

Modified-Vestibular Incision Subperiosteal Tunnel Access Technique Using Advanced Platelet-Rich Fibrin Membrane for the Treatment of Miller's Class II/ III Gingival Recession: A Case Report

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ABSTRACT

Gingival recession presents a major problem in clinical practice due to jeopardized root coverage outcomes. The Modified Vestibular Incision Subperiosteal Tunnel Access (Modified-VISTA) technique offers a minimally invasive solution for enhancing soft tissue. Incorporating autologous materials like Advanced Platelet-Rich Fibrin (A-PRF) may enhance regenerative potential. This case report describes the management of Miller's Class II/ III gingival recession defects in the lower anterior region in a 25-year-old patient. The Modified-VISTA method was used to create a subperiosteal tunnel through vestibular incisions, into which an A-PRF membrane was inserted to improve soft tissue regeneration. Healing progressed smoothly, with notable root coverage and increased gingival thickness observed after one month. Combining the Modified-VISTA technique with A-PRF appears effective for addressing complex gingival recession cases. This method results in improved patient comfort with acceptable aesthetic outcomes. However, more clinical research is required to establish long-term success.

Keywords: Gingival Recession, Miller's Class II/ III, Modified-VISTA, Advanced Platelet-Rich Fibrin (A-PRF), Periodontal Regeneration.

Introduction

Gingival recession is a frequent dental issue that causes discomfort for patients, resulting in tooth sensitivity and an unesthetic appearance. As patients' aesthetic demands increase, clinicians must hone their skills and introduce newer, more innovative techniques to meet these demands [1]. While conventional surgical methods allow access to the underlying bone for complete debridement, the usage of large flaps can result in undesirable outcomes, including crestal bone resorption, loss of interdental papilla, loss of gingival height and contour, and increased root sensitivity. Additionally, prolonged surgery can cause tissue impaction, leading to increased postoperative pain, swelling, edema, and delayed healing. As more individuals show interest in patient-centered procedures

that undergo peer review, clinical researchers are developing less invasive techniques [2]. These techniques aim to diminish soft tissue damage and boost blood flow, which in turn leads to superior results in covering exposed roots.

Combining blood derivatives with a minimally invasive approach for managing marginal tissue recession would overcome the drawbacks associated with a second donor site in autogenous grafting, providing faster and more favorable healing outcomes [3]. This approach offers the benefits of an autogenous and biologically enhanced procedure.

Therefore, the present case intends to use the Modified Vestibular Incision Subperiosteal Tunnel Access (M-VISTA) technique along with the Advanced platelet-rich fibrin (A-PRF) membrane to manage Miller's Class II/III gingival recession defects in the lower front teeth region.

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Case Presentation

A 25-year-old systemically healthy female came to the Department of Periodontology with the chief complaint of receding gums in the lower front teeth region for the past few years. On clinical examination, Miller's Class III recession defect with recession height of 2-3 mm was found around 31 and 41 along with Class II (Nordland & Tarnow's classification) interdental papilla loss around 31,41, and Miller's Class II recession defect around 32,42 having adequate width of attached gingiva and vestibular depth [4,5]. Also, generalized gingival hyperpigmentation with a thick gingival biotype was present (Figure 1a). Following this, the patient underwent phase I therapy, including instructions to maintain oral hygiene, occlusal adjustment, scaling, and root planning. After thoroughly explaining the procedure to the patient, written informed consent was obtained before the commencement of surgery.

Surgical Procedure

The surgical site was anesthetized using a solution of 1:1,00,000 lignocaine combined with adrenaline. Two separate incisions were created in the vestibular area using a number 15 blade, positioned along the distal angles of 32 and 42, to provide access to the entire anterior mandible region (Figure 1b). The incision is made through the periosteum to elevate a subperiosteal tunnel, exposing the facial osseous plate and root dehiscence. Specialized microsurgical VISTA instruments were utilized to prepare the subperiosteal tunnel. The radicular gingival margin was elevated from 32 to 42 using blunt dissection (Figure 1c). Additionally, the tunnel was extended towards the interproximal area under each papilla as much as the embrasure space allows, without cutting through the papilla (Figure 1d). The dissection was carefully extended beyond the mucogingival junction to prevent tension during coronal advancement.

To prepare the A-PRF, 10 mL of venous blood was collected from the patient's antecubital vein using a syringe, promptly transferred to a sterile glass tube, and centrifuged at 1500 rpm for 14 minutes, as described by Ghanaati et al. Following the centrifugation process, the A-PRF plug was carefully separated from the red blood cell layer using scissors and placed into the PRF box to create the A-PRF membrane [6]. (Figures 1e)

A freshly made A-PRF membrane was cut into smaller pieces and put under the prepared tunnel, covering the exposed roots (Figure 2a). Following that, the membrane and mucogingival complex were advanced coronally and secured in the new position using 5-0 black silk sutures and coronally anchored suturing technique, which entails placing a horizontal mattress suture at approx. 2 to 3 mm apical to the gingival margin of each tooth and kept in position using composite buttons at the middle portion of the buccal surface of each tooth (Figure 2b). The surgical area was then covered with tin foil, and then a periodontal pack was placed over it (Coe-pak™) (Figure 2c).

Post-Operative Care

The patient was given a five-day treatment that included antibiotics and non-steroidal anti-inflammatory drugs (NSAIDs) and advised to use 10 ml of chlorhexidine (0.2%) mouth rinse twice daily instead of brushing their teeth for 2-3 weeks in the surgical area. Sutures were removed after 10 days, and the patient was scheduled for weekly follow-up appointments for one month after surgery. After suture removal, healing was satisfactory, with 90% root

coverage and an increase in gingival thickness, which remained stable during follow-up visits, one month after surgery (Figure 2d).

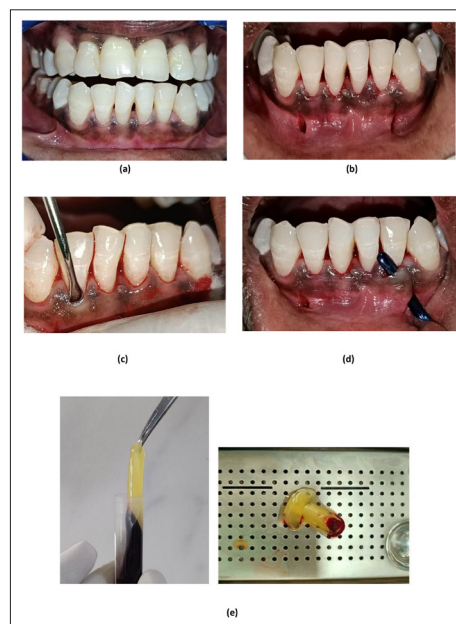


Figure 1:

- Clinical image shows pre-operative frontal view depicting gingival recession and loss of interdental papilla concerning 31,41,32, and 42.
- Clinical image shows two vertical incisions made in the vestibule along distal line angles of 32 and 42.
- Clinical image shows the radicular gingival margin elevated from 32 to 42 using blunt dissection utilizing a microsurgical papilla elevator.
- Clinical image shows the subperiosteal tunnel extending interproximally under each papilla without splitting of the papilla with crevicular incisions.
- Clinical image shows A-PRF plug being prepared and placed in PRF box to prepare A-PRF membrane.

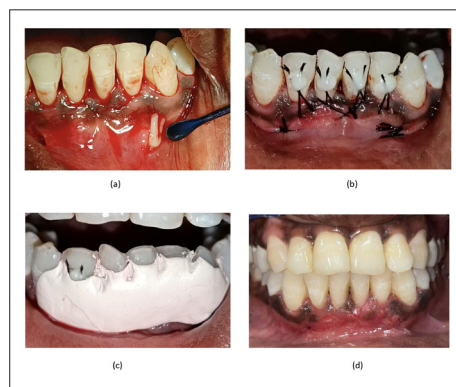


Figure 2:

- Clinical image shows a freshly prepared A-PRF membrane placed beneath the subperiosteal tunnel.
- Clinical image shows the mucogingival complex advanced coronally and stabilized with coronally anchored suturing technique utilizing composite buttons.
- Clinical image shows the surgical site being covered by a periodontal dressing.
- Clinical image shows post-operative frontal view after one month, depicting satisfactory healing and stable 90% root coverage.

Discussion

Gingival recession resulting from improper toothbrushing technique or high frenum attachment is becoming increasingly common and requires aesthetic treatments. Over time, various minimally invasive surgical methods have been created to address gum recession, utilizing specific tools and equipment. One method was suggested by Allen in 1994. He improved Raetzke's "Envelope Technique" and introduced the "Tunnel or Supraperiosteal Envelope Technique" for treating multiple adjacent gingival recessions [7]. Tunneling is a widely used but highly sensitive and blind technique that causes trauma to the sulcular epithelium, leading to unsatisfactory results.

To overcome the technicality, **Homayoun H. Zadeh** in 2011 introduced a novel minimally invasive approach popularized as Vestibular Incision Subperiosteal Tunnel Access (VISTA), which utilizes a smaller vestibular incision and avoids Supraperiosteal Tunnel preparation incision, reducing the risk of traumatizing the gingiva of the teeth being treated. VISTA allows both direct access and an opportunity to reposition the gingival margins of all involved teeth coronally [8]. **Najafi** further redesigned this method and developed the Modified Vestibular Incision Subperiosteal Tunnel Access (M-VISTA) technique to address intraosseous defects in the aesthetic region [9].

In this case report, the minimally invasive Modified VISTA approach was combined with blood-derived wound-healing growth factors to provide unique advantages for the successful management of multiple adjacent recession defects in the lower front teeth region, resulting in satisfactory healing and stable 90% root coverage.

Advanced Platelet-rich fibrin (A-PRF) favours a higher growth factor release than conventional PRF, and this may have a direct impact on tissue regeneration by boosting levels of collagen mRNA and fibroblast migration and proliferation. Furthermore, gel-like A-PRF contains collagen fibres that serve as a natural component, inducing vascularization, supporting the immune system, and providing a three-dimensional scaffold for cell proliferation [10]. A-PRF membrane is more flexible and a great alternative to free or connective tissue graft, avoiding donor site morbidity and increasing patient comfort.

Some of the limitations of the M-VISTA technique cannot be overlooked including every gingival recession defect is not suitable for VISTA, and performing VISTA requires a high level of surgical skill to precisely dissect the subperiosteal tunnel and manage tissue manipulation. Also, special microsurgical instruments are required for this technique.

In conclusion, many different surgical methods exist for treating multiple recession defects, but they often provide less effective root coverage in areas with multiple adjacent defects compared to cases involving a single defect. VISTA technique, therefore

employed in our case report to overcome the limitations of other treatment options and give better results, especially when combined with an A-PRF membrane. To gain a more comprehensive understanding of the VISTA technique when combined with A-PRF enhancement for covering exposed root surfaces, further long-term clinical and histological studies are necessary to assess its effectiveness and predictability.

Conflict of Interest- None

Author Funding- None

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