm-induced inflammation, anatomical limitations, or unfavorable tooth movement may compromise tissue stability. Therefore, surgical therapy should be considered part of a broader approach that includes patient education, periodontal maintenance, and long-term monitoring. Accordingly, the findings of the present case, in agreement with the literature, suggest that tunneling combined with a modified VISTA approach and a subepithelial connective tissue graft may represent a conservative and biologically plausible alternative for managing recessions in mandibular incisors, particularly when the therapeutic goals include

not only root coverage but also phenotype thickening and clinical stability²⁰⁻²².

4. CONCLUSION

Root coverage of mandibular incisors using the tunneling technique combined with the modified VISTA approach may represent a minimally invasive treatment alternative when appropriately indicated and combined with control of etiological factors and periodontal maintenance.

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