*e-ISSN - 2582-7855*
*https://doi.org/10.53274/IJCRD.2025.6201*

*Case Report*

# Biologically Enhanced Root Coverage in Gingival Recession Defects Using Modified Zucchelli's Flap and Platelet-Rich Fibrin: A Case Report

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## Abstract

Gingival recession is a common mucogingival defect that can lead to root hypersensitivity, esthetic concerns, and plaque retention. The coronally advanced flap (CAF) technique, particularly the modified Zucchelli approach, has demonstrated reliable root coverage outcomes. This case report highlights the successful management of a Miller Class I gingival recession defect in the maxillary lateral incisor and canine (teeth 22 & 23) using a biologically enhanced technique involving a modified Zucchelli's flap in conjunction with Platelet -Rich Fibrin (PRF). Clinical evaluation after one month demonstrated complete root coverage, increased gingival thickness, and satisfactory esthetics without any complications.

**Keywords:** Coronally advanced flap, Gingival recession, Modified Zucchelli technique, platelet-rich fibrin, root coverage

Received - 17-09-2025
Accepted - 19-12-2025

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**How to cite:** Selvakumar M, Rajasekar S, Krishnan V.Biologically Enhanced Root Coverage in Gingival Recession Defects Using Modified Zucchelli's Flap and Platelet-Rich Fibrin: A Case Report. Ind J Clin Res Dent 2025; Jul-Dec:6 (2): 1-4



## Introduction

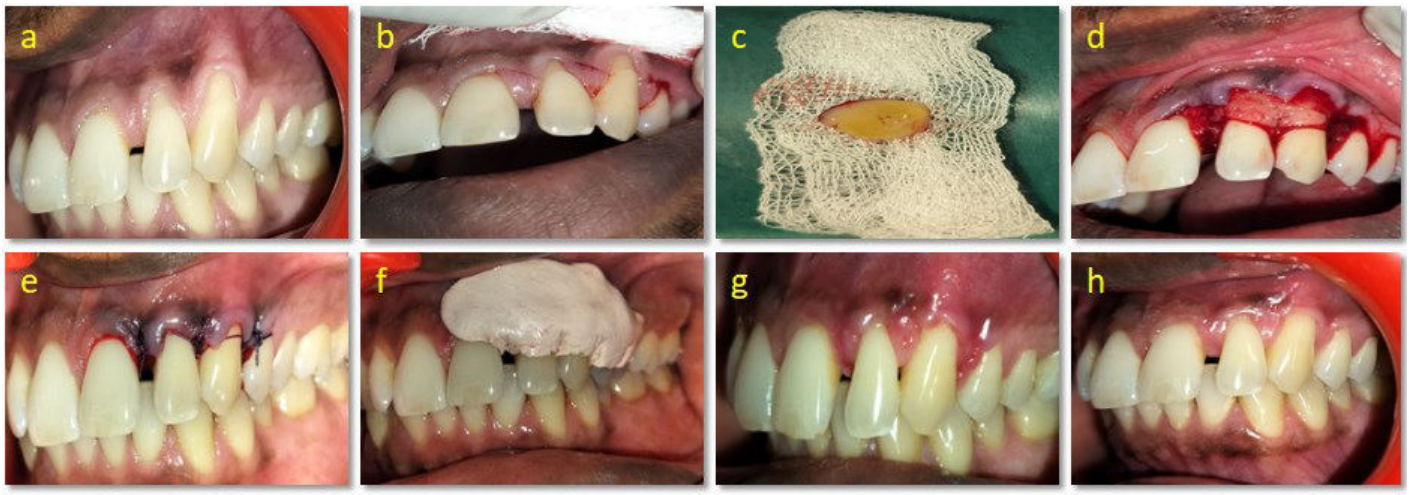
Gingival recession is defined as the apical displacement of the gingival margin relative to the cementoenamel junction (CEJ), often resulting in root exposure, esthetic impairment, and increased sensitivity [1]. Among the various mucogingival surgical techniques, the coronally advanced flap (CAF), especially Zucchelli's modification, is a widely accepted and effective treatment for single and multiple recession defects due to its predictable esthetic and functional outcomes [2]. Biologically driven approaches, particularly the use of autologous platelet concentrates like Platelet-Rich Fibrin (PRF), have recently been incorporated into root coverage procedures to enhance healing and soft tissue regeneration [3]. PRF releases a variety of growth factors such as PDGF, TGF-β, and VEGF, promoting angiogenesis and matrix remodeling [4]. The PRF protocol introduced by Choukroun et al. uses no anticoagulant and requires immediate centrifugation to form a fibrin matrix rich in platelets and leukocytes [5]. This case report documents the successful use of PRF with a modified Zucchelli's flap for complete root coverage in a Miller Class I gingival recession in the maxillary canine region.

**Case Report**

A 32-year-old male patient reported to the Department of Periodontology with a chief complaint of receding gums in the upper left front tooth region. Clinical examination revealed a Miller Class I gingival recession in relation to teeth 22and 23, with a probing depth of 2 mm, clinical attachment loss of 5 mm, recession height 3mm, recession width 3mm, and an adequate width of keratinized gingiva. (Fig. 1a) No abnormal frenal attachments or inflammation was observed. The treatment objective was complete root coverage using a minimally invasive, biologically enhanced surgical approach. A modified Zucchelli's coronally advanced flap was designed, characterized by a split–full–split thickness approach without vertical releasing incisions.(Fig. 1b) After obtaining informed consent, local anesthesia (2% lignocaine with 1:80,000 epinephrine) was administered, and autologous PRF was prepared by collecting 10 ml of venous blood, centrifuged immediately at 2700 rpm for 12 minutes following Choukroun's protocol [5]. (Fig. 1c) The adjacent papillae were carefully de-epithelialized to facilitate a connective tissue bed for flap adaptation. The adjacent papillae were carefully de-epithelialized to facilitate a connective tissue bed for flap adaptation. Thorough root surface debridement was performed using gracey curettes. The PRF membrane was placed over the exposed root surface and stabilized using 5-0 resorbable sling sutures.(Fig. 1d) The flap was advanced coronally and secured using simple interrupted sutures to ensure tension-free adaptation.(Fig. 1e) periodontal dressing given (Fig. 1f) Postoperatively, the patient was prescribed Moxikind-CV 625 mg TID for 5 days, Zerodol-P BD for 3 days, and Pan 40 for gastric protection. Chlorhexidine mouth rinse (0.12%) was advised twice daily for 2 weeks, and sutures were removed on the 10th postoperative day. (Fig. 1g) Follow-up evaluations over one month showed uneventful healing, with complete root coverage, enhanced gingival thickness, and excellent esthetic results.(Fig. 1h)

**Discussion**

The present case exemplifies the predictable and esthetically favorable outcome achievable with a modified Zucchelli's coronally advanced flap (CAF) combined with Platelet-Rich Fibrin (PRF) in the management of localized Miller Class I gingival recession. Gingival recession, particularly in the esthetic zone, is a significant concern in clinical periodontology due to its association with root hypersensitivity, cervical abrasions, and esthetic compromise [1]. The coronally advanced flap, when executed with a tension-free design and without vertical incisions, provides a broad base for vascular supply, crucial for flap survival and tissue integration [2]. Zucchelli and De Sanctis originally introduced the flap design with the aim of maximizing esthetic outcomes and minimizing scar formation, particularly in cases without interproximal tissue loss [2].




**a.** Pre-op gingival recession in 22 and 23, **b.** oblique Incision, **c.** PRF membrane, **d.** PRF membrane stabilized using 5-0 vicryl suture, **e.** flap coronally advanced, **f.** Periodontal pack, **g.** 10 days post-op immediately after suture removal, **h.** one month post-op

The use of PRF in mucogingival procedures, as first proposed by Choukroun et al. [5], provides a biomimetic advantage, offering autologous growth factors such as PDGF, VEGF, and TGF-β that enhance angiogenesis, epithelial migration, and extracellular matrix remodeling [4,5].

In this case, the PRF membrane contributed to improved wound stability and faster tissue maturation, supporting the findings of Dohan Ehrenfest et al. [3], who demonstrated the superior healing potential of PRF compared to traditional clot formation.

Several clinical studies have confirmed the adjunctive benefit of PRF in root coverage procedures. Aroca et al. [6] conducted a randomized controlled trial showing significantly greater gingival thickness and mean root coverage in patients treated with CAF+PRF compared to CAF alone. Sharma and Pradeep [7], in a similar study, found PRF to provide clinical outcomes equivalent to connective tissue grafts (CTG) without the associated morbidity of donor site harvesting. Jankovic et al. [9] supported these findings, reporting early neovascularization and enhanced esthetic integration with PRF-assisted surgeries.

In this case, the modified Zucchelli's technique offered several biomechanical advantages. The split–full –split thickness elevation ensured preservation of the periosteum in the coronal third, improving flap elasticity and permitting tension-free coronal advancement [2]. The absence of vertical incisions helped maintain vascular integrity and reduced the risk of post-surgical scarring [10]. Studies by Trombelli et al. [10] and Cairo et al. [11] emphasize that flap passivity and proper papillary adaptation are critical determinants of complete root coverage and esthetic success. Long-term outcomes in root coverage therapy are often evaluated using the Root Coverage Esthetic Score (RES) system proposed by Cairo et al. [11], which includes factors like marginal tissue contour, soft tissue texture, and gingival color. In the present case, all RES parameters were favorable at 1-month follow-up. Importantly, the application of PRF helped reduce post-operative inflammation and discomfort, consistent with the reports by Sridharan et al. [8], who documented better patient-centered outcomes when PRF was used. This case demonstrates that a biologically enhanced approach using PRF combined with a carefully executed flap design can result in optimal root coverage, improved gingival biotype, and high patient satisfaction.

Conclusion

The combination of a modified Zucchelli's flap with Platelet-Rich Fibrin provides a clinically effective, biologically favorable, and esthetically pleasing option for the treatment of Miller Class I gingival recession. The present case demonstrated complete root coverage, increased tissue thickness, and superior esthetic outcomes within a short follow-up period, with no donor site morbidity or complications. PRF enhances wound healing and soft tissue integration and should be considered a viable adjunct in periodontal plastic surgical procedures.

**Conflict of Interest :** None declared
**Acknowledgments:** None

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