

A Vestibular Tunnel Strategy for Multiple Maxillary Anterior Gingival Recessions Using Vestibular Incision Subperiosteal Tunnel Access and Subepithelial Connective Tissue Grafting

A Minimally Invasive Approach for Predictable Root Coverage

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Abstract: This case report describes the management of multiple adjacent gingival recession defects in the maxillary anterior region using the Vestibular Incision Subperiosteal Tunnel Access (VISTA) technique in combination with a subepithelial connective tissue graft (SCTG). VISTA is a minimally invasive periodontal plastic surgery approach that enables subperiosteal tunnel preparation and coronal advancement of the gingival tissues through a remote vestibular access incision, thereby preserving the integrity of the interdental papillae. In the present case, an autogenous SCTG was incorporated to enhance soft-tissue thickness and improve the quality and stability of the augmented gingival tissue. The combined approach was selected to minimize surgical trauma while providing predictable root coverage and satisfactory esthetic outcomes across multiple contiguous recession defects. Healing was uneventful, and favorable clinical results were observed during postoperative follow-up. Nevertheless, longer-term clinical evaluation and further studies involving larger patient populations are required to establish the predictability and applicability of this technique across different clinical presentations.

Keywords: *Gingival Recession, VISTA Technique, Subepithelial Connective Tissue Graft, Root Coverage, Minimally Invasive Periodontal Surgery, Cairo Classification, Miller Classification.*

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I. INTRODUCTION

Gingival recession (GR), defined as the apical displacement of the gingival margin relative to the cemento-enamel junction (CEJ), is a common periodontal condition that may result in root exposure, dentinal hypersensitivity, and compromised dento-gingival esthetics [1]. It may occur as an isolated defect or affect multiple adjacent teeth. The aetiology is multifactorial and includes traumatic tooth brushing, tooth malposition, periodontal

inflammation, mechanical trauma, aberrant frenal attachment, deleterious oral habits, iatrogenic factors, and alveolar bone dehiscence [2]. Initial management involves identification and correction of predisposing factors, while surgical root coverage may be indicated for esthetic concerns, hypersensitivity, progressive recession, or inadequate soft-tissue dimensions [3].

Several periodontal plastic surgical procedures have been developed for the treatment of multiple recession

defects. Following Raetzke's envelope technique, Allen introduced a suprapariosteal tunneling approach, which was subsequently modified by Zabalegui et al. by eliminating the internal bevel incision to preserve marginal gingival and papillary tissues [4,5]. Although tunneling techniques provide satisfactory clinical outcomes, conventional access through the sulcular region can be technically demanding and may increase the risk of tissue perforation, marginal tissue trauma, and difficulty during graft placement, especially when several neighbouring recession sites require simultaneous treatment.

In an effort to address these limitations, Zadeh introduced the Vestibular Incision Subperiosteal Tunnel Access (VISTA) technique in 2011 [6]. VISTA utilizes a remote vestibular access incision to create a subperiosteal tunnel beneath the involved mucogingival tissues, permitting coronal repositioning of the gingival margin while preserving the marginal gingiva and interdental papillae. When combined with a subepithelial connective tissue graft (SCTG), the technique can additionally enhance soft-tissue thickness and improve the stability and esthetic outcome of root coverage. The minimally invasive access and ability to address multiple contiguous defects through a single incision make VISTA particularly attractive for esthetically demanding maxillary anterior sites.

Therefore, the present case report describes the clinical application of VISTA combined with an autogenous SCTG for the management of multiple adjacent gingival recession defects in the maxillary anterior region and presents the clinical outcome following treatment.

II. CASE PRESENTATION

A 37-year-old systemically healthy, non-smoking male presented with gradually increasing gingival recession and cold sensitivity in the maxillary anterior region for several months. He reported vigorous horizontal brushing with a medium-bristled toothbrush.

Clinical examination revealed a thin gingival phenotype with multiple contiguous buccal recession defects from 13 to 23, with average recession depth ranging from 2- 3 mm (Figure 1).

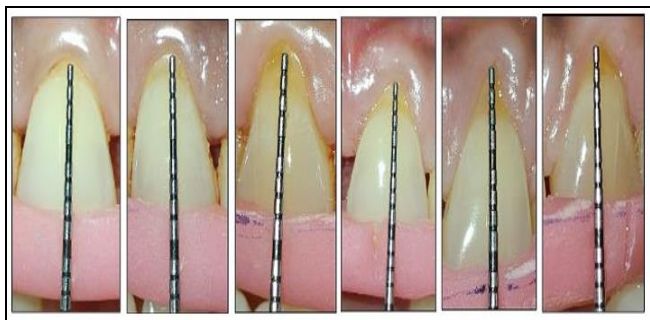


Fig 1 Pre-Operative Measurements

The defects showed root exposure without interproximal clinical attachment loss and were classified as Cairo RT1 and Miller Class I. The width of keratinized tissue

was approximately 2 mm, with adequate vestibular depth. Periapical radiographs revealed preserved interdental bone levels without osseous destruction.

Considering the multiple adjacent recession defects, thin phenotype, limited keratinized tissue, and esthetic and sensitivity concerns, VISTA with subepithelial connective tissue graft (SCTG) was planned.

➤ Treatment Planning

Initial periodontal therapy comprised scaling and root planing, oral hygiene instruction, and modification of traumatic brushing habits. Selective odontoplasty was performed where prominent cervical root contours interfered with soft-tissue adaptation. Following establishment of satisfactory plaque control and tissue health, periodontal plastic surgery was performed.

➤ Surgical Procedure

Under local anesthesia with 2% lignocaine and 1:80,000 adrenaline, a single vertical incision was placed through the midline labial frenum (Figure 2).



Fig 2 Labial Frenum Incision Made

A full-thickness subperiosteal tunnel was carefully prepared using a tunneling instrument, extending one tooth beyond the terminal recession and apical to the mucogingival junction, providing adequate mobility for tension-free coronal repositioning (Figure 3).



Fig 3 Tunnel Preparation Done

An autogenous SCTG was harvested from the palate using the de-epithelialized free gingival graft technique and maintained in sterile saline (Figure 4).



Fig 4 FGG Harvested and De-Epithelialization Done

The donor site was sutured with 4-0 polyamide sutures (Figure 5).

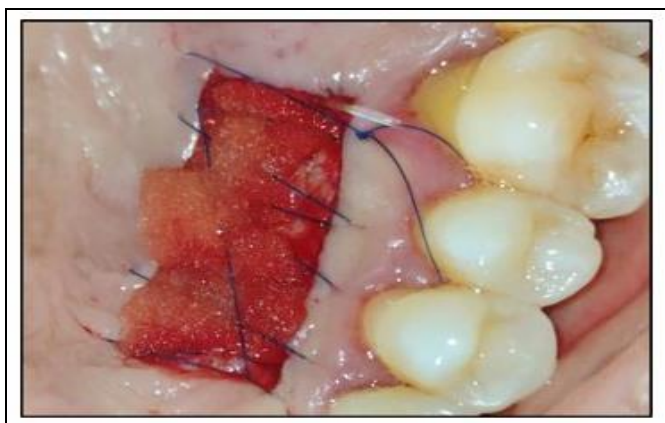


Fig 5 Donor Site Sutured

The SCTG was carefully passed into the tunnel using a lasso suture technique and positioned beneath the recession defects (Figure 6).



Fig 6 Inserting SCTG into Tunnel Using Lasso Suture

The mucogingival tissues and graft were coronally advanced and secured using coronally anchored horizontal mattress sutures. The gingival margin was positioned coronal to the CEJ, and the suture knots were stabilized on the facial tooth surfaces using flowable composite resin (Figure 7).

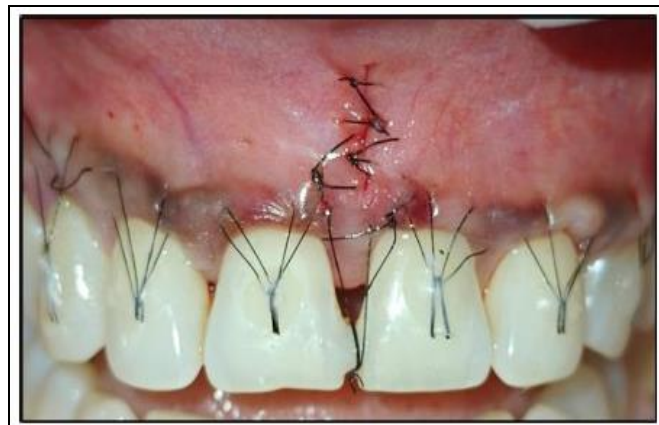


Fig 7 Immediate Post-op after Suturing

Postoperatively, ibuprofen 400 mg three times daily for 3 days and 0.12% chlorhexidine mouthwash twice daily for 3 weeks were prescribed. Mechanical brushing of the surgical area was avoided for 3 weeks, and the patient was followed regularly to assess healing and root coverage.

III. POSTOPERATIVE FOLLOW-UP AND CLINICAL OUTCOME

Postoperative healing progressed without complications, and the patient experienced only minimal discomfort during the early healing period. Sutures were removed at 21 days, and subsequent clinical evaluations were carried out at 3 and 6 months to assess soft-tissue healing and root coverage. No clinically significant adverse events were observed during the follow-up period, and the treated tissues demonstrated satisfactory adaptation and maturation. At the 6-month evaluation, soft-tissue parameters improved measurably (Figure 8).



Fig 8 6 Month Post-op

Gingival thickness increased from 1 mm at baseline to 3 mm, and all treated teeth achieved complete root coverage. The patient expressed high satisfaction with the esthetic outcome and reported complete resolution of sensitivity to thermal stimuli. Examination of the vestibular access site revealed favorable healing without evidence of scar formation, keloid development, or reduction in vestibular depth.

IV. DISCUSSION

Management of multiple adjacent gingival recession defects in the maxillary anterior region remains challenging due to the need for predictable root coverage, preservation of soft-tissue architecture, and improvement of esthetic outcomes. Several factors influence the prognosis of root coverage procedures, including defect morphology, interdental tissue integrity, gingival phenotype, and surgical technique selection [7,8]. In the present case, multiple maxillary anterior recession defects were classified as Cairo RT1 and Miller Class I, with intact interproximal tissues and a thin gingival phenotype, providing favorable conditions for achieving predictable soft-tissue correction.

The subepithelial connective tissue graft (SCTG), first described by Langer and Langer, remains one of the most predictable approaches for root coverage due to its ability to increase gingival thickness, improve tissue quality, and enhance long-term stability of the gingival margin [9]. Systematic reviews evaluating periodontal soft-tissue root coverage procedures have reported high predictability with SCTG-based techniques, with mean root coverage commonly exceeding 80% in appropriately selected cases [10]. In the present case, SCTG was combined with the Vestibular Incision Subperiosteal Tunnel Access (VISTA) technique to augment the thin soft-tissue phenotype and improve the esthetic outcome of the maxillary anterior region.

The VISTA technique, introduced by Zadeh, allows treatment of multiple adjacent recession defects through a single vestibular access incision while preserving the marginal gingiva and interdental papillae [6]. Recent reviews report approximately 88% mean root coverage with VISTA, with favorable outcomes when combined with connective tissue grafts, including improved keratinized tissue and gingival thickness [11]. Consistent with these findings, the present case demonstrated increased gingival thickness from 1 mm to 3 mm and gain in keratinized tissue width from 2 mm to 4 mm at 6 months, along with improvement in esthetics and resolution of thermal sensitivity.

The favorable healing observed in this case may be attributed to the minimally invasive nature of VISTA, preservation of vascular supply, and stable adaptation of the connective tissue graft. This case highlights VISTA with SCTG as a valuable approach for managing multiple contiguous maxillary anterior gingival recessions, particularly in patients with thin gingival phenotype and high esthetic demands.

V. CONCLUSION

The combination of the VISTA technique with a subepithelial connective tissue graft offers a minimally invasive approach for the management of multiple adjacent Cairo RT1/Miller Class I gingival recession defects in the maxillary anterior region. The technique allows preservation of the interdental papillae, improved graft stability, and favorable soft-tissue augmentation while minimizing surgical trauma.

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