

Case Report

Management of Multiple Gingival Recessions: Tunnel Technique Vs. Zucchelli and Desanctis Technique

Nada Kriouach^{1*}, Samir Erraji², Zouheir Ismaili²¹Department of Periodontology Specialist in Periodontology, AL Massira Regional Dental Care Center, Rabat, Morocco²Department of Periodontology, Professor of Periodontology, Faculty of Dentistry, Mohamed V University, Rabat, Morocco***Corresponding author:** Nada Kriouach, Department of Periodontology, Specialist in Periodontology, AL Massira Regional Dental Care Center, Mohammed V University, Rabat, Morocco**Citation:** Kriouach N, Erraji S, Ismaili Z (2025) Management of Multiple Gingival Recessions: Tunnel Technique Vs. Zucchelli and Desanctis Technique J Surg 10: 11415 DOI: 10.29011/2575-9760.011415**Received Date:** 08 August 2025; **Accepted Date:** 15 August 2025; **Published Date:** 18 August 2025**Abstract**

Gingival recession is a common mucogingival condition affecting many patients. In cases of multiple adjacent recessions, especially in the anterior (aesthetic) zone, patient demands for treatment increase significantly. Various mucogingival surgical techniques are available to manage this condition. The gold standard remains the coronally advanced flap combined with a connective tissue graft. In this article, we compare two variations of this approach to evaluate their outcomes and effectiveness in treating multiple gingival recessions.

Keywords: Connective Tissue Graft; Multiple Gingival Recessions; Tunnel Technique; Zucchelli and DeSanctis Technique**Introduction**

Gingival recession is a common mucogingival condition defined as the apical migration of the gingival margin relative to the Cemento Enamel Junction (CEJ) [1]. It is associated with attachment loss and root surface exposure to the oral environment [1]. Consequences of gingival recession include esthetic concerns, tooth hypersensitivity, cervical wear, plaque accumulation, and increased risk of root caries [2,3]. Several risk factors contribute to gingival recession, including tooth malposition, periodontal phenotype, mechanical trauma, and plaque-induced inflammation [4,6]. Other contributing factors include improper toothbrushing technique, which acts as a significant mechanical irritant; inadequate intra-sulcular cervical restorations that violate the biological width, leading to inflammation and recession; and orthodontic treatment, especially

when teeth are moved labially, which may cause bone dehiscence and subsequent recession and attachment loss [2,4]. Esthetics and hypersensitivity are the primary indications for treating gingival recession. Various surgical approaches in periodontal plastic surgery can successfully manage these defects [5]. The gold standard is the Coronally Advanced Flap (CAF) combined with a connective tissue graft. To reduce surgical trauma, two alternative techniques have been proposed: the Zucchelli and DeSanctis technique modified Coronally Advanced Flap (mCAF) and the Tunnel Technique (TUN), both avoiding releasing incisions.

Case Presentation 1

Zucchelli and DeSanctis Technique: A 35-year-old female patient in good general health presented to the periodontology department for esthetic concerns. Multiple gingival recessions on the maxillary anterior teeth (teeth 21-24) had developed over one year following orthodontic treatment (Table 1).

Gingival site				Tooth site	
	Recession depth	GT	KTW	CEJ (A/B)	Step (+/-)
RT1 21 -22 -24	1mm	Thick	3mm	A	-
Gingival site				Tooth site	
	Recession depth	GT	KTW	CEJ (A/B)	Step (+/-)
RT1 23	3mm	Thin	3mm	A	-

GT: Gingival Thickness, KTW: Keratinized Tissue Width, CEJ: Cementum-Enamel Junction, (A: detectable, B: undetectable), step: root surface concavity (Class + = presence of a cervical step >0.5 mm. Class - = absence of cervical step) [4].

Table 1: Classification of Phenotype and Gingival Recession: 21-22-23-24

The patient had good oral hygiene but used an aggressive, incorrect brushing technique with a hard toothbrush.

Clinical examination revealed:

- O'Leary plaque index: 20%,
- Minor calculus localized to lower incisors and canines,
- Mucogingival complex showing a thin biotype with insufficient attached gingiva (Figures 1-3).



Figure 1: patient at the first appointment



Figure 2: patient's smile

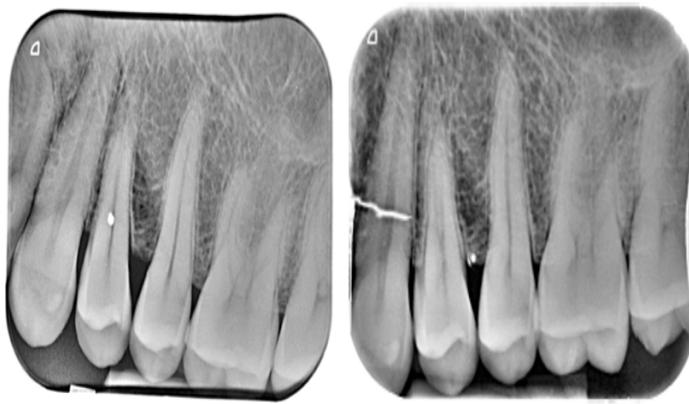


Figure 3: radiographs

Treatment Plan According to the EFP(European Federation of Periodontology) Recommendations

Step 1: Oral hygiene motivation and correction of brushing technique; supra- gingival scaling, Compliance reevaluation

Step 2: subgingival scaling; Reassessment after 15 days;

Step 3: Corrective phase: Root coverage surgery on teeth 21-24; Final evaluation: Post-surgical reassessment;

SPC: Supportive Periodontal Care: Maintenance phase.

After initial periodontal therapy and brushing correction, surgery was planned due to satisfactory bleeding on probing and plaque control. The incision line was marked by measuring recession heights from the papilla tips on mesial and distal sides of affected teeth (Figure 4).

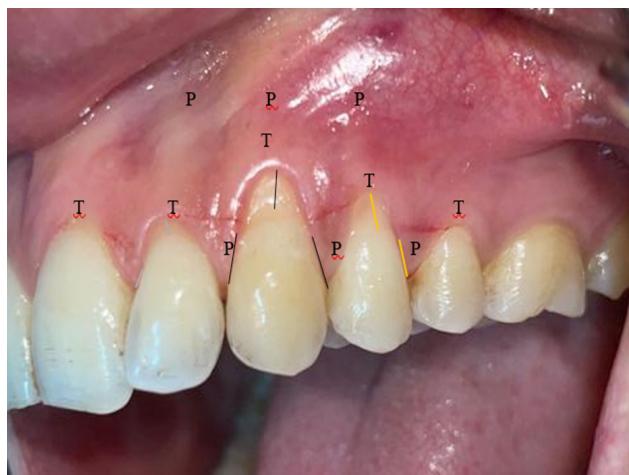


Figure 4: technique's description. Arrows split The blue, yellow and black lines indicate the height of the recession from the

top of the papillae; partial dissection (P) and the full thickness detachment (T).

The flap was elevated full thickness to the mucogingival junction, then split thickness. Anatomical papillae were partially de-epithelialized, flap mobility was verified, and the flap was coronally advanced. Surgical papillae were sutured to the de-epithelialized anatomical papillae to cover the recessions (Figures 5-7) [6].



Figure 5: incision line



Figure 6: flap realising



Figure 7: flexibility verication

A Connective Tissue Graft (CTG) was harvested from the left palate, de-epithelialized, and placed on tooth #23 due to its thin gingival biotype (Figures 8-10).



Figure 8: Donor site



Figure 11: Sutures

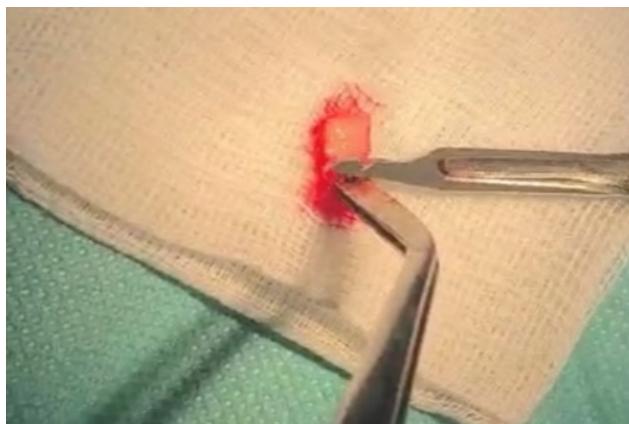


Figure 9: Desepithelialisation

Postoperative Care and Follow-Up

- Analgesics: Paracetamol 500 mg, three times daily for 3 days;
- Antiseptic: Chlorhexidine 0.12% rinse twice daily for 14 days;
- Surgical toothbrush recommended 15 days post-op.

The patient was monitored at 3, 10, 15 days, and at 1 and 3 months post-op (Figures 12-14).



Figure 12: Control at 10 days



Figure 10: CTG placing

The flap was then sutured (Figure 11).



Figure 13: Control at 1 month



Figure 14: Control at 3 months

At 1 year, results were stable with slight gingival retraction on tooth #24 where CTG was not used (Figure 15).



Figure 15: One year post-operative.

Case Presentation 2: Tunnel Technique (TUN): A 34-year-old male patient in good health presented with gingival recession on upper incisors (Table 2).

Gingival site				Tooth site	
	Recession depth	GT	KTW	CEJ (A/B)	Step (+/-)
RT2	3	Thin	3	A	-

GT: Gingival Thickness, KTW: Keratinized Tissue Width, CEJ: Cementum-Enamel Junction, (A: detectable, B: undetectable), step: root surface concavity (Class + = presence of a cervical step >0.5 mm. Class - = absence of cervical step) [4].

Table 2: 2017 Classification of Phenotype and Gingival Recession

Incisions were made around each recession but did not extend into interdental papillae. A full-thickness mucoperiosteal flap was reflected beyond the mucogingival junction to reduce tension and facilitate coronal flap displacement after graft placement. The tunnel was prepared with lateral extensions of 3-5 mm from each recession (Figure 16 a,b,c,d). A Subepithelial Connective Tissue Graft (SCTG) was harvested from the palate and carefully positioned within the tunnel (Figure 16 e,f). Sutures secured the graft mesially and distally, preventing graft movement and suspending it around interproximal contacts (Figure 16g).

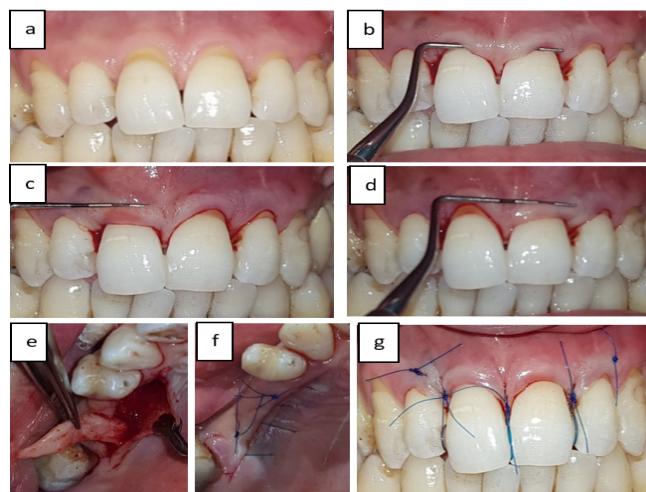


Figure 16: a: Enbo-buccal view, b: Releasing the tunnel, c,d: Mobility verification of the flap, e: Harvesting the connective tissue graft, f: Suturing the palatal site, g: Sutures

Clinical follow-up at 1 and 3 years showed stable root coverage and tissue healing (Figure 17).



Figure 17: a: At consultation, b: One year later, c: Three years later

Discussion

Multiple adjacent gingival recessions are frequently encountered and should ideally be treated simultaneously to reduce surgical sessions and improve esthetic outcomes, though this poses a clinical challenge with patient comfort in mind [7,8]. A randomized mono-center clinical trial Karmakar et al (2021) Comparing Tunnel + CTG (TUN+CTG) with mCAF found that TUN+CTG promoted faster healing and better esthetic outcomes due to its minimally invasive nature, preservation of blood supply, and avoidance of releasing incisions. This technique was associated with less morbidity and statistically superior clinical and patient-centered results [9]. The CAF combined with SCTG remains the gold standard for root coverage. Modifications such as Zucchelli and DeSanctis mCAF and the Tunneling Technique (TUN) improve outcomes and adapt to varying clinical scenarios [10]. A systematic review by Chambrone et al. (2009) reported a mean root coverage of 96% with mCAF + SCTG, with 73% of sites achieving Complete Root Coverage (CRC) [11]. Conversely, a meta-analysis by Tavelli et al. (2018) showed that CAF yielded better complete root coverage and keratinized tissue gain compared to TUN when using the same graft material [12]. Despite this, TUN is often preferred for its conservative approach, preserving interdental papillae and avoiding vertical releasing incisions, which enhance esthetic integration. TUN also reduces postoperative morbidity and accelerates healing due to limited flap elevation [13]. Flap thickness affects outcomes. While Mazzocco et al. (2011) found no significant difference between full- and partial-thickness flaps, many recommend full-thickness flaps for thin biotypes to ensure vascularization and stability [14-16]. Cairo et al. (2012) demonstrated in an RCT that adding CTG to CAF achieves complete root coverage in RT2 recessions, with interdental clinical attachment level being a key prognostic factor. Well-preserved interdental papillae, especially ≥ 5 mm in height, strongly correlate with successful root coverage [17,18]. Aroca et al. (2018) highlighted the impact of the Distance from the papilla tip to the Contact Point (DCP) and tooth position on root coverage

outcomes, with maxillary teeth showing superior results compared to mandibular teeth [19]. Coronal flap advancement often leads to increased gingival height due to mucogingival junction returning to its genetically determined position and granulation tissue thickening the marginal tissue [8]. Flaps should ideally be used only when at least 1-2 mm of keratinized tissue is present apical or lateral to the recession defect [20]. Gingival thickness >1.2 mm is strongly associated with complete root coverage at 6 months [21].

Conclusion

Technique selection depends on multiple factors, including periodontal phenotype, papilla height, probing depth, recession type, keratinized tissue width apical to the recession, and gingival thickness. When gingival thickness is less than 1 mm, connective tissue grafting is recommended. The homogeneous tunnel technique suits shallow recessions, while the Zucchelli and DeSanctis technique is preferred otherwise. These criteria help clinicians choose the most appropriate technique for each patient [22].

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