Annals of Clinical Case Reports

Case Report
Published: 12 Mar, 2025

Mucosal Access Tunnel Technique (MAT) for Root Coverage: Six-Month Clinical Outcomes of Three Distinct Cases

*Mutlu Keskin**

Department of Oral and Dental Health, Altınbaş University, Turkey

Abstract

Gingival recession is a prevalent mucogingival defect characterized by the apical migration of the gingival margin, leading to root surface exposure, increased tooth sensitivity, and higher susceptibility to root caries. The mucosal access tunnel technique (MAT) is introduced as an alternative modified mucosal approach for treating these defects which aims to maintain the vascular integrity crucial for optimal healing by maximally preserving the periosteum, minimizing surgical trauma, and preserving the interdental papilla by avoiding incisions in the sulcular area. A case series of three systemically healthy patients with various degrees of gingival recession was treated using the MAT. Six-month follow-ups showed significant improvements in gingival recession and periodontal health parameters, with stable and aesthetically pleasing outcomes. This study highlights the potential of MAT in achieving effective root coverage and enhancing patient satisfaction by reducing surgical trauma and preserving critical vascular structures. However, randomized controlled trials with long-term follow-ups are necessary to thoroughly assess the success rates, predictability, and stability of this technique.

Keywords: Gingival recession, Periodontal surgery, Root coverage, Subepithelial connective tissue graft

Introduction

Gingival recession, a common mucogingival defect, is marked by the apical migration of the gingival margin, exposing the root surface. This condition causes aesthetic concerns and functional issues, including increased tooth sensitivity, higher risk of root caries, and potential for further periodontal deterioration [1,2].

Gingival recession is influenced by various factors, both direct and predisposing. Primary causes include chronic inflammatory periodontal disease, improper brushin and occlusal trauma. Anatomical factors such as a thin gingival phenotype, bone dehiscences, and high frenulum attachment increase susceptibility. Orthodontic treatment can also exacerbate recession, especially with a thin buccal bone plate or dehiscences [3,4].

Historically, surgical operations to cover gingival recessions and correct mucogingival deficiencies have included techniques such as free gingival grafting (FGG), lateral positioned flaps (LPF), and coronally advanced flaps (CAF) [5–7].

Alongside these techniques, the coronally advanced flap (CAF), one of the most frequently used techniques today, was introduced by Norberg in 1926 and has evolved significantly in its original and modified forms [4,5,8,9]. Advancements in minimally invasive techniques offer the benefits of reducing surgical trauma and enhancing patient satisfaction, ultimately improving patient care [10–12]. These techniques, which involve no oblique or vertical incisions and avoid the involvement of gingival papillae, ensure that the treated area's tissue color and texture seamlessly blend with the surrounding soft tissues while also promising effective root coverage [13–15]. As a result, surgical procedures for root coverage have undergone significant evolution, moving from their initial concepts to the sophisticated techniques employed today.

The tunneling technique, a cornerstone of minimally invasive periodontal plastic surgery, has gained widespread acceptance for its innovative approach to gingival recession treatment, highlighting a shift towards procedures that prioritize patient care and aesthetic outcomes

Correspondence:
Mutlu Keskin, Zuhuratbaba, Department of Oral and Dental Health, Altınbaş University, İncirli Cd. No:11-A, 34147 Bakırköy/İstanbul, Turkey, Tel: +90 536 524 6000

Received Date: *26 Feb 2025*
Accepted Date: *10 Mar 2025*
Published Date: *12 Mar 2025*

Citation:
Mutlu Keskin. Mucosal Access Tunnel Technique (MAT) for Root Coverage: Six-Month Clinical Outcomes of Three Distinct Cases. Ann Clin Case Rep. 2025; 10: 2732.
ISSN: 2474-1655.

[11,13,14]. Building on this foundation, two widely recognized mucosal approach techniques, Vestibular Incision Subperiosteal Tunnel Access (VISTA) and Pinhole Surgical Technique (PST), as well as modifications and other techniques, were introduced [15–20].

The success of root coverage procedures relies on biological healing at the interface between a flap or graft and the exposed root surface. Essential healing requires the recipient bed to allow cellular and vascular infiltration, gradually replacing the fibrin layer with connective tissue. Healing for free soft tissue grafts depends on plasma diffusion and revascularization, with vascular edges crucial for "bridging" healing. The pedicle flap is vital for root coverage, ensuring its survival and providing additional vascular support for the graft, highlighting the importance of adequate vascularization for graft longevity and success [21].

Evaluating the tunneling technique for root coverage reveals several disadvantages. Intrasulcular incisions risk minor ruptures, especially with a thin phenotype, and microblades require exceptional skill, increasing the likelihood of tissue damage. Exposing the connective tissue graft can compromise aesthetics and increase the risk of necrosis due to insufficient blood supply. Sophisticated suturing is required, making the procedure time-consuming and dependent on the operator's skill [22,23]. These factors suggest the need for refinement to enhance outcomes in gingival recession treatment.

The VISTA technique, notable for its innovative approach to periodontal plastic surgery, faces challenges due to cost and technical demands. The procedure's use of a sophisticated membrane complex involving β-TCP hydrated with rhPDGF-BB significantly increases costs, affecting patient accessibility[15]. Additionally, the subperiosteal approach, while facilitating tension-free coronal advancement of mucosal tissue, introduces complexity due to the delicate nature of subperiosteal tunneling. This requires precise surgical skill to mobilize mucosal tissue without tension, enhancing healing but also highlighting the technique's technical demands and cost considerations.

The PST technique, though less invasive for treating gingival recession, has disadvantages. The use of specialized tunneling instruments requires meticulous care to avoid trauma to the periosteum or surrounding tissues. Additionally, the technique's reliance on collagen strips for stabilization raises concerns about the long-term durability and stability of the material, as well as the potential for migration or misplacement. These challenges underscore the need for careful patient selection and thorough practitioner training to maximize the benefits while mitigating the disadvantages of PST.

The challenges and risks of current methods for covering gingival recessions—complexity, potential tissue damage, and high technical skill—underscore the need for innovation in periodontal surgery. A simpler, more efficient technique is needed. An ideal method would secure the graft and ensure a robust blood supply, simplifying the process, minimizing risks, and improving patient care outcomes.

This case series discusses the Mucosal Access Tunnel Technique (MAT), specifically tailored for treating mucogingival defects.

The patients featured in this case series were systemically healthy, non-smokers, and non-diabetic, without any immune disorders (such as AIDS) and not on immunosuppressive medications.

Before the surgical procedure, all patients underwent radiographic and clinical periodontal examination including probing depth measurement, gingival recession measurement, plaque index and bleeding on probing. Additionally, all patients were administered initial aMMP-8 point-of-care tests, targeting an aMMP-8 value of less than 20 ng/ml [24,25]. Patients received initial periodontal treatment, including scaling and root planing if needed. These measures aimed to reduce the patients' bleeding on probing values to below 20%. All periodontal treatments in this study were performed by specialist periodontist M.K. at Tekirdağ Private Oral and Dental Health Clinic. For all patients in these case reports, the surgical procedure was explained in detail, and both verbal and written consent were obtained.

Surgical Procedure Stages

1. Before the operation, composite fillings are recommended on the incisal/occlusal side of the interdental contact to stabilize the SCTG and flap during surgery. Occlusal checks should be performed to ensure the composite filling does not break during daily use. For single tooth recession or shallow recessions, the stable palatal side of the interdental papilla can anchor the coronal movement of the flap.

2. A superficial incision is made in the mucosa, creating a mucosal access window at least 4-5 mm from the mucogingival line and aligned distally to the gum recession. The window can be widened to enhance the field of view, ensuring no damage to the periosteum and maintaining its position on the bone.

3. Using a 15c scalpel blade, an entry is made through the window, with incisions parallel to the inner mucosal surface towards the target coverage area, extending to one tooth laterally with a relieving incision.

4. For thick phenotypes, the internal incision can extend coronally beyond the mucogingival line to preserve periosteal integrity over a wider area. For thin gingival phenotypes, the attached gingiva is elevated coronally using micro periosteal elevators to achieve full-thickness elevation and access to the sulcular area, without an incision in the sulcular area. The marginal gingival edge is elevated through the vestibular window using micro periosteal elevators.

5. Using papilla elevators, the entire interdental papilla is elevated. Vestibular mucosal access allows for complete elevation of the tissue around the interdental bone crest and the palatal aspect of the papilla, ensuring full mobilization without detachment.

6. Different SCTG harvesting methods can be chosen based on the operator's preference. Removing fatty tissue from the graft can benefit the general healing process.

7. The harvested SCTG is placed into the graft bed area through the mucosal access window using tissue forceps. It is secured from the vestibular surface with a 6-0 monofilament non-resorbable suture, passing through the detached gingiva and graft, exiting from the stable palatal surface, and anchored to the desired coronal position.

8. Interdental suspension sutures should extend at least one tooth distance both mesially and distally from the operation area.

9. Postoperative care includes avoiding vigorous spitting for 24 hours, hot foods and beverages for three days, pulling or exerting tension on the surgical area, and applying ice packs to keep the area cool without exerting pressure on the graft site. Patients should avoid foods that could cause trauma to the surgical area.

Table 1: Overall clinical parameters (probing depth,, gingival recession, plaque index, bleeding on probing and aMMP-8 scores) recorded at baseline, and at 1 month and 6 months postoperatively. N/A: Not Available.

Parameter	Baseline	Postoperative Month 1	Postoperative Month 6
Overall Probing Depth (mm)	1.8 ± 0.2	N/A	1.6 ± 0.3
Overall Gingival Recession (mm)	0.5 ± 0.1	0.3 ± 0.1	0.1 ± 0.02
Overall Plaque Index	0.8 ± 0.2	0.6 ± 0.2	0.5 ± 0.2
Overall Bleeding on Probing (%)	4% ± 1%	N/A	1% ± 0.5%
Overall aMMP-8 score	<20 ng/ml	N/A	N/A

Table 2: Tooth-Based Clinical Parameters (probing depth, gingival recession, plaque index and bleeding on probing) recorded at baseline, and at 1 month and 6 months postoperatively. N/A: Not Available.

Tooth No: 23			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	2	N/A	2
Vestibular	2	N/A	2
Distal	2	N/A	2
Region	**Baseline Gingival Recession (mm)**	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	0	0	0
Vestibular	4	0	0
Distal	0	0	0
Region	**Baseline Plaque Index**	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	0	0	0
Vestibular	0	0	0
Distal	0	0	0
Region	**Baseline Bleeding on Probing +/-**	**Month 1 Bleeding on Probing +/-**	**Month 6 Bleeding on Probing +/-**
Mesial	-	N/A	-
Vestibular	-	N/A	-
Distal	-	N/A	-
Tooth No: 24			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	2	N/A	2
Vestibular	2	N/A	1
Distal	2	N/A	2
Region	**Baseline Gingival Recession (mm)**	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	0	0	0
Vestibular	2	0	0
Distal	0	0	0
Region	**Baseline Plaque Index**	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	1	1	0
Vestibular	0	0	0
Distal	0	0	0
Region	**Baseline Bleeding on Probing +/-**	**Month 1 Bleeding on Probing +/-**	**Month 6 Bleeding on Probing +/-**
Mesial	-	N/A	-
Vestibular	-	N/A	-
Distal	-	N/A	-

10. Patients are prescribed anti-inflammatory analgesics and broad-spectrum antibiotics. From the third day post-operation, patients should rinse their mouths with 0.12% chlorhexidine.

11. Sutures at the graft placement site are typically removed no earlier than two weeks post-operation, while sutures at the donor site are generally removed after one week.

Case 1

A 22-year-old patient presented with gingival recession in the maxillary left region. The patient was systemically healthy and had

Table 3: Overall clinical parameters (probing depth, gingival recession, plaque index, bleeding on probing, and aMMP-8 scores) recorded at baseline, and at 1 month and 6 months postoperatively.

Parameter	Baseline	Postoperative Month 1	Postoperative Month 6
Overall Probing Depth (mm)	3.0 ± 0.5	N/A	2.5 ± 0.4
Overall Gingival Recession (mm)	3.0 ± 1.0	2.0 ± 0.2	2.2 ± 0.3
Overall Plaque Index	2.5 ± 0.5	2.5 ± 0.8	2.3 ± 0.7
Overall Bleeding on Probing (%)	35% ± 5%	N/A	12% ± 2%
Overall aMMP-8 score	<20 ng/ml	N/A	N/A

Figure 1: Gingival recession defect in maxillary left region.

Figure 2: Surgical phases of the procedure before SCTG augmentation (Visualization captured from the operation video footage). a) Initial incision design b) Internal relieving incision c) Access to the marginal sulcus through mucosal window d) Relieved flap prior to the SCTG augmentation.

Figure 3: Harvested connected tissue graft.

completed orthodontic treatment three years prior, after which the gingival recession started. Intraoral examination showed a 4mm recession at tooth 23 and a 2 mm recession at tooth 24 (Figure 1). Periodontal parameters are presented in Tables 1-2.

Before the operation, anti-debridement treatment, including

Figure 4: Immediate postoperative photo showing suturing.

Figure 5: Two-week postoperative follow-up showing healing progress.

Figure 6: Six-month postoperative follow-up showing maintained stability and complete coverage of the gingival recession.

scaling, was performed to ensure bleeding and plaque indices were below 20%. The MAT technique was then used.

Details of the operation can be summarized as follows: An access window was created using a 15c scalpel blade through a superficial oblique incision, positioned ~5mm apical to the mucogingival junction and aligned with the middle vestibular line of tooth number 22 (Figure 2a). The internal superficial incision was meticulously extended coronally and distally towards the area of gingival recession, with controlled dissection to preserve the periosteum as much as possible (Figure 2b and c). Internal dissection was extended until flap mobility was achieved, allowing the flap to reach ~2 mm coronal to

the targeted coverage boundary (Figure 2d).

A connective tissue graft (Figure 3), harvested from the left palatal region using a single-incision technique, was placed into the recession area through the mucosal access window with tissue forceps. The graft was secured to the mobilized flap and positioned coronally using suspension sutures passing through the interdental area and anchored at the interdental stop points (Figure 4).

At the two-week follow-up, there were no complications (Figure 5), and the periodontal parameters showed significant improvement, with reduced gingival recession. This stability was maintained at the six-month follow-up (Figure 6).

Case 2

A 35-year-old patient presented with generalized gingival recessions from tooth 41 to 33 (Figure 7). Significant plaque and calculus accumulation, along with a bleeding index above 30%, were observed (Tables 3 and 4). Initial treatment included thorough scaling and root planing, reducing the bleeding index to below 20%.

Using the MAT technique, a mucosal access window was created in the interdental region of teeth 42 and 41 with a 15c scalpel blade, extending horizontally across the vestibular surface. The gingival tissue was gently elevated using micro periosteal elevators to achieve flap elevation while minimizing periosteum damage (Figure 8). The interdental papillae were mobilized through the window, preserving their structure (Supplementary video).

A SCTG harvested from the palatal region was inserted through the mucosal access window, positioned with tissue forceps and secured with 6-0 monofilament non-resorbable sutures anchored to retention wires at the interdental contact points (Figure 9). The mobilized flap was positioned tension-free and secured with suspension sutures for stable coronal positioning.

Figure 7: Initial presentation of the patient showing generalized gingival recessions with significant plaque accumulation.

Figure 8: Surgical phases of SCTG placement (Visualization captured from the operation video footage). a) Demonstration of the mucosal window entry b) Flap relief through the tunnel created by the mucosal window c) Placement of the SCTG through the mucosal window d) Positioning of the SCTG in the recession area.

Figure 9: Postoperative image showing the sutures securing the graft and flap, anchored to the patient's existing retention wires.

Figure 10: Postoperative one-week image showing a complication-free first week.

Figure 11: One-month postoperative image showing complete coverage of gingival recessions.

Figure 12: Six-month postoperative image showing maintained stability of the treated gingival recessions.

By the first postoperative week, no complications were observed (Figure 10). At the one-month follow-up, the gingival recessions were completely covered, and this stability was maintained at the six-month follow-up, demonstrating significant improvement (Figures 11-12).

Case 3

A 30-year-old healthy, non-smoking female presented with

Table 4: Tooth-Based Clinical Parameters (probing depth, gingival recession, plaque index, bleeding on probing) recorded at baseline, and at 1 month and 6 months postoperatively.

Tooth No: 33			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month & Probing Depth (mm)**
Mesial	3	N/A	2
Vestibular	3	N/A	2
Distal	3	N/A	2
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	1	0	0
Vestibular	4	0	0
Distal	1	0	0
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	3	1	1
Vestibular	3	1	1
Distal	3	1	1
	Baseline Bleeding on Probing (+/-)	Month 1 Bleeding on Probing (+/-)	Month 6 Bleeding on Probing (+/-)
Mesial	+	N/A	-
Vestibular	+	N/A	-
Distal	+	N/A	+
Tooth No: 32			
Region	**Baseline Probing Depth (mm)**	**h1P Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	2	N/A	2
Vestibular	2	N/A	2
Distal	2	N/A	2
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	1	0	0
Vestibular	6	0	0
Distal	1	0	0
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month & Plaque Index**
Mesial	3	1	1
Vestibular	3	1	1
Distal	3	1	1
	Baseline Bleeding on Probing (+/-)	**Month 1 Bleeding on Probing (+/-)**	**Month 6 Bleeding on Probing (+/-)**
Mesial	+	N/A	+
Vestibular	-	N/A	-
Distal	+	N/A	-
Tooth No: 31			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month & Probing Depth (mm)**
Mesial	4	N/A	2
Vestibular	3	N/A	2
Distal	3	N/A	2
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	2	1	1
Vestibular	3	0	0
Distal	1	0	0
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	3	1	1
Vestibular	3	1	1
Distal	3	1	1

	Baseline Bleeding on Probing (+/-)	Month 1 Bleeding on Probing (+/-)	Month 6 Bleeding on Probing (+/-)
Mesial	+	N/A	+
Vestibular	+	N/A	-
Distal	+	N/A	-
Tooth No: 41			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	4	N/A	2
Vestibular	3	N/A	2
Distal	4	NIA	2
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	2	1	1
Vestibular	3	0	0
Distal	1	0	0
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month & Plaque Index**
Mesial	3	1	1
Vestibular	3	1	1
Distal	3	1	1
	Baseline Bleeding on Probing (+/-)	**Month 1 Bleeding on Probing (+/-)**	**Months Bleeding on Probing (+/-)**
Mesial	+	N/A	-
Vestibular	-	N/A	-
Distal	+	N/A	-
Tooth No: 42			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	3	N/A	2
Vestibular	2	N/A	2
Distal	3	N/A	2
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	0	0	0
Vestibular	2	0	0
Distal	1	1	1
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	3	1	1
Vestibular	3	0	0
Distal	3	1	1
	Baseline Bleeding on Probing (+/-)	**Month 1 Bleeding on Probing (+/-)**	**Month 6 Bleeding on Probing (+/-)**
Mesial	.	N/A	+
Vestibular		N/A	-
Distal	.	N/A	+

gingival recession and root sensitivity in the upper right quadrant after orthodontic treatment, which she declined to continue. She had 4 mm of gingival recession at tooth 12 (Figure 13). Periodontal parameters are detailed in Tables 5 and 6.

After obtaining written and verbal consent, routine scaling was performed a day before surgery. An access window was created through a superficial oblique incision 5mm apical to the mucogingival junction of tooth 13. The incision was extended until the flap was mobile enough to reach 2-3 mm coronal to the target coverage boundary.

A connective tissue graft, harvested from the right palatal region using a single-incision technique, was placed in the recession area through the mucosal access window and secured with sutures (Figures 14-17).

At the one-week follow-up, there were no complications (Figure 18). One month postoperatively, complete gingival recession coverage was observed and maintained at the six-month follow-up (Figure 19).

Discussion

The MAT technique introduced in this study offers several advantages in treating mucogingival defects. In individuals with a thin phenotype, the gingival tissue and papillary region are more

Figure 13: Baseline photo showing gingival recession in the maxillary right region.

Figure 14: Mucosal access window positioned 5mm apical to the mucogingival junction.

Figure 15: Placement of the connective tissue graft through the mucosal access window.

Figure 16: Connective tissue graft secured to the mobilized flap with interdental sutures.

Figure 17: Suspension sutures were used to achieve maximum coronal position.

Figure 18: One-week postoperative follow-up with no complications affecting wound healing.

Figure 19: Six-month postoperative follow-up showing maintained stability.

delicate and sensitive [26]. Conventional sulcular incisions can cause micro tears that may develop into larger ruptures under stress, posing a greater risk for these patients. Papilla-sparing incisions elicit a reduced tissue response compared to sulcular incisions, highlighting the importance of careful surgical planning to minimize tissue damage and support optimal healing [27]. The MAT technique offer to decrease rupture risk by avoiding sulcular incisions and preserving interdental papilla integrity through the mucosal access window, reducing trauma to the papillary region.

In oral surgical procedures, vertical or horizontal incisions that disrupt superficial tissues can significantly impair blood supply [28–30]. Excessive periosteum damage during surgery further impairs the vascular system, negatively affecting healing [31,32]. The absence of vertical and horizontal incisions in gingival recession areas, along with efforts to preserve the periosteum, aims to maintain the circulatory network and ensure better blood flow. By preserving blood vessels within and around the periosteal region and avoiding relieving incisions, the technique supports graft survival. The intact vascular network enhances healing, as evidenced by optimal healing observed in the second week post-operation, contributing to improved outcomes.

In the conventional tunnel technique, specific suture techniques

Table 5: Overall clinical parameters (probing depth, gingival recession, plaque index, bleeding on probing, and aMMP-8 scores) recorded at baseline, at 1 month and 6 months postoperatively. N/A: Not Available.

Parameter	Baseline	Postoperative Month 1	Postoperative Month 6
Overall Probing Depth (mm)	2.02 ± 0.3	N/A	2.14 ± 0.7
Overall Gingival Recession (mm)	0.7 ± 0.2	0.6 ± 0.2	0.2 ± 0.02
Overall Plaque Index	1.4 ± 0.3	1 ± 0.2	1 ± 0.3
Overall Bleeding on Probing (%)	5% ± 1%	N/A	2% ± 1%
Overall aMMP - 8 score	< 20 ng/ml	N/A	N/A

Table 6: Tooth-Based Clinical Parameters (probing depth, gingival recession, plaque index and bleeding on probing) recorded at baseline, and at 1 month and 6 months postoperatively. N/A: Not Available

Tooth No: 11			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	2	N/A	1
Vestibular	1	N/A	1
Distal	1	N/A	1
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	0	0	0
Vestibular	3	0	0
Distal	1	0	0
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	1	1	0
Vestibular	1	0	0
Distal	1	1	0
	Baseline Bleeding on Probing (+/-)	**Month 1 Bleeding on Probing (+/-)**	**Month 6 Bleeding on Probing (+/-)**
Mesial	-	N/A	-
Vestibular	-	N/A	-
Distal	-	N/A	-
Tooth No: 12			
Region	**Baseline Probing Depth (mm)**	**Month 1 Probing Depth (mm)**	**Month 6 Probing Depth (mm)**
Mesial	2	N/A	2
Vestibular	1	N/A	1
Distal	2	N/A	2
	Baseline Gingival Recession (mm)	**Month 1 Gingival Recession (mm)**	**Month 6 Gingival Recession (mm)**
Mesial	2	0	0
Vestibular	4	0	0
Distal	2	0	0
	Baseline Plaque Index	**Month 1 Plaque Index**	**Month 6 Plaque Index**
Mesial	1	1	0
Vestibular	0	0	0
Distal	1	1	0
	Baseline Bleeding on Probing (+/-)	**Month 1 Bleeding on Probing (+/-)**	**Month 6 Bleeding on Probing (+/-)**
Mesial	-	N/A	-
Vestibular	-	N/A	-
Distal	-	N/A	.

are used to stabilize the connective tissue graft, requiring precise skills and sometimes specialized instruments [12,33,34]. This technique allows expanding the mucosal access window to facilitate manual graft positioning, reducing the need for complex suturing. This approach enhances graft stability and minimizes trauma, contributing to more predictable and aesthetically pleasing outcomes. Additionally, securing the graft with interdental suspension sutures makes the process more efficient and less reliant on intricate suturing methods.

While the MAT technique offers advantages in treating mucogingival defects, it also has potential disadvantages. The

creation of the mucosal window and relaxing incisions increases the procedure's technical sensitivity, requiring meticulous anatomical precision. Compared to traditional methods with vertical incisions, the MAT technique demands higher surgical skill to navigate anatomical variations like bony protrusions and root formations, which can complicate the surgery. Traditional methods allow for easier management of these challenges through direct visualization, whereas the MAT technique's limited view requires blind dissections, increasing technical sensitivity and reliance on the surgeon's experience. Preserving the periosteum is crucial for vascular integrity and optimal healing; poor handling can compromise blood supply and aesthetic results. Blind dissections risk arterial injuries and intraoperative bleeding. Therefore, the MAT technique requires precise and skilled execution, emphasizing the need for comprehensive training in periodontal plastic surgery.

The MAT technique may show potential in treating mucogingival defects, but further research is needed to validate its efficacy. Randomized controlled trials with long-term follow-ups are essential to thoroughly assess the success rates, predictability, and stability of this technique. Such studies would provide robust data on clinical outcomes and help identify the patient populations that would benefit most from the MAT technique.

Conclusions

The Mucosal Access Technique (MAT) shows promise in treating mucogingival defects by minimizing tissue trauma and preserving the interdental papilla. However, further randomized controlled trials with long-term follow-ups are needed to validate its efficacy and identify the patient populations that would benefit most, thereby enhancing clinical outcomes in periodontal plastic surgery.

References

1. Cortellini P, Bissada NF. Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. J Clin Periodontol. 2018;45(S20):S190-S198.
2. Madani FM, Kuperstein AS. Normal Variations of Oral Anatomy and Common Oral Soft Tissue Lesions. Medical Clinics of North America. 2014;98(6):1281-1298.
3. Jati AS, Furquim LZ, Consolaro A. Gingival recession: its causes and types, and the importance of orthodontic treatment. Dental Press J Orthod. 2016;21(3):18-29.
4. Zucchelli G, Mounssif I. Periodontal plastic surgery. Periodontol 2000. 2015;68(1):333-368.
5. Allen EP, Miller PD. Coronal Positioning of Existing Gingiva: J Periodontol. 1989;60(6):316-9.
6. Lang NP, Löe H. The Relationship Between the Width of Keratinized Gingiva and Gingival Health. J Periodontol. 1972;43(10):623-627.
7. Stefanini M, Marzadori M, Aroca S, Felice P, Sangiorgi M, Zucchelli G. Decision making in root-coverage procedures for the esthetic outcome. Periodontol 2000. 2018;77(1):54-64.
8. Norberg O. Är en utläkining utan vävnadsförlust otänkbar vid kirkurgisk behandling av sk alveolarpyorrea. Svensk Tandläkar Tidskrift. 1926;19:171-172.
9. De Sanctis M, Zucchelli G. Coronally advanced flap: a modified surgical approach for isolated recession-type defects: Three-year results. J Clin Periodontol. 2007;34(3):262-8.
10. Ozenci I, Ipci SD, Cakar G, Yilmaz S. Tunnel technique versus coronally advanced flap with acellular dermal matrix graft in the treatment of multiple gingival recessions. J Clin Periodontol. 2015;42(12):1135-42.
11. Zabalegui I, Sicilia A, Cambra J, Gil J, Sanz M. Treatment of multiple adjacent gingival recessions with the tunnel subepithelial connective tissue graft: a clinical report. Int J Periodontics Restorative Dent. 1999;19(2):199-206.
12. González-Febles J, Romandini M, Laciar-Oudshoorn F, et al. Tunnel vs. coronally advanced flap in combination with a connective tissue graft for the treatment of multiple gingival recessions: a multi-center randomized clinical trial. Clin Oral Investig. 2023;27(7):3627-38.
13. Allen AL. Use of the supraperiosteal envelope in soft tissue grafting for root coverage. II. Clinical results. Int J Periodontics Restorative Dent. 1994;14(4):302-15.
14. Allen AL. Use of the supraperiosteal envelope in soft tissue grafting for root coverage. I. Rationale and technique. Int J Periodontics Restorative Dent. 1994;14(3):216-27.
15. Zadeh HH. Minimally invasive treatment of maxillary anterior gingival recession defects by vestibular incision subperiosteal tunnel access and platelet-derived growth factor BB. Int J Periodontics Restorative Dent. 2011;31(6):653-60.
16. Chao JC. A novel approach to root coverage: the pinhole surgical technique. Int J Periodontics Restorative Dent. 2012;32(5):521-31.
17. Lee CT, Hamalian T, Schulze-Späte U. Minimally Invasive Treatment of Soft Tissue Deficiency Around an Implant-Supported Restoration in the Esthetic Zone: Modified VISTA Technique Case Report. Journal of Oral Implantology. 2015;41(1):71-6.
18. Fernández-Jiménez A, Estefanía-Fresco R, García-De-La-Fuente AM, Marichalar-Mendia X, Aguirre-Zorzano LA. Description of the modified vestibular incision subperiosteal tunnel access (m-VISTA) technique in the treatment of multiple Miller class III gingival recessions: a case series. BMC Oral Health. 2021;21(1):142.
19. Rimbert M, Barré R. New Surgical Approach for Mandibular Anterior Root Coverage by Modified Tunnel Technique With Simultaneous Frenuloplasty: Technical Description and 5-Year Recall Case Report. Clin Adv Periodontics. 2021;11(3):155-160.
20. Guimarães DM, Andrade PF de, Rebollal J, Neves AM das, Granjeiro JM. A modified tunnel technique to treat multiple gingival recessions: Case Series. Braz Dent J. 2023;34(3):136-45.
21. Mazzotti C, Mounssif I, Rendón A, Mele M, Sangiorgi M, Stefanini M, et al. Complications and treatment errors in root coverage procedures. Periodontol 2000. 2023;92(1):62-89.
22. Gobbato L, Nart J, Bressan E, Mazzocco F, Paniz G, Lops D. Patient morbidity and root coverage outcomes after the application of a subepithelial connective tissue graft in combination with a coronally advanced flap or via a tunneling technique: a randomized controlled clinical trial. Clin Oral Investig. 2016;20(8):2191-202.
23. González-Febles J, Romandini M, Laciar-Oudshoorn F, Noguerol F, Marruganti C, Bujaldón-Daza A, et al. Tunnel vs. coronally advanced flap in combination with a connective tissue graft for the treatment of multiple gingival recessions: a multi-center randomized clinical trial. Clin Oral Investig. 2023;27(7):3627-3638.
24. Keskin M, Lähteenmäki H, Rathnayake N, Räisänen IT, Tervahartiala T, Pärnänen P, et al. Active matrix metalloproteinase-8 and interleukin-6 detect periodontal degeneration caused by radiotherapy of head and neck cancer: a pilot study. Expert Rev Proteomics. 2020;17(10):777-84.
25. Keskin M, Rintamarttunen J, Gülçiçek E, Räisänen IT, Gupta S, Tervahartiala T, et al. A Comparative Analysis of Treatment-Related Changes in the Diagnostic Biomarker Active Metalloproteinase-8 Levels in Patients with Periodontitis. Diagnostics. 2023;13(5):903.
26. Mohan Kumar P, Nagate RR, Chaturvedi S, Al-Ahmari MMM, Al-Qarni MA, Gokhale ST, et al. Importance of periodontal phenotype in

periodontics and restorative dentistry: a systematic review. BMC Oral Health. 2024;24(1):41.

27. Fickl S, Fischer KR, Negri B, Ruíz RD, Calvo-Guirado JL, Kebschull M, et al. Tissue response following papilla-sparing and sulcular incisions in oral surgery—an experimental study. Clin Oral Investig. 2014;18(4):1313-1317.

28. Abdulmoein AlFotawi R. Flap Techniques in Dentoalveolar Surgery. In: Oral Diseases. IntechOpen; 2020.

29. Mörmann W, Ciancio SG. Blood Supply of Human Gingiva Following Periodontal Surgery: A Fluorescein Angiographic Study. J Periodontol. 1977;48(11):681-92.

30. McLean TN, Smith BA, Morrison EC, Nasjleti CE, Caffesse RG. Vascular Changes Following Mucoperiosteal Flap Surgery: A Fluorescein Angiography Study in Dogs. J Periodontol. 1995;66(3):205-10.

31. Nobuto T, Tokioka T, Limai H, Suwa F, Ohta Y, Yamaoka A. Microvascularization of Gingival Wound Healing Using Corrosion Casts. J Periodontol. 1987;58(4):240-246.

32. Nobuto T, Imai H, Suwa F, Kono T, Suga H, Jyoshi K, et al. Microvascular Response in the Periodontal Ligament Following Mucoperiosteal Flap Surgery. J Periodontol. 2003;74(4):521-8.

33. Cairo F. Periodontal plastic surgery of gingival recessions at single and multiple teeth. Periodontol 2000. 2017;75(1):296-316.

34. Tavelli L, Majzoub J, Kauffmann F, Rodriguez MR, Mancini L, Chan H-L, et al. Coronally advanced flap versus tunnel technique for the treatment of peri-implant soft tissue dehiscences with the connective tissue graft: A randomized, controlled clinical trial. J Clin Periodontol. 2023;50(7):980-95.